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IWRM in international river basins

Hydropower dams and transboundary water conflicts in the Lower
Salween river basin

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Abstract

Sharing a river's potential in terms of hydropower is a common way in transboundary river basins, especially in regions with rising energy demands. However, new strategies in river and basin management are necessary to sustainably benefit from water resources. Implementing IWRM concepts in the national policy is a standard process; the challenges are internationally shared basins. This study investigates the Salween River Basin in South East Asia, a transboundary basin shared by China, Burma and Thailand. The respective governments developed plans to use the Salween's hydropower potential and construct a dam cascade in the downstream part of the river. However, all three countries have different interests and IWRM implementation statuses in the projects due to different backgrounds and national developments. A status analysis of the basin concluded that China has mainly unilateral interests in the hydropower projects and no IWRM experience. Burma is still involved in its civil war and is in the early stages of IWRM. Thailand is actively involved in the transboundary organization of the Mekong River Commission, has integrated IWRM in its own policy and could serve as a leader in the basin. However, at this point, there is no basin-wide agreement over water resources in the Salween and the hydropower projects are the only existing cooperation plans between the riparian countries. Other transboundary agreements might be possible if certain steps and developments towards IWRM will be fulfilled.

Popular Science Summary

Although controversial, large hydropower dams are a popular way of generating renewable energy and many countries with major rivers already rely on them for a considerable portion of their produced energy. However, half of the worlds available freshwater resources are to be found in river basins shared by at least two countries. Although there is much cooperation and benefit sharing over water resources between the riparian countries (nations sharing a water body), international rivers often have a tendency towards tensions. Different interests and miscommunication between or within countries are amongst several other factors that can cause serious conflicts. To avoid or reduce tensions it is necessary to establish a dialogue between the riparians and implement new strategies for a sustainable use of the resource. Concepts such as Integrated Water Resource Management (IWRM) are new approaches that consider all sectors of the society and integrate every stakeholder involved to foster cooperation.

This study investigates the Salween River Basin in South East Asia, a transboundary (international) basin shared by China, Burma and Thailand. The respective governments developed joint plans to use the Salweens hydropower potential and construct several dams in the downstream part of the river. However, due to different backgrounds and national developments, all three countries have individual interests in the Salween. Additionally, every nation has a different IWRM implementation status. The main goal of the study was to research the current situation in the Lower Salween basin, in a transboundary perspective and from the riparian countries point of view.

The results were that no transboundary cooperation based on a sustainable water management concept exists so far in the Salween Basin. Upstream nation China has interests in the hydropower projects but does not respect possible downstream impacts for Burma and Thailand. Burma is still involved in its civil war but has major interests in selling hydropower to Thailand and China. Thailands economy also wants to benefit from the dams and is, just as China, strongly involved in the planning process. The national IWRM implementations strongly differ between the three nations. China has no IWRM experience and no intentions of implementing it, Burma is in the early development stages and Thailand is far ahead. The country is already active in another transboundary organization (Mekong), has integrated IWRM in its own policy and could serve as a leader in the basin.

Due to different backgrounds, interests and point of views in sustainable water management, there is no basin-wide agreement over water resources in the Salween possible at the moment. The hydropower projects are the only existing cooperation plans between the riparian countries. Other transboundary agreements might be possible if certain steps and developments towards IWRM will be fulfilled.

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Glossary of abbreviated terms

ADB	Asian Development Bank
AFD	Agence Française de Développement
BSPP	Burma Socialist Programme Party
CEMRA	Centre for Environmental Modeling and Risk Assessment
DWR	Department of Water Resources
EGAT	Electricity Generating Authority
EPDC	Electric Power Development Company
FAO	Food and Agriculture Organization
GIS	Geographic Information System
GMS	Greater Mekong Sub-Region
GWh	Gigawatt hour
GWDP	Great Western Development Program
GWP	Global Water Partnership
INBO	International Network of Basin Organizations
IWRM	Integrated Water Resource Management
JICA	Japan International Cooperation Agency
KNLA	Karen National Liberation Army
KNU	Karen National Union
MEPE	Burma Electric Power Enterprise
MRC	Mekong River Commission
MWC	Burma Water Commission
NDRC	National Development and Reform Commission
NEA	National Energy Administration
NEPO	National Energy and Policy Office
NWRC	National Water Resources Committee
SEPA	State Environmental Protection Agency
SIDA	Swedish International Development Cooperation Agency
SLORC	State Law and Order Restoration Council
SPDC	State Peace and Development Council
SSA-S	Shan State Army-South
TDA	Transboundary Diagnostic Analysis
UNDESA	United Nations Department of Economic and Social Affairs
UNDP	United Nations Development Programme
UNECE	United Nations Economic Commission for Europe
UNESCO	United Nations Educational, Scientific and Cultural Organization
WCD	World Commission of Dams
WFD	Water Framework Directive

1 Introduction

Water is our most precious resource and can be referred to as the foundation of all sectors in our society. However, it is unequally distributed over the planet and only about 2% of the available freshwater resources can be used for human consumption (Jägerskog and Berntell, 2009). The world's population steadily grows and more and more countries aspire after higher living standards - yet the available freshwater amount per capita remains constant. Additional factors like the industrialization of the agricultural sector, domestic use and also climate change are exacerbating the freshwater situation in many parts of the world. It is expected that by 2050 between 44% and 65% of the global population is going to experience water stress (Swain, 2004). Asia especially will have to deal with massive increases in urban population. The UN Population Division of the Department of Economic and Social Affairs (DESA) expects a growth between 1.9 billion and 3.3 billion people by 2050 (United Nations, 2011). Providing sufficient quantities of freshwater and energy for this upcoming generation will be a major challenge. Although controversial, large hydropower dams are a popular way of generating sustainable energy and many countries with major rivers already rely on them for a considerable portion of their produced energy. However, new strategies in river and basin management are necessary to sustainably benefit from water resources. IWRM is a popular sustainable approach and has already been integrated in several national policies; the key challenge is internationally shared basins.

1.1 Background: Transboundary water conflicts and cooperation

Half of the world's available freshwater resources are to be found in river basins shared by at least two countries, providing a livelihood for nearly 40% of the global population (World Bank, 2012). However, cooperation and benefit sharing in terms of river and water management cannot always be taken for granted in transboundary basins. Different interests and miscommunication between or within countries are amongst several other factors that can cause serious tensions and eventually lead to conflict (Jägerskog and Berntell, 2009). The significance in literature about the role of water connected to international conflicts has been steadily increasing in the last decades. Water professionals generally concluded in their studies that the resource will influence future riparian relationships and has the potential to increase conflict situations in several regions worldwide. Especially aridity and population growth stand out as prominent indicators for the cause of so called 'water wars'

in the future (Yoffe and Wolf, 2002). Nevertheless, an historical review indicated that there was only one instance of a water war over 4,500 years ago, yet over 3,600 water-related treaties (Wolf, 2007). These agreements are based on a shared interest in the water source; hydropower dams and water diversion projects are such examples of common joint projects in international river basins. In several cases a shared water resource helped to establish cooperation, Wolf (2007) therefore refers to water as a 'catalyst for cooperation'. However, water sharing can also decrease cooperation. Negative impacts and conflicts in terms of environmental and social damages, especially among riparian countries in a downstream-upstream context, are a common issue in international basins. Facilitating cooperation over water resources between all stakeholders is one of the major goals of effective transboundary water management. Several projects all over the world are concerned with this issue, not all of them successfully: The conflict hotspots are mainly located in the Middle East such as, the Euphrates/Tigris or the Jordan River (Yoffe and Wolf, 2002). There are also cases of productive cooperation in river management. A popular example would be the Danube River in Central and Eastern Europe; the EU Water Framework Directive (WFD) made it possible that all riparian countries along the Danube River share a singular water management guideline and cooperate within its framework (ICPDR, 2009).

1.2 Integrated Water Resource Management

Borders are able to turn water issues into political issues and affect other sectors like agriculture, industry and social development. The conflicts around water can be very complex and interconnected, becoming more so in the future (Rahaman, 2009). Biswas (2004) states that 'water can no longer be viewed in isolation as a single resource, without the explicit and simultaneous consideration of other related development sectors and vice-versa'. It is therefore necessary to implement new approaches in water management, which consider all sectors and integrate every stakeholder involved to enable sustainable development in basins and establish cooperative projects.

The most known concept for sector-wide water management is Integrated Water Resource Management (IWRM). It was first defined at the United Nations Conference on Water (Mar del Plata, 1977) as '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' (Global Partner Watership, 2007). This concept, co-developed by water professionals, governments and affected stakeholders, tackles all water related issues and integrates all sectors in one management process (Rahaman, 2009). However, IWRM is not a completely new idea. Several countries such as Spain in the 1920s, the United States in 1940 and Germany in 1960 developed individual approaches similar to IWRM, mainly focused on river basin management. After the successful introduction at the UN Conference in 1977, IWRM has

been a major topic in several international environmental and/or water conferences. The most important ones were the International Conference on Water and Environment (Dublin, 1992), the UN Conference on Environment and Development (Rio de Janeiro, 1992), the Second World Water Forum (The Hague, 2000) and the International Conference on Freshwater (Bonn 2001) (Rahaman, 2009). At the International Conference on Water and the Environment in Dublin in 1992, international experts defined the 'Dublin Principles'. The principles are:

1. Freshwater is a finite and vulnerable resource, essential to sustain life, development and the environment.
2. Water development and management should be based on a participatory approach, involving users, planners and policy makers at all levels.
3. Women play a central part in the provision, management and safeguarding of water.
4. Water has an economic value in all its competing uses and should be recognized as an economic good.

Since the introduction in 1992, the Dublin Principles are universally seen as IWRM's main guidelines and have contributed to several other agendas (Department of Water Affairs & Forestry, 2008). Nevertheless, also the following water-related conferences helped to continue implementing IWRM principles in international water agendas and collectively led to breakthroughs (Rahaman, 2009). The concept strongly differs from approaches that were established in the decades before. Back then the concepts were primarily based on interventional models changing landscapes to meet human needs. These technocratic concepts still remain in many parts of the world, especially China (MacLean, K. et al., 2004). However, IWRM is a concept that tries not to intervene in nature. It is based on sustainable development and the intervention is mainly focused on the coordination of stakeholders and the environment. The approach found worldwide acceptance and has gained recognition as an effective way to tackle the upcoming scarcity of freshwater resources in several parts of the world. Particularly in Asia, several countries have adopted the model as a strategy to foster hydro-management over national and international water resources. However, every nation has a different IWRM experiences, which depends on the country's motivation and interest in the respective freshwater resource. This makes it particularly difficult to introduce a transboundary context, with two or more states sharing a river and a basin. International organizations and water professionals promote strategies and offer support for a joint agreements in river basin (GWP et al., 2012). Nevertheless, every basin is unique and there is no universal approach, only guidelines exist. In order to assess how the strategies work in practice, this study will focus on one set of guidelines and analyze the current national and transboundary IWRM status of riparian countries in one particular basin in SE Asia.

1.3 Research questions

Asia's river basins constitute the basis of existence for millions of people, covering several countries. National borders often do not correspond with watersheds and the basins tend to have a potential for political, social and economical conflicts. Also different interests over water resources complicate communication and hinder developments for basin management. This study concentrated on Integrated Water Management in an international river basin - the Salween River Basin in SE Asia - and analyzed present developments in its implementation. Local hydropower projects are taken as examples to investigate the conflict potential in the area and to study the IWRM status in the region. The work was supported by field trips along the Salween River and interviews with stakeholders in the Thai basin area and the closest bigger Thai city, Chiang Mai.

The main questions discussed in this study are:

1. What are China's, Burma's and Thailand's political and socio-economical interests in the Salween River and, in particular, in the planned hydropower dams?
2. What is the current national and international IWRM implementation status in the Lower Salween River Basin?
3. Are hydropower agreements the only possible way of cooperation in the Salween River Basin?

At first there will be a description of the river basin, the dam projects and an identification of the current state of transboundary conflicts. The second part analyzes the involved riparians, their different interests and intentions in the hydropower dams. In the methodology part the paper examines the current situation in the Lower Salween by using the Global Water Partnership's (GWP) IWRM guidelines for transboundary river basins. The riparian countries will be considered separately and in a transboundary context. After presenting the results, the discussion part analyzes the possibility of a transboundary IWRM agreement in the Salween. Finally, the summary concludes and gives a future outlook.

1.4 Methodology

The study's methodology is a qualitative analysis of a case study. The analysis part is based on the Handbook for Integrated Water Resource Management in Transboundary Basins of Rivers, Lakes and Aquifers which was released by the International Office for Water and its partners. The handbook offers guidelines for IWRM in international river basins, several examples and cases from all over the world support the handbook's theoretical approaches. The analysis can be seen as the heuristic case study of the Salween River, to study and evaluate the implementation status of IWRM in the area, with the help of the guidelines.

Additional data sources are interviews from a field trip to Thailand, mainly limited to Chiang Mai in the North of the country. The city is the closest and safest place to study the Salween, all the organization and stakeholders groups have their main offices in the city and operate from there. The interview partners were members of local and international organizations, all related to human rights or environmental protection. Since there is a lack of official information and literature about the river and the hydropower dams, the interviews in Chiang Mai were very useful for understanding the situation. The sharing of knowledge and discussing Salween-related matters helped to grasp the social, political and economical circumstances in the basin.

This study's purpose is not to implement new concepts or create an IWRM model. It will rather analyze the Lower Salween's current situation in terms of water management structures and the planned hydropower dams. The handbook, online literature and personal interviews provide the information.

1.5 Reason for choosing this study & limitations

In the context of transboundary river cooperation in SE Asia, the Mekong River most likely crosses one's mind. With the foundation of the Mekong River Commission (MRC) over 15 years ago the riparian countries developed an institution that governs and coordinates the benefit sharing of the river. According to Dr. Carl Middleton, a Mekong Program Coordinator, the water management policies within the MRC are practiced according to the IWRM concept. Although no transboundary IWRM agreement exists so far in the Salween River Basin, there are similar preconditions to the Mekong: both basins inhabit countries with growing economies (some states are even part of the Salween and Mekong) and both have downstream-upstream conflicts. However, the Salween is, compared to the Mekong and several other international river basins, undeveloped and has not raised much of attention worldwide, yet. The main reason for choosing this particular river basin is the low amount of research work that has been conducted so far, especially in terms of transboundary river management. The literature is therefore rather limited: Thailand and Myanmar have released national water management plans, but nothing referred particularly to the Salween. Scientific papers are rare or not directly related to the topic and most of the other resources are provided by environmental and human rights organizations.

It was clear from the beginning that the study has to face several kinds of limitations. A major one is the geographic boundary. The Salween is divided into a lower (Thai and Myanmarian) and upper (Chinese) part and all riparian countries have individual plans to construct hydropower dams in both segments. This thesis however concentrates on the hydropower projects in the Lower Salween. The reason is the particular focus on the Thai/Burmese border close to Chiang Mai and the transboundary water management issues in this area. The planned dam cascade in the Upper Salween has a different background and is mainly

focused on China, the transboundary context is not as dominant as in the shared part of the river between Thailand and Myanmar. Furthermore, the study is limited by the political situation in Myanmar. Especially the dam projects are a critical issue since the construction sites are located in areas where the conflict between military troops and local communities has led to several violent conflicts. It was therefore not possible to access the described dam sites in this thesis or to talk to people from the construction sites. Another problem was the location: The limited time in the region allowed me to get in touch with national and international organizations, scientists and journalists in Chiang Mai but made it difficult to meet with personally affected stakeholders (e.g. local fishermen, farmers and workers) in the border villages along the river. Visiting the Salween border region from the Myanmarian side is problematic since it is a military controlled region and reaching it from the Thai side is also difficult. The remote villages on the Thai side are mainly border and trading posts, collecting local information or organizing interviews were limited since nobody wanted to get involved or take the risk of loosing the trading privileges with Burma. Language barriers also aggravated the field studies: The Shan, Karen and Karenni communities speak different dialects and many locals do not even speak the common Thai language. It was therefore very difficult to find and interview people from the region who were able to speak English and to find suitable translators.

2 The Salween River Basin

For the purposes of understanding, this study refers to the 'Salween' when discussing its entire length. The 'Lower Salween' is the Burmese/Thai part and the 'Upper Salween' belongs to China. When discussing the Salween in China, the river is called after its Chinese name, the 'Nu River'. Within Burma the river is also known as the Thanlwin. The Salween River is the second biggest river in SE Asia and extends from China to Burma, along the Thai- Burmese border into the Pacific Ocean (International Rivers, 2013). As already mentioned in the previous section, this study will only analyze the Lower Salween River at the Thai/Burmese border region in terms of water management, the situation in the Nu River will be only explained briefly. However, China's role and influence as an upstream country cannot be ignored and will be discussed in due course.

2.1 Background

With its long narrow river valleys and mountainous topography, also known as the 'Grand Canyon of the East', the Salween River flows for over 2,800km from its source in the Tibetan Plateau southwards to the Andaman Sea (Figure 2.1). The basin covers a total of 320,000 km²; 53% of the area is located in the Yunnan Province in China, 42% is Burma and 5% is Thailand, mostly the border region. More than ten million people inhabit the basin, from over 13 different ethnic groups, who are all dependent on the basins resources. 320km north of its estuary to the sea, the Salween River forms a 120km-long border between Thailand and Burma, a mountainous area with narrow valleys. The river runs through the Burmese states of Mon, Karen and Shan, providing the livelihood of the local ethnic minority groups. Besides freshwater, the basin is rich in wildlife, forest, aquatic life and minerals. Especially fishery is one of the most important sources of protein; the rivers nutritious sediments are necessary to fertilize the farms and gardens during the dry season. The region is also famous for its caves, cliffs and waterfalls and serves as a popular tourist destination (Salween Watch, 2008*b*). Its impressive landscape and amazing biodiversity were the reason why the Upper Salween was proclaimed a UNESCO World Heritage Site in 2003 (International Rivers, 2012).

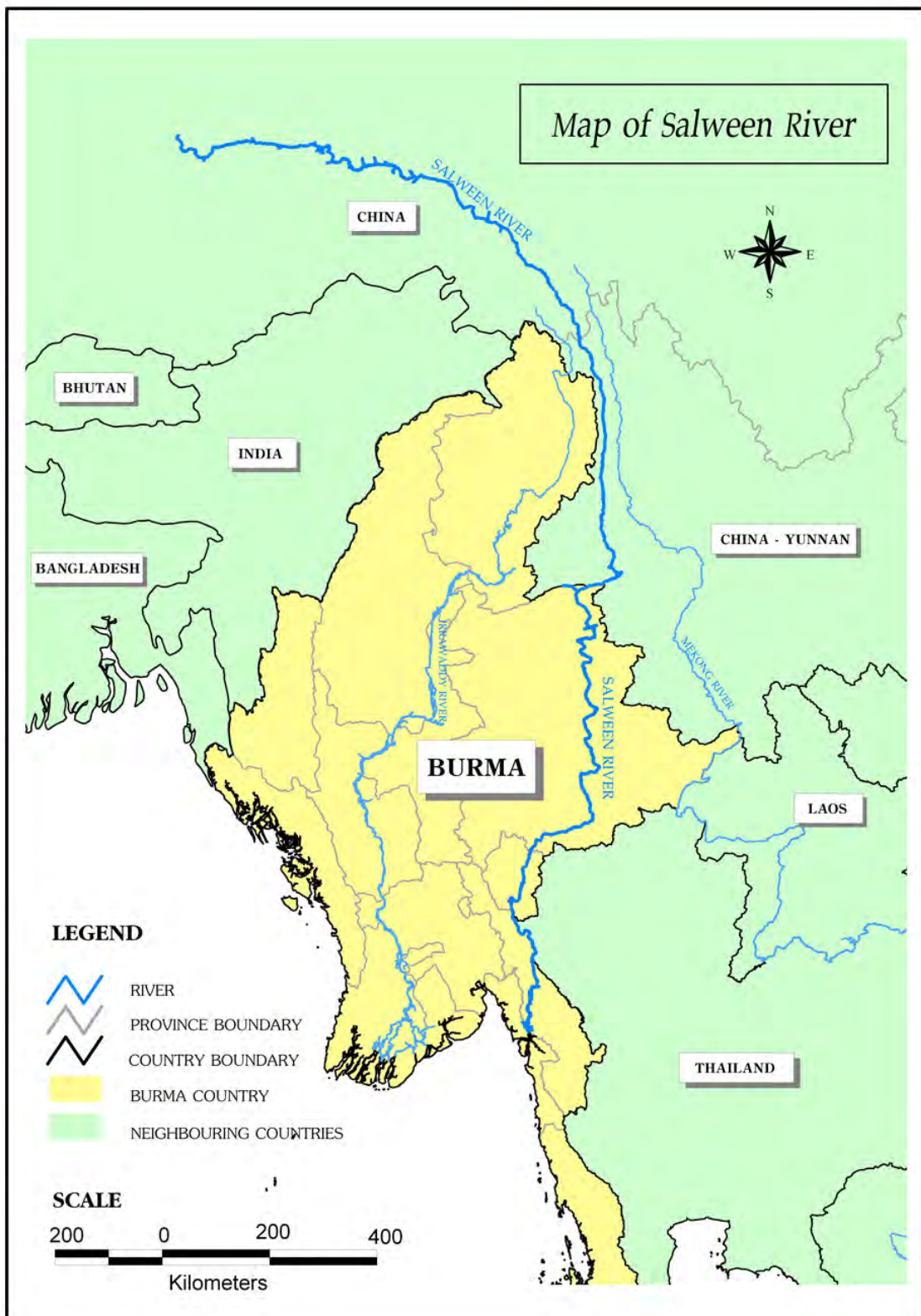


Figure 2.1: The Salween River(Salween Watch, 2007)

Equally to the Mekong, the Salween also originates in the Himalayas and the two rivers run parallel for several hundred kilometers. However, the Mekong is in fact over 1,500km longer and its discharge is, at 15,000 m³/s, almost 3-times higher than the Salween's (4,900 m³). However, the Salween has a higher hydropower potential: The topography provides nearly ideal prerequisites for dam sites along major parts of the river (Osborne, 2007). In the 1970's, hydropower companies and dam constructors from Japan, China, Australia and Thailand, along with financial institutions such as the World Bank and the Asian Development Bank, started to gain an interest in the Salween and conducted feasibility studies (Salween Watch and SEARIN, 2004). Besides power, water diversion has also been seriously considered, especially by Thailand. The country has a major motivation in the river basin's development and promoted plans for irrigation and transportation on the watercourse (Salween Watch, 2008a). Nevertheless, the river is still undammed and remains the longest free flowing river in the region - for now.

2.1.1 Chronological list of the Lower Salween River

The following table displays a timeline, which chronologically listing all major events and development in the Lower Salween Basin since the 1970's.

1979: Thailand's Electricity Generating Authority (EGAT) announces its intentions to conduct feasibility studies for 14 inter-basin water diversion projects. The freshwater would be diverted from tributaries of the Mekong and Salween River (TERRA, 2006)

1989: The Japan International Cooperation Agency (JICA) completed the feasibility studies (Wolf and Newton, 2004)

1989: The Thai cabinet sets up a work group that is responsible for the development of hydropower projects along the Thai-Burmese border. Representatives from the Burma Electric Power Enterprise (MEPE), Thailand's National Energy and Policy Office (NEPO) and EGAT join the committee (TERRA, 2006)

1991: The joint working group decides to involve Japan's Electric Power Development Company (EPDC) to conduct the hydropower dams' feasibility studies (Wolf and Newton, 2004)

1992: EPDC completes the studies and proposes 8 dams along the border with a total capacity of 6,400 MW and costs of US\$ 5.12 billion. The dam sites would be mainly on Karen territory (Burmese ethnic minority group) (TERRA, 2006)

1992: As part of the Salween freshwater diversion scheme the Thai cabinet approves the plans to divert water from the Salween River Basin to the Chao Phraya River Basin (Wolf and Newton, 2004)

1993: Protests from the Burmese ethnic minority groups to stop the hydropower projects;

The Karen National Union (KNU) states to involve armed forces in the case the problems cannot be solved (Wolf and Newton, 2004)

1997: Signing of Thai- Burmese Memorandum of Understanding, justification for the construction of large hydropower dams (Wolf and Newton, 2004)

2001: Thailand's PM breaks with former politics of keeping a distance with Burma; he encourages Thai companies to invest in the country and supports policies of cooperation and public support. Plans are made to construct a bridge across the Salween (AQUASTAT, 2011)

2003: Several alternative plans are made to divert water from the basin to Central Thailand. A system of holding dams, pumps and tunnels shall divert up to 2.2 billion m³ water per year from the Salween and its tributaries to the Bhumiphol Dam in the Chao Phraya River (TERRA, 2006)

2004: The governments of Thailand and Burma officially agree to construct five hydropower dams in the Lower Salween River (TERRA, 2006)

2005: Protests and petitions by affected local people continue. EGAT and the Burmese government refuse to disclose information and details about the dams (TERRA, 2006)

2006: Due to the critical situation in Burma, Thailand's Human Rights Commission appeal to the Thai government to stop the dam plans (TERRA, 2006)

2006: Sinohydro announces agreement with EGAT and MEPE to jointly develop the Hat Gyi Dam (International Rivers, 2012)

2007-2011: No construction progress, several protests from international organizations against the projects

2011: The Burmese military skirmishes with ethnic minority groups around dam sites (International Rivers, 2012)

2012: General peace talks between the government and the KNU (Winn, 2012)

2013: New plan: MEPE officially approves 6 instead of 5 hydropower dams on the Lower Salween in the Shan, Kayah and Karen State with a planned total capacity of 15,000 MW (see Table 2.1). The planning and construction will be conducted by EGAT and various Chinese companies (Salween Watch, 2013).

2.1.2 General: Hydropower dam projects

The dam projects in the Salween represent the trend of SE Asia's development and the region's increasing need for energy. In general, large dam projects have always been linked to the overcoming of nature, the successful altering of rivers and using water resources with the

Table 2.1: The 6 approved hydropower dams in the Lower Salween River (status: May 2013) (International Rivers, 2012, Salween Watch, 2013)

NAME	CAPACITY (MW)	HEIGHT (M)	COSTS (US\$)	STATUS
Hat Gyi	1,360	100	2,6 billion	Planning
Ta Sang	7,100	228	6 billion	Construction
Ywathit	4,500	Unknown	Unknown	Preparation
Nong Pha	1,200	Unknown	Unknown	MoU
Upper Thanlwin	1,400	unknown	unknown	Construction
Mantawng	unknown	unknown	unknown	Planning

newest technology. The dams built in SE Asia during colonial times had the main purpose to foster the agriculture of high-value crops and export the products to Europe. Today dams are mainly constructed for energy generation but are also a symbol of the country's 'civilized' status and demonstrate engineering capability (Salween Watch and SEARIN, 2004). However, in its 2001 status report, the World Commission of Dams (WCD) came to the conclusion that large hydropower dams are more harmful to a country than beneficial. After analyzing and reviewing over 1,000 dams in 79 countries, the WCD admitted that dams definitely made a significant contribution to human development in terms of energy production, flood control and the socioeconomic use. But in too many cases dams have been proven to be irresponsible and unacceptable in terms of impacts. On the one hand, dams caused floods and changes of ecosystems which led to significant and sometimes irreversible loss of species. On the other hand, besides the natural environment impacts, the WCD estimated a number between 40 and 80 million people who have been physically displaced because of a dam construction. The majority has never had the chance to regain their former livelihoods (Washington College of Law Journals, 2001). Nevertheless, it is important to distinguish 'good dams' from 'bad dams'. Good dams are projects with fairly low impacts and effective measures to alleviate these impacts in the future. Instead of the main water course, the dams should be preferably constructed in tributaries of the main river to avoid a too high influence. Bad dams, on the other hand are characterized to have significant influences on the environment and the local population. Corruption and biased or falsed impact assessments are common in many countries and the reason why many 'bad' dams are being built in the first place (Ledec and Quintero, 2003).

2.2 Cooperation and conflicts

The national and international relations within the Salween Basin are a complicated issue. Conflict and cooperation on different levels influence the basin's development and the hydropower plans. This section will first explain Burma's situation within the lower basin and secondly relational issues between the downstream countries and the upstream nation China.

2.2.1 Interstate conflicts

The civil war in Burma was the world's longest-running civil war, the Burmese military troops have been fighting ethnic minority guerillas for over 63 years. However, after the latest elections in 2012, reforms were established to end the war. In the same year, representatives from the KNU and the Karen National Liberation Army (KNLA) met with president Thein Sein to stimulate peace talks. The meetings resulted in a cease of the daily warfare, at least in the Karen State and also, with the respective representatives, in the Shan State. In other territories however, like the Kachin State close to the Chinese border, the military still fights the local troops. The peace situation is questionable in every region since army outposts remain in the areas and military brutality towards the local population remains (Winn, 2012). Especially around the Salween dam sites, the armed conflict still occurs intermittently. The construction sites in the Shan State (Upper Thanlwin, Nong Pha and Ta Sang) have been armed with additional troops although a ceasefire agreement has been signed with the Shan State Army-South (SSA-S). A similar process is going on in the Karenni State where government troops have secured the Ywathit and Hat Gyi Dam sites. The official reason for the higher military presence around the dams is the protection of the Thai and Chinese engineers and construction staff, the government fears attacks from local guerilla troops. However, human rights organizations assume a different background. With the ceasefire the government agreed to decrease the military troops and eventually disappear. This would limit their direct influence in the affected areas and the junta had concerns to lose control and hand it over to the guerillas. The dams were a fortunate reason to deploy troops once more at least in some areas and regain control, in this case to officially protect the workers (Salween Watch, 2013).

2.2.2 Upstream and downstream

When the MEPE approved the six hydropower dams in 2013, the government also released that it will be a cooperation project between the Salween Basin riparians Thailand, Burma and China. This can be seen as a first step towards cooperation. However, dams also create diplomatic tension, especially in an upstream-downstream context. Although the nations cooperate on the Lower Salween, the upper part is a potential conflict hotspot for the relations between China (the upstream country) and the downstream riparians (Thailand and Burma). From its source in the Qinghai Plateau, the Nu River flows for over 615km through the Chinese province of Yunnan before it reaches Burma further south. In the 1990's the Yunnan Huadian Nujiang Hydropower Development Company surveyed the Nu and identified its hydropower potential. In the 'Middle and Lower Nu River Hydropower Planning Report' from 2003 Huadian calculated a theoretical hydropower potential of 36,400 MW, of which over 50% can be exploited at the current state by a dam cascade (Magee, 2006). In August 2003 after several meetings, the Yunnan provincial government, together with the National Development and Reform Commission (NDRC), announced their intention to

use this potential and build 13 hydropower dams in the Nu River with a total electricity generation of 21,300 MW (Figure 2.1). Representatives from China's Environmental Protection Agency (EPA) also attended the meeting and they refused to sign off the plan due to the environmental damage the cascade would cause in China. Just a month later the EPA organized a new meeting and presented three key reasons against the damming of the Nu River (Quanlun, 2013):

1. Hydroelectric development and the construction of dam cascades would go against the principle of protecting the Three Parallel Rivers heritage site
2. Caution should be used with anything that could threaten the outstanding natural beauty of the Nu River valley
3. Local species and culture require protection

Meanwhile, Thailand and Burma, who have their own plans for using the river's power potential, were alarmed. The two countries were concerned that China might take advantage of its upstream position and interfere in the Salween's flow, which would not only affect the downstream hydropower but also the environment and livelihood of the local population. As a result, over 80 human rights and environmental groups from both Thailand and Burma sent petitions to China to seek consultation with the downstream riparians before proceeding with the dam projects (Wolf and Newton, 2004). With the public pressure from the Chinese EPA and the downstream countries against the projects, China eventually stopped the cascade project in 2004. China's former PM Wen Jiabao ordered a review of the plans and commissioned environmental and social assessment plans. In the following years, the local government of Yunnan continuously lobbied Beijing to proceed with the plans. In February 2011, four Chinese geologists published an article, which stated that the Nu River is located on an active fault with frequent earthquakes. The scientists concluded that the seismic risks were too high and therefore no dam should be constructed. Although constructions were officially suspended in 2004, international environmental organizations found out that preliminary work has been secretly continued ever since. In 2008, without any state approval, the main construction on one of the dams started again. After more public pressure for an explanation from the downstream countries, China's National Energy Administration (NEA) officially admitted in late 2011 that, although the PM himself has stopped the project, research and design had been continued at the Upper Salween dam sites. NEA stated that the river plays an important role in the plans for energy development during the 12th Five-Year Plan. At the moment the construction companies are officially waiting for state approval to continue working at the other dam sites (Quanlun, D., 2013).

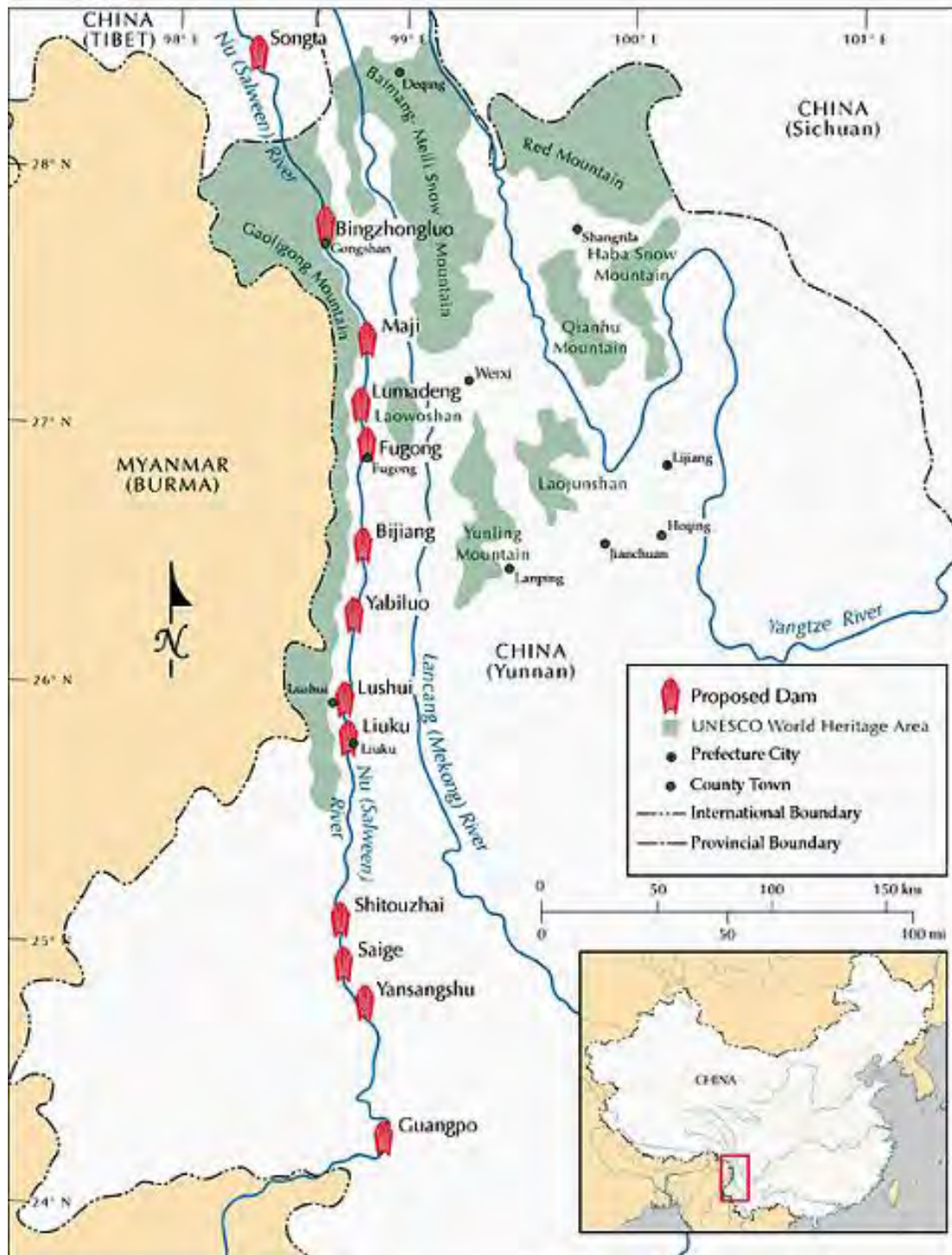


Figure 2.2: Map of the proposed dam cascade in the Upper Salween/Nu River (Osborne, 2007)

2.3 The different stakeholders and their interests in the Lower Salween River Basin

The stakeholder section briefly describes China's, Burma's and Thailand's mutual interests and the respective involvement in the Lower Salween Basin. The particular focus will be on the planned hydropower dams.

2.3.1 China

China's development and growth demands gigantic amounts of energy: In 2011, it consumed 4,7 million GWh, which is almost a fifth of the entire planet's consumption (20 million GWh). This not only makes it the world's biggest electricity consumer but also producer (4,9 million GWh) (CIA, 2013*b*). To support the current main energy source, coal-fired power plants, China counts on the construction of hydropower dams. The Three Gorges Dam in the Hubei Province and the planned Nu River Cascade are two examples of China's energy plans for the near future. As already mentioned above, the Nu River has a huge energy potential and its surpluses of water are desperately needed in other Chinese regions. Due to strong urbanization and industrialization, particularly in the East of the country, water has become scarce and the situation has reached a crisis level. To prevent a slowing down of the development and to push the undeveloped West, Beijing has plans to divert Yunnan's river and pump the water to the dry North and urbanized East. The positive side effects would be the generation of hydropower and flood control in the Yunnan State. Therefore, in 2000, the Great Western Development Program (GWDP) was founded to develop infrastructure and transportation in the poor western regions and particularly promote the Nu River dam cascade. China's next step will be to integrate Yunnan into the Greater Mekong Sub-Region (GMS), which is supported by the Asian Development Bank (ADB). This would not only result in extra funding and development opportunities for the region but also increase China's influence on the southern Mekong region (MacLean, K. et al., 2004).

Besides the river itself, China also has a big general interest in Burma. Transboundary cooperation between the two countries has existed since the 1950's and today China is Burma's most important partner. Besides trading and military equipment, China also provides the former military junta with financial and political support. One of the key interests behind this cooperation is Burma's location. Access to the Indian Ocean is of strategic importance for China's plan to achieve more influence in the region. To avoid long distance transportation, Burma also constitutes an excellent source for natural resources. The close by neighbor offers forests, rivers but also minerals, and fossil energy sources. To benefit from these resources, China has made investments in several energy projects. Figure 2.2 shows several projects in Burma with Chinese involvement which include proposed gas pipelines from the Shwe gas fields in the western part of the country, offshore oil platforms and mining sites,

along with hydropower dams. Although no dam construction has been finished yet, over 60 multinational corporations have already been involved in Burmese hydropower projects, the largest one will be the Ta Sang Dam on the Salween, constructed by Sinohydro Corporation, China's biggest hydropower company (Earth Rights, 2008).

The Nu River is an example of how China chooses to ignore social and environmental impacts to fulfill the national energy demands. As a matter of fact, nine of the proposed thirteen dams in the Upper Salween were located in national nature reserves, mainly the Three Parallel Rivers World Heritage Site. According to International Rivers (2012) the dams would result in displacements of over 50,000 people and would furthermore endanger many different animal and plant species. In 2003, China made a clear statement towards its environmental protection policy: in August, the Three Parallel Rivers area received the status of a UNESCO World Heritage site, only two months before the construction plans of the Nu River dam cascade were announced (International Rivers, 2012).

2.3.2 Burma

To understand Burma's interests in the Salween River, it is necessary to look back in the country's history. Since the military succeeded with a coup d'état in 1962, Burma has been under military control, directly and indirectly. The junta, which had several names like the Burma Socialist Programme Party (BSPP), State Law and Order Restoration Council (SLORC) and, most recently, the State Peace and Development Council (SPDC), led the country in a very repressive and authoritarian way. Several protests, mainly organized by monks and students, were brutally repressed over the years, until the Saffron Revolution in 2007 enabled basic steps towards democracy and elections (held in 2010 and 2012) (Bajoria, 2012). During the military rule, the junta always favored economic stability over other expenses, mainly because the government spends over 40% of its budget on military expenses. Maintaining and increasing the army was Burma's main interest and exploiting the country's vast natural resources was a major income (Earth Rights, 2008). In 1989, the country was shaken by riots and political demonstrations; however, the MEPE decided to join Thailand's new founded committee for developing hydropower dams on the Salween, which resulted in several protest actions and demonstrations against the projects (see chronology). From this moment onwards, Burma's interest in the Salween River can be seen in two different ways: the junta's economic and financial perspective and the local population's essential and environmental interest in the river. As already elaborated in section 2.2.1, the projects are quite controversial, since the dam site locations are hotspots for the still ongoing conflict and the junta's attempt to protect the workers at the dam sites. Besides the control effect, the government is also very interested in making profit out of its hydropower resources. As described in the previous section, the Burmese government is quite anxious to strengthen its positive relation to its powerful neighbor China. By allowing Chinese companies to conduct feasibility studies and signing joint construction agreements in the Salween, Burma emphasizes its interests in this aspect. Thailand, the other downstream riparian, also plays an

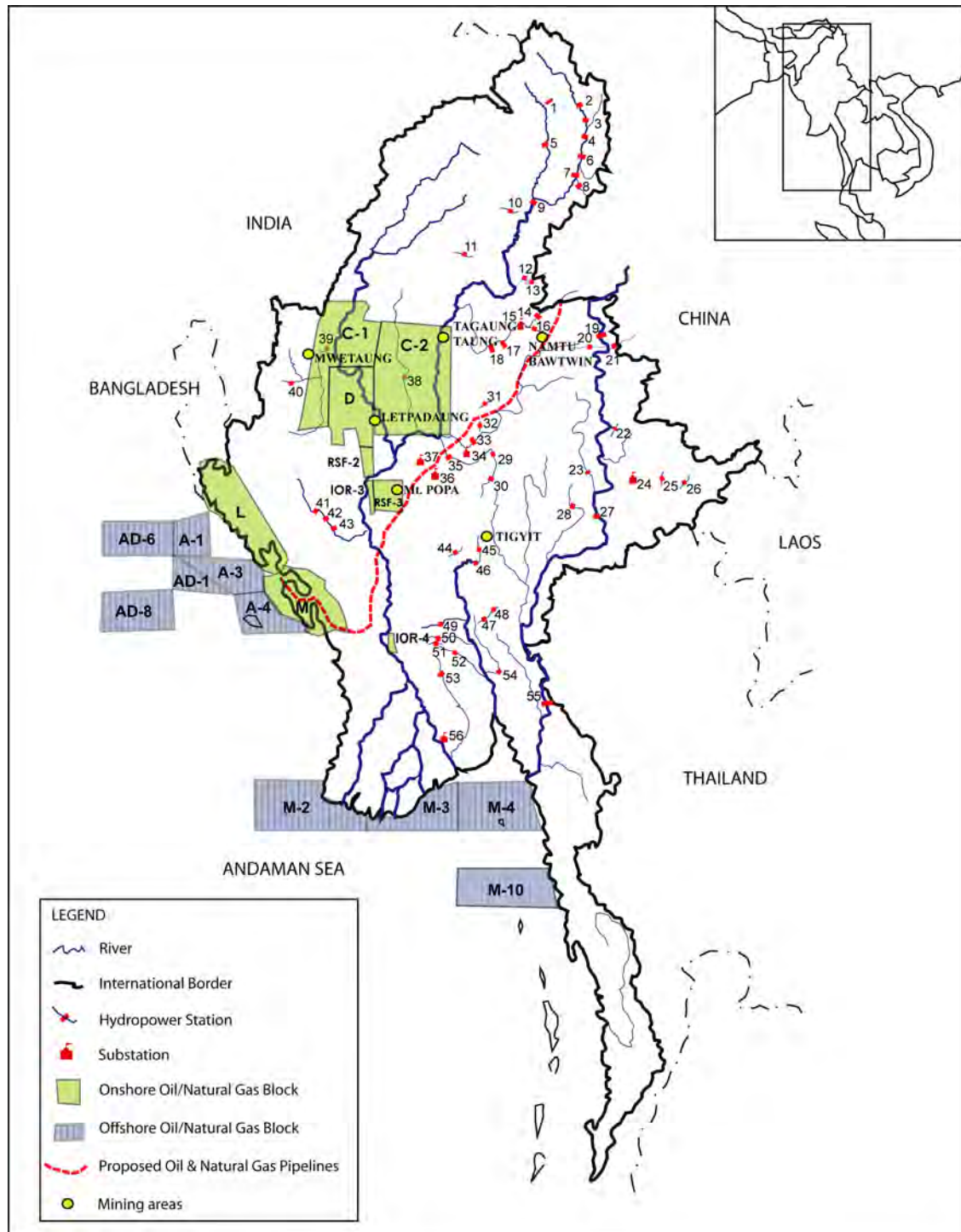


Figure 2.3: Map of completed, current and planned projects in Burma with Chinese involvement (Earth Rights, 2008)

important role for Burma's economy. A great share of the generated energy will flow eastwards into the Thai power grid and freshwater will be diverted to the Chao Phraya River, financially benefiting Burma. The primary sector supplies the major income in Burma and the local population depends on the Salween and its importance for the agriculture. It is the main source of livelihood for about 70% of the population who live in the rural areas. However, the hydropower subsector is also the most important in terms of economic development and investment, which creates a conflict of interests (Ministry of Agriculture and Irrigation, 2005).

The local population sees the river in a different way. The Lower Salween provides a livelihood for 13 different ethnic groups. Paddy fields, vegetables from the fertile soil and fishing are the main food sources and important goods for trading and income. It would be in the local population's main interest to maintain the river's natural flow and the ecological balance. Hydropower dams (and the consequences as described in section 2.1.2) would not only destroy precious nature and agricultural land but also aggravate the conflict situation for the ethnic minorities in the region. Besides fighting the rebels, the military junta has one of the worst records of human rights violations worldwide, forcing local people from villages close to the dam sites to work for the military or to abandon their homes and move to military controlled settlements, known as relocation programs (Salween Watch and SEARIN, 2004). Although the opposition, lead by infamous Aung San Suu Kyi, took over most of the parliament in 2012 and democratic reforms led to several ceasefire agreements, Human Rights Watch (2013) is still concerned by the situation, since violence and brutality still affect big parts of the population, especially the ethnic minorities.

2.3.3 Thailand

Compared to the other riparian countries of the Salween, China and Burma, Thailand's share of the river is very small. Only 5% of the basin is Thai territory and the direct access to the river is limited to a 120km-long mountainous riverbank. Nevertheless, Thailand wants to benefit from the Salween's water resources and is very interested in transboundary cooperation with Burma. The Salween hydropower and water diversion projects are the major interests and play an important role in Thailand's future development. The countries development in the last 20 years has been a story of success. The economy had a steady rise of about 5% per year, poverty decreased from 21% to 8% and the country has been ranked up from a lower-middle income country to an upper-middle income economy in 2011 (World Bank, 2012). Due to this development, Thailand has a growing demand for energy. In 2011, the National Energy Policy Council (NEPC) approved the national 2012-2030 Power Development Plan (PDP). The master plan aims to double the generating capacity from 32,000 MW in 2011 to 70,000 MW in 2030 by increasing the efficiency and raise the share of sustainable energies to 25% within ten years (Ministry of Energy, 2012). The proposed dams in the Lower Salween are seen as an opportunity to approach these goals. To enable these projects, Thailand's former PM Thaksin Shinawatra started to support

conciliation and cooperation with the neighbor country Burma shortly after his election in 2001. Thai companies were encouraged to cooperate and invest since the foreign policy towards Burma was rather defined by keeping the distance in the past, mainly because of its domestic politic problems. Besides the power plants, Thailand also plans to divert water from the Salween (see chronology). The dams would be a major support for Thailand's dry northeast; due to massive deforestations in the area water became even scarcer and made it impossible to generate more electricity (Wolf and Newton, 2004). Additionally, Thailand is, like China, an important trading partner for Burma. 80% of Thailand's energy consumption is based on fossil fuels whereas a big share is natural gas. The Yadana fields in SW Burma provide one fourth of the Thai gas supply, which is 28 million m³ per day. Since Thailand suffers from massive power shortages all over the country, there is a major interest in extending the gas supplies from Burma and also to look for alternatives in hydropower (UPI, 2013). Furthermore, the Thai government is very keen on maintaining a healthy diplomatic relationship towards Burma in terms of a bilateral Salween agreement. As already explained in section 2.2.2 both countries are against China's unilateral plans upstream. Seen geographically, the downstream impacts of the Nu River cascade might not be as dramatic for Thailand as it would be for Burma. The territorial share of 5% and possible floods due to the upstream dams are not the main reason why Thailand is against the projects. The cascade would cause irregular water flows and cause problems for the Lower Salween dam projects in which Thailand is a major stakeholder. The joint initiative from 2004 to stop the Chinese dam constructions demonstrated that the two countries need to form an alliance to tackle the upstream superpower China and can be successful.

3 Analysis and Discussion

Basin-wide cooperation can be a solution to solve potential management problems in an international basin. However, before implementing transboundary management structures, it is necessary to analyze the water framework on a national level. The following chapter is a step-by-step study of the current IWRM status in the Lower Salween riparian countries, Thailand and Burma, and the efforts to establish transboundary water management. The handbook for Integrated Water Resource Management in Transboundary Basins of Rivers, Lakes and Aquifers provides guidelines and related practical examples that are related to IWRM in transboundary basins. The handbook is also the main reference (GWP et al., 2012).

3.1 Introduction of the handbook

'Building a global community across transboundary waters that enhances connections between all stakeholders is an important undertaking that justifies increased investment and attention, to ensure water for all ' (GWP et al., 2012). Since its foundation in 1996, the Global Water Partnership (GWP) supports the sustainable development and management of water, the organization was founded by the World Bank, the United Nations Development Programme (UNDP) and the Swedish International Development Cooperation Agency (Sida). It is one of GWP's main targets to foster IWRM in transboundary rivers and basins, since these areas have high conflict potentials (Global Partner Watership, 2010). Therefore, GWP in cooperation with the International Network of Basin Organizations (INBO), United Nations Economic Commission for Europe (UNECE), UNESCO, Global Environment Facility (GEF) and Agence Francaise de Developpement (AFD) have produced a handbook that provides practical information on the improvement of integrated management of shared transboundary water resources. The collective work contains several guidelines, examples of best practice and addresses different stakeholders involved from national governments to regional organizations, managers, water professionals and users in the field (GWP et al., 2012). The Handbook for Integrated Water Resource Management in Transboundary Basins of Rivers, Lakes and Aquifers (as from now on: handbook) version used in this study is the latest version from 2012.

3.2 Analysis: IWRM and transboundary water management in Burma and Thailand

The analysis is based on the following 6 steps:

1. Establishing Cooperation
2. Governance
3. Information Systems
4. Participation
5. Planning
6. Financing

3.2.1 Establishing Cooperation

The first step describes the political and legal framework for IWRM in transboundary basins. This includes all the policies, legal practices and institutionalizations that are necessary to build the foundations of cooperation.

Agreement on IWRM

One of the first essential steps to sustainable water management is the willingness of a country to cooperate in an international river basin and to agree on implementing IWRM. As already described in the stakeholder section, all 3 riparian states of the Salween have individual but also shared interests in the river. The development level on national water management varies and affects the state's ability in participating in a transboundary organization. In this respect, Thailand is much more advanced compared to Burma. The Thai government already established integrated river management concepts over 15 years ago, over 25 national river basin committees have been founded since then. Nevertheless, there are still plenty of improvements to achieve in the Thai water management policy. This particularly concerns the clear responsibility of institutions and the integration of the local population (World Bank, 2011).

The situation in Burma is different since the country is not a proper member of any transboundary river agreement and environmental development has never been a primary goal for the military government. However, in 2003, the country launched the Burma Water Vision program to stimulate integrated river basin management and also efficiently use the huge hydropower potential. Only two years later, in 2005, the Inter-Ministry Task Force on Water Resources released a strategic plan on IWRM and its implementation in the national policy

(Ministry of Agriculture and Irrigation, 2005). The situation differs in an international context; no official agreements about sharing the Salween's resources and benefits have been signed so far. However, transboundary cooperation exists: Burma and Thailand work together to benefit from the Lower Salween's hydropower potential; although with different interests. Several hydropower contracts between the two countries support the willingness to work together, at least on this level. Political institutions could help to improve and catalyze the cooperation among the two countries and help with joint projects. First steps can be regular meetings, public campaigns or, very important, a general ongoing dialogue that might eventually lead to an agreement.

International water laws

Besides an agreement, there is also the need of a legal framework in transboundary basins. So far no global water law exists that could impose a general legal framework for all river basins. The only existing worldwide law agreement is the UN Convention on the Non-Navigational Uses of International Watercourses from 1997, which can be seen as a first institutional approach to establish water laws in an international context. It is a 'framework of principles and rules that may be applied and adjusted to suit the characteristics of particular international watercourses' (McCaffrey, 2008). At the introduction in 1997, over 100 countries have adopted the treaty. However, it is not ratified yet, thus not compulsory for any country that has adopted it. Naturally, the rules only affect the basin riparian, which signed the transboundary agreement and both countries in this analysis, Thailand and Burma, have not agreed to the UN Convention yet. A successful implementation of international water rules also depends on the countries domestic situation. It is a great advantage if national water law already exists and is acknowledged, the handbook recommends countries to develop and review their own national legislative framework before agreeing on an international legal framework. Besides some urban water and groundwater usage rights, Burma does not have a national water law. All water-related legislations were mainly set in the early 1900's and need to be reviewed and updated; the national strategic plan on IWRM imposed it with a high priority. Thailand's main water authority, the Department of Water Resources (DWR), has been processing a new 'water act' since 1992 and submitted it to the parliament in 2007 but it has not yet been processed. The enactment includes several features in the context of water management and water rights (Ministry of Agriculture and Irrigation, 2005, World Bank, 2011).

However, some water laws have a higher relevance in a transboundary context. An exemplary rule, which plays an essential role in a transboundary context but should also be integrated in national water law, is the law for the 'reasonable use of water'. By agreeing to the UN Convention, the countries are entitled to provide an 'equitable and reasonable utilization' (GWP et al., 2012) of the shared resource, meaning that every basin member has to respect other riparians and their water needs. If there would be a transboundary agreement in the Salween Basin, this rule would mainly affect the upstream state China.

The nation's inequitable use of the river's upper part might have impacts on the downstream countries and affect the downstream dam cascade.

3.2.2 Governance - Transboundary basin organizations

This section is dedicated to a possible transboundary river basin organization and its governance. After two or more basin countries made a cooperation agreement, it is quite usual that an organization is established, which main functions are to represent all the riparian countries, maintain the agreed arrangements and function as a body for exchanging data. The Salween River Basin does not have an organization yet but could use the Mekong as a role model for international agreements in SE Asia. In 1995, Thailand, Cambodia, Vietnam, and Laos signed the Mekong River Basin Agreement as a framework for transboundary river cooperation and founded the MRC as a body of establishing the rules for water use. With the financial support of various organizations and countries, the IWRM concept has been integrated in many programs of the MRC and improved the river-stakeholder cooperation in the Lower Mekong (World Bank, 2011).

Types of organizations

In general, there are different types of organizations and functions that have to be considered by the member nations before establishing a basin body. A transboundary river basin organization can be defined as a 'permanent institutional arrangement dedicated to all or parts of the management of shared waters between at least two countries' (GWP et al., 2012). It is up to the countries which arrangement is chosen according to the basin's needs, history or other conditions. Every basin is unique with a different structure and context, there is no universal model. A Salween committee could be structured like the MRC, a basin council, which consists of different work groups in charge of basin-related issues from all member states. Committees mainly consist of water governance officials and are consulted by external professional. These groups can be advisers to the head of departments or also decision-makers. As already elaborated above, Thailand is already experienced in participating in a transboundary basin commission since it is a foundation member of the MRC. In a national context, Thailand's National Water Resources Committee (NWRC) and the 25 river basin committees are the main institutions, the Department of Water Resources is the head authority (World Bank, 2011). Burma has several government water supply agencies with different policies but no cooperation. During a workshop in 2003, both the United Nations Economic and Social Commission for Asia (UNESCAP) and UN Food and Agriculture Organization (FAO) recommended Burma to establish a body on national-level that is responsible for IWRM. Eventually, there has been a proposal for the establishment of the Burma Water Commission (MWC), it waits for the approval of the Ministry of Agriculture and Irrigation. The suggested duties of the body would include, among others, policies and guidelines, preparation of water laws and coordination among stakeholders (Ministry of Agriculture and Irrigation, 2005).

3.2.3 Information Systems

Data collection and monitoring are necessary duties in a river basin. Information about water levels can prevent flooding, regular samples control the quality and sediment analyses determine the river's flow culture. The sharing of data amongst stakeholders is a key feature of IWRM. The benefit of a transboundary information is the collective and basin wide monitoring of water data which will improve control over the basin and lead to an increased and more diverse data set. So far, Burma collects information from its national monitoring systems; the systems operate under the respective national laws and regulations. Several ministries (Health, Transport, Industry) measure discharges, water level and quality in over 200 gauging stations in all major rivers. There is also a regularly control of the Salween's water quality and flow, the river has two installed stations in the South of Burma (Ra, 2011, Ministry of Agriculture and Irrigation, 2005). Besides monitoring the Thai part of the Mekong for the MRC, Thailand is also regularly monitoring its rivers since 1980 and has installed nearly 400 sampling station in 25 basins. Recently, water quality models have been tested to improve the cause/effect understanding of pollution and according to the Pollution Control Department the models also function with Geographic Information Systems (GIS). In 2001, the Centre for Environmental Modeling and Risk Assessment (CEMRA) has been established in order to maintain and develop national environmental models (Simachaya, 2001). However, the more countries involved in sharing basin data the more complicated the process gets, the exchange is often a difficult issue in international basins. The reasons can be structural (no agreement of sharing) or technical (different formats and methods, collection frequency and definitions). Although there is no transboundary system installed so far in the Lower Salween, the planned dam cascade can be seen as an opportunity towards information sharing. Burma and Thailand are both involved in the project planning and cooperate until the dams are finished and beyond: EGAT will manage some of the plants but the location is still on Burmese terrain. The dam does not only provide infrastructure for the generation of energy or divert water, it also functions as a medium for monitoring systems. Both country's territory in the basin are mainly located downstream of the dams and therefore it should be in their interests to share data about water levels and discharges to prevent floods.

3.2.4 Participation

The participants in a transboundary river basin, also called stakeholders, have to be distinguished in 3 categories. On the one hand there is the public sector (ministries, local authorities, government) and on the other the civil sector (NGOs, associations and water users) and private sector (companies and investors). All major Chinese, Thai and Burmese companies involved in the Lower Salween dam projects (e.g. EGAT, Hydrochina Kunming Engineering or MEPE) are state-owned and under public control, they all directly follow the state policy. The civil sector is represented by the local Burmese (and Thai on a small scale)

communities along the river, NGOs from China, Burma and all over the world. Stakeholders from the third sector are investors (banks) and water-related companies from abroad. Difficulties in the relationship between the sectors might appear by moving between local, national and international levels. Conflicts are often caused by the lack of communication between stakeholder groups on the decisional level and e.g. the local population. Differences in language, culture or pre-knowledge can also cause problems. A transboundary organization could be an excellent platform for mediating these issues and help to communicate in the basin. This could improve not only transparency and accountability but also the consultation of all members in basin-related issues. Since the construction plans have emerged in 2004, Burma has militarized several dam sites and relocated the local population. Human rights organization reported that an increasing number of local ethnic groups have forcibly been moved from their land. In total over 30,000 people from the Central Shan, Karen and Karenni State have been either displaced to other areas or military controlled resettlement sites (Salween Watch and SEARIN, 2004). A common way of amending displaced people are compensations. The affected population should not only be consulted but also be compensated financially or in any other way for the impacts caused. According to several NGOs, the downstream communities in the Salween have not been offered such compensations yet (International Rivers, 2013).

3.2.5 Strategy & Planning

After establishing an agreement, a legal framework and an organization the handbook recommends to establish a strategy plan for the future. This should be conducted by the basin organization and includes development actions, either on a short term (3-5 years) or long term basis (20-30 years). In the beginning, analytic and diagnostic tools can help to define and assess problems. Examples are a Transboundary Diagnostic Analysis (TDA) whereby the main goal is to 'identify, quantify, and set priorities for water related problems that are transboundary in nature' (GWP et al., 2012). Also GIS and other decision-making supporting tools, which are based on the simulating of hydrological and hydraulic events, can be useful. These tools in particular are necessary for simulating impacts of new dams and possible scenarios. After completing the assessment it is recommended to establish a transboundary master plan with all the actions that are 'most-likely to promote integration between different countries' (GWP et al., 2012). This can be for example hydropower, flood control, irrigation or protection of the ecosystem. In 2011 the MRC adopted the Mekong River Basin Development Strategy, a master plan with strategies to tackle future basin challenges. It includes priority actions related to economic and environmental developments but also benefits and risks for the member states, moreover it should be updated every fifth year. As a member, Thailand is integrated in this strategy plan. Additionally, the country is very keen on developing its national water resource plan. The latest version from 2011, which has been released together with the World Bank, sets the priorities for the next 10 to 15 years (World Bank, 2011):

1. Stronger support for IWRM (local and national level)
2. Higher engagement of local communities in planning and implementation
3. Facilitate future development in the water resource sector
4. Addressing transboundary Issue in the Mekong River
5. Effective cooperation on IWRM within the DWR

Burma's government released a similar strategy plan in 2005 that includes a long-term master plan (30-year) for every water-related department in the government. The main purpose is the 'alleviation of poverty and upgrading of living standards by means of sustainable development of the water and water resources and conservation of the environment' (Ministry of Agriculture and Irrigation, 2005). To achieve this mission, the Inter-Ministry Task Force on Water Resources formulated 3 main goals (Ministry of Agriculture and Irrigation, 2005):

1. Manage, develop and protect water and related resources to meet the needs of current and future generations
2. Operate, maintain and rehabilitate facilities safely, reliably and efficiently to protect the public investment
3. Enhance the organizational effectiveness of the water resources coordination system, and promote capacity-building

The Salween River is mentioned in both national plans in a general national way but not as a transboundary issue. Although the dam projects and cooperation between Thailand and Burma already exists, there is no strategy plan to integrated IWRM basin-wide.

3.2.6 Financing

To secure a transboundary organization's future work it is absolutely necessary to establish a sustainable financing system. First of all, expenses have to be covered regularly to enable efficient and continuous work. Second, there should be a budget only for the structure and operation of the body which allows independence from the member states. The system should be able to finance:

1. The operating expenses of the basin organization
2. Ongoing projects
3. Infrastructure and maintenance

The general financial situation in Burma is critical, it is the poorest country in SE Asia with a poverty rate of 32% (CIA, 2013a). The possible establishment of a water institution like the MWC would require funds and a higher financial priority than it is at the moment.

However, the Ministry of Agriculture and Irrigation wants to increase the budget of water-related actions to ensure an effective for a sustainable development (Ministry of Agriculture and Irrigation, 2005). The Thai government already has experience in implemented a financing system, the National Water Resource Policy includes a sustainable support for the 25 national river basin organizations (World Bank, 2011). Since there is no transboundary organization established yet in the Salween, no financing system exists either. The only project that includes shared financing is the dam cascade, which is funded by Chinese, Burmese and Thai state-owned companies. However, Thailand's national financing system could work as a role model for the Salween basin.

3.3 Results

The Analysis section examined the current status of IWRM implementation in the Salween basin. The results of the analysis are summarized in the following.

Burma's current state towards IWRM

1. Willingness to introduce IWRM
2. No national water law
3. No coordination among state agencies, water commission waits for approval
4. Several existing measuring stations along the major rivers
5. Strong involvement of the public sector
6. Master plan: Focus on national IWRM
7. Poor country, water related investments are planned

Thailand's current state towards IWRM

1. IWRM already implemented in national policy, improvement is required
2. 'Water act' waiting for approval
3. Member of the MRC, national basin committees exist
4. Experience in monitoring in a transboundary basin
5. Strong involvement of the public sector
6. National-level plans and focus on the Mekong
7. Developed financing plan for national basin organizations

State of transboundary IWRM in the Salween River

1. Agreement on shared hydropower
2. No approval of international water laws
3. No transboundary basin organization
4. Dams could provide monitoring systems
5. Critical conflict between stakeholders: public versus civil sector
6. No transboundary master plan
7. No financial system available

3.4 Discussion

This section discusses if it is possible for Thailand, Burma and China to agree on more than just dam construction plans and move towards a common IWRM approach in the Lower Salween.

The thesis already elaborated the current state of cooperation in the basin. The planned dam cascade in the Lower Salween is the main reason why Thailand, Burma and China currently cooperate and communicate. Besides that, the two downstream riparians also act together against China's upstream dam projects. Asymmetric power relationships are a common problem in international basins. This is often the case when the upstream riparian is the most powerful state in the basin. Famous examples are Turkey (Euphrates and Tigris), the United States (Colorado River) or, once more, China (Mekong). These countries do not only have control over the water flow going downstream but also the power to decide the outcome of the basin's transboundary water management. The effect is a so-called 'hydro-hegemony' status of the upstream country. By not consulting the downstream riparians and conserving its power, the basin leader strengthens its unilateral interests in the basin (Zeitoun and Jägerskog, 2009). In 2003, without consulting Thailand and Burma, China announced the construction of 13 hydropower dams in the Upper Salween and although the projects were suspended in 2004, it was only a matter of time until new plans emerged. Eventually, in 2013, China officially declared the dam sites to be open and under construction again. Besides the upstream plans, China is also strongly involved in the downstream parts and plays a big part in the Lower Salween Development. Salween Watch just recently released a status update of the dam project's progress; the report revealed which companies will be involved in the particular projects. Table 3.1 shows that Chinese companies are involved in almost every dam site or, in the case of Ywathit, Nong Pha and Thanlwin, even control the complete project. The generated energy from Thanlwin will directly flow into the Chinese

power grid, the power from Ta Sang will be induced into the Mekong Power Grip and benefit the GMS.

Table 3.1: Companies involved in the Lower Salween hydropower projects (Salween Watch, 2013)

Dam site	Companies involved from China (C) and Thailand (T)
Hat Gyi	EGAT (T), Sinohydro Corporation (C)
Ta Sang	EGAT (T), China Three Gorges Corporation (C)
Ywathit	Datang United Hydropower Developing Co. (C)
Nong Pha	Chinese (no particular company announced yet)
Upper Thanlwin	Hydrochina Kunming Engineering (C)
Mantawng	No information yet

This proves that China is generally still very interested in benefiting from the Salween River Basin and agreements regarding to energy generation. However, this also raises the question whether or not China only agrees on transboundary hydropower or would also participate in a basin-wide cooperation that is based on integrated water management. A study from 2008 investigated China's IWRM process and concluded that the country is not ready yet to implement the concept since three critical requirements cannot be accomplished. According to this study, the Chinese socio-political landscape is currently not feasible for IWRM on a national level since the basic premises are not fulfilled for a sustainable introduction of the concept. These premises would be appropriate policies and institutions as well as international cooperation and a fair participation process of stakeholder groups (Reynolds, 2008). As already described in the analysis part, national IWRM pre-settings are recommended to implement the concept on an international level.

The section also highlighted Burma's and Thailand's different progress statuses of water management integration on a national level and in the transboundary context. Applying IWRM on a national scale under national laws and conditions is a major difference to international basins with more countries involved. It is not only the different stages of cooperating, enabling a legal framework or establishing an organization which can be a challenge. Besides China's inability in sustainable water management, there are several other obstacles in the Salween Basin that have to be overcome first before by the respective countries as explained in the following part provided by the (GWP et al., 2012).

A first example is the state sovereignty. Although democratic elections, Burma is still in a very difficult political situation. The former military government, the human rights situation and several other circumstances led to several sanctions (import/export, investments) by the EU and United States against Burma in the past and resulted in not acknowledging the country's sovereignty (Sanctions Wiki, 2013). As described in 3.2.5 this status did not affect the government's plan to develop and implement the IWRM concept in national river basins. Sovereignty could however be an issue in a transboundary context: Thailand's

shared border with Burma is claimed by the local Karen community. Several conflicts in the last years and ongoing struggles over national territory and sovereignty could be a reason for Thailand not to join a shared water management agreement. The interviews in Chiang Mai revealed that the Burma River Network, Salween Watch and Living River Siam already asked the Thai government and EGAT not to cooperate with Burma and show social responsibility. However, Shining (2011) researched that EGAT is not responsible enough in the Hat Gyi case and prioritizes the generated energy over policies. A member of a human rights organization stated that in 2011 a EGAT environmental officer got assassinated. He openly supported the environmental organizations, took a stand for neutral impact assessments and criticised Thailand's energy policy. The company failed to interact with local river communities, to disclose relevant information in a transparent way and to integrate the population in the decision-making process. Burma's approach towards social impacts has already been explained in section 2.3.2, China's attitude is also quite controversial. The public should not expect much social liability from China since there will be a re-allocation of 70,000 to 80,000 people in case the Nu River cascade will be finished (MacLean, K. et al., 2004).

Another difference is the proportion of the state's affected territory. For example, Thailand has IWRM strategies for its 25 national river basins and is keen to development the plans even further. The country's share of the Salween Basin is with 5% relatively small and it would only play a small role in an international agreement. Besides hydropower, there is so far no real interest from the Thai side in establishing a basin-wide body like the MRC. However, since Thailand has the most experience in IWRM of all riparians in the Salween Basin it would probably act as leader in a possible basin organization. The question has to be raised of how the country would interact with the other nations. One scenario could be that Thailand offers leadership and experience, China and Burma will appreciate/accept it and basin management will be conducted under Thai management. It could also happen that both China and Burma act unilateral and would not accept the Thai leadership. A solution could be, as explained in 3.2.1, a neutral international organization that is willing to help establishing IWRM in the basin. Also different standard like, for example, the exchange of information and data can become a problem, section 3.2.2 already explained the difficulties that might appear in sharing data between riparians. For developing countries like Burma it can the plan to install various river-monitoring systems be seen as a success towards national water management. However, the national standards differ to transboundary quality requirements and might be too low to provide satisfying data for international monitoring (Ministry of Agriculture and Irrigation, 2005).

Besides IWRM, it is also the comparison with the Mekong respectively, which raises the question of a future transboundary agreement in the Salween. All three riparian countries are also a part of the Mekong Basin agreement; however, with different statuses. Thailand is a full member and participates in all decisions concerning the Lower Mekong Basin. Burma and China also joined the MRC in 1996 but are both only 'dialogue partners', which means

that they are not bound by the MRC's conventions. Both countries are located in the upstream part of the Mekong and have no intention of joining the MRC in the near future. China already installed several dams in the Upper Mekong and started a similar upstream-downstream conflict like in the Salween. At a MRC conference in 2011, Chinese delegates were the target of officials from Laos, Thailand, Vietnam and Cambodia, who blamed the dams for causing downstream floods when they were opened and droughts when they were closed. China responded by blaming climate change for the downstream impacts (Kongrut, 2013). This example shows that even a successful and big river basin organization like the MRC cannot cooperate with China. Burma's position in the Mekong is more passive since only a small share of the river is on Burmese territory and the nation's role as dialogue partner is rather insignificant.

The results in section 3.3 illustrated the situation of the three riparian countries and the basin itself. One of the outcomes is the clear lack of legitimate institutions within the countries but also, and most important, in the basin-wide perspective. Berger and Luckmann (1966) define institutionalizing as a 'a social process in which people come to accept a shared understanding of the reality'. The problem in the Salween case is that no shared understanding exists and fragmented interests dominate basin policy. A transboundary institution would have the power to overcome international borders and share the benefits of the Salween River equally. So far only the governments and selected companies, which are mainly state-owned as well, profit from the water resource.

The major support for small stakeholder groups such as local farmers or fishermen are the national and international NGOs. Salween Watch, International Rivers and TERRA are examples for groups that contribute to the basin in several ways. Besides literature and current information updates, the NGOs are often the only basin-wide support for the protests against social and environmental impacts. As already described in the stakeholder section, several organizations were involved in the 2004 withdrawal from the Nu River dam cascade plans. Another very important part of some groups is the active involvement in Burma's innerstate conflict, the officially suspended but still on-going conflict, especially around the dam sites. A local Karen explained that the government considers the local communities as too few and too unimportant to involve in the planning and construction process. The NGOs try to merge the groups and build up a stronger opposition towards the government mediate communication between the groups. Additionally, the organizations could be helpful for a future transboundary agreement: facilitating of sustainable development, involvement of all stakeholders in the decision-making process and environmental protection awareness are already major parts of their agendas and could be used to establish a basin body. However, Burma also uses the organizations for their benefits: One of the NGOs in Chiang Mai discovered in 2010 that a member of a Salween work group has been an spy from the Burmese government who infiltrated the group in order to get valuable information.

The discussion resulted in the realization that no more than an agreement over hydropower

is feasible in the Salween at the current stage. Burma and China are not ready yet to implement IWRM concepts and Thailand might not be interested in getting involved.

4 Conclusion and recommendations

Freshwater scarcity will be one of the major challenges in the upcoming future. Several parts of the world already suffer from water supply problems that come with growing economies and an increasing population. Damming rivers and diverting the water to dryer regions has always been a popular water distribution concept. Using the dams for generating energy is a relatively new concept and becomes more and more attractive worldwide as a substitute for fossil fuels. Sustainable water management concepts like IWRM have been developed by international water experts to enable countries a structured and effective way of dealing with future water-related issues and facilitate cooperation among stakeholders. However, the practical implementation remains a challenge, especially in international basins that are shared by two or more countries. The Salween River Basin in Central and SE Asia offers vast natural resources and is the last undammed major river in SE Asia. The riparian nations China, Burma and Thailand want to benefit from the Salween's potential and are planning to construct several hydropower dams along the river. The projects are quite controversial since no transboundary water management agreement exists, social and environmental problems are not considered sufficiently and every nation is interested in different aspects of the river. First of all, there is China with its unilateral hydropower plans in the upper part of the river which would cause downstream impacts affecting both Thailand and Burma. However, the country is also a major part of the downstream projects and wants to benefit from the generated energy. Burma is still struggling with the after effects of the civil war, especially in the area of the planned dam sites, and mainly financially interested. The government does not involve the local communities in the decision-making process, displaces people without compensations and lacks in releasing official information. Thailand depends on Burma's resources to support the growing economy and reduce water scarcities. The nation's responsibility awareness is questionable though. An analysis of the respective nation's water management policies and the status of a transboundary basin agreement resulted in the fact that, besides cooperating over hydropower projects in the Lower Salween, no international basin agreement exists so far. This includes the absence of a basin body, legal framework or master plan for the future. The following steps have to be established before IWRM can be successfully implemented:

1. China has to integrate IWRM in its national policy first
2. Burma and also Thailand have to develop their policies as well (in terms of institutionalizing and legal framework)

3. Downstream-upstream conflict: China has to stop acting unilateral and consult Burma and Thailand in questions regarding the Nu River dam cascade
4. Burma has to improve the inner political situation and the human rights situation
5. Thailand can be a basin leader but has to follow social responsibility policies
6. All riparians should turn environmental issues into policymaking

IWRM is in general a very idealistic way of thinking. The concept is especially difficult to implement in international river basins since different interests of riparian countries complicate a successful and effective approach. The open gap between theory and practice is one of the major problems in the IWRM concept and needs more attention in the future. Theoretically, the developed guidelines presented in the analysis section, are logically structured and easy to apply. Difficult backgrounds, history and other issues make every basin unique and aggravate the practical implementation of the GWP strategies. The case study of this thesis shows how difficult it is to apply IWRM in transboundary river basins although already some sort of cooperation exists. Although a downstream-upstream conflict over dams exist and the situation around ethnic minorities in Burma is quite critical, the Salween Basin is not at risk of a water war. All three countries benefit from the Salween individually as a water resource but not in terms of a transboundary basin agreement.

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