POLICY AND INSTITUTIONAL ARRANGEMENT FOR WATER RESOURCE MANAGEMENT: CASE STUDY IN HAKHA WATERSHED, CHIN STATE, MYANMAR

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A Thesis Submitted in Partial Fulfillment of the Requirements
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Thesis Title	POLICY AND INSTITUTIONAL ARRANGEMENT FOR WATER RESOURCEMANAGEMENT: CASE STUDY IN HAKHA WATERSHED,CHIN STATE, MYANMAR
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Field of Study	International Development Studies
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ฮาข่า เมืองหลวงของรัฐชิน ประเทศเมียนมา ประสบกับปัญหาความขาดแคลนน้ำ ความไม่มั่นคงทางด้านน้ำ และความเสื่อมโทรมของทรัพยากรน้ำเป็นเวลานับสิบปี ประชาชนในเมืองฮาข่ามีน้ำไม่เพียงพอต่อความต้องการขั้นพื้นฐานในด้านน้ำสะอาดเพื่อการบริโภค การอุปโภค และความต้องการอาหารของจำนวนประชากรที่กำลังขยายตัว ด้วยเหตุนี้ ปัญหาดังกล่าวจึงมีการรับมือด้วยแนวคิดของการจัดการทรัพยากรน้ำเชิงบูรณาการ (IWRM) การจัดสถาบันที่เป็นทางการและไม่เป็นทางการ รวมทั้งการจัดการทรัพยากรธรรมชาติในสภาพแวดล้อมที่รุนแรงในการศึกษานี้

เนื่องจากผู้วิจัยใช้การวิจัยเชิงคุณภาพ วิธีการสัมภาษณ์ผู้ให้ข้อมูลสำคัญ การสัมภาษณ์กลุ่ม และการวิเคราะห์ผู้มีส่วนได้เสียจึงนำมาใช้กับกรณีศึกษาที่ฮาข่า ข้อมูลที่ได้จากการลงพื้นที่ศึกษาพบว่ามีการเปลี่ยนแปลงการพัฒนาอย่างมากในฮาข่าในด้านโครงสร้างพื้นฐาน การใช้ที่ดินและการทำลายป่า การขยายตัวของจำนวนประชากร และระบบการเมืองในฮาข่า ในขณะเดียวกันประชาชนในฮาข่ายังคงประสบปัญหาความขาดแคลนน้ำ ผลกระทบจากการขาดแคลนน้ำที่มีต่อเศรษฐกิจ สุขภาพ และการดำรงชีวิตทางสังคม ในเชิงของสถาบันในการบริหารจัดการน้ำนั้น สถาบันที่เป็นทางการไม่สามารถประสานงานเพื่อการเข้าถึงและการจัดสรรน้ำ การบริหารจัดการทรัพยากรน้ำ และแนวคิดเชิงบูรณาการเพื่อการจัดการทรัพยากรน้ำในลักษณะที่ยั่งยืนต่อสิ่งแวดล้อมเนื่องจากขาดกฎหมายและนโยบายต่างๆ ขณะที่สถาบันที่ไม่เป็นทางการได้กลายเป็นเสียงข้างน้อยในกระบวนการมีส่วนร่วม

ด้วยเหตุนี้ กฎหมายและนโยบายเชิงสถาบันที่เป็นทางการต้องมีการจัดร่างอย่างเหมาะสมเพื่อการบริหารจัดการทรัพยากรน้ำจากมุมมองของการจัดการทรัพยากรน้ำเชิงบูรณาการและสถาบันที่ไม่เป็นทางการควรได้รับการอนุญาตให้มีส่วนร่วมอย่างเต็มที่ในการเป็นผู้นำการบริหารจัดการลุ่มน้ำและทรัพยากรทางด้านน้ำซึ่งช่วยส่งเสริมการตัดสินใจโดยชุมชน

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VAN BAWI LIAN: POLICY AND INSTITUTIONAL ARRANGEMENT FOR WATER RESOURCEMANAGEMENT: CASE STUDY IN HAKHA WATERSHED,CHIN STATE, MYANMAR. ADVISOR: CARL MIDDLETON, Ph.D., 112 pp.

Hakha, the capital city of Chin State, Myanmar has been facing severe water shortage, water insecurity and water-related resources degradation for over a decade. The people in Hakha town are unable to meet their basic needs related to water, including for clean drinking water, domestic use, and for food requirements. This thesis addresses the research question: What are the major development changes, impacts of water access and allocation, and institutions, policy and laws in Hakha? The thesis is based on qualitative research that involved key informant interviews, focus group discussions and stakeholder analysis.

The thesis finds that there have been major development changes in Hakha in term of infrastructure construction, population growth, land use and deforestation, and political systems. People in Hakha suffer shortages of water, and water scarcity impacts on economics, health and social life. In term of institutions for water resources management, formal institutions are unable to coordinate water access and allocation because of the inadequate laws and policies, while informal institutions marginalized from participation in decision-making processes.

The thesis recommends that formal institutions, laws and policies must be drafted that reflect the actual needs and challenges in Hakha town. Furthermore, informal institutions should be allowed to fully participate to promote community-based decision making in watershed and water resources management.

Field of Study: International Development Studies — Student's Signature .....
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List of Acronyms

ADB	Asian Development Bank
CHRO	Chin Human Rights Organization
CND	Chin National Day
CNF	Chin National Front
CM	Chief Minister
CSOs	Civil Society Organizations
CSC	Chin State Council
DANIDA	Danish International Development Agency
FIs	Formal Institutions
GDP	Gross Domestic Product
GWP	Global Water Partnership
HCDC	Hakha City Development Committee
HTDC	Hakha Township Development Committee
II	Informal Institution
INGOs	International Non-Government Organizations
IWRM	Integrated Water Resource Management
LDC	Local Development Committee
LIB	Light Infantry Battalion
MIID	Myanmar Institute for Integrated Development
MoA&I	Ministry of Agriculture and Irrigation
MoI&P	Ministry of Immigration and Population
MoFEC	Ministry of Forestry and Environment Conservation
MoBA	Ministry of Border Affairs
MoH	Ministry of Health
MP	Member of Parliament
NGOs	Non-Government Organizations
NWC	National Water Committee
TDC	Township Development Committee
TCP	The Chinland Post

UNDP	United Nations Development Programs
UNICEF	United Nations Children Fund
UNESCO	United Nations Educational, Scientific and Cultural Organization
USA	United States of America
WB	World Bank
WEF	World Economic Forum

CHAPTER I
INTRODUCTION

1.1 Background of the Study

Burma/ Myanmar[1] is a country rich the natural resources yet remains one of the poorest countries in the world, despite the quasi-democratic government of President Thein Sein, ex-general of the Burmese military regime that has led the so-called democratic transaction in the country since 2010 general election from the military regime. And the new government has taken many initiatives amidst so many risks and challenges in order to transform the old systems and forms of administrations, legislations and judiciaries so that the country can compete with the neighboring countries in all round development sectors. However, not only Burma is still the least developed countries in South East Asia but also the "worst performance in most of the indicators of economics and social progress". The GDP growth of Burma, which is 700 USD, is also the least compared to Cambodia (815$), Laos (1000 $), Timor-Lest (2600 $), and Thailand (4900 $) (Benjamin, 2012).

There are seven States and Regions in Burma. Of these, Chin State is the poorest State, with a poverty rate of under 73% according to UNDP report (UNDP, 2013). In Myanmar's development, plans for States, Regions and Villages have been prepared by the current government for implementing the social and economic national development plan (Asia Development Bank, 2013). However changes in infrastructures, economic, political system and social development change in Chin State is not visible yet because of the long neglecting status by the previous successive governments.

Hakha, the capital city of Chin State started experiencing changes in social development and others from last year, which particular changes in water resource and water supply which is still under the process in construction. All the trees and

[1] Burma /Myanmar is used unchangeably here in this paper because many people including the author still think that Burma is the official name of the country though the military junta changed the name Burma into Myanmar on 26 May, 1989 without taking any consent from the public by force.

land in the watershed areas have been used and exploited for road construction, housing projects, and cultivation by both the military and the local elites. As a result the water sources become drier and drier year after year and the local people have been seriously and severely facing water scarcity and shortage. On the other hand before 2014, though the old piped water supply systems in the towns, the limited and unsystematic drainage systems, and other related services were in the city; the 40 years old pipe lines, drainage systems and water supply were not upgraded and maintained properly until recently 2015.

1.2 Problem Statement

Water is a key driver of economic and social development while maintaining the integrity of the natural environment which is central to life. However water is only one of a number of vital natural resources and it is imperative that water issues are not considered in isolation (ESCAP, 2013). Water, which was once regarded as abundant, is increasingly becoming a limited resource for meeting the basic needs of human beings for fresh drinking water and water for domestic uses as well as the increasing food requirements of a growing world population. Integrated concepts for managing natural resources in a sustainable and environmentally friendly way are ambitious but encouraging in a long term perspective (Biswas, Varis, & Tortajada, 2005). The interaction between societal use of freshwater, ecosystems' dependence on water, and hydro-climatic flow from watershed processes is a dynamic one. Changes in any of these subsystems, particularly in watershed areas, cause unpredictable outcomes, resulting not only in water insecurity and scarcity for humans but also in unsustainable development in ecosystems.

Until 2010, water related resource management in Myanmar fell under the responsibility of the Watershed Management Division of Ministry of Forestry and Environment Conservation, Ministry of Agriculture and Irrigation, Ministry of Border Affairs and other different institutions. From 2012, the institutions undertake planning and implementation of watershed management with the objective of systematically conserving water related resources according to new laws and policies that have been adopted. Efficient watershed management is to be considered core to integrated water

resources management for the country as a whole. This research considers in particular the environmental improvements and improvements of the socio-economic status of local people in poor and highly degraded watershed areas that come from effective water resource management.

However, the previous water management efforts globally that were fragmented, technological and centralized have proved inadequate, because of a lack of specific laws and policies to recognize and appreciate the inter-relations involved in watershed management and the multiple uses of water in ecosystems Access to societal use of freshwater, ecosystems' dependence on water, and hydro-climatic which is flowed from watershed processes, interact dynamically. Therefore changes in any of these subsystems especially in watershed areas cause unpredictable outcomes, resulting not only in water insecurity and water scarcity for humans but also in unsustainable development in ecosystems (Puustjarvi, 2000). Consequently, integrated water resource management has been suggested as a solution and has been tried for decades in many countries in the world. However in Myanmar, new water law reforms were only introduced in 2012 (Min, 2014). These reforms culminated in the development of a new institutional framework for integrated watershed management, where the country was divided into six hydrological regions. In line with the new reforms, there are efforts towards integrated watershed management in various major catchment and sub-catchment areas in the country (Hyland, 2014). From an Integrated Water Resource Management (IWRM)[2] point of view (see it in section 1.5.5), watershed, land and water related resources conservation in the mountains and hills is to be considered core to Myanmar's water resources management.

Chin State is located in the western part of Myanmar and its capital city is Hakha, situated in the north of Chin State. The State is hilly and Hakha is situated under the Rung Mountains, 6,200 feet above sea level. Due to the mountainous terrain there are few transportation links to the flat areas of Myanmar and the State has many

[2] The IWRM which long form is Integrated Water Resources Management is the concept popularizing among water related resource stakeholders.

sparsely populated areas, making it the least developed in the country. Chin State has the highest poverty rate of 73% as per the released figures from the first official survey (UNDP, 2013). Most of the population in Chin State is Christians with a few Buddhist populations in the southern part.

Since Chin were animists before the Christianity came to the present Chin State, they believed in Mountain, Rock, Lake, and Trees (Hu, 1996). It was believed that the Rung Mountains were a sacred place and the people of Chin State believed in preserving and conserving the forests, natures, and everything in the Rung Mountain region in reverence of spirits and Nature. All the trees and plants around the mountain continued to be preserved after the Chin people living there converted to Christianity because they believed that the forests contained rainfalls and produced water for human consumption from their traditional beliefs. As a result, the forests, mountains and all related resources are carefully preserved to honor their traditional knowledge for both religious and survival purpose.

Until recently, Hakha was a small town with a small population, meaning for the past 20 years the town residents have had abundant water for domestic and agricultural use. After the 1988 democracy uprising in Myanmar, Military camps were built throughout the Rung Mountain on which the main Hakha watershed depends. A significant change was noticed by the town dwellers and water became scarcer and scarcer because of the military camps, housing and road construction, growth in population and burning of bushes along with deforestation in the upland watershed areas. Deforestation, urbanization, land use and a violent environment[3] stationing military camps on watershed areas created significant challenges to water and water related resource scarcity and insecurity. At the same time it had adverse physical effects on the environment in a number of ways such as soil erosion and degradation, deforestation, rapid silting of reservoirs, rising of riverbed, floods downstream and navigation problems, etc.

[3] It is the concept drawn from Nancy Lee Peluso and Michael Watts (2001) whose definition provides Violent Environment as both a critiques of the school of environmental security and alternative ways of understanding the connections between environment and violence.

Peluso and Watts (2001) defined a violent environment as the ways that specific resource environments (tropical forests or oil reserves) and environmental processes (deforestation, conservation, or resource amelioration) are constituted by, and in part constitute, the political economy of access to and control over resources. In the context of Hakha water resource management, the forests and lands which are the main water container in watershed are heavily controlled and access to them is denied in the management of water resources. Hakha should not experience shortage of water with an average annual rainfall of 74 inches (1880 mm), but due to controlled water resources by the military and a lack of storage infrastructure and weak management of watershed areas, severe water shortages do occur. The area's water sources are natural springs and surface runoff water that runs into natural streams. Discharge from natural springs and streams are decreasing and local experts consider this to be due to degradation of forests caused by a violent environment and the effects of global warming (MIID, 2014a).

The purpose of this thesis is to discover why changes occurred in the upland watershed of Hakha. Also, how the existing institutions coordinate each other in the management of Hakha water resources management and how the management affects water insecurity for the lives of people. As a researcher, it interested me to see what the policies and laws on water resource management in Hakha and the arrangements of participations for stakeholders, namely the local community, local NGOs, private firms and State level government. The purpose is also to see the causes of the watershed management from a decade ago that could promote or fail to promote community-based decision making in natural resource management while factoring in the political implications of water planning.

1.3 Objectives of the Study

The general objective of this thesis is to study the major development changes in Hakha and evaluate the impacts of changes of water resources management such as access and allocation and the law and policy of the government on the livelihoods and socio-economic situation of the local people in Hakha watershed areas.

The objectives of the study are;

1. To see how the major development changes occurred in infrastructure, economic, population growth, land uses, deforestation and political systems in Hakha
2. To see how water allocation and access are arranged, and the social impacts for those who cannot access to water
3. To see what are the functions of existing institutional arrangements of upland watershed and the impacts on downstream parts.

1.4 Research Questions

My main research question is: What are the major development changes in Hakha, impacts of water access and allocation, and institutions, policy and laws in Hakha, Chin State, Myanmar?

1. What have been the major development changes in Hakha in term of infrastructure, economic, population growth, land uses and deforestation, political systems and Hakha watershed over the past 50 years?
2. Who can access and benefit from water and who cannot, and what are the social impacts for who cannot access to water?
3. What are the institutions, policies and laws related to water resources in Hakha and do they meet the best practice of IWRM?

1.5 Conceptual Framework

The objective of this particular part is to define and explore water allocation and access, the integrated water resource management, and natural resources management in violent environments.

1.5.1 Water Allocation and Access

It is stated in Global Water Partnership (Global Water Partnership, 2012) that water resources management is complex and it is fundamentally important that government and public and private stakeholders recognize this complexity. Therefore it is also important that there must be firm laws, policies and processes for all the concerned stakeholders so that Integrated Water Resource Management (IWRM) is

practiced at best for water access, allocation, and water related resources as a whole for solving the complexities of water resources management. One concise definition of (IWRM) the integrated water resources management adopted by the Global Water Partnership is: the allocation of raw water and reused water to competing uses and users (Biswas et al., 2005) (see section 1.5.2). Water allocation (quantity and quality) regimes reflect social priorities and relationships with water, and the role of water in maintaining life processes, through supporting livelihoods, economies and social life within an ecological framework. While water laws establish clearer entitlements to water through supporting the allocation framework and licensing regime, it cannot ensure the equity of allocation unless the underlying assumptions and priorities of that regime are addressed(Global Water Partnership, 2012).

Water allocation and access might differentiate based on the level of decisions, communication, and allocations which affect distribution, looking both upward toward the source from which the water derives and downward to the downstream population (Chambers, 1989). Particular attention is needed to pay to the laws, policies, institutions and operation of communities and bureaucracies in the distribution of water. A central issue in the distribution of open water and springs water is who gets what, when, and where. How this access and allocation are arranged in the communities is combined with politics and bureaucracy. Other issues which arise within water distributed communities[4] also arise now within the users, between the governmental departments and the communities, and between communities itself. The problems of water allocations between competitors, the questions of the quality of decision, productivity and equity are not only directly related to the arrangement of institutions from the different departments but also the water committee of different communities and private vendor in small scale.

Where water is scarce and often constraining and when individual water users for domestic consumption and communities of farmers compete for it, the focus is on the

[4] A water distributed community is a system arranged by local municipalities in Hakha town while some water is open access.

processes of allocation and acquisition which determine the access of users to water (Chambers, 1989). These processes can be classified as:

1. User acquires water directly from a natural source such as a private dam or well
2. communal source of water is allocated among a community of users
3. the user acquires water through agreement with a supplier in exchange for goods or services or payment
4. some water is open access that individual users have direct chance to access from springs, lakes and streams while
5. some water is allocated by a city municipality to one or more communities in a way that the concerned government departments have full power to control it on her own decision in water allocation and distribution management (World Bank, 2008).

Allocation of water and natural resources at times of scarcity or in case of competing applications are traditionally practiced in the community as informal institutions, but there still lacks of mechanisms for water resource allocation and access such as water uses for basic human needs and pattern of ecosystem protection. In order to have a fairer water access and allocation, clarity of process and law, policy and equity of participation in the design of allocation regimes and process from the very beginning of design and implementation is required. Integration among water related institutions based existing policy and laws for water resource management is needed or reviewed if water rights are assigned inequitably, or do not reflect the value of water or the management and decision making roles of specific social groups or genders. The institutional arrangements for water allocation, access and management in a way of encouraging all the stakeholders to participate in the process from decision making to implementation is a crucial plan and vision to be adopted.

1.5.2 Integrated Water Resource Management

Since the basic concept of integrated water resource management defined in section 1.5.1 is the allocation of raw water and reused water to competing uses and users, the concept of integrated watershed resources management programs is also included in most contemporary water agendas, irrespective of the purpose and scale of the task (Biswas et al., 2005). "IWRM is a process which promotes the coordinated development and management of water, land and related resources, in order to maximize the resultant economic and social welfare in an equitable manner without compromising the sustainability of vital ecosystems" (Biswas et al., 2005). Integrated water resources management encourages local groups to be integrated through volunteer participation and decision making. The needs for integrated land and water management including land use, vegetative cover, soils, and water interact throughout the watershed and management approaches must consistently address them together (World Bank, 2008). Therefore, typically, watershed management programs adopt integrated resource management approaches for a broader and effective management practices.

In modern-day governance, integration of efforts through coordination and cooperation among a number of institutions is an organizational imperative from which there is no escape (Biswas et al., 2005). The integrated and participatory watershed management approach adopted in recent years has driven new institutional arrangements amongst public agencies and with local communities. In order to integrate managing water resource successfully, all laws, policy, and processes throughout different institutions and participation of local people must somehow be ensured. Since water related issues are multidimensional in character, a single government ministry cannot solve them. Therefore these problems can only be solved by taking recourse to the knowledge, skills, and technology available in a number of ministries and agencies in close cooperation with the private sector, NGOs, and relevant members of the communities (Biswas et al., 2005). In best-practice examples, laws, policies and the institutions with the local participation is focused from community to the national level for integration within permanent agencies and for interagency collaboration for water resource management.

Upstream land and water management inevitably impacts the downstream environment, not only in terms of quantity and quality of water flows and on the operation of downstream assets, such as reservoirs and irrigation schemes, but also on other "environmental services," such as water quality, water quantity, biodiversity, natural disaster vulnerability reduction and, under some circumstances and at some scales, reduced localized flash flooding (World Bank, 2008). Because of the direction of these effects from upstream to downstream, watershed management programs are typically oriented toward problem solving in upland areas. However, solving such issues in upland watershed management needs an effective law, policy guidelines and institutions. This can create a geographically discrete drainage area for the integrated use of forest, land, vegetation and water in order to benefit residents and the ecosystems for reducing negative downstream or groundwater impacts.

In conclusion, in order to evaluate the impacts of upland watershed, it is important to analyze:

1. Constitution failure: Where a lack of clear provision for water or values for natural resources, or poorly functioning unclear clauses can result in misallocation of resources, resource exploitation, and subsequent degradation.
2. Policy failure: Where inappropriate government policies, or an absence of required policy, result in difficult cooperation among institutions for managing natural resource use, and natural resource degradation.
3. Institutional failure: Where a country lacks the necessary government structures, environmental legislation and regulations, or where a decline in traditional land use management processes occurs and more importantly local participation, resulting in natural resource degradation.
4. Implementation failure: Where a country lacks the technical capacity and/or financial resources to properly implement and enforce sustainable development policies, programs, and legislation, resulting in natural resource degradation" (World Bank, 2008).

1.5.3 Natural Resource Management in Violent Environment

Violent environments account for ways that specific environmental processes (for example, tropical forest, water source degradation, land, deforestation, conservation, or resource amelioration) are included in the political economy of access to and control over resources (Watts, 2001). As for protection of water resources, water catchment areas and environmental management are essential to reach a national consensus on comprehensive land-use, forest conservation and planning policy from the law, policy and processes. Until recently, natural resource management and arbitrary grabbing, especially of land and forest, has been one of the biggest issues and challenges and is still heavily controlled by the Burmese military. Yet land, agriculture, deforestation, road construction, burning bush and housing all affect the runoff for ground and surface water resources. In addition, ecosystem preservation depends on the delicate balance between water availability and quality. However the situation in Myanmar is different from other Asian countries because the military government extracts the natural resources and overrules all related resources for sustainability of the military institution. Violence can take a variety of organizational forms such as sporadic violence between military and the community, state-sponsored punishment for rising the issues of forest and land use, and among the elite (government staffs and the local people) (Watts, 2001).

The exploitation of natural resources offers many opportunities and incentives for unscrupulous looting of the wealth by the economic elite if they are able to lever state power, and equally by armed military if they are able to control resource-rich areas. If State power is gained, land, forest and other resources can be managed and exploited as much as they want without proper laws, and guidelines. As a result, natural resource extraction is widely associated with high levels of corruption, rent capture by the elite, and ineffective governance (World Economic Forum, 2014). This dynamic of exploitation and violence creates a downward spiral in which the state essentially leaves the people to fend for them, while natural resource production falls under the control of those with access to power and weapons. If the State is not an effective provider of services, security or legitimacy, armed groups/ military or militia will often claim those roles, reinforcing their strength against the State.

1.5.4 Formal versus Informal Water Institutions

In this particular concept, the meaning of institution broadly defined by Ostrom (2012a) is the prescription that human use to organize all form of repetitive and structural interaction including those within families, neighborhoods, markets, firms, sport leagues, religious associations, private associations and governments at all scales. Individuals interacting within rule-structured situations face choices regarding the actions and strategies they take, leading to consequences for themselves and for others(UNESCO, 2012b). In intuitional arrangement processes, there are some rules, regulations and procedures for people to be applied are a stable, proper, legitimate and functional with normative structures.

While the concept of institutions is defined like in above statement by some scholars, the concept of institution can be generally defined again into two as Formal and Informal Institutions in water sector. Since formal Institutions and informational institution are interrelated affecting the social, economic and political life in many different ways, a distinction has to be made between them. In order to make distinction between these twos, Ostram also said that Formal Institution is generally created by government policy, regulations, and they have resources and authority to coordinate users and areas. They are involved the processes of extracting, distributing and using water and such institutions are under the control of government such as courts, districts, town and municipalities. However the private sectors and NGOs working on water can also be a part of formal institutions because they are driven by such policies, regulation and committees for water extraction, distribution and uses apart from the role of watchdog. In term of water section Informal Institution is defined by others (UNESCO, 2012b) as a part of traditional and contemporary social rules applied to water use and allocation. In these informal institutions, there are rules and procedures but such rules are created by community based organizations, private sectors, religious associations and so forth in formal institutions. In informal institution sector, traditional customs and culture are related on how to distribute and allocate water to water users and water sources.

1.6 Research Methodology

For this thesis, qualitative methods were applied in the way of ethnographic research design and case study. Creswell (2007) said that qualitative research begins with assumptions, a worldview, the possible use of a theoretical lens and the study of research problems to inquire into the meanings individuals or groups ascribe to social or human problems. Since my study adopts a case study approach and used qualitative methods to construct knowledge about changes and impacts of watershed, key informant in-depth interviews were employed. Interviews were held with influential community leaders, the concerned government department officials such as Forest, Environment, Agriculture and Irrigation, Land Resettlement Record Department, Township and State Municipality, local Development Committee, private water vendors, INGOs, Local NGOs, Media such as The Hakha Post and local Water Committee. Three focus group discussions in the upstream and downstream areas and selected town elders were also conducted. The primary sources of data collected from the field were supported by an assessment of secondary sources like NGOs statistics, official documents and other publications like journals, news articles.

Figure 1 Research Area

Sources: Hakha Map before 1960 (Photo Credit: British Library)

Table 1 Map of Hakha Watershed Areas after 50 years (Photo by The Author)

Pagodas Construction Areas	Camps of LIB 266 and Camps of Commander Office Construction Area	Downstream Area-1	Housing and Roads Construction Upstream	Downstream Area-2

The research study area covered Hakha watershed area, which is the Rung mountain range area and Hakha town, watershed areas on Hakha- Gangaw Roads and watershed areas in Sacuang Va- streams above Cawbuk, Hakha. All the watershed areas in Hakha and nearby were above 6200m over sea level. The first pointed arrow in the above Hakha photo is the watershed area where pagodas were built and caused deforestation around the outskirt of Rung Mountain. The second is where the military camps and television channel stations are stationed throughout the mountain range in the highest mountain level and clear-cut forests for camps construction are widely seen in those areas. At the same time in the fourth arrow point, deforestation and land

use changes are clearly happening for housing, road construction and cultivations because of mismanagement of natural resources and rapid growth of population. In the third arrow point, it is the downstream who mostly suffer from the impacts of upstream activities. The final arrow is the second downstream area that suffers from the upland activities of camps, roads and houses construction and land uses changes. As a result, not only local people from the downstream areas but also the upland areas suffer water shortages and water insecurity.

1.6.1 Sampling

The sampling was categorized in two parts: one group of around 15 people from the upland watershed area, 5 town elders and another group of 11 from the downstream areas were sampled so that the impacts might be clearly learned. The sampling of the research was done with purpose so that the research questions could be well answered from data collection (Creswell, 2007). The first participants selected in household surveys were those who lived nearby, relied on upland watershed areas and were somehow causing the deforestation of and land use changes. The five town elders were who experienced changes from time to time in Hakha were selected as second participants. The third participants selected included those who live in the downstream of watershed runoff areas, whose livelihood are affected by water insecurity and water resources of mountain to downstream. Participants are selected based on their household location in upland and downstream respectively, any aged groups who experience changes, and livelihoods to ensure representation of all the diverse views and perspectives considered significant to integrated watershed management.

1.6.2 Data Collection

All the primary data needed for this particular research was collected from the key informants interviews, focus groups interviews, and the secondary data from the concerned government institutions and other sources like news articles as well as stakeholder analysis from the field.

1.6.3 Key Informants Interviews

The Ministry of Environment Conservation and Forestry department, Land Record and Settlement Department, State and City Municipal, Hakha City Development Committee, Local Development Committee Agricultural and Irrigation department officers selected for the interviews were those dealing with various key management aspects of the Hakha watershed resources such as water, land, forestry and wildlife and those who administer the whole Hakha watershed from Hakha district to the whole Chin State.

Table 2 List of Key Informant Respondents (Officials, Politicians, NGOs and Community Elders)

Names of Agencies	Numbers
Hakha Municipal Office(One is from State/ one is township level)	2
Minister for Social and Development (Chin State Government)	1
Agriculture Office	1
Irrigation Office	1
Forest Office	1
Hakha Dev. Commit.	2
Local Water Committee in Hakha	2
State MPs	2
Private Vendors	1
NGOs on Waters/ local org and UNICEF	2
Retired Official from Military Camps	1
MIID working on Chin Water issues in Yangon	1

1.6.4 Focus Group Interviews

The interviews with the local community involved a survey of 30 households residing in two groups in two different areas affected by upland watershed management in the Hakha town. These areas are directly affected by streams and lakes coming out from the upland and lowland watershed of Hakha district, as shown

in Map-2. The researcher went further to explore the kinds of activities that are undertaken by those living under Rung Mountain range and upland watershed. The study also sought to understand how the households benefit and was affected by the biophysical changes taking place within Hakha watershed attributed to land use changes, road construction, housing and deforestation in Hakha watershed. To take gender balance into consideration, the researcher invited more women for focus group discussion because women are the most affected by water scarcity in term of time and energy for collection, cleaning, washing and domestic uses. The participants were also interviewed on their attitude towards integrated watershed management.

Table 3 List of Respondents from Focus Group Discussion

Names of Groups	Female	Male	Total
Focus Group Discussion in Upstream Area in Kan-kaw lam	**9**	**5**	**15**
Focus Group- Downstream Area in Chin Oo Sii Block	**8**	**3**	**11**
Town Elders from Khuachung. Pyidawtha and Sakta lam	**2**	**3**	**5**

1.6.5 Secondary Data/ Documents

The documents collected for the study during fieldwork include papers of previous studies performed in the Hakha watershed and the old and recent official policy documents on Water Resources and Forestry Conservation. Documents and papers on recent water, land, forestry and environment reforms were also included. The recent water laws, policy documents and water resource governance policies drafted and passed by the Chin State government in December 2014 were selected for the study because they underpin the shift towards integrated watershed management in Myanmar.

1.6.6 Stakeholders Analysis

As mentioned previously the flaws of previous approaches to water management were to a large extent due to the top down approaches and little or no consideration of the views and perceptions of a broader group of stakeholders. As a consequence to remedy of these flaws it is important to make an analysis of the relevant stakeholders. Stakeholder analysis were therefore performed, aimed at categorizing stakeholders in the Hakha watershed and exploring potential areas of conflict or interaction considered useful in developing strategies for intervention. Stakeholder analysis is an important tool to select and assess information about any individual or group interested or involved in an issue, which can influence the end result of an issue or suffer the consequences of it.

Table 4. This is the Methodology Matric and Interview Strategy table how the data were collected is shown here below.

How could upland watershed management be improved for fairer allocation of water in Hakha, Chin State, Myanmar?		**Data Needed**	**Source of Information & Interviewee/ origin of sources**	**Tools and Methods of Data Collection**
1.	What have been the major development changes in Hakha in term of infrastructure, economic, population growth, political systems and Hakha	➢ Infrastructure Changes ➢ Economic Changes ➢ Population Growth ➢ Political Systems ➢ Seasonal Scarcity of Water ➢ Water Availability Changes	➢ Hakha Development Committee ➢ Interview with Town elders, ➢ concerned officials, ➢ historic documents ➢ First hand Experiences/ perceptions of local people	➢ In-depth interview with key informants from local development ➢ In-depth interview with key informants from concerned governmen

	watershed over the past 20 years?	➢ Land Uses Changes		t officials ➢ Secondary data from official records from different institutions ➢ Focus Group Discussion
2.	Who can access and benefit from water and who cannot, and what are the social impacts for who cannot access to water?	➢ Quantity and Quality of Water Access ➢ Who can access &Who cannot to water ➢ Impacts of access to Water ➢ Social Livelihood ➢ Health, bathing ➢ Economic ➢ Daily needs for domestic consumptions	➢ Key informant from town elders ➢ Officers responsible for water related sectors from different institutions, NGOs/ CBO and local people ➢ private vendor of waters ➢ Official concerned, ➢ Local community	➢ Secondary Document from different Offices, ➢ Key Informant Interview ➢ Focus Group Discussion ➢ Stakeholder Analysis
3.	What are the institutions, process, policies and laws related	➢ Institutions of Government related water in	➢ Hakha Local Development Committee ➢ Community Elder	➢ Focus Group Interview ➢ Key Informant

	to water resources in Hakha and do they meet the best practice of IWRM**?**	Hakha ➢ Laws and Policy in Hakha on Water ➢ Rules and Regulations on Water of Local Institution on Water ➢ Mechanism of cooperation among Governmen t institutions ➢ Mechanism of cooperation among State Governmen t and Local Institution ➢ Hindrance of Cooperation between State and Local Institution ➢ Coordinatio n among local institutions ➢ Role of Private and NGOs	➢ Officials concerned in different institutions ➢ NGOs/ CBO and ➢ local people	interview with local Hakha Developme nt Committee & Town elders ➢ secondary documents on the concerned Institutions

		➢ role and participation of local people		

1.6.7 Data Analysis

All verbal and written interviews were recorded by recorder and files. All interviews were conducted in Chin dialect, translated into English, transcribed and entered into software system for qualitative data analysis. Data was coded according to the categories identified in the above methodology matrix box and analyzed to answer the research questions.

1.7 Scope of the Research

The scope of this research was on Hakha watershed areas and water resource management in Hakha town in Chin State, Myanmar. The physical research areas were Rung Mountain range above Hakha town, Hakha down town and its watershed areas throughout the mountains. The specific scope of the research was the physical relationship between the upland watershed management impacts to the downstream in Hakha town. The units of analysis mainly focused on the impacts on the livelihoods of downstream local people based on the real experiences of people in Hakha town.

1.8 Research Ethics

Though my topic was not directly linked to the military camps overriding of watershed areas and water resource, I knew well that the access for interviews for water related issues was not easy and cautiousness was required due to its connection with the military overriding of the mountains in the upland watershed. The topic of this research might be an issue of controversy and therefore I try to avoid any issues directly related to military which could be a potential risk to me and to those being interviewed in the research area. Before conducting any interviews, I tried my best to explain to the interviewees the purpose of my research and what the information would be used for. Only after full consent was given, or conditions of anonymity

granted, would I use the data. I made an agreement not to use any deemed sensitive data until after they were sent back, after which I could use the information they provided for my research with their name or title if permitted.

1.9 Significance of the Research

I hope that my research on the Hakha watershed and water resource management is the first academic research conducted independently and narrows the knowledge gap in watershed and water resource management projects in development sectors. One of the most ambitious reasons for this thesis was that this topic in Hakha and Chin State has never been conducted in the way of academic research, though every city, including Hakha, faces severe water shortages, water security and water scarcity. Another reason for this research was that the knowledge gained and shared in the water resources management could be applied with the hope of tackling the challenging issue of water resource depletion and depletion of natural resources which cause floods, mudslide and landslides in Chin State and Myanmar, as the existing policy and institutions fail to promote efficient water management. I also think that my research could be part of local and regional guideline for further policy setting and implementation for natural resource management, especially for water in Chin State. It would also bring awareness among the local water users and alert the people in office to search for means, knowledge and support for further development projects and help them appreciate how important the voluntary participation of local people is for integration in making development decisions.

1.10 Limitation of the Research

Interviews with one of the main stakeholder military institutions and camps in the study were limited, but interviews were instead conducted with a retired executive officer from the time of military rule. The interviewees from government and local institutions might be afraid to speak out about access to watershed management and water allocation directly controlled by military so direct questions that could affect their security and work were not asked. Access to interviews with State minister level was difficult because they have a lot of meetings and busy schedules. If not available

for interviews, the interviews were conducted with second line leaders like Directors of State departments. If such information was needed, newspapers, documents and other means were used. However some stakeholders interviewed, have experience of issues covering the entire watershed.

1.11 Structure of the Thesis

The structure of this thesis is constituted within 6 chapters. The first chapter introduces the thesis with the problems statement, research objectives and questions of the thesis, conceptual framework, research methodology, significance and limitations of the research. The next chapter presents the literature review from the brief history of Hakha and Burma, Hakha water resource management. Chapter three is the findings on major development changes in Hakha on infrastructure, economics, population, and political systems so on. Chapter four contains the findings on the water scarcity and the impacts on local people and the response of the local people to water scarcity. Chapter five discusses why the laws, policies and the institutions fail to coordinate in water resource management in Hakha and the relationship between local institutions and government institutions. Chapter six is the conclusion that sums up all the literature and findings to make recommendations to the Chin State government, the Local Institutions, Private Sectors and Civil Societies and presenting the Causes and Impacts on flooding situation, landslides and mudslides in July, 2015 in Hakha according to the findings in my research in May, 2015.

CHAPTER II
LITERATURE REVIEW

2.1 Literature Review

Reliable sources of information on watershed management in Hakha, Chin State are very rare. Starting in the 2013, large-scale, comprehensive surveys of the social conditions for development plan 2016-2021 with local society began being carried out by the Myanmar Institute for Integrated Development in cooperation with DANIDA, UNICEF and Chin State Government (MIID, 2014b). Even though they have complete coverage of urban and rural areas in general, they cannot cover detailed planning on water resources management and governance because of logistics difficulties in the poorest State. Some useful surveys have been officially published but the original databases have not been placed in the public domain for independent researchers to analyze. This literature review uses large scale social condition surveys and other available documents, while noting some of the difficulties of interpretation. Some of the sources of information are unpublished.

Section 2.1 will cover a brief history of Burma and Chin State, section 2.2 Hakha Water Resource Management in Militarized Context and in section 2.3 Environment and Water Laws and policy of Burma will be reviewed and presented.

2.1.1 Brief History of Chin State and Burma

Burma is the largest country in mainland Southeast Asia and is strategically located as a potential land bridge between South and Southeast Asia(Asian Development Bank, 2013). It shares borders with Bangladesh, the People's Republic of China (PRC), India, the Lao People's Democratic Republic, and Thailand. In addition to its strategic location between two of the most powerful countries India and China, Myanmar is very rich in natural resources like gas, oil for energy and other natural resources. The country is divided into seven national states and seven regions with a Burmese majority. The seven states are Chin, Kachin, Kayah, Kayin, Mon, Rakhine, and Shan and they mainly cover the hilly and mountainous areas,

predominantly populated by ethnic people. The seven regions (previously called divisions) — Ayeyarwady, Bago, Magway, Mandalay, Sagaing, Tanintharyi, and Yangon — cover the plains and are predominantly populated by people of Bamar ethnic origin. Some ethnic majority regions are Ayeyarwady, Magwe and Thaintharyi.

Myanmar has abundant water resources compared to its neighboring countries, though with marked seasonal and regional variability. Despite the mean annual rainfall being around 2,100 millimeters, the quantity of rainfall varies from as high as 5,000 millimeters along the coastal areas of Rakhine and Tanintharyi states to less than 1,000 millimeters in the central dry zone. Most rain falls during the months of the southwest monsoon (May–October). Total renewable annual water resources are estimated at 1,100 cubic kilometers. Water endowment (i.e., the total sustainable water per inhabitant) is about 24,000 cubic meters per year(Asian Development Bank, 2013). However all over Myanmar, most of the people are facing serious water problems for both domestic and agricultural purposes. Among them, Chin State has one of the most serious cases of water problems in the country. Many of these regions and States in Myanmar, including Chin State, are still sites of dire poverty, widespread land degradation and inequitable land rights. For example, it can be seen that approximately 90 percent of the mountain populations in Chin State have about half of million people who are vulnerable to food insecurity and water insecurity in securing the basic daily needs of the household (MIID, 2014a) .

The Chin State is a mountainous state with few transportation links to the plain areas of Myanmar. It is sparsely populated and remains one of the least developed areas of the country. Chin State has the highest poverty rate of 73% as per the released figures from the first official survey (UNDP, 2013). Hakha, capital of Chin State, is situated in the Northern Chin State. Since Chin State is hilly, Hakha is situated over the Rung Mountains, at 6,200 feet above sea level. There is only one main road running along the middle of the city and the whole city is built along this road. The road goes to Gangaw and Magwe Division connecting to the mainland Burma through the Rung Mountain, the most important parts of watershed areas. Along the road and the mountainous areas many houses were constructed along with

deforestation, burning, overgrazing and agriculture activities. This was not only because of the military camps and but also the land was sold out for housing by some Chin corrupted officials in the past.

2.1.2 Hakha Resource Management

Hakha has very mountainous terrain. Therefore mountain watershed and water resource management is very important for the basic livelihood and long-term development of the local people. Because of its location and lack of infrastructure development in Chin State, there are many limitations for transportation, education, trade, health and social sectors. All the city area in Chin State are engulfed by mountain regions which supply Chin and Hakha people with freshwater, water for agricultural use, firewood, and other natural resources. There is no data available on watershed management and related resources in this area because of the lack of researches, reporting and documenting done by the previous government.

Hakha, the present capital city of Chin State was inhabited by the group of Chin, indigenous people in around 1400[5] (Kio, 2014). The Chin people are said to be the first ever habitants under the hilly mountain of Rung, which is a mountainous range with deep forest and big trees. After the annexation of the British in 1890, it was recorded that there existed in Hakha[6] village more than four streams, two lakes, and six mud lakes which the inhabitants of the area relied on for water consumption centuries ago. It was said among the city dwellers that many species such as various kinds of birds, wild animals, flowers, plants and trees were on the Rung Mountain of Hakha until 1962.

However, after the military coup led by Ne Win took power in 1962, the administrative body known as Chin Oo Sii Aphuah[7], and its office was moved from

[5] This source is taken from the book of History of Origin of (Lai) Chin History written by Pu Chawn Kio in Chin Dialect.
[6] The name of Hakha was originally Haka or Halkha but it was changed by the Burmese military region.
[7] Chin Oo Sii Aphuah was named after Ne Win sized the power and moved Chin Affair Ministry from Yangon.

Kalay to Hakha. Even though Hakha is the capital city with over 30000 habitants and 73 per cent of the population are under poverty line (UNDP, 2013) there were no problems with water scarcity and insecurity before 1990s. The settlement of armies and military camps housing across the mountain, cutting of trees (deforestation) and fires have become the most challenging problems facing the city dwellers in terms of water security alongside the growth in population. Before the 1988 democracy movement in which Chin students took arms to fight the central government for self-determination, there were no military camps in Chin State. Prior to 1988 democracy uprising, no single Burma Army battalion was stationed in Chin State. At that time, Light Infantry Battalion (LIB) 89 in Kalaymyo, Sagaing Division operated in northern Chin State, while LIB 50 based in Gangaw, Magway Division covered southern Chin State. After the military coup in September 1988, militarization rapidly increased. As of 2012, there are 14 battalions operational across Chin State, and 54 Burma Army bases. Each battalion has on average 400 soldiers in its ranks, meaning that there are more than 5,000 Burma Army soldiers in Chin State at any given time according to the reports of Chin Human Rights Organization (CHRO, 2012a).

As a result of military camps on the top of the Rung mountain, clear-cutting of the trees for firewood, shifting cultivation for changing agricultural purposes on the mountain watershed areas, burning forests for husbandry purposes and security reasons for the military camps, selling lands for housing for the expansion of the city across the outskirts of mountain and land uses for agricultural purposes by the local people, has led to the lakes and streams that produce water for consumption for the Hakha city dwellers becoming significantly drier year after year. Moreover, weak law enforcement on water resource management is a part of the cause of water scarcity and insecurity for the city dwellers. In the summer time the people in Hakha have to fetch water for cooking, drinking and washing from the river seven miles away because the groundwater, stream water and lakes on which the local people rely on for consumption are becoming drier and drier. As a result, water resource scarcity occurs and environmental degradation, pollution, natural variation or a breakdown in the delivery infrastructure constrains the total supply and availability of a specific resource.

From the previous military government, discriminatory policies, rights and laws that marginalize specific groups were practiced in ethnic states, especially Chin State: When one user group (military) controls access to renewable or un-renewable resources and land in the watershed area, natural resource dependent communities are often marginalized. Violence can occur as individuals and groups seek greater or more equitable access to key resources.

The struggle for increased equity can become linked to the recognition of identity, status and political rights; making conflict resolution processes more of a challenge. As discussed above, this can be a key factor causing structural scarcity. Unequal distribution of benefits and burdens from development projects affect the local livelihood. The environmental impacts of development projects can create tensions if communities are not compensated for the damage and do not receive a share of the development benefits, financial or otherwise.

In spite of Myanmar's initiative for watershed management being developed to link with sustainable development, their impairment is a common feature worldwide, not least in Asia. This impairment is as a result of rapid growth of population, increased demand for food, rapid economic growth (Onn, 2013) and most importantly inadequate laws, and policies of the government which has led to several challenges such as ecosystems destruction, threatened livelihoods, water scarcity and subsequent conflicts in Chin State. In Myanmar, the problem of watershed degradation is well illustrated by extensive deforestation, hydropower dams and mining through inadequate watershed management. Reasons for deforestation are for logging, shifting cultivation, land modifications in the upland watershed, with subsequent impacts on land and water resources, vital for ecosystems functioning, livelihoods and socio-economic development in Myanmar (Puustjarvi, 2000). Deterioration of the vegetation in the mountain slopes also has the effect that rainwater runoff has become more direct and fast whilst taking along large amounts of sediment downstream. The increase in the rainfall-runoff has resulted in higher floods

with shorter duration and increase in sedimentation in the lower reaches of the streams and downstream areas (I. UNESCO, 2014).

2.1.3 Laws, Policies and Institutions for Water Resources Management in Burma

No single institution is responsible for the overall management of Myanmar's water resources. Currently, the Ministry of Agriculture and Irrigation is the main ministry involved in water resources, with the mandate to develop agriculture and irrigation. Departments include;

1. Irrigation, Settlement and Land Records (responsible for provisions of irrigation water to farmlands
2. Department of Human Settlement and Housing Development under Ministry of Construction which is responsible for Domestic Water Supply
3. Forest Department under the Ministry of Environmental Conservation and Forestry which takes Reforestation and Conservation of Forest, afforestation and watershed management
4. Department of Development Affairs (DDA) under the Ministry of Border Areas and National Races and Development Affairs whose responsibility is also Domestic and rural water supply and sanitation
5. And Water Resources Utilization under Ministry of Agriculture and Agricultural planning which plays an important role in rural water supply through its responsibility for pump irrigation water and groundwater resources.

In the three largest cities, water supply and sewage treatment is the responsibility of the respective city development committees (Min, 2014). Likewise efficient watershed management is to be considered core to integrated water resources management for the country as a whole.

Existing Laws and Policies for water in Myanmar before 2012 are (1) Water for Agricultural Sector and Irrigation development and efficient utilization of nation's water resources from 1860 (2) Watershed conservation in 2006 (3) National Environment policy and Environmental health in 2012. Recently Water resources

management by National Water Resources Committee chaired by Vice President in 2013 which implementations had never been seen in visible manner yet have been already set up in central level. Although the first law on water pollution and the penal code was enacted in 1860, most of existing laws and legislations were enacted before the year 2000 were not in enforcement like Conservation of Water Resources and River Law enacted in October 2006 and Environmental Conservation Law enacted in March 2012. In that environment law, there are some sub-small titles of provisions for water like (a) suitable surface water quality standards in the usage in rivers, streams, canals, springs, marshes, swamps, lakes, reservoirs and other inland water sources of the public; (b) water quality standards for coastal and estuarine areas; (c) underground water quality standards in chapter VI and (c) fresh water resources including underground water (The Pyitawnsuh Parliment, 2012).

However there is no specific Water Law or adequate law presently being drafted by Myanmar water professionals (Min, 2014). As a result there is still a lack of management knowledge, skills, capacity, preparation, concrete visions and projects in Myanmar on the subject of water and its related resources. It is interesting to see whether all the laws and policies of water are implemented efficiently and effectively in the region as formal institutions in Burma and Hakha.

However when it comes to informal institutions like local block committees on water, local development committees and Hakha City Development, there rules and regulations accordingly with the traditional custom and social norms for water resources management. Even though there are rules and procedures are created by community based organizations, private sectors, religious associations and so forth, the capability and power within the informal institutions are still limited and challenged by the formal institutions.

2.2 Knowledge Gap

This particular research on water resources management in Hakha and Chin State may be the first ever conducted academically and systematically. As of 2014,

there was no document available on water sectors because of a lack of research and systematic documentation in Hakha and Chin State. However from 2014 some general researches on water sectors were partly covered by the organizations like MIID. Therefore there is a big knowledge gap on water resource management and I am hoping that this Thesis would somehow help the local people and the concerned State officials become more aware of the weak water resource management in the State. At the same time I hope that my research would narrow the knowledge gap to help facilitate further water resources management in Hakha and Chin State.

CHAPTER III
FINDINGS IN MAJOR DEVELOPMENT CHANGES IN HAKHA WATERSHED IN THE PAST 50 YEARS

This chapter details the research findings that answer the first research question on the major development changes in Hakha in terms of infrastructure, economic, population growth, land use changes and deforestation in Hakha as well as political systems changes and Hakha watershed over the past 50 years. The findings discussed below are separated into the following sub-chapters: 3.1 Major changes in Hakha and Hakha watershed in the past 50 Years, 3.2 Social-economic conditions in Hakha watershed context; 3.3 Development changes in infrastructures in Hakha; 3.4 Economic development changes in Hakha; 3.5 Population growth in Hakha; 3.6 Land use changes and deforestation; 3.7 Political system changes in Hakha; 3.8 Summary.

3.1 Major Changes in Hakha and Hakha Watershed in the past 50 Years

The most significant change in Haka[8] came in 1965 when the village Hakha was made capital city of Chin State. According to the findings from interviews with key informants, it is found that there was no specific town plan when Hakha was initially named capital city. All government administrative offices, called Chin Oo Sii, were moved into Hakha town and government offices and government related buildings were constructed (see the picture in Figure-1 in Chapter 1, section 1.6.1).

The most significant changes in terms of Hakha watershed were the road constructions in 1975 from Hakha to Mutupi, which later facilitated land use changes for housing construction on the outskirts of the Rung Mountain (Local Development Commttee-2, 22 May, 2015). In addition, all the trees in the watershed areas of the Rung Mountain were ordered to be cut down by the then Lt Colonel Kap Cung Nung, Chairman of Chin State Council to enable the replanting of other local trees from 1977-1978, according to the prominent Chin Scholar and Historian Dr. Lian H. Sakhong. In terms of political changes, most of the Chin Affairs ministers between

[8] Haka was the original name of the then capital city of Chin State which was changed by the military government regime.

1948 and 1962, the parliamentary democracy age, and State Council Chairmen between 1962 and 1988, a time of Socialist and Military regimes, were Chin nationals. Along with the deforestation at that time, land uses changes for constructing government offices, police stations, monastery, housing and settlement and road construction can be found in the upland area (N. Hre, 2002). It is also found a lack of irrigation systems in the upland areas where the police station, government offices, housings and road construction were being developed in Hakha.

Figure 2. This photo which showed the constructions of Pagodas and Police Office in the upstream area, was taken by the Author on 13, May, 2015.

Other significant changes were road constructions from Hakha to Gangaw highway along the Rung Mountain range in 1983 which also paved the way to construction of militaries camps, housing and agriculture in the upland areas of Hakha watershed (Hu, 2002a) (Focus Group-1, 18 May, 2015). It is also found that from that time onwards, houses for settlement, religious buildings like churches and government offices on were built on Hakha-Matupi road without any particular town planning and irrigation or a plan for the management of existing wells, springs and streams (Focus Group-3, 28 May, 2015).

After the 1988 student uprising for democratic movement, it is also found that the two military camps of LIB 266 and Commander Offices were stationed in the Rung Mountain in the 1990s, along with other heavy militarization movements in

Chin State after the Chin students went underground to fight the central government for greater autonomy and self-determination (CHRO, 2012b). While two key informants (The local development committe-2, 11 May 2015, and Hakha City development committe-2, 22 May 2015) said that all the trees had been more protected because of the military presence in the Rung mountain, the rest of the key informants said that all trees and land in the watershed were sold out and used by the military officers and local elite who exploited the resources for their own benefits.

In the 1980s, the Hakha city area was estimated at around 6.24 square miles which was extended to 33.36 sq. miles in 2000s at the time of rapid population growth from 12000 to 36000 thousand people. However, economic development at this time remained unchanged with very few trades, very little local entrepreneurship and no local products for export (Government-1, 11 May 2015). Because of the geographical location and water scarcity in Hakha, the local people relied on imports such as rice from Kalay, Sagaing Division, and tomatoes, potatoes, onions, garlics, chilies, and other vegetables from Falam and Tedim Townships, both parts of Chin State (Hakha Development Committee-2, 22 May 2015). It was also found in the three focus groups discussions that 60 % of the respondents said that they regularly did agricultural activities on a small scale such as keeping small gardens around their compound and self-sufficient farming, while the remaining 40% of respondents saying their livelihoods depended on remittance sent by relatives in the United States, Canada, Europe, and Australia so they can buy rice, meat and vegetables from the above mentioned areas (Focus Groups-1, 2, 3). It was also learned that land uses for housing, road construction and other infrastructures led to the weakening of irrigation and water supply system problems due to the lack of technical planning.

The most significant changes in electricity supply after Hakha's so-called quasi-democratic transition in 2012 was the protests by local people in Hakha demanding an electricity supply. During this time, Hakha only had electricity for 7 hours per week which went to the central government. In 2013, Hakha city was supplied electricity 24 hours per day as a response to the local voice with the new

government (Local development committee-2, 11 May 2015). A year later in 2014, the local people requested domestic water supply to the President Thein Sein, who came to participate in Chin National Day, which had previously been banned for half a century by military regime. Through the Hakha Development Committee the request for water supply was granted by the President at a cost of more than 8.8 Billion kyats. The dam project for water supply from Timit stream began construction in late 2014 and is expected to be finished towards the end of 2015 (government-3, 15 May 2015). These are the first ever demands of the local people that have been granted by the central government in half a century, showing significant changes in political systems in the history of Hakha town.

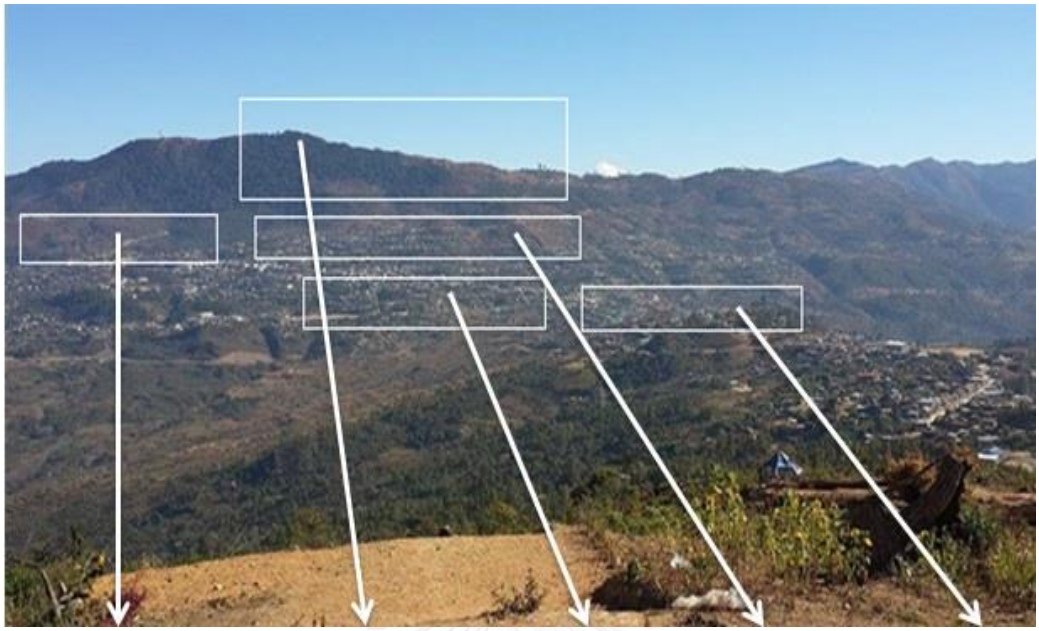

Figure 3 Hakha Watershed and Research Areas

Pagodas Construction Areas	Camps of LIB 266 and Camps of Commander Office Construction Area	Downstream Area-1	Housing and Roads Construction Upstream	Downstream Area-2

Figure 4 Pagoda Construction in the upland areas of Rung Mountain

Figure 5 This is where the TV Stations, Police Station and other activities for land use changes and deforestations which cause landslides and floods are found in the upland area above the Lake

Figure 6. This is where Housing Human Settlement are done on the outskirt of Rung Mountain

Figure 7 This photo taken by the author on 13 May, 2015 showed the house construction and military camps in between Rungtlang watershed and Matupi road construction!

Figure 8 This is where housing and road construction have taken place in the upstream areas.

3.2 Social-economic conditions in Hakha Watershed Context

Major changes in the socio-economic conditions in Hakha watershed began when Hakha was made capital city of Chin State in 1965. According to the stakeholders' analysis shown in Table.3, focus groups and key informant interviews, the lack of town planning for the capital city resulted in local officials and governances using their power to control the construction of highway roads, sub-way roads and lands to serve their own interests by having them pass near their houses and lands (Focus Group-3, 28 May, 2015).

Most of the interviewed politicians, town elders, local government officials and development committee members showed a higher awareness and interest in the rapid depletion of forests, land uses changes and population growth than the local community. This is most likely because the local community, mostly women, have a low level of participation in a male dominant community which greatly affects the knowledge application for managing the root causes of problems with water scarcity and natural resource degradation. Levels of awareness and interest in water resource management in Hakha watershed areas are higher among the politicians, the community elders, the local government officials and local youths. However the intervention for managing the degradation of water-related resources in Hakha failed because the laws, policies, guidelines and institutions on water sectors were unclear and not specifically prescribed in the constitution.

It was also found that the role of local people, particularly women who are most responsible for domestic water in the society, were left behind by the high ranking government officials and community leaders (Focus Group-1, 18 May 2015and Focus Group-2, 21, May, 2015). The government records show that there no high ranking female officials in government. High ranking officers like Ministers and Chairmen of Chin State Council were of Chin nationals from 1965 to 1988 and from 1988 to 2010 all the high ranking officers in Hakha were Burmese military officers except Hung Ngai, ex-major general and the then Chief Minister of Chin State (Bik, 2002).

However, the successive governments neglected socioeconomic conditions such high poverty, rapid population growth, corruption and political expediency, which badly affected the efforts for improving the inadequate existing laws towards coordination for water and other issues (Focus Group-2, 18 May 2015). The findings show that previous water and water related resource management efforts failed to address Hakha's social-economic problems because they addressed individual problems and issues without cooperation and collaboration between government institutions (Politician-1, 19 May 2015 and Government-2, 3, 5). At the same time, local institutions and people were prevented from participating in the political process of water and other natural resources management (Hakha City Development Committee-2 and Focus Groups-1, 2, 3).

3.3 Development Changes of Infrastructure in Hakha

Since 1965[9], there have been major development changes in housing and roads along with the city's four-fold area expansion from 7.94 squares miles in 2001 (Committee, 2002) to 33.363 sq. miles in 2015, (Government-1, 11 May 2015). Chin State is the second least populated State after Kaya State and the least developed and most isolated State in Burma for half century. Until recently there were no high-rise buildings, highway roads, railways, airports, modern technological assets and limited access. Chin State is the one and only State in Burma where there is no government university, colleges, railway transportation, airport or national highway roads.

Hakha's infrastructures started transforming in 1981, when the highway from Hakha to the Gangaw-Mandalay road was constructed over a period of 8 years by a volunteer workforce of 5275 local people from 69 villages, with the support of Minister Van Kulh, Chin national Union Minister of the socialist regime (Hu, 2002b). Another highway from Hakha to Matupi road was constructed in 1975. The highway road construction to Gangaw and Matupi was both a landmark in history and notable in infrastructure development for Hakha but also had negative impacts on Hakha watershed management as both highways crossed the main watershed areas.

[9] Before 1965, there was no Chin capital city in Chin Special Division except towns like Yangon first, Kalay second and Falam third in where Chin Affairs was administrative office was based.

Stakeholder analysis and key informant interviews with the town elders, informed that the highways and roads were constructed by the local officials of Hakha and some elites to pass by their houses. As a result, the highway had to cross the watershed areas across the Rung mountain ranges which later caused land use changes for housing, deforestation, and natural resources degradation (Focus Group-3, 28 May 2015). It is found that construction of new buildings for government offices and staff increased to twice the number than before the 2010 election. Households were also said to be increasing to three times the size they were before 2000 (Government-1 11 May 2015).

In Hakha there was no electricity supply until 2014, no telecommunications until recently and no clean water supply system until today. There is a lack of schools, hospitals and medical care for the public, all considered the basic infrastructure for human beings. Even if the school buildings and hospital were there physically, prior to 2012 there were not enough teachers for the children and enough doctors and nurses for patients. This research however found great improvements in the basic infrastructures such as roads, electricity, hospitals, schools, and staff in schools and hospitals and transportation. Everything, other than clean water supply, is more developed in Hakha and throughout Chin State during the four year period of the new government, compared to the previous Socialist governments and military junta regime (Government-6, 26 May, 2014). Only the clean water supply which has been under construction from 2014 remains unfinished.

3.4 Development Changes of Economics in Hakha

Among major development changes in Hakha during 50 years period, the findings of this research indicate that economic development changes are slow despite the city's physical growth because of a lack of trade and export and import of goods from inside and outside Hakha until 2000. The lack of trade is due to the bad transportation systems (Hakha City Development Committee-2, 22 May, 2015). However the findings suggest that at least 10 percent of city dwellers can open small scale shops in the city and 5 percent of the local people are engaging in trade from

Mandalay, Tuang-Gyi and Shan State to Hakha and trade to India. In Chin State and Hakha, there were very few local industries and entrepreneurs or private companies until 2012 (Local development committee-1, 11 May 2015). It is concluded that there was very little positive economic growth in Hakha.

A significant finding is the big role that remittance from USA, European Countries and Australia plays in basic self-sustainability for people in Hakha and Chin State. To study this it is important to trace back the brief history of Chin migration. Before military coup in 1988, there were no Burmese military (Tamadaw) battalions and camps stationed in Chin State. From 1990s Chin State became host to 14 battalions and more than 50 camps, including two camps in Rung Mountain(Human Rights Watch, 2009). In 1988 the Chin University students took arms to resist the military junta in the name of the Chin National Front. Since then, the Burmese military arrest, persecute, torture, and repress the local Chin people in many ways, for example using them for forced labor and carrying out extrajudicial killings as a response to the Chin resistance. In order to avoid such persecutions in Chin State, more than 200 thousand fled to other neighboring countries as refugees (CHRO, 2012b). One of the respondents said that while having to flee was once thought as a curse, it now seems to be a blessing in disguise because many Hakha and Chin households rely on the remittance money from their relatives who settled in third countries like the United States, Australia and European countries. However according to research on remittance and economic development in Chin State carried out by Mr. Rual Lian Thang, though the remittance helps to meet the basic livelihoods for the local people, it does not bring any economic growth (R. L. Thang, 2012).

3.5 Population Growth Changes in Hakha

Water scarcity, natural resource depletion, and water demand and supply are directly related with the population growth. The rapid population growth in Hakha is evidenced by the fact that the current population of Hakha is three times higher than in the year 1990. The population of Hakha recorded in 2001 was 16992 in total but now more 45000 people currently stay in Hakha in 2014 (Committee, 2002). The

changes in Hakha population come not only from increasing birth rates but also from internal migration from rural villages to the town. In addition there are more government staff and their families since the 2010 election because the new government has appointed and hired more staff in every sector including hospitals and schools. Though the management of water resources demand and supply is limited in Hakha at present, there is an inevitable need to meet the basic needs of human beings in terms of freshwater, water for domestic use and agricultural purposes with the growth of the population in mind.

It has been difficult to understand the long-term population growth trends of Hakha mainly because censuses have been conducted only in 1983 and 2014 in Myanmar (Ministry of Immigration and Population, 2015). The current population growth trends show that there are two factors determining the population, one being regular birth and the other being internal migration from rural areas to urban areas. Interestingly the findings indicate that the local people in Hakha and rural areas are already anxious about the surge of incoming Burmese laborers from poor mainland Burma to work on basic constructions such as roads and buildings in Hakha and Chin State. The Burmese from poorer areas used to settle down permanently in wherever they worked. In the future, this will be a new challenge of assimilation for the Chin people into "Burmarnization" in the name of development. It is well known that Chin State is the only state that has no Burmese Affairs Minister, meaning Chin State is still occupied and inhabited by the Chin people whereas elsewhere the Burmese influences and assimilation have greatly taken place.

3.6 Land Use Changes and Deforestation

In Hakha, specific records of areas of watershed in Hakha watershed cannot be found from 1965, only from 2014. The watershed that has been measured along the Rung mountain range exceeds 1100 acres and outside Hakha town and Rung Mountain is around 200 acres according to U Win Aung[10], township executive officer of the Forestry department. The findings indicate that land uses have been

[10] U Win Aung (Forestry Executive Officer in Hakha) was interviewed at his office by the author on 24 May, 2015.

dramatically changing over the past 50 years. Even before the military camps in 1990s which were stationed on the Rung Mountain, land use was changing because of issues such as cultivation, husbandry and building government offices in the 1970s and road construction to Kan-gaw in the 1980s throughout the upstream areas. According to Dr. Lian H.. Sakhong[11], a local Chin scholar and historian, from 1976-1978, Kap Cung Nung, the Chin State Council chairman ordered all virgin forest trees in Rung Mountain watershed areas to be cut in order to plant other local trees.

Figure 9 Credit to British Library: Hakha village picture around 1950

All the land in the watershed area had been used traditionally for human settlements, housing, cultivation and husbandry purposes between 1965 and the 1990s. Significant land use changes came with the military regime, which stationed one Light Infantry Battalion and 266 camps, one Strategist Commander Offices, a Television Channel Station, Pagodas and Monasteries throughout the Rung Mountain ranges in the 1990s (Focus Group-2, and 3). This research discovered that the land in

[11] Dr. Lian H. Sakhong, the Chin Scholar, historian and political activist was interviewed on 27 June, 2015 in Bangkok Christian Guest House in Thailand.

the upland areas of watershed nearby the highway to Kan-kaw became land for house constructions and cultivation because corrupt officers gradually sold pieces of land to become a block, or ward, called Kan-kaw lam[12].

Mr Ngun Hre, an article writer in the No.1 BEHS Hakha Golden Jubilee Magazine 1950-2000, wrote that trees were secretly stolen for firewood from places that used to have big trees and forests but now sport stadiums, polices office, post offices and houses have been built. Now these places have become parts of town in the outskirts of Rung Mountain (N. Hre, 2002). The causes of deforestation come with issues with land use changes, and land and soil degradation. It is also found that there was no, or ineffective, management of water and other natural resources in Hakha. This was not only because of inadequate laws and policies but also because of corruption in the successive government whereby the former military and civilian government officials took bribes for land, forest cutting and other similar activities (Focus Group-2, 21, May, 2015, FG- 3). One key informant said that the reasons for water scarcity are the military camps in the Rung Mountain, road construction, deforestation in the upstream and watershed areas by the local elite groups on Sacuang va and other streams. He expressed concern that the residents of Hakha town would face more water scarcity if the issue is not taken seriously (Government-4, 24 May 2015). He continued to say that even if the office of the Forestry department learned that the trees were being cut illegally and forests were being burned, they could not take legal action because of corruption and weak enforcement of laws in Hakha.

Surprisingly, contradicting the above statement on deforestation and land use changes, two key informants out of 23 argued that stationing military camps on the Rung Mountain was not the main reason for deforestation. Rather, it is the local people who cut the trees for firewood, and other purposes like fences for gardens and house constructions that cause problems. However it was the general opinion of Focus Group-3 and most of the key informants' discussions that the cause of deforestation

[12] Kan-kaw lam is the local dialect for Gangaw Highway which became a Block for Human Settlement later on!

for firewood by the local people had less of an effect on deforestation than the military camps who cut trees, burn forests, constructed roads and houses and the local elite who cut the trees in watershed areas above Matupi road and other places.

Many scholars like (Bandaragoda, 2002) argue that the significance of forest cover removal that has been explored in many parts of the world show little or no effect to the amount of rainfall in the area. However in this research, most of the respondents indicated that there has been significant changes in local climate such as increases in temperature, irregular declines and increases in rainfall and increases in evaporation. According to the findings from all interviews, the most significant effect of forest removal was the reduction in rainfall and increase in temperature. Most of the key informant respondents said that though the forest removal in Hakha watershed is one of the main causes for reduction in rainfall and increase in temperature, global climate change is also a major concern.

3.7 Political Systems Changes in Hakha

Originally the Chin people, including people from Hakha, practiced the Ram-uk system. This was a traditional Chin administrative system whereby a tribal or local chief called Ram-uk who ruled at least two villages, though usually the entire tribe or several villages and communities, practiced a feudal system before the British annexation of Chinram (Chin Country or Chinland) in 1893 (Sakhong, 2003). During the struggle for independence from the British, each Ram-uk, or Chief, fought back from their respective territories. In order to gain independence faster, the Chin people joined other Ethnic Frontier States such as Kachin and Shan in signing the Panglong Agreement with the Burma Proper areas. After the independence from the British, Burma practiced a Parliamentary democratic system where all the promises in the Panlong agreement such as self-determination, full human rights and minority rights were broken by the Burmese dominant parliament who ruled from 1948 to 1962, before the military coup by General Ne Win.

With Hakha being the capital city of Chin State, all the governors and State officers appointed by the Socialist party for Chin State were based in Hakha. Appointing the State party chairmen and secretaries had many direct impacts on the people of Hakha because they were the ones who ruled and administrated the Capital and the whole of Chin. This research learned from the town elders that according to their perceptions, the former governors and State Administrator Officers in Hakha did not care about the sustainability of the watershed, natural resources and threats to human security because of corruption, tribalism among Chin clans and government policies (Focus Group-1, 2, 3, and local development-1, 2). Before the 1988 democratic uprising in Burma, most of the State level officers were Chin people from different tribes in townships like Tedim, Tongzam, Mindat, Falam and Hakha.

However after the 1988 uprising, the high ranking military officers were appointed for all administration in every sector in Hakha, Chin State. As a result, human rights abuses, general administration and natural resources governance became worse in the political system of the military junta. A handful of the local elite group tried to team up with the military so that they could exploit everything; water related resources, lands, forests, and trees (Focus group-3, 28 May 2015). Because of bribes and corruption throughout the military regime, the political institution disappeared and the exploitation of the common goods such as natural resources, including water resources, by the local rich people became widespread. In the governance for water resources in Hakha it was found that there was no transparency in decision making, accountability for decisions on resource uses, equality, participation of stakeholders, communication, incentive-based approaches, coherence, efficiency, integration and ethics as set by the international norms, standards and criteria (Bandaragoda, 2002).

Since the 2010 election the political landscape has been changing superficially in government and parliament. The Chief Minister, former major-general, was appointed and recruited his ministers from both elected members of parliament and unelected retired officials. According to the interview with Prof. Dr Ba Mawng[13], Social and Development Minister for Chin State quoting Steven Tha Bik, MP, the

[13] Prof. Dr. Ba Mawng was interviewed by the author in his office on 23th, May, 2015.

entire Chin State budget, which was once equivalent to the single bridge leg construction in the plain areas, is ten times higher than four years ago. At the same the Chinland Post news agency quoted Deputy Union Minister Pu Ngun Mawng, and also an MP from a local Hakha constituency saying that the more budget to reduce poverty is granted to Chin State, the more the corruption rates increases in Chin State (Editor, 2015). It is reported that more than 5,000 million kyats were paid to the high ranking officers as bribes for getting jobs in government office between 2012 and 2015 and more than 100 million kyats were paid to the ministerial level officers to get tenders called by the State government, under the name of Chin State development programs. To sum up the topic of political systems changes in Hakha, it has been gradually changing little by little but there is still lack of basic principles of democracy such as freedom of association, freedom to belief, self-determination, transparency, accountability and so on.

Table 5 Stakeholders of Hakha Watershed and Water Resource Management in Hakha

Primary Stakeholders	Interests	• Resources • Perspectives	• Risks • Challenges
Local Water Users	Water Sufficiency and Water Resource Searching	• Resources: Local Knowledge • Perspective: traditional value/	• Risk: Low • Challenges: lack of awarenes

		practices	s and political participation in decision making process
Upstream Community	More water and related resources extraction like forests/ lands	• Resource: Local Knowledge • Perspective: customary practices/ values	• Risk: Low • Challenges: lack of awareness and participation in deci

			sion making level
Downstream Community	More access to distributed water from Block and City Municipal	• Resource: Local knowledge • Perspective: traditional practices	• Risk: Low • Challenges: Less water resource and lack of awarenes s in community
City Development Committee	More Water resource searching and Allocation	• Resources: Local Knowledge and Technician	• Risk: Middle • Challenges:

		• Perspective: traditional practices	lack of participation in political process like decision making
Hakha Municipality	Partnership with CDC on Water Supply /Allocation and Distribution Systems	• Resource: Laws. Policies, Guideline • Perspective: Financials/ Human Resource	• Risk: High • Challenges: Inadequate Laws, Policies, Guidelines

			and Financial Supports from Central government
National Water Resource Committee in Nay Pyi Taw	Water Supply along with water related resource management	• Resource: Experts on Water related Resource Management • Resource: Financial Support	• Risk: High • Challenges: Lack of Specific Water related laws, policies and guid

			elines yet
State Government Departments like Forest, Agriculture & Irrigation/ Land	Water and Natural Resource Management like Forest Conservation / Land Use and Agricultural Purposes	• Resource: Experts / Resource Management Committee • Resource: Financial Supports and Experts	• Risk: High • Challenges: Still weak implementations for the laws, policies and guided are highly centralized
Politicians	Votes/	• Resour	• Risk

	Livelihoods for their constituencies	ce: Policies and Laws plus Financial Support to the local people for water • Perspective: Limited Space from 2008 Constitution	: High • Challenges: Still lack of political power for legislations because their proposal are rejected and the constitution limit their

			legislative power for State
Local Communities	Water Sufficiency and Water Access	• Resource: Local Knowledge • Perspective: Traditional Practices	• Risk: Low • Challenges: lack of awareness and participation in local political processes
NGOs	Water Supply and	• Resource:	• Risk:

	Water Related Disease Prevention	• Experts and Financials • Perspective: Technician	• Middle • Challenges: Very limited participation in the process
Private Water Vendors/ Company	Water Supply and Interests from Water Prices	• Resource: Local Knowledge • Perspective: Traditional Value	• Risk: Low • Challenges: Lack of participation in the process

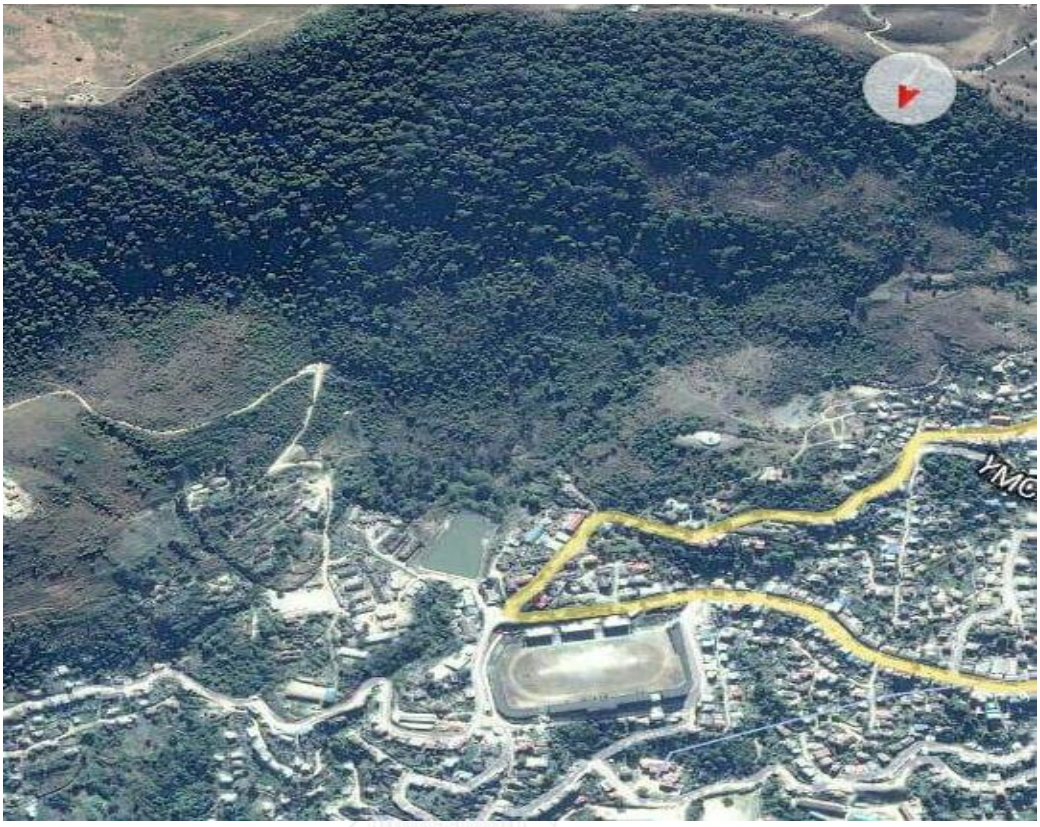

Figure 10 Google Map, photo of where the roads to Kankaw and Matupi were constructed.

3.8 Summary

To summarize the major development changes in Hakha, the first major change was Hakha town becoming the capital city of Chin in 1965. This change brought development changes, both positive and negative, such as basic infrastructures, roads, school and hospital buildings, housing for private sectors, economic development, population growth, land uses changes, and deforestation. Political systems changes slowly occurred from 1965 to 1988 in the socialist government regime. The road constructions to Kan-kaw and Matupi in 1976 and 1981 respectively had a negative effect on the Hakha watershed because the two roads disrupted the Hakha watershed area in Rung Mountain watershed on both Kankaw and Matupi side. However, rapid changes occurred politically from 1988 with the military coup from the socialist government. In the 1990s the two military camps,

pagodas and monasteries directly and indirectly affected the Hakha watershed and water security were stationed and built on Rung Mountain and its outskirts.

The population changes in Hakha started increasing along with the city expansion from 2001 while economic development changes remain the slowest of the changes in Hakha. The population now is three times higher than in 2001 and the city expansion is four times greater than in 2001. Three changes in political systems which impacted these issues directly occurred in 1962, 1988 and 2010. During the past 50 years of socialist regimes and military juntas, there were few positive development changes related to the biophysical and social-economic conditions in Hakha watershed. Instead, changes seen were the destruction of the biophysical watershed areas and social economic corruption. Even after the 2010 general election in Burma, issues with water and related resources management have continued to receive little intention. It is accepted among the local community that there is, in reality, no magic formula to transform Myanmar into a well- governed, modern, equitable society at any point in the near future because of the constitution, lack of rule of law, weak law enforcement and corruption.

The findings from the field research on Hakha, Hakha watershed and Hakha water resource management, conclude that the respondents from the key informants interviews, focus groups and other stakeholders have seen a lot of major changes in the biophysical and social-economic conditions in the Hakha watershed area as well as changes in infrastructure, economics, population growth, changes in land use, deforestation and changes in political systems in Hakha.

CHAPTER IV
KEY FINDINGS ON CAUSES OF WATER SCARCITY FOR WATER ACCESS AND ALLOCATION IN HAKHA

Chapter IV discusses the research findings to answer the second research question regarding who is able to access and benefit from water and who cannot, and the social impacts for those who cannot access. The findings are divided into five sub-chapters, as following: 4.1 who experiences water scarcity and when? 4.2 Why is there water scarcity? 4.3 Impacts of water scarcity for the local people; 4.4 Responses to water scarcity by Formal and Informal Institutions; and 4.5 Summary of findings.

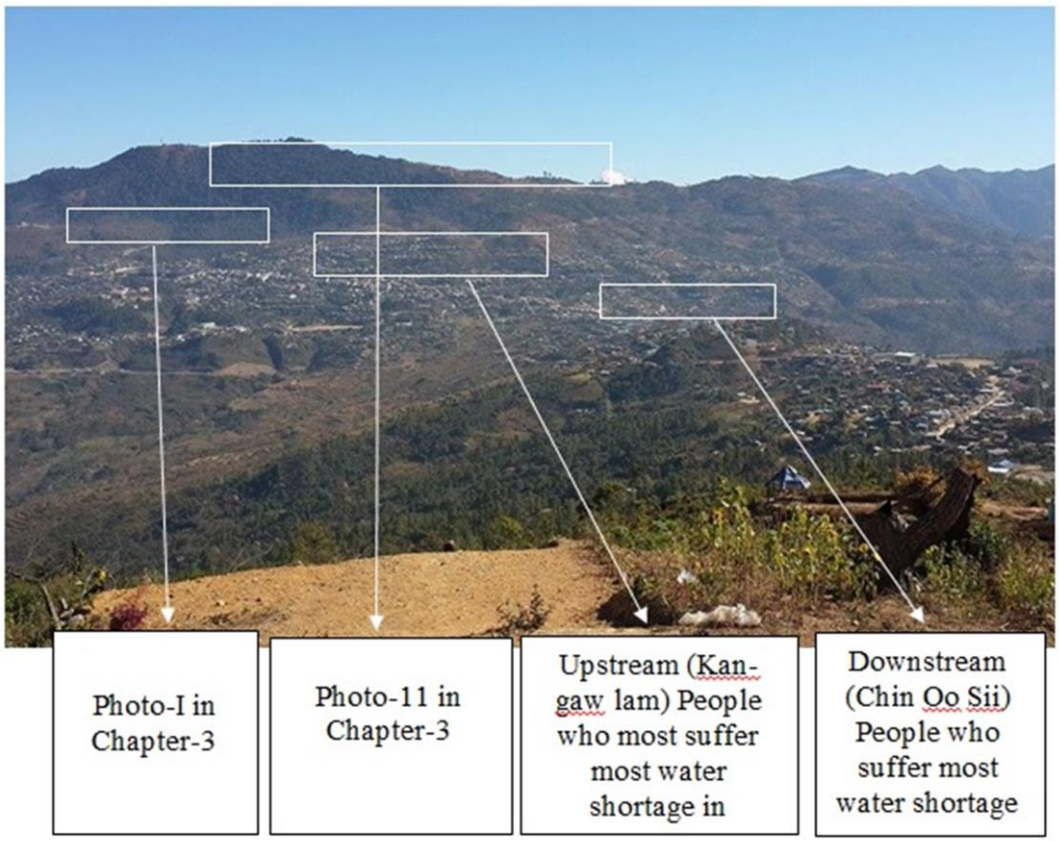

Figure 11 This is where the new picture show the watershed and research during the field trip.

Figure 12 People who are waiting for water in Hakha

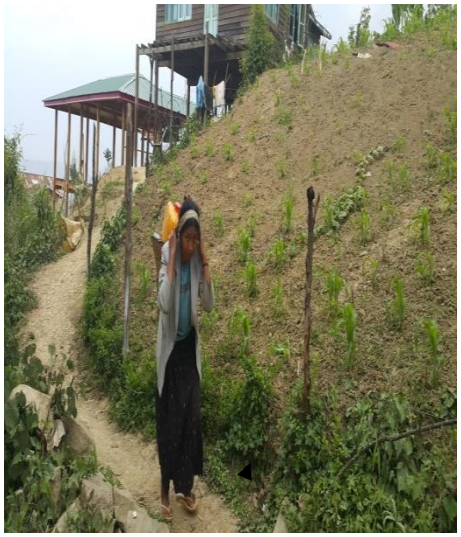

Figure 13 This is how local people especially women used the water from streams

Figure 14 Photo by the Researcher, People who were waiting for water at night around 11:00PM in Hakha

Figure 15 Photo by the Researcher, People who were waiting for water at night around 11:00PM in Hakha

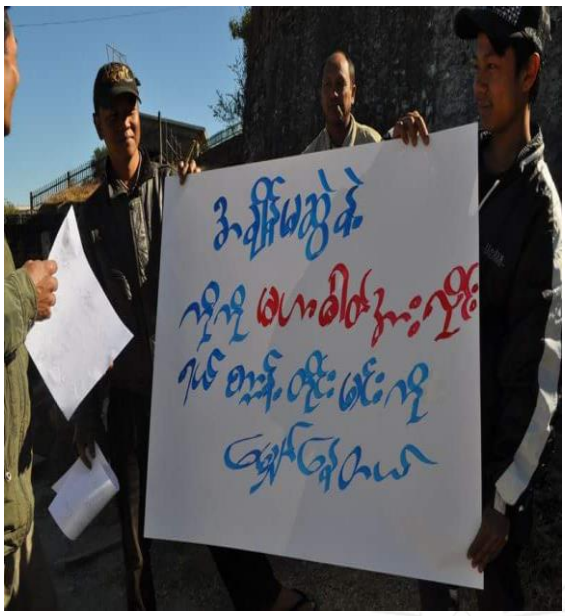

Figure 16 Photo Credit to the Chinland Post / It was when the local Hakha people demand for electrify peacefully

Figure 17 Photo Credit to the Chinland Post / It was when the local Hakha people demand for electrify peacefully

4.1 Who Experiences Water Scarcity and When?

All local people throughout the 6 blocks of Hakha town have experienced some kind of water shortage, especially in the summer time from February to May, every year for decades. However, water scarcity in the summer differs from block (or ward) to block due to the location of the city meaning that the water supply comes from a gravity flow water supply – water flows from upland hill to downstream to supply the city (INGO-1, 23 May,2015). The findings indicated that the whole town faces serious water shortages in the summer period. However, two communities most affected are Kan- kawlam, on the outskirts of Rung Mountain, where the city municipal water supply cannot reach because of the gravity flow of the water and Chin Oo Sii [14], in the downstream part of the city because of less water source availability and water use contestation between the local community, staffers and government officials. It was learned that the first municipal water supply pipes was constructed eleven years after the city became the Capital of Chin State around 1976s

[14] Chin Oo Sii was the name of Chin Administrative Body but here in Hakha Chin Oo Sii is the place where the offices of the Chin State Administrative Body, Council and Government station.

and the UNICEF pipe was constructed in 1982 (Hakha City Development-2. 22 May, 2015). It was found that government official residents are given prioritized water supply allocation by the municipal in the Chin Oo Sii block.

Figure 18 Hakha Town Picture

The findings clearly indicate that the people in Kan-kawlam block in the upland area suffer the most serious water shortage in summer because the water supply for the city has to run from upstream to downstream. As a result, the water source from the mountain becomes drier and drier year after year, especially in summer (Focus Group-1, 18 May, 2015). The second community to face serious water shortages is the downstream area called Chin Oo Sii. In summer, despite having more water sources compared to the upstream, the water is given prioritized allocation from the municipal to the offices and staff of the government. For the local people, the water that is accessible near their home is of poor quality and is considered unsafe for domestic use. At times when water is so scarce during summer, the local people are forced to use the water near their houses even though the water contains dirt and

waste from septic tanks built near the stream in the upland and middle areas (Focus Group-2, 21, May, 2015).

In rainy reason and winter, increased rainfall means most of the water sources are significantly increased. However this water is mostly inconsumable because there is no treatment or filtering system for raw water coming directly from streams, wells and lakes. Therefore the local people have to rely mostly on rainwater which is caught in the roof and piped to store in tanks to use for cooking, drinking, bathing and sanitation. It is found that the local people did not face significant water shortages in rainy and winter seasons because they can rely on the rainwater piped from their zinc house roofs, even though this water may not be the best or safest way for domestic water supply.

It is found in Hakha that water allocation is mostly based on water availability at both a community scale and a town municipal scale, when water demand and utilization are high for the five month period in summer. Though it is the responsibility of the State to supply and distribute the water to the residents of Hakha, the pattern of allocation, distribution and management of the water source is noted as being according to a hierarchical structure. The Hakha City Development Committee (HCDC), a part of Hakha Municipal body under the State government, typifies most natural resource management including water resources according to a top-down management structure (Local Development Committee-2, 11 May, 2015).

Water access, allocation and distribution in Hakha can be divided into three patterns. First, distribution by municipal; second, allocation by the local water committee block-by-block; and third, supply or service contract between the water users and the private vendors in the form of exchange for goods, money or services. In Hakha official documents for how water resources are managed in terms of quality and quantity of water are rare which makes it hard to describe, analyze and compare the past and present situation. For the past decades water resource management in Hakha is maintained by Forestry, Land, Municipal, Irrigation and local institutions but without coordination with each other (Government-1 and 2). As a result the process of

water allocation to groups or individuals is arranged in a variety of ways, such as by the Municipal Office to communities, private water vendors to individuals or local water committees to each community (Chambers, 1989). One significant finding is that there is very little water use for small and medium entrepreneurship in Hakha and Chin State, which would be an urgently requirement for the development of the agricultural and industrial sectors.

The lack of coordination for water allocation management over the past half a century results in the water shortage which occurs in the summer time, despite Hakha and Chin State having an average annual rainfall of 74 inches (1880 mm) which should mean water scarcity should not occur (MIID, 2014a). According to the Myanmar Institute for Integrated Development the water demand for domestic consumption in summer cannot be met. It was reported as follows:

"The estimated demand for water is 20 gallons of water per person per day and Hakha City's total domestic requirement is therefore about 513,000 gallons per day. However, the discharge in the dry period is estimated to be only 218,000 gallons per day or a shortfall of 195,000 gallons" (MIID, 2014a).

The water shortage in the community is most severe from March to May and it was found the demand during these months can be up to twice as high as the available supply. In addition to these two communities who suffer particularly severe water shortages, it is also found that shortages are experienced throughout the rest of Hakha during the summer because the availability of water resources has decreased more and more year by year (Focus Group-3, 28 May, 2015). Only the few households who have their own water source like small streams, wells and lakes near their houses have enough water for domestic use in the summer (Local Development Committee-1, 2, and Private Vendor-1, 2). It is widely said among the local people that the cause of water scarcity is not only because of the mismanagement of forest, land, and water supply systems but also the local and global climate changes (Focus Groups-1, 2, 3).

4.2 Why is there water scarcity?

The findings show that the main causes for water scarcity in Hakha are deforestation in the watershed areas on Rung mountain and other watershed areas near Hakha, land use changes for housing, pagodas, monasteries and government offices constructions, road constructions and agricultural activities, rapid population growth, corruption in political systems in the successive government, and local climate change in the past decades. One of the most prominent local news agencies The Chinland Post News covered the narrative of water scarcity as an Editorial and Cover Story. The Chinland Post quoted Mr. Tawk Lian, a town elder, saying that the root causes of Hakha water scarcity are the cutting of trees on the mountain, selling lands for housing and human settlement in the Kan-kaw road watershed areas, and agriculture by a handful of the local elite that caused deforestation on the outskirts of Rung Mountain. The TCP quoted another town elder, named Mr. Hrang Awr, saying that Hakha had never faced water shortage before the military were stationed in Rung Mountain. Shortages began after the military cut all the trees and burned them (The Editorial Board, 2015).

In order to find the cause of water insecurity in Hakha, it is important to evaluate how the original water sources were managed in the past as this will have a major impact on the current water resource management, watershed and water users. According to the interview with (Government-1, 11 May, 2015), there are eight water sources currently used for consumption in Hakha. Three sources are from outside Hakha: the Sacungva stream on Mutupi road, 8 miles away from city, Haucheunakva stream on Dau Chin village side and Farva stream in Khuathar[15] side. All the remaining sources are from Hakha town. The water supply and distribution system is based on the natural gravity flow from upland to the downstream areas. In Hakha town, there are around 6 sources which are used so there is no scarcity in rainy season. Even though water is available from June to December, water shortages occur as soon as the rain stops. In the past the 6 inch-wide pipes would have been full of water flow but now the water quantity has dramatically dropped to around 3 inches, meaning the water quantity has decreased by half in the past 20 years. As well as

[15] Khuathar in Hakha dialect means New Village or New Town.

deforestation from agriculture; climate changes and land use as the main causes for water scarcity in Hakha (Local Development Committee-2, 26 May, 2015), 90% percent of the respondents from the three focus groups also said that the root causes of water scarcity in Hakha are the mismanagement of the streams, wells, forests, and lands in the watershed areas. This is said to be connected to a lack of town planning in the past (Focus Groups-1, 2, 3). This research found that trees and land in the 1100 acre-wide watershed area on Rung mountain and 150 acre-wide watershed outside of Hakha town on Loklunglam, Dauchinglam and Khuathar sides have been deforested so much that only 200 acres has small, newly planted trees by the local youths organization (Government-4 24 May, 2015). 70% percent of the key informants said that land use changes in town areas, the sources of springs and well for housing, the station of military camps on Rung Mountain and the agricultural activities in the watershed by the local elite group also affect the water scarcity in Hakha (See Table-3 in chapter-3). In addition, Burmanization such as building pagodas, Buddhist missionary schools and monasteries in the Christian city and the corruption of the government cause water scarcity more and more. Since there have been no scientific studies until today, my results and findings are based on the perceptions the interviewees.

4.3 Impacts of Water Scarcity for the local people

There are many impacts of water scarcity on the economics, livelihoods, social, political and health of the local people as well as on the government staff and people whose work assignments post them temporarily in Hakha.

Water Shortage Impact on Economics in Hakha: The research findings show that most households in Hakha city rely on at least two water sources and allocation from three sources like community allocation, service contract from private water vendor and municipal/bureaucratic allocation. In some communities, the municipal water supply doesn't exist at all. During the summer when water availability is scarce most households in Hakha try to find water from lakes, rivers, and even the dirty water near septic tanks. It is found in the city that water brought

and fetched from the nearby streams was sold around the city from cars and rickshaws. It was found in the focus group interviews that the Hakha residents can use less than 5 gallons of water per person per day. This can be compared to the standard international norm for individual water use which is 20 gallons per person per day. In 2015, raw water was priced at 15000Ks (equivalent to 15 USD) for 30 gallons of water (The Editorial Board, 2015). This means two gallons of water cost 1000Ks ($1). For drinking water, 500 Ks (50 cent USD) is paid for 1 liter. The findings indicated that each household spends at least 5000 Ks (5 USD) per day to meet their basic needs for fresh water. With Chin being one of the poorest states, it is found that lack of basic human needs such as water, electricity and food is a biggest challenge for poverty eradication. According to the Millennium Development Goal, poverty was supposed to be reduced by a half by the end of 2015.

Figure 19 This is how private water vendors sell water on the street by Tuk Tuk and Car in Hakha in 22, May 2015. Photo by Author

Water Scarcity Impacts on Time Waste for Water and Livelihood: According to Myanmar Multiple Cluster Survey 2009-2010, people in Chin State spend an average of 16.8 minutes per round-trip collecting water, the highest average time spent among seven States and Seven Regions in Myanmar (Ministry of Health, 2011). In the summer time in Hakha, most of the water fetchers are women who have a repressed role in the male-dominant Chin society. The focus group interview found that 98% percent of women spend around 3 to 4 hours per day collecting water from the nearest

sources, if they don't buy the water from a street water vendor. This amounts to half of their daily labor spent collecting water. In some cases women must travel up to seven miles away from the city for washing clothes and bathing in the summer time (see the photos in 4.1).

Because in Chin Society, women are more responsible to domestic works such as child nursing, cooking, cleaning and taking care of the house than men who are most responsible to work for the livelihood of all the entire family. However it is found that the leadership role of women in community services and religions especially, in Baptist Christian society are highly promoted while the leadership role of women is very low in government and political participations. In Baptist church many women had been ordained as Reverences, Pastors, leaders and teachers. However in water section all of the my participants in focus groups responded that since they are most responsible for water scarcity, they are the ones who suffer most and paid the price for water while their role in managing water resources are limited politically because they had to go far to fetch water with heavy load (Focus Groups, 1, 2, 3).

Water shortages also affect the livelihoods of local people. As result of water scarcity in summer, almost all of the city residents unable to grow vegetables, fruit, plants and trees which would normally sustain the local people and enable long term development. All vegetables, fruits and plants are imported from Falam and Kalay townships because the residents in Hakha cannot afford to buy the water to feed their crops and vegetables. Local people had to pay at least 6000 Ks ($6) per household per month to the Municipal Office in water tax, despite their allocation and supply status. Therefore it is concluded that water scarcity has a negative effect on the livelihoods and therefore economic situations of the residents in Hakha.

Water Shortage Impact on Social and Political in Hakha: Mr. Ral Kham[16], Chairman of Hakha City Development Committee explained the positive impacts of water scarcity in the town saying that if such water shortages occurred in other towns, it would have caused unrest among the people in the community. However, the local people in Hakha show sympathy, love, a servicing mind-set, and a humanitarian heart towards each other and try to understand their problems and difficulties so as to avoid unnecessary conflicts over water within the community. However, some findings contradict this as it was discovered that there have been several conflicts, both big and small, among the local people and between the bureaucratic municipal allocation and local community. There is also gossiping, accusations and criticism about unfair water allocation and piped water being diverted to the households of rich and high ranking officers. This research found that the State government led by Chin Buddhist Chief Minister used to give orders to collect between 500Ks and 1000Ks from every household to pay for the Burmese Religious Water Festival in April every year and during this time piped water is diverted to tanks to be used for the festival when it is desperately needed by the local people for domestic use. The only Chin media published in English online, the Chinland Guardian wrote as follows:

> "The new government of Chin State claimed to celebrate the Burmese New Year Water Festival in Hakha amid acute water shortages facing the local people in the capital of Burma's northwestern state…according to the Hakha Post last week, the water supply, badly maintained and exploited by the local municipal department, has been very limited and people in each block of the town haven't got enough water even for cooking. It is claimed that the water crisis has been caused by problems relating to the high temperature of the dry season and the non-functional water supply systems still in use, worsened by exploitation of the local municipal department (Editor, 2012)".

[16] Mr Ral Kham, the Chairman of Hakha City Development Committee and Hakha Municipal was interviewed by the author on 23, May, 2015 at his residence in Hakha.

***Water Shortage Impact on Health in Hakha*:** The findings on impact on health are interesting and somewhat different from the expected outcome. 65% of respondents from the three focus group interviews said that they did not know about the impacts of water shortage on health because of a lack of information on the water quality. 19% of the respondents did not think there might be critical impacts on health because the water quality was good, except for small amounts of calcium and magnesium. Another 16% of respondents said that the raw or hard water in Hakha affected health through waterborne diseases which can cause diarrhea. The lack of impacts on health may be surprising but there may still be health impacts from washing, sanitation of toilet water and bathing. It is reported that prevalence of diarrhea diseases in Chin State is 13.1% which is the highest percentage in the whole country, with the average national diarrhea prevalence being only 7%. This is directly linked to waterborne diseases (Ministry of Health, 2011). It can be said that water scarcity does have an impact on the health of local residents but this impact cannot be measured officially yet.

The most common way of treating water so it can be consumed is based on local knowledge. The water is drained through a cloth but this will not make it safe for drinking. Most local people said that they boiled the water first to make it safe to drink and to avoid waterborne diseases.

4.4 Responses to Water Scarcity by Formal and Informal Institutions

There are two kinds of institutions which gave responses to water scarcity, namely Governmental Institutions as Formal Institution and, Local Institutions and Private Institutions in informal one in Hakha. These three institutions share similar interests but have slightly different approaches to the root causes for managing water resource degradation in Hakha.

The Governmental Institutions' Response as Formal Institution to Water Scarcity in Hakha: It was discovered in the findings that the Governmental Institutions involved in water resource management are the Hakha Development

Committee (Hakha Town Municipal), which is the most responsible for water supply in town, Forestry and Environment Department, Irrigation Department, Land Settlement and Recording Department, General Administration Department and Agricultural Department in Hakha with different individual laws and policies. It is found that these formal institutions fail to manage the watershed areas and water resources because they do not work in collaboration with each other (Government-4, and Hakha City Development Committee-1). Each concerned formal institution with different polices and law separately tries to address water resource management issues separately, while giving little concern to the conservation of watershed areas. The findings indicate that the governmental institutions, other than Hakha Municipal Office, do not consider themselves directly responsible for managing domestic use water. With no one accepting responsibility, the process of water resource management becomes ineffective (Government-6, 18 May, 2015). Instead of managing the watershed in Hakha, Rung Mountain and other Forests, water and its related resources has been exploited by the concerned formal institutions and a handful of local elite.

Official documents (Editor, 2015) and interviews with key informants show that the mismanagement of the watershed and water related resources is due to a lack of coordination, lack of human resources and lack of capacity and capability. There are no systematic water distributions and supply systems effectively arranged by formal institution like Town Municipality, Forest and Environment department and so forth in Hakha (INGO-2, 4 June, 2015) and any existing ones are 40 years old with very poor maintenance. As a result of the lack of human resources and capacity, old broken pipes which cause water leakages along the streets were neither repaired nor maintained properly. Instead of maintaining the supply, over the past decade the institutions have simply been collecting water tax from local people who may or may not use the water supply from them (Focus Group-2, 22 May, 2015).

After the quasi-civilian government took power in 2011, the Hakha public came to the streets to protest and demand electricity in 2012. Until then there had been no electricity in Hakha and Chin State except the Laiva Hydro Dam which could

supply low voltage electricity for only 7 hours per week. In 2014, the local people, through the City Development Committee, and town elders requested a sufficient water supply in the capital from President Thein Sein when he visited Chin State. Their request for water, which would cost more than 8.8 Billion kyats, was granted by the President. The Timit dam, which is under construction by the Myanma Ahla Company Limited, is expected to reach completion by the end of 2015. And it will provide the whole water supply for Hakha. This is the most significant response by the formal institutions from government to local demands (Hakha City Development Committee-1, 22 May, 2015) (see Photo-4.3)

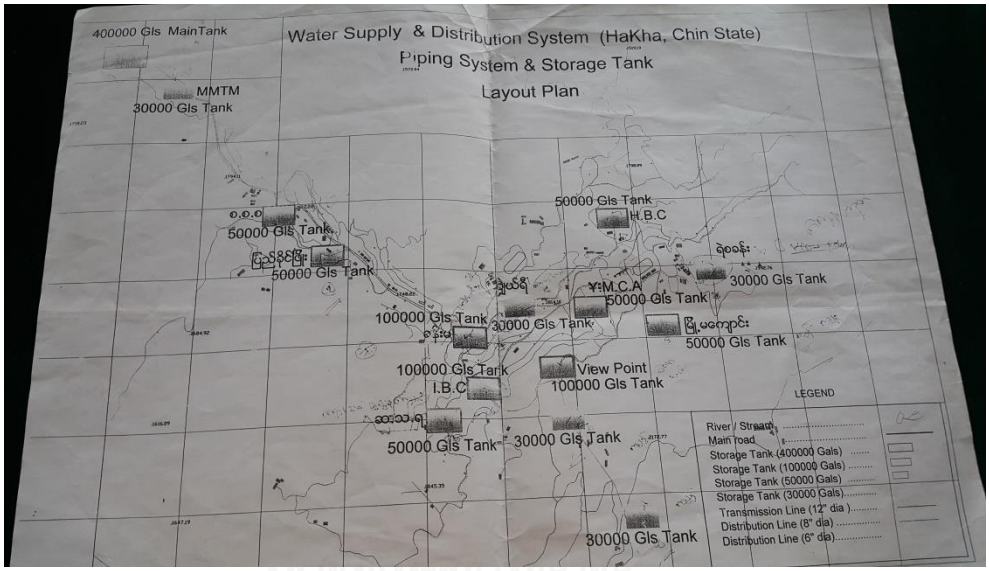

Figure 20 This is the blue print for the new water supply project being constructed in Hakha.

The Local Institutions' or Communities' Response as Informal Institution to Water Scarcity in Hakha: At a local level, block water committees were created by the six local communities so that they could participate in managing water and related resources in Hakha, though the government formal institution maintained full power in every sector. Most of the committee members are elected from representatives by each community. It was found that communities were unable to take part in the management of watershed areas because they had been under the direct control of municipal departments or were private lands of local elites though they had some rule and regulation by themselves as informal ones. All the local community as informal institutions with very limited laws, policies, resources and

capacities could do in response the water scarcity was manage the local water sources like wells, streams and lakes owned by a community. The degradation of water sources due to external factors such as deforestation and burning of land and trees in the upstream watershed areas could not be controlled by local communities. Some committee members of the block were also employed by the local municipal department on a voluntary basis to maintain the pipes in town.

The local institutions' response to the water shortages is to allocate the existing water sources by a rotation system to every household so that the local people are given equal quantities of water. However the local people played the key role searching for new water sources outside Hakha city. The governmental institutions had never attempted to search for new water sources other than the Sucuangva water source which was brought with the cooperation of the local community. In the past decades the public of Hakha have been forced to suffer the effects of water scarcity but have not been empowered to build capacity and capability.

The Private Institutions' Response as Informal Institutions to Water Scarcity in Hakha: As informal institutions, private institutions are those who have wells, spring and other sources that they can sell to other people. The private institutions' response as informal institutions to the water scarcity in the city is the least significant compared to the other two institutions because the private sectors and related vendors have their own sources which are registered separately with the local municipal department. These institutions are just responsible for managing and maintaining their own water sources so that they can continue to supply water to their clients. Private water vendors revealed that they could not supply sufficient water to the clients with limited amounts of water from the source, even if the service charges and water bills were paid. Instead of cooperating with private institutions, the local municipal department charged the Dingdi, the private water company, for drinking water and domestic use water. This water tax was at first around 1,500,000 Ks and then 500,000Ks. The role of the private water vendor is only to store water from their respective sources and allocate it to the clients, sometimes by rotation systems. In local level, block water committees were created by the local communities in the six communities so that they would be at least able to participate in managing water and

water related resource in Hakha, wherein the government/ bureaucratic institution were endowed with full power in every sector. Most of the committee members are elected or selected from representatives by the communities. Since they were denied to take in any political processes such as in water resource management, it was found that they could not able to take part of managing the watershed areas because all the watershed areas had been under the direct control of municipal department, forestry, land and private lands of local elites. What the local community could do to response the water scarcity is only that they could manage to maintain the water sources like wells, streams and lakes owned by a community or a group while the degradation of water sources were being effected sharply by the external factors like forests, lands and burning in the upstream watershed areas. Some committee members of the block had been voluntarily employed by the local municipal department without any salaries for serving and maintaining the pipes in town.

Figure 21 Photo by the Researcher: Water Storage Tank of Private Water vendor and Pipe Allocation by UNICEF in Hakha upland areas

Figure 22 Photo by the Researcher: Water Storage Tank of Private Water vendor and Pipe Allocation by UNICEF in Hakha upland areas

4.5 Summary

In summary, the main causes of water scarcity in Hakha were found to be severe deforestation, burning of forests, land degradation, soil erosion and landslides, housing for human settlement, military camps and offices construction on Rung

Mountain, and road construction on the watershed areas, and corruption in political systems. The local elite exploit the natural resources in Hakha while the authoritarian political system directly influences the political, social, economic, and administrative process of the State which is one of the main centric causes for mismanagement of water and other natural resources in Hakha.

According to these findings, the impacts of water scarcity in the city affected the lives of local people in various ways. The health of residents is affected by poor water quality and sanitation which causes diarrhea and other waterborne diseases. The livelihoods and economic situations of residents are affected through the money spent on water; the time spent collecting water and being unable to grow vegetables due to not having enough water to feed plants. Social impacts include conflicts among communities and neighbors, and people becoming corrupt or stealing the water in the city due to shortages. The findings shows that the systematic neglect of the Chin people by the past dictatorship rule resulted in Chin becoming the poorest State with 71% of Hakha and Chin people being under the international poverty line, according to a recent report by the World Bank Group (The World Bank Group, 2014).

Responses to water scarcity in the city vary from formal institutions to informal institutions because of varying, power dynamics, policies, laws, interests and different levels of capacity and capability to manage watershed areas and water related resources. The weakness of existing laws, policies in formal institutions for water resource management in Burma means that all institutions are also weak in management while the informal local community and local institutions remain unable to take part in the water management process. Local institutions can only arrange the reallocation of existing water resources to communities by rotation systems, while private water vendors focus on maintaining their own sources and supplying water to their clients. In conclusion, the respondents in this research thought the management of water was superficial, ineffective, and insufficient and has a negative effect on the main watershed areas in Hakha.

CHAPTER V
KEY FINDINGS IN POLICIES, LAWS AND INSITUTIONAL ARRANGEMENT FOR WATER RESOURCE IN HAKHA

Chapter five discusses the research findings to answer the final research question: what are the institutions, process, policies and laws relating to water resources in Hakha, and do they meet the best practice of IWRM? Section 5.1 presents the policies, laws and formal institutions for water resource management while section 5.2 discusses the mechanisms for coordination of water management. Section 5.3 discusses the informal institutions for water resource management and section 5.4 the relationship between the informal institutions and formal institutions. Section 5.5 looks at the challenges and prospects for coordination of water resources management in Hakha and finally section 5.6 gives a summary.

5.1 Policies, Laws and Formal Institution for Water Resource Management in Myanmar and Hakha

At a national level, the newly formal designed institutions, policies and regulations for water in Myanmar, designed by the National Water Committee and chaired by the Vice President with the support of World Bank, are as follows:

1. Irrigation Department is responsible for Water Resources Management (i) agriculture water supply for irrigation Development, (ii) to some extent, urban water supply,(iii) preventing of saline water intrusion, (iv) water level recording and discharge measurement, especially for irrigation dams and canals
2. Forest Department is responsible for rehabilitation and conservation of forests and watersheds and maintaining the stability of Environment in order to develop the social and economic conditions of the nation, especially in rural areas
3. Water Resource Utilization Department (WRUD) under Ministry of Agriculture and Irrigation (MOAI) is responsible for pumping up water from rivers for irrigation purposes.

4. Directorate of Water Resources and Improvement of River Systems (DWIR) is responsible for improving water ways, canals and river systems for a variety of issues including navigation, sedimentation and water quality issues, river system health, sustainability, disaster risk reduction and economic productivity**.**
5. Municipal bodies like Yangon, Nay Pyi Taw, Mandalay City Development Committees (YCDC, MCDC) and City/Township Development Committees (TDC) is responsible for gradually taking over the responsibility for urban water supply.
6. Department of Health is partially responsible for some aspects related to rural water supply and sanitation linked to health facilities' operation (The World Bank, 2014).

In the state and regional levels, there are also new laws, policies, and procedures for water resources management in Hakha as prepared by the Government of Chin State in 2014. These new procedures failed to name the institutions responsible for water resource management at Union level which participate with the Ministry of Agriculture and Irrigation, Ministry of Forestry and other institutions. The local government has to rely heavily on institutions, laws and policies provided by the central government, not including the city water supply, because the constitution still limits the power of the state government to draft local laws.

However there are some policies for domestic water supply programs drafted by Chin State government and passed in the State parliament on 12th December 2014, which are as follows;

1. State Ministry of Municipality is responsible to make a Town Development Committee consisted of two members from Rural Development Department and General Administrative Office supposed to be Secretariats and selected five members from the local people by the said government officers after consultation with the local people and the Committee is authorized to manage the well water and ground water inside and outside of the municipal areas.
2. The Committee is responsible to manage Watershed areas, water storage, well water, spring waters piped water supply systems, maintenance, allowing

private water supply system, creating spring water committee and inspecting the spring water supply systems.

3. The Committee can collaborate with national and international organizations for searching water resources and sufficient water supply.
4. The Committee can sell the project for the water resource search and supply through tender, contract and other means in line the set guideline(Chin State Government, 2014).

Though there are some provisions in laws and policies in Chin State from 2014, they are yet to function in practice because the concerned institutions have continued to use the old existing laws (Politican-1, 19 May, 2015). The private water vendor in the upstream areas said that all the laws and rules and regulations for water as well as for other natural resources management failed in Hakha because of the inadequate laws, policies for coordination and corruptions in the previous government (Private Water Vendor-2, 16, May, 2015). This research also discovered that the former military and civilian government officials took bribes for lands, forest cutting and other similar activities. The residents of Hakha town would face water scarcity due to reasons previously mentioned, such as military camps in the Rung Mountain, road construction, deforestation in the upstream and watershed areas by the local elite groups (Government-4, 24 May, 2015). However, even if the Forestry Department learned that the trees were cut illegally, they could not take legal action because of corruption and weak law enforcement in Hakha.

It was discovered in the interviews that there were no specific regulations for integrated water resource management at neither local nor national level in Myanmar. According to interviews with officers from Hakha departments of Land Use, Forest, Agriculture and Irrigation, and with the State Director of Municipal and Hakha Township there are no integrated water or other resource management mechanisms. However formal meetings have been organized by the local development committee and policy papers for integration and coordination have been drafted in Nay Pi Taw by a selection of water professionals. Some former and current officials, including the military and police, have shown little respect for the concerns of the local community

regarding the impact of projects. As an example, on 6th June 2015 leaders of the Hakha elders expressed strong opposition to the plans to construct a new police headquarters upstream of the historic lake in Hakha. However, according to Hrang Vung, secretary of the Hakha Elders, who spoke to the Hakha Post, the State Police Chief Mynint Lwin denied their call to meet with him to discuss the issue (Guardian, 2015).

At local level, it is found that all water related institutions responsible for domestic and agricultural water resources in newly drafted water laws, such as Forestry Department, Irrigation Department, Health Department and others are excluded from integrated water resource management. It is found that the above mentioned institutions have made individual attempts to address the water scarcity issues but failed to coordinate with others in the past. However in the new project being constructed in Timit stream the Forestry and Irrigation Department have to coordinate with Hakha Municipal and Myanma Ahlah Company because they need to cut some forests and land to use for water pipelines and water storage tanks (Government-4, 24 May, 2015).

5.2 Mechanism for Coordination for Water Resource Management in Hakha in Paper

It was discovered that an officer from UNICEF said that there were no systematic mechanisms for coordination of water resource management in Hakha (INGO-1, 23 May, 2015). In response to this, the officer of Hakha Township argued that it is not due to a lack of systematic mechanisms for water management but instead because of weak maintenance of the 40 year old water supply systems (Government-3. 15 May, 2015). In fact, few of the policies from the first law on water pollution and the penal code enacted in 1860 and legislations enacted before the year 2000 have been enforced. For example, implementation of the Conservation of Water Resources and River Law enacted in October 2006 and Environmental Conservation Law enacted in March 2012 has yet to be seen at the central level.

This study found that even though there are specific water laws and clear policies being drafted (Min, 2014) at a national level, the practical implementation has been weak at ground level perhaps because of weak law enforcement and laws which are outdated and incomplete. As a result, there is a lack of knowledge, skills, capacity, preparation, concrete visions and projects for water resource management in Hakha. Problems with corruption, lack of transparency and accountability in governance have also been found over the past half century. Not only was it found that laws and policies are poorly implemented at the regional and state level but also the level of law enforcement has been unable to improve because of a lack of mechanisms. In the Chinland Guardian news, one Chin local was quoted as saying (written in English),

> "Parts of the aggravating water problems are also associated with a corrupt management of the local municipal department in charge of water supplies. These days the people don't get water from the pipeline even once a week any more. 'The water would run only for about an hour even when it is made available. Then the soldiers would take control of it again', said the Chin local. Members of the local Municipal Department have also been accused of re-routing water from the community-shared storage into families who could afford to pay more money" (T. Z. Thang, 2012).

5.3 Institutional Coordination for Water Resources Management in Hakha in Practice

The literature mentions that no single institution is responsible for the overall management of Myanmar's water resources. This study also found gaps in the coordination between existing institutions like the Ministry of Agriculture and Irrigation and the Department of Human Settlement and Housing Development under the Ministry of Construction which is responsible for domestic water supply at the state and regional level. At local level in Hakha the Municipal Authority of Hakha plays an important role in rural water supply through its responsibility for well, spring, stream and groundwater resources but did not practice the principles of

integrated water resource management in managing water resources in coincidence with other institutions.

The new draft for integrated water resource management in Nay Pyi Taw does not yet function at state level and this research found that some officials from water agencies are unaware of the laws and policies (see Table.3 in section 3.1). In Hakha, the City Development Committee, which is made up of members from different government institutions, and the Hakha Town Development Committees (HTDC), in which members are selected representatives from the local community, is responsible for the domestic water supply. According to an officer from the Hakha municipal office, the office is unable to meet the basic needs of the city and to practice integrated water resource management because of limited staff, (the office has only ten members of staff for the whole Hakha population) and the lack of clear rules and regulations for cooperating with other institutions. Therefore the Hakha municipal office requests help from local development committee and the local people (Governemnt-3, 15 May 2015).

However one of the local development committees' member interviewee told the researcher that the Hakha municipal and other departments including the Chin State governments did not cooperate with us- local people at all, ironically instead of coordination with us, they destroyed the water storage tanks built by the local people. When they brought that case and requested the State government, there was no response at all for rebuilding the water tanks that the local people themselves constructed for water storage (Local Development Committee-1, 11 May, 2015). The local media bi-weekly published in Chin-local Hakha dialect the Hakha Post reported also that even the local authority destroyed the existing ones, saying they would build new ones but there was no water storage built so far (The Hakha Post, 2015).

One of the most widely read local media reported that the main reasons of why the local Hakha people facing serious water shortages are the land use changes like housing and deforestation in the upstream areas, agricultural activities in Rung mountain, the fire burning and cutting trees in the watershed areas by the elite group

of Hakha and the settlement of military camps on the Rung Mountain(The Chinland Post, 2015). It is also one of the direct outcomes of lack of coordination among the institution in Hakha and Chin State. In contrast with the above views from the medias, the Chairman of Hakha Development Committee said that military camps are not the main reasons of deforestations although it might somehow related to water scarcity caused by deforestation but the local people who cut the trees for firewood, and other purposes like fence for gardens and house constructions because there was not electricity in Hakha and materials available to meet the needs and demands. He continued to say that we the Chin people were neglected in the past in development sectors by the central government and even today the Chin State government sometimes did not pay attention to what we the Hakha Development Committee already propose for local people and denied what we proposed to implement (Hakha City Development Committee-2, 22 May, 2015).

In sum, there is a lack of coordination between related institutions for water and institutional arrangement for integrated water resources management in Hakha due to the lack of specific polices provided for integrated water resource management and weak law enforcement from top-down level in government institutions.

5.4 Relationship between Informal Institutions and Formal Institution for Water Resources Management

According to the findings, the relationship between local institutions like Block or Award local committees, Hakha Development Committee, Hakha Municipal Office, and other state institutions are top down, hierarchical relationships. The local institutions are under pressure from the government institutions to implement the projects and activities as required and ordered by the State government (Focus Group-2, 21 May 2015). Projects not only for water resource management but also other development projects which are proposed by local institutions are neglected even though there are selected by the local people (Hakha City Development Committee-2, 22 May, 2015). Analysis of the interviews with key informants show that the voice of

the local people is not really heard and it is them who suffer the negative impacts of projects by government institutions (Focus Groups 1, 2, 3).

For example, on 6th June 2015, the Police Chief of Chin State denied to meet with the local development committee who protested against the construction of a new police headquarters in the upstream area of Hakha (Guardian, 2015). One member from the Hakha City Development Committee said that the Chin State governments officials do not consult with the local people before implanting projects and that sometimes the plans of the Hakha Development Committee are not taken into consideration in the government agenda. He continued to say that the current quasi-government is a little better than the previous ones and hopes that things will get better next term (Hakha City Development Committee-2, 22 May, 2015). Moreover the local community who participated in focus groups and in-depth interviews revealed that the previous and current Chin State government never consult them but only serve the rich or elite group of Hakha. In local politics, it is still quite clear that the State government is not concerned with the ideas and opinions of the local people and requests from the local people are rejected directly by the Chief Minister of the Chin State government or other high ranking Chin State government officials (Focus Groups-1, 2, 3).

5.5 Challenges and Prospects of Institutions for Coordination in Water Resources Management in Hakha

Despite the newly drafted national water policy which supports the initiatives and efforts towards integrated watershed management for river basin, sub-river basin and streams in Myanmar, the findings from the filed still indicate little or no coordination between the several actors who are responsible for water resource management in Hakha. Evidence from the key informant interviews with officers from the concerned departments indicates that all government agencies try to address issues concerning water and natural resources individually, while NGOs and local institutions are denied direct participation in any decision making process because of the political systems from successive governments. Most challenging for integrated

water resource management in Hakha is the lack of laws, policies and guidelines which force the concerned institutions to take a fragmented approach to the management of the Hakha watershed with different organizational objectives.

The findings indicate that the local people and officers from the government institutions recognize the need to come together to attempt to solve some of the problems regarding water scarcity challenges and climate change (Focus Groups-2 and 3). Though most of the stakeholders interviewed showed willingness to work together in an effort to solve the crucial issues such as deforestation of Hakha watershed and land and water degradation, it was found that no policies exist to allow the stakeholders to come together for coordination in integrated water resource management.

This research hopes that if government agencies understand the urgency of coordination among stakeholders in water resource management, future integration efforts may be more successful. Government institutions cannot achieve and implement integrated water resource management in Hakha without the coordination from local people, private sectors and NGOs (Government-3, 15 May 2015). At the same time, it was found that the participation of stakeholders such as NGOs and local people (see table-3 in section 3.2) may not easily be translated into effective integrated water resource management because without clear policies and guidelines it is not clear to what extent the views of stakeholders are given space to be incorporated.

5.6 Summary

Though laws and policies on water related resources have been drafted by water professionals with the support of government, World Bank, and NGOs, there has been weak enforcement and implementation at the ground level. It is found that the institutions in Nay Pyi Taw have no effective enforcement at state and regional level while the governments remain reluctant to draft bills on these crucial issues. The institutions from local authorities at state and township level have separately addressed water and natural resource management in Hakha but without collaboration

between them. The findings indicate that institutions in Hakha failed to implement integrated water resource management because of inadequate laws, policies and serious corruption in political systems.

At township level, the local politics very much influence the management of water because of the collapsed political systems of Myanmar which affect the local level. Even after the quasi-democratic civilian government of Burma took power from 2011, the voices of local people continue to be neglected and their participation in the decision making process for local development denied. Local CSOs and NGOs are unable to take part because of the Chin State government policies which are too much influenced by the Central Government.

CHAPTER VI
CONCLUSION, RECOMMENDATION AND DIRECTION FOR FUTURE RESEARCH

This chapter will answer the main research question and address the major development changes in Hakha, impacts of water access and allocation, and institutions, policy and laws in Hakha, Chin State, Myanmar. Chapter 6 is presented herein as Section 6.1 Conclusion, Section 6.2 Recommendations and Section 6.3 Direction for Future Research. This chapter is to sum up the main findings from field research, express interests for future research and make some recommendations to the concerned parties in water resource management in Hakha.

6.1 Conclusion

The first major development change in Hakha over the past 50 years was Hakha becoming the capital city of Chin State in 1965. After becoming capital, development changes such as basic infrastructures, roads, school and hospital, government buildings, housing for private sectors, economic development, population growth, land uses changes, deforestation were seen while the political system shifted in 1965 and 2011 from a socialist government regime to a military regime. Road construction to Kan- kaw and Matupi in 1976 and 1981 respectively (see photo in section 3.7) brought big changes that had a direct negative effect on the Hakha watershed because the two roads were constructed to pass the watershed area in Rung Mountain. At the same time, military camps, monasteries, pagodas, private housing and public buildings like police headquarter; post offices and other buildings were being built from 1977 to 2014 in the outskirts of Rung mountain watershed and along the mountain range (See section 3.1).

Dramatic population changes in Hakha started with a three-time increase from 16,992 in 2001 to 45,000 in 2014 along with the city's expansion, though economic development changes fluctuated slowly. With population growth now three times higher than in 2001, the city expansion is four times greater than the 7.94 square miles in 2001 to 33.36 square miles today. Because of rapid population growth in Hakha,

the existing water sources cannot meet the basic needs of water users in the city (See section 3.5). Also, the political system changes in 1962, 1988 and 2010 have greatly impacted these issues. During the past 50 years of socialist regimes and military junta regime, few positive development changes related to biophysical and social-economic conditions could be seen in Hakha watershed context. This research found several major changes in social-economic conditions in Hakha watershed context such as changes in infrastructure, economics, population, land use and deforestation which have had little positive and huge negative impacts on the people of Hakha.

Research found that the causes of water scarcity in Hakha were predominantly serious deforestation and burning of forests, land degradation, soil erosion and landslides, lack of planning for housing for human settlement and irrigation, military camps and offices construction on Rung Mountain, road construction on the watershed areas, and corruption in political systems (See Section 3.6). Water scarcity in the city has a direct impact on the lives of local people with relation to health such as diarrhea, washing and sanitation, economics such as money spent on water, livelihood such time spent on water collection and being unable to grow vegetables, and social problems such as conflicts among the communities, corruption and stealing water in the city (See Section 4.1). The concluded findings show that the systematic neglect of the Chin people in the past dictatorship rule brought the State to its poorest stage with 71% under the international poverty line, according to a report by the World Bank Group (The World Bank Group, 2014).

The responses to water scarcity in the city vary from one formal institution like Governmental to another informal institution like Local because of differing interests, capacity and capabilities. There is a lack of laws, policies and formal institutions for water resources in Myanmar and weak enforcement of existing laws by governmental institutions. Also, the informal institutions like local community and local committees have been repressed and unable to take part in decision making for this crucial sector. The governmental institutions as formal response to water scarcity in Hakha are so weak that the demands for water needs in Hakha cannot be met, while local institutions as informal are only allowed to arrange the re-allocation of existing

water resources to their respective communities through rotation systems, while the private water vendors keep their sources to maintain and supply water to their clients. Though responses and approaches to the management of water scarcity had been superficial, ineffective, and risky to the main watershed areas before 2014, there is new hope for the local people in a new project being constructed by Myanmar Ahla Company Limited, supported by the Burmese president in 2014 (See Section 4.4).

Enforcement of any policy drafts by water professionals in Myanmar was found to be weak at ground level. Institutions do not work together to find solutions to the existing problems and instead attempt to manage water individually. While local and private institutions are denied or restricted to participate in natural and water resource management in Hakha, the government institutions face challenges with staff capacity and skill. Local politics has an effect on water management and the voices of local people are for the most part neglected and the local people, NGOs and CSOs cannot be found in any decision making process.

Changes in socioeconomics, infrastructure, land and deforestation, population growth and political systems in Hakha have brought many impacts to the local people. For a decade, the people have face water shortages, local climate changes like the increased temperatures and heavier rain which causes mudslide, landslides, and flooding. Heavy rainfall in July 2015 caused flooding and landslides because of deforestation, soil erosion, land degradation and left more than 7000 local people displaced in Hakha (Holy, 2015).

Local institutions, particularly in the water sector, local people, local development committees and the Hakha City Development Committees can be understood as the fourth power[17], which can promote good governance in the democratic transitional process and people-centered development. Local institutions have the potential and the power from the people to promote good governance by ensuring local governance. Chin State government has to coordinate water resource

[17] In Burma, the first power is Military, the second is Government, the third is Parliament and the Fourth is Civil Society organizations.

management by meeting at least once a month to ensure that the government can conduct a public service to the local community according to the standards which stimulate the legitimacy of the public authority. The current failed management of the local Chin State government in water resource management is not only down to inadequate laws of the Union but also the former military influenced systems and behavior with the present high ranking officials being ex-generals and military personnel (Please see Section 3.7). This research found that local institutions can be successful in management within the state and national development framework if government institutions collaborate with them from a bottom-up approach in any development projects.

Some problems and challenges being faced include limitations on human resources, firm laws, policies and mechanisms for integrated water resource management and operational budgets. Now the voices of the local people have been given more attention by the local government due to the recent protests over the unsatisfactory services provided by the State Government. Local institutions are empowered to help local people claim their right to water and deliver informal legal consultations for any development projects by the State. It is believed that the role of local institutions is to ensure proper governance practices in water and other development sectors to bring social justice, equality and water resource awareness which will contribute to the development of the whole Hakha community (See section 5.4).

6.2 Recommendation

Hakha watershed and natural resources in Hakha, if well preserved, are not only vital to the conservation of water resources but also to the ecosystem which in turn offers vital support to the sustainable livelihood of more than 40,000 people in Hakha. It is essential that ecosystems are taken into consideration in town planning and water and natural resource management for the long-term benefit to the Chin people.

6.2.1 Recommendation to Chin State Government

The Chin State government must adopt sound policies for natural resource management, including water, forest and land, taking a more inclusive, people-centered approach to encourage stakeholder participation and promote sustainable development.

This study urgently recommends that the Chin State government reconsiders the stationing of military camps in watershed areas to enable the current proposed efforts for integrated water resource management to be achieved without any hindrances.

It is also recommended that afforestation policies must be set in the watershed areas and surrounding areas and that the local people, local institutions and private sectors can participate in the project through integrated management.

6.2.2 Recommendation to the Local Institutions

Since local institutions such as the Local Development Committees and Hakha City Development Committees are already aware of the water scarcity issues, deforestation, land use changes, and weak town planning, it is recommended that they engage with the Chin State government to promote their participations in decision making processes for current and future development projects.

It is recommended that local institutions give greater priority to capacity building for policy making water resources management, rather than simply providing a service for supply and distribution of water to the local people.

The local institutions should engage more with the media and academic research so that the community can be made more aware of these issues.

6.2.3 Recommendation to the Private Sectors

It is recommended that the private sector should demand more incentives for water resource management in Hakha, such as financial support, granting licenses and more participation from the government. This will enable them to coordinate with the government effectively to deliver a better service to the public.

It is also recommended that the private sector work on capacity building of staff so that they can be more capable of serving the good of the community.

In addition, it is recommended that Chin communities in Myanmar and abroad create a common pool resource for sharing knowledge, information, funds, and technology.

6.2.4 Recommendation to the Civil Societies

It is also recommended to the civil societies to engage with the local and State government about the plans and project of the Government so that all the development projects with the regions might be sustainable, helpful and healthy. It is also recommended to the civil societies to raise more awareness about the Town Plans, Environment Conservation and Preservation and water distributions in Hakha so that the Chin State government listen to the public voices and more productive polices to be utilized to serve the good of the community and people in the ground.

It is also recommended to the civil societies to build up capacities and capability so that all the development projects from Government and others including budget planning become transparent, accountable, healthy and sustainable for the long run.

6.3 Direction for Future Research

1. National land right policies affect land uses, agriculture and forests directly related to water and water resource management in Chin State and therefore any changes in laws can affect the livelihoods of local people especially in clean water access in rural areas in Chin State. Research is needed to discover

how national land use and land rights laws affect the livelihood of indigenous people in term of water access who still practice customary laws in Chin State.

2. The role of religious institutions plays a key role in development because of the work they do to promote awareness for the environment. For example, the Christian churches have Ecology Sunday, Awareness Rising for Climate Changes, Deforestation and Environmental Courses and Faith based organizations work on Environment and Water Supply in Chin State. Research is needed to find out the extent to which religious institutions held in water governance and environment as development in Chin State.

3. It interests me to see how much the role of civil societies in Burma promote good governance locally related to water resource governance in local areas. Therefore it should be researched on "The Role of Civil Society in Water Management in Burma in term of local governance?"

CHAPTER VII
POST SCRIPT

Chapter seven is the post script of my findings from the field research. The heaviest rain (7.33 inch) ever occurred in Hakha that caused flood and landslide because of deforestation, soil erosion, land degradation and lack of irrigation left more than 7000 local people displaced in Hakha in July, 2015 (Holy, 2015). It is worth noticing what have been faced by the local Hakha people after two months of my research there. Because it is important and significant to present the interrelation of my findings on land use changes for infrastructure such as housing, roads, pagoda, monasteries, churches and other government offices on previous upland watershed areas and heavy deforestation in watershed and forest in Hakha and Chin State to the local climate changes along with heavy rain which caused landslides and mudslides to destroy human residence in Hakha.

7.1 Causes of Flooding, Landslides and Mudslides in Hakha, July 2015

According to the findings on the research, one of the main reasons for local climate changes like storms, heavy rain which cause landslides and mudslides, drought, heat temperature and cold temperature is the global climate changes along with local area deforestation and so forth.

In particular case of Hakha for land uses, it is clearly found in the findings that there were no or – if there is one, it is a very weak town - plans, heavy deforestation on the all watershed areas in Rungtlang mountain and other places where water sources exist in Hakha and Chin State. First of all when Hakha was made the Capital City of Chin State, there were no specific town plans and there was no vision for a greater Hakha. As a result, roads were made to pass their houses meaning houses of local high ranking officers at that time) without proper irrigation systems and drainage systems, housing designs and open space in the city. The land uses for housing even inside Hakha town were not systematic and well planned in Hakha for the past 50 years. The land usage were changed for road construction to Kan-kaw highway and

Matupi highway in 1975 and 1982 respectively are very significant for landslides and mudslides happened recently in Hakha because the roads opened to construct houses in the upland watershed areas where there were deep forests.

In term of deforestation, it is learned in the findings that the Rung Mountain and other places around Hakha watershed were a virgin forests before 1950. Even though there were some changes in Hakha forests between 1950 and 1965, the changes were not that much visible. However the changes started from the year 1965 when Haka was made the Capital city of Chin State. It is also learned that the mass deforestation was not only by Kap Cun Nung, the then Chairman of Chin Socialist Council who ordered to cut the deep and virgin trees in Rung mountain watershed with the purpose for replanting other trees but the local people also cut the trees for firewood and house constructions around 1970s.

More importantly, deforestation was severely happened continually from 1970s up today in Hakha and Hakha watershed areas during the Socialist regime and military regimes. Even 1200 Acres had been lost on the past 50 years according to the Executive Officer of Hakha Forestry Department. It is assumed in the hearts of Chin people that militarization and Burmanization were the unwritten policies of the military regimes because military camps, pagodas and monasteries had been stationed and constructed in every top hillocks and mountain top in Hakha and other cities in Chin State. Therefore it is found that they were one of the main causes for deforestations on the Hakha watershed and mountains in the water sources areas (see section 3.6 & Forestry Officers).

In my conclusion weak town plan, land use inside the Hakha city and the upland watershed areas of Hakha, deforestation in the whole country and State, and local and global climate changes are the main causes for soil erosion, lack of water runoff control which in turn caused mudslides, flood and landslides in Hakha from 14 July 2015 to 30 July 2015.

7.2. Impacts of Flooding, Landslides and Mudslides in Hakha, July 2015

The heaviest rain (7.33 inch) ever occurred in Hakha that caused flood and landslide because of deforestation, soil erosion, land degradation and lack of irrigation left more than 7000 local people displaced in Hakha in July, 2015.These all were the turning point for the local people ever in a life time of history in Hakha. It was never expected to experience such severe natural disasters in Hakha town and heavy collapsing landslides of Mount Rungtlang which beauty, distinctiveness and histories were composed and written. But when it was heavily raining nonstop for nearly a month in July in 2015, the landslides from Mount Rungtlang and mudslides from the historic Ralkap Tili Lake in the outskirt of Rungtlang left more than 7000 people displaced in temporary camps and churches in Hakha, and more than 700 houses were destroyed in July 2015 (Thang, 2015).

Since the end of July, six primary and middle schools had been closed because of the landslides. Therefore many students estimated around 500 could not go to schools due to the collapses of schools and many people had been facing difficulties to healthcare services because the hospitals were affected by the flood and the landslides. As a result, they had to move it to safer places which were far from the communities. The worst things for both victims of the disaster and the safe local people facing were shortage of rice which is main staple food for the local people, vegetables, patrols, medicines, blankets and other supplies because the roads from mainland Burma were cut off by the severe landslides in many places. Even though some had money to buy rice and things, there was nothing to buy in the city because all the rice and vegetables imported from other Regions and town had been in shortages (see Section 3.4 in the text).

Even when it has been two months and some roads were reconstructed after natural disasters in Hakha and Chin State, the price of one rice bag (20 Km) is till more than 800,00 Ks and all the prices of vegetables, things and meat became triple for a safe local people but for those who are evacuated into camps, they had been supplied by Chin, None Chins, Government, NGOs, volunteers, Churches, Buddhist Monks, Individuals, Music Bands, Actors and Actress from Film Association and

International Chin community with the contribution of estimated amount 2.00 Million USD. One significant of the positive impact of the disaster is that all the Chin people become more united to response the emergency reliefs and aids to the victims. But it is learned from the Chin State government requested 15 million USD for the whole State for emergency reliefs and reconstruction while Hakha Rescue Committee and Experts' estimated amount was more than 50 million USD. Now those people have still been staying there before the new Blocks are created after having well town plan in Hakha (Holy, 2015).

In my conclusion, it is reported from the Japanese, German and Myanmar geologists and topologists that all the landslides, mudslides and flood were occurred in Hakha because of mass deforestations and land uses changes and weak town plan which is the same finding from my research before the disaster (P. T. Hre, 2015). Therefore my research had been very significant and important to note and present to all the concerned parties in Hakha and Chin State for further preparation and awareness for the whole Chin people.

REFERENCES

Asia Development Bank. (2013). *Myanmar: Urban Development and Water Sector Assessment, Strategy, and Road Map*. Retrieved from Mandaluyong City:

Asian Development Bank. (2013). *Myanmar: Urban Development and Water Sector Assessment, Strategy, and Road Map*. Retrieved from Mandaluyong:

Bandaragoda, B. B. D. J. (2002). *Governance for Integrated Water Resource Management in River Basin Context*. Bangkok: International Water Management Institute.

Benjamin, S. (2012). Environmental Conservation Problems and Possible Solutions in Myanmar. *Contemporary Southeast Asia, Vol. 34, No. 2*, , pp. 217-248 Retrieved from http://www.researchgate.net/publication/236710781_Environmental_Conservation_Problems_and_Possible_Solutions_in_Myanmar

Bik, S. O. K. (2002). Histries were recorded *No.1 BEHS, Hakha Golden Jubilee Mangazine:1950-2000*, 144-151.

Biswas, K. A., Varis, O., & Tortajada, C. (2005). *Integrated Water Resource Management in South and South-East Asia*. New Delhi: Oxford University Press.

Chambers, R. (1989). Basic Concepts in the Organization of Irrigation. *Development Studies Journal*, PP. 28-50.

Chin State Government. (2014). *Laws, Rules and Regulations for Chin State Municipalities.* Hakha: Chin State Government.

CHRO. (2012a). *Threats to our Existence: Persecution on Ethnic Chin Christian in Burma*. Retrieved from Thailand:

CHRO. (2012b). *Threats to our Existence: Persecution on Ethnic Chin Christian in Burma. Thailand: Wanida Press.* Retrieved from Thailand:

Committee, M. (2002). No. 1 BEHS HAKHA Golden Jubilee Magazine: 1950-2000, 2.

Creswell, J. W. (2007). *Qualitative inquiry and research design: Choosing among five approaches.* . London: Sage Publications. .

Editor (Producer). (2012, 04, April). Govt to Hold 'Thingyan' amid Water Shortages in Hakha. *The Chinland Guardian* Retrieved from http://www.chinlandguardian.com/index.php/news/item/1300-govt-to-hold-thingyan-amid-water-shortages-in-hakha

Editor. (2015, 22 May, 2015). The most danerous things behind development projects Editorial *The Chinland Post*. Retrieved from http://thechinlpost.com/index.php/chin/full-width/558-chinram-thanchonak-rian-phen-ah-tih-a-nungmi-cawlcanghnak

ESCAP, U. (2013). *Water Security and Water Agenda*. Retrieved from Hamilton:

Global Water Partnership. (2012). *Perspective Paper on Increasing Water Security*. Stockholm: Global Water partnership.

Guardian, T. C. (2015). Hakha residents protest against police quarters construction. *The Chinland Guardian*.

Holy. (2015 30 July). Hakha was severely hit by Natural Disaster. *The Chinland Post.*

Hre, N. (2002). Once Hakha City and Our School. *No.1 BEHS, Hakha; Golden Jubelee Magazine:1950-2000*, 3.

Hre, P. T. (2015). Research Finding on Hakha Landslides released by Japanese Geologiests. *The Hakha Post*, 2.

Hu, B. (1996). Literacy and Language Maintenance in Chin State, Myanmar.

Hu, B. (2002a). The Best Heritage Hakha-Gangaw Road. *No.1 BEHS, Hakha: Golden Jubilee Magazine- 1950-2000*, 74-79.

Hu, B. (2002b). No. 1 BEHS, HAKHA; Golden Jubilee Magazine: 1950-2000, 4.

Human Rights Watch. (2009). *"We Are Like Forgotten People" The Chin People of Burma: Unsafe in Burma, Unprotected in India.* Retrieved from New York:

Hyland, S. (2014). Integrated Water Resources Management in Myanmar. *PISASPEAK*, 1-4.

Kio, C. (2014). *The History of Origin of Lai People*. Yangon: Dingdi Music Magazine Committee.

MIID. (2014a). *Support to Chin State's Comphrehensive 5-Year Development Plan and Annual Planning 2016-2021 with Local Social Plan*. Retrieved from Yangon:

MIID. (2014b). *Support to Chin State's Comphrehensive 5-Year Development Plan and Annual Planning 2016-2021 with Local Social Plan. .* Retrieved from Yangon:

Min, S. A. (2014). *National Water Resource Managment in Myanmar.* Paper presented at the Environment Conversation in Myanmar Nay Pi Taw.

Ministry of Health. (2011). *Myanmar Multiple Indicator Cluster Survey 2009 - 2010*. Nay Pyi Taw: Ministry of Health, UNICEF and Ministry of National Planning and Economi Development

Ministry of Immigration and Population. (2015). *The 2014 Myanmar Population and Housing Census: The Union Report*. Nay Pyi Taw: Ministry of Immigration and Population.

Onn, L. P. (2013). *Water Issues in Southeast Asia*. Singapore: Institute of Southeast Asian Studies.

Puustjarvi, E. (2000). *Review of Policies and Institutions Related to Watershed Management in Myanmar* Retrieved from

Sakhong, L. H. (2003). *IN SEARCH OF CHIN IDENTITY: A Study in Religion, Politics and Ethnic Identity in Burma* Copenhagen S: Nordic Institute of Asian Studies

Thang, R. L. (2012). *Remittance and Rural Development in Chin State: Case Study of Aibur*. (MA), Chulalongkorn University Bangkok.

Thang, T. Z. (2012, 29, May). Water Shortages Worsen in Falam due to Military Constructions. *The Chinland Guardian*. Retrieved from http://www.chinlandguardian.com/index.php/news/item/1340-water-shortages-worsen-in-falam-due-to-military-constructionsa

Thang, T. Z. (2015). Hakha-based artists, media to hold fundraising concert. *The Chinland Guardian. .* Retrieved from http://www.chinlandguardian.com/index.php/chin-news/item/2373-about-700-buildings-evacuated-in-hakha-after-landslidesa

The Chinland Post. (2015). Local Hakha people face hardships because of water scarcity *THe Chinland Post, 3*. (No 92), 1-3. Retrieved from www.thechinlpost.com

The Editorial Board. (2015, 6-12 March). Hakha Public face serious hardships because of water scarcity *The Chinland Post*, p. 3.

The Hakha Post. (2015, 11, March, 2015). Hakha Drinking Water project constructed in Timit stream by Myanma Ahla Company might come to Hakha town next September. *The Hakha Post*.

The Pyitawnsuh Parliment. (2012). *Environment Conservation Law*. Nay Pi Taw: Ministry of Forestry.

The World Bank. (2014). *Myanmar Ayeyarwady Integrated River Basin Management Project*

Draft Environmental and Social Management Framework. Government of the Republic of the Union of Myanmar Retrieved from https://www.worldbank.org/content/dam/Worldbank/document/EAP/Myanmar/ESMF%20AIRBM%20Project(English).pdf.

The World Bank Group. (2014). *MYANMAR : A SYSTEMATIC COUNTRY DIAGNOSTIC-Ending poverty and boosting shared prosperity in a time of transition*. Retrieved from Yangon:

UNDP. (2013). *A New UNDP for A New Myanmar*. Retrieved from Yangon:

UNESCO. (2012a). *Managing Water Under Uncertainty and Risk: United Nations World Water Report 4*. Retrieved from Washington DC:

UNESCO. (2012b). *Managing Water Under Uncertainty and Risk: United Nations World Water Report 4.* . Retrieved from Washington DC:

UNESCO, I. (2014). *Myanmar Integrated Water Resources Management Strategic Studies* Retrieved from Yangon:

Watts, N. L. P. a. M. (2001). *Violent Environments*. London: Cornell University Press.

World Bank. (2008). *Watershed Management Approaches, Policies, and Operations: Lessons for Scaling Up.* . Retrieved from New York:

World Economic Forum. (2014). *Natural Riches? Perspectives on Responsible Natural Resource Management in Conflict-affected Countries* Retrieved from Geneva:

APPENDIX

APPENDIX 1: QUESTIONNAIRES FOR INTERVIEWS

In order to get the accurate and genuine data, I tried my best to explain to the interviewee the purpose of my research and what the information would be used for. Only after they gave me full consent, the below research questions were asked to key informants and groups as well.

Sample Questionnaires for Key Informants

Major Development Changes

1. What is your name? Please/ what is the name of your departments or ministry and your position?
2. What is your role in your department or organizations?
3. What have the major development changes in Hakha in term of infrastructure in the 50 years?
4. What have the major development changes in Hakha in term of economic growth in the 50 years?
5. What have the major development changes in Hakha in term of population growth in the 50 years?
6. What have the major development changes in Hakha in term of land use changes in the 50 years?
7. What have the major development changes in Hakha in term of political system in the 50 years?
8. What have the major changes in term of seasonal scarcity of water in the 50 years?

Water Access and Allocation

9. What do you think the water quantity now from the past 20 years?
10. What is the quality of water access in the past 20 years?
11. What is the water quality of water access now?
12. Who can access water most?
13. Who cannot access water? Why?

14. How do you arrange to allocate water in Hakha?
15. What are the mechanisms to allocate water?
16. Do you have some mechanisms to manage open water access from springs, wells and streams?
17. What are the major reasons of changes you think for the water scarcity now?
18. Do you think that this is related to Deforestations, Land Use changes and population growth and so on?
19. Do you think that the local people access water as the past 20 years?
20. If not, what are impacts of not having access to water?
21. How does it affect the social life of the local people?
22. How does it affect the livelihood?
23. How does it affect economic?
24. How does it affect health?
25. How do you arrange the participation for local people in political process?

Institution Arrangement

26. What are the institutions, laws and policy for water resources management you know in Hakha and what are your priorities for such water resources management as a department or an organizations or as a group or as an individual?
27. In your departments do you have specific policy for water resources management and if yes, what are they?
28. Do we have an appropriate institutional structure that can facilitate Hakha water resources management?
29. As departments/ organization do you have cooperation with other departments and organizations for water resources management? If yes how many times you have coordination meetings or workshops for that?
30. If not, why do you not have such cooperation or coordinator meetings? What are reasons and the biggest hindrances to do so?
31. Do you have arrangements for participation of stakeholders to coordinate for water resources management i.e. hydrology, agriculture, forestry and social sciences i.e. economics, communication, psychology, political sciences in your planning, research and implementation of your programs?
32. Do you involve the knowledge from all relevant disciplines such as environmental sciences i.e. hydrology, forestry and social sciences i.e. economics, communication,

political sciences in your planning, research and implementation of your programs?

33. In your decisions regarding management and development initiatives in Hakha watershed do you involve all stakeholders' knowledge including local knowledge?
34. Can you specify mechanisms used like consultations or meetings, empowerment?
35. If you don't have, why don't you have such procedures?
36. What are the intervention mechanisms for water allocation and water distributions in water resources management?
37. In your departments or organizations what is your view with regard to managing the watershed collectively?
38. Are you supported by the management of your departments/ organizations to get involved in integrated activities for water resources management?
39. Do you support the activities of integration in Hakha watershed in terms of resources? If you do? In what way to you support them?

Sample Questionnaires for Focus Group

Major Development Changes

1. What have the major development changes in term of infrastructure in the 50 years in Hakha? What are your house, family and roads?
2. What have the major development changes in term of economic growth in the 50 years in Hakha? What and where are you income?
3. What have the major development changes in Hakha in term of population growth in the 50 years? Household members? Increase or decrease?
4. What have the major development changes in Hakha in term of land use changes in the 50 years? What level and how do you access to land? How do you thin land in Hakha?
5. What have the major development changes in Hakha in term of political system in the 50 years? What do you think of political change?
6. What have the major changes in term of seasonal scarcity of water in the 50 years?
7. What are your experiences of changes over water quantity and quality from the past 20 years to today?
8. In your own view, what are the reasons of changes over quantity and quality of water from the past 20 years from now?

9. Do you think Hakha watershed is being degraded? If Yes, why? And if not, what are the other reasons for such changes do you think?
10. Water is very scarce in Hakha now, If you agree, what is your rating of the problem 1) It is very critical and requires urgent attention 2) It is critical but does not necessarily require urgent attention 3) It is not critical it is only exaggerated by the politicians and the media 4) It is not even a problem
11. What do you think are the causes of Hakha forest watershed impairment? Do you think that is because of a) government policy on Water resource/ forest and land b) Growth of population c) Inefficiency in forest management d) Poor government policy e) Political influence f) Corruption g) Any other reason

Water Access and Allocation

12. What is your water quantity and quality of water access in the past 20 years?
13. What is your water quantity and quality of water access now?
14. Who can access water most?
15. Who cannot access water? Why?
16. What are the major reasons of changes you think for the water scarcity now?
17. Do you think that this is related to Deforestations, Land Use changes and population growth and so on? Why you think that the rich can exploit the natural resources/
18. Can you access water as the past 20 years?
19. If not, what are impacts of not having access to water?
20. Are you affected by water scarcity and Hakha forest watershed degradation?
21. If yes, how are you affected?
22. Who are most affected in Hakha, which blocks? And what groups like men or women in the household? If women are most affected? Why?/ If men, why?
23. Does it affect your social life, livelihood, economic, health, and your participation in political process?
24. How is your livelihoods affected by degradation of upstream watershed?
25. I heard that you pay for water, so how much do you pay for water for domestic use per week or month?
26. What are the land uses in Hakha watershed? Please say your opinion a) Farming b) Infrastructural Changes c) Road Construction d) Deforestation e) Any other.

27. In what way do you think the land uses and forests burning are affecting the water resources like increase in surface water runoff, reduction in water infiltration d) Ground water decline, increase in soil erosion, sedimentation of lakes and streams and increasing Stream flow?
28. Any other way in which water resources are being affected?
29. What do you think are the socio-economic impacts arising from Hakha watershed impairment? Do you think that these are causing increase in water scarcity, low vegetable production due to lack of water, conflicts due to water scarcity and Water related diseases?
30. In your own opinion what do you think should be done to tackle the problem of Hakha water problems and Hakha watershed problem? Can this problem be solved by afforestation, enhanced management of forests aimed at preventing further land use, fire and cutting trees and participation from all stakeholders among interest groups again?
31. Are a community water users association and community water committee set up in Award help you to get a fairer water allocation and distribution in Hakha watershed forest and water resources?

Institutional Arrangement Questions for Focus Groups and Other Key Informants from Local People and NGOS!

32. What are you roles as local stakeholders in water resources management in Hakha?
33. What are you doing as local stakeholders to address the problem?
34. Do you think government regulation provided in laws and policy as provided for Water resources Management and other relevant mechanisms are sufficient in addressing the Hakha water resource management and Hakha watershed problem?
35. If No, what other measures should be taken to solve the problem?
36. Do you think locally controlled management of water resources can help in addressing the Hakha water allocation and Hakha watershed problem?
37. What role do you think water resources management Authority or Hakha municipal is playing in the management of water resources in Hakha water distribution and Hakha watershed?

38. Do you think integrated management of the Hakha watershed can help in addressing the problem?
39. What are some of the challenges towards integrated management of water resources in the watershed areas?
40. What do you think should be done to overcome the challenges?
41. What are you expecting to come in the next two years if this is not solved by the government quickly?
42. What are your expectations or participation for the new water dam project?

APPENDIX 2
STAKEHOLDERS IN HAKHA WATERSHED AREA

Table 3. Stakeholders of Hakha Watershed and Water Resource Management in Hakha

Primary Stakeholders	Interests	Resources Perspectives	Risks Challenges
Local Water Users	Water Sufficiency and Water Resource Searching	Resources: Local Knowledge Perspective: traditional value/ practices	Risk: Low Challenges: lack of awareness and political participation in decision making process
Upstream Community	More water and related resources extraction like forests/ lands	Resource: Local Knowledge Perspective: customary practices/ values	Risk: Low Challenges: lack of awareness and participation in decision making level
Downstream Community	More access to distributed water from Block and City Municipal	Resource: Local knowledge Perspective: traditional practices	Risk: Low Challenges: Less water resource and lack of awareness in community
City Development Committee	More Water resource searching and Allocation	Resources: Local Knowledge and Technician Perspective: traditional practices	Risk: Middle Challenges: lack of participation in political process like

			decision making
Hakha Municipality	Partnership with CDC on Water Supply /Allocation and Distribution Systems	Resource: Laws. Policies, Guideline Perspective: Financials/ Human Resource	Risk: High Challenges: Inadequate Laws, Policies, Guidelines and Financial Supports from Central government
National Water Resource Committee in Nay Pyi Taw	Water Supply along with water related resource management	Resource: Experts on Water related Resource Management Resource: Financial Support	Risk: High Challenges: Lack of Specific Water related laws, policies and guidelines yet
State Government Departments like Forest, Agriculture & Irrigation/ Land	Water and Natural Resource Management like Forest Conservation/ Land Use and Agricultural Purposes	Resource: Experts/ Resource Management Committee Resource: Financial Supports and Experts	Risk: High Challenges: Still weak implementations for the laws, policies and guided are highly centralized
Politicians	Votes/ Livelihoods for their constituencies	Resource: Policies and Laws plus Financial Support to the local people for water	Risk: High Challenges: Still lack of political power for legislations

		Perspective: Limited Space from 2008 Constitution	because their proposal are rejected and the constitution limit their legislative power for State
Local Communities	Water Sufficiency and Water Access	Resource: Local Knowledge Perspective: Traditional Practices	Risk: Low Challenges: lack of awareness and participation in local political processes
NGOs	Water Supply and Water Related Disease Prevention	Resource: Experts and Financials Perspective: Technician	Risk: Middle Challenges: Very limited participation in the process
Private Water Vendors/ Company	Water Supply and Interests from Water Prices	Resource: Local Knowledge Perspective: Traditional Value	Risk: Low Challenges: Lack of participation in the process

APPENDIX 3
MAPS OF HAKHA WATERSHED

Figure. What this photo wants to show is how all the upland watershed areas became bare and how the downstream people suffer in Hakha! Photo by the Author on 27 May, 2015

APPENDIX 4

List of Interviewees and Respondents in the Research

Code	Organization	Date
Government-1	Rep. of State Municipalities	11, May, 2015
Government-2	Rep. of Ministry of Agricultures	13, May, 2015
Government-3	Rep. of Hakha Township Municipalities	15, May, 2015
Government-4	Rep. of Forestry	24, May 2015
Government-5	Rep. of Land Use and Record Department	18, May 2015
Government-6	Rep. of Social and Development Ministry	26 May 2015
Local Development Committee-1	Block Administrative Body	11, May, 2015
Local Development Committee-2	Water Committee	11, May, 2015
Hakha City Development Committee-1	Community Representative	22 May, 2015
Hakha City Development Committee-2	Community Representative	22 May, 2015
Local NGOS-	Rep. of CAD	11, May 2015
INGO-1	UNICEF	23 May,2015
INGO-2	MIID	
Politicain-1	Chin State Member of Parliament	19, May, 2015
Politician-2	Chin State Member of Parliament	19, May 2015
Private Water Vendor-1	Dingdi Private Water Company	18, May, 2015
Private Water Vendor-2	Private Water Supplier	16, May 2015
First Focus Group Discussion	Upstream Area in Kan-kaw lam	18 May, 2015
Second Focus Group-	Downstream Area in Chin Oo Sii Block	21, May, 2015
Town Elders from Khuachung. Pyidawtha and Sakta lam	The Representatives of the whole town	28 May 2015

VITA

Bawi Lian was born in Aibur village, Thantlang Township in Chin State, Union of Burma in 1982 by the late Mr. Lung Peng and Mrs. Dar Kil. He studied his primary and secondary educations in his own village. In his grade ten, he went to Hnaring village for a year and then for his matriculation he went to Lumbang High School, in where he passed his matriculation in Lumbang village with his uncle who was a high school teacher in Lumbang village, Falam Township Chin State in 2000 academic year. Then he went to Yangon for his Bachelor degree while working there as a private tuition teacher for high school students.

After graduating in Bachelor of Arts in Theology, he went to India for Master program. He did Bachelor of Divinity (B.D) which is equivalent to Master of Divinity in Theology in Bangalore.

He previously worked as Director cum Teacher for Dagon Youth Development in Yangon for four years while doing his Bachelor degree. After he finished his BD, he worked as an Office Assistant at Euro-Burma Office for months. Then he returned his home town and worked as a Field Director of Chinland Development and Research Society based in Sweden, an organization that has worked in the local context with specific focus on water resource management and children education in remote areas of one of Burma's most isolated regions. His interest is in natural resource management in relation to policy and institutional management. As a person growing up under the military regime, he has been active in political activism in Burma for the last many years, and played a key role in organizing and mobilizing local NGOs in his capacity as Field Coordinator for Prague-based People In Need (PIN).

He completed his coursework and thesis for Master degree at Master of Arts in International Development Studies program, at the Faculty of Political Science, Chulalongkorn University in Bangkok, Thailand. This Master Thesis is for the completion of his Master in Arts in International Development Studies. He lives in Yangon and Hakha and speaks fluent Chin Languages (Hakha, Falam, Zophai, Lautu Dialects) Burmese, and English.