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The Duality of flood in Cambodia: Has the government helped the villagers?

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Title:

The Duality of flood in Cambodia:

Has the government helped the villagers?

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Acknowledgement

The governance subject sounds like an uninteresting subject, as the student needs to read about laws and governance system of a nation. As I read and write about subject in-depth, I discover the policy and governance are living and evolving subjects that bring unpredictable issues that form an image of unsolvable situation. Nevertheless, the solutions are available if one focuses at the heart of the problem. The problems and solutions integrated with human behaviour make policy and governance interesting. To Professor Ashok Swain who has planted the seed of knowledge in me and shape my thesis, I cannot thank him enough for his patience, inspiration and trust in me.

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My wife Aiko who is always supporting me; this thesis will be a different one without her force of encouragement. The thesis journey instills in me a new meaning and understanding in what academic research can contribute to the human society and the world. The journey starts and ends with a noble thought of helping others. I take in criticism and appreciation of my thesis in good faith.

Wee, Kok Boon

31 October 2010

Summary

The mighty Mekong River flows from Qinghai Province the inland of China to South China Sea through Myanmar, Lao, Thailand, Cambodia and Viet Nam. Almost all of Cambodia forms the catchment areas for Mekong River. In return, the river floodplains are easy for the Cambodian villagers to grow agricultural crops especially the rice. On the other hand, the river brings its destructive forces of flooding and cause immense damages to the crops, properties and human lives.

The annual report from Mekong River Commission shows that during a good flood year when the annual flood does not cause much damage and the economical return of the agricultural crops is high. This is the duality of the flood where the benefits outweigh the costs. During the bad flood year, the costs of the flood outweigh the benefits. As the agricultural economy is important, it is rational to vision the Royal Government of Cambodia (RGC) will enact policy to help the villagers living along the river floodplains to adapt to or control the annual flood in order to maximize the benefits of the flood.

The Participatory Rural Appraisal (PRA) was the main qualitative research method used. The different techniques from literature review, group and in-depth interviews with semi-structure questions, participant observation, Venn diagrams, and transect walk were used to collect information from the government officers, independent researchers, and local villagers. The flood adaptation policy were analyzed and compared to the other Cambodian natural resources management policies to assess for the effectiveness.

The extreme rainfall was expected under the Climate Change (CC) influence and coupled with annual flood; it was reasonable to believe the flood would be stronger and devastating. The Mekong River Commission through Flood Management and Mitigation Programme, and Climate Change and Adaptation Initiative had projects to prepare and strengthen the villagers' ability to adapt to the extreme food, but the projects were usually funded by foreign donors and only selected few provinces could benefit. Currently, the Cambodian government does not have enough own funding to implement their own NAPA policy designed to help the cities, and villages in different provinces to adapt to the floods.

The only help from the Cambodian government was the post disaster emergency relief, in which the National Committee Disaster Management sent their staffs to the flooded areas to provide emergency food and other services. The research reflected the inability of the government officers to work and cooperate with other ministries to cooperate in natural resources management.

Though there is no flood adaptation policy run by government to help villagers to adapt, but it is possible let the villagers to build an adaptation plan against flood. The idea hopes to motivate the villagers to learn and unite as a community self-help organization to build adaptation plan with their own hands, and teach other villages too. It is better to try than to wait for assistance that will or will not come.

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List of Abbreviations

- AR4 IPCC's Fourth Assessment Report
- ADB Asian Development Bank
- ADPC Asian Disaster Preparedness Center
- CC Climate Change
- CARERE Cambodia Area Rehabilitation and Regeneration Project
- CCAI Climate Change and Adaptation Initiative
- CCCO Cambodian Climate Change Office
- CDRI Cambodia Development Resource Institute
- CGIAR Consultative Group on International Agricultural Research
- CNMC Cambodia National Mekong Committee
- CPWF Challenge Program on Water and Food
- CSIRO Commonwealth Scientific and Industrial Research Organization
- D&D Decentralisation and Deconcentration
- DANIDA Danish International Development Agency
- DOM Department of Meteorology
- DNA Designated National Authority
- DHRW Department of Hydrology and River Works
- ECHO European Commission Humanitarian Aid Department
- FMMP Flood Management and Mitigation Programme
- GEF Global Environment Facility
- GERES Groupe Energies Renouvelables, Environnement et Solidarietés
- GHG Greenhouse Gases
- GMS Greater Mekong Subregion
- GTZ Deutsche Gesellschaft für Technische Zusammenarbeit
- ICEM International Centre for Environmental Management

- ICHARM International Centre for Water Hazard and Risk Management
- IPCC Intergovernmental Panel on climate Change
- IUCN International Union for Conservation of Nature
- IWRM Integrated Water Resources Management
- JICA Japan International Cooperation Agency
- Lao PDR Lao People's Democratic Republic
- LMB Lower Mekong River Basin
- MAFF Ministry of Agriculture, Forestry and Fisheries
- MoE Ministry of Environment
- MoH Ministry of Health
- MOWRAM Ministry of Water Resources and Meteorology
- MPWT Ministry of Public Works and Transport
- MRB Mekong River Basin
- MRC Mekong River Commission
- MRD Ministry of Rural Development
- NAPA National Adaptation Programme of Action to Climate Change
- NCCC National Climate Change Committee
- NGO Non-Governmental Organization
- NP-SNDD National Program for Sub-National Democratic Development
- PRA Participatory Rural Appraisal
- PRC People's Republic of China
- RGC Royal Government of Cambodia
- RRA Rapid Rural Appraisal
- Sida Swedish International Development Agency
- UMB Upper Mekong River Basin
- UNDP United Nations Development Programme

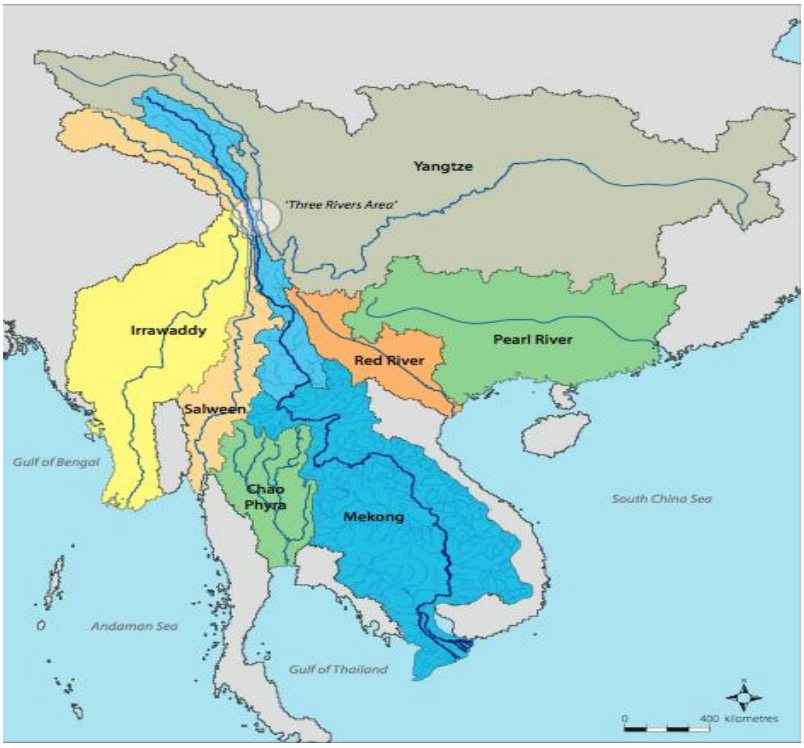
- UNESCAP United Nations Economic and Social Commission for Asia and the Pacific
- UNESCO United Nations Educational, Scientific and Cultural Organization
- UNFCCC United Nations Framework Convention on Climate Change
- WB World Bank
- WWF World Wide Fund for Nature

1 Introduction

1.1 The origin of the Mekong River

The river begins its flow from the Qinghai Province in China, and pass through the Eastern part of Myanmar called Lancang River. This part of the Mekong River Basin is called Upper Mekong River Basin (UMB). The river continues its path through Thailand, Lao People's Democratic Republic (PDR), Cambodia and Viet Nam, and reached the South China Sea. This part of the Mekong River basin is called Lower Mekong River Basin (LMB). The whole length of the Mekong river is 4200km with a drainage area of 795 000km^2 (Fig 1), in which the upper Mekong River Basin is mainly mountainous while the LMB is lowlands and floodplains. [1] Mekong River's runoff is 475,000 million m^3 per year towards South China Sea.[2]

Fig. 1.1 The whole Mekong River



Source: MRC, State of the Basin Report 2010

[1] J Eastham, F Mpelasoka, M Mainuddin, C Ticehurst, P Dyce, G Hodgson, R Ali & M Kirby, *Mekong River Basin Water Resources Assessment: Impacts of Climate Change*, CSIRO: Water for a Healthy Country National Research Flagship, Australia, 2008.

[2] Mekong River Commission, *MRC Management Information booklet series No.2: The Flow of the Mekong*, MRC Secretariat, Lao PDR, 2009.

1.2 The population and livelihood

The LMB catchment area exceeds 606,000 km^2 with an estimation of more than 60 million people live in this area, and depends on the natural resources and environment of the LMB for livelihoods, social health and economy.[3] Most of the lands in Cambodia and the Lao are within the catchment area, with 37% of Thailand surface area in the basin catchment, and 20% of Viet Nam (the Central Highlands and the Delta) providing the catchment areas (Fig. 2).[4] There are about 80% of 60 million LMB populations living in rural areas. A total of 25 million rural people reside along the corridor, which stretches for 15km, on the either side of the Mekong River. Cambodia has 70% of its national population living in this narrow strip of corridor; Lao PDR has the second highest number of 53% of its citizens, followed by Viet Nam that has 16% and Thailand with 4%. [5] The 4 LMB countries have very high percentage of their citizens working as farmers for a living. In Cambodia, Laos and Viet Nam agricultural labour sectors contribute from 65 - 85% of the total workforce. Even though Thailand is more industrialized than the other three countries, the Thai citizens living in the Northeast region account for 70% of the workforce making a living in agricultural sector.[6] Since agricultural sector is important and needs lot of water, the best location for farming will logically be situated in the floodplains where the natural fertilizers are always replenished by Mekong River and supply of water is always available. It is not hard to see that cities, towns and villages are always built along the river.

[3] International Centre for Environmental Management, *Climate Change Adaptation in the Lower Mekong Basin Countries: regional synthesis report*, Mekong River Commission, Vientiane, 2009, p. 1.

[4] MRC, *State of the Basin Report 2010*, Mekong River Commission, Vientiane Lao PDR, 2010, p. 31.

[5] ibid., p. 47.

[6] ibid., p. 48.

Fig. 1.2 Lower Mekong River Basin shows the catchment areas of 4 LMB countries

Source: MRC, Adaptation to climate change in the countries of the Lower Mekong Countries, 2009

1.3 The Flood of Mekong River and its destructive forces

The Mekong River can bring the benefits to the villagers but when the River swamps over the villages and fields by annual flooding, it can bring loss of agricultural crops, properties and even lives. Just one flood can force the villagers to lose everything they have worked hard for. This river is one force of the nature that needed to be respected and monitored constantly for safety reason.

2 Research Design

2.1 Integrated Water Resources Management

Too much water is not good, yet too little water is not good too. Therefore, the water needs to be controlled or managed in a way to support human development in agricultural, industrial, and domestic areas. The traditional way water used to be managed in a country individually by different governmental departments like Fishery, Forestry, Water Supply, Agricultural and Trade. Usually, there is no direct interaction and coordination between different Departments and each Department plan and executed their own policy, causing overlapping of work and responsibilities, unnecessary and wasted manpower. For example, the changing of river course for boat navigation done by Department of Transportation and dam construction by the Department of Water Supply will have an impact on the livelihood of the fishermen depending on the river; unfortunately, there is no Department to look into this matter. Most people will view the construction of dams and boat navigation channels as the direct visible affiliation to the 'hard' aspect of water management. This is an incomplete understanding of the water management. There is a need to regulate and share, and solve the conflicting caused by the water usage as in the above example of resolving the fishermen livelihood problems. This is 'soft' aspect of water management that forms the missing part of the whole understanding of the water management. The gradual acceptable theoretical framework in water management known as Integrated Water Resources Management or IWRM in short has been used increasingly in different parts of the world. IWRM is a holistic approach that uses the knowledge, insight, and demands from all different stakeholders of the water resources to formulate and employ efficient, fair and durable solutions to water problems in development and usage. As the water has a different use in agricultural, industrial, ecosystem and recreation, the IWRM approach can bring together all stakeholders from these areas that share the water resources, and set the policy to apply in response to new difficulties arising and impacting the common water resources. This paper will investigate and concentrate on the policy aspect of the IWRM.

2.2 Problem statement

Climate Change has become a great concern for many countries. It can lead to increases in temperature, wind and precipitation enormously, and in turn causing the changes in rainfall that can affect agricultural production and food security. In addition, it increases the intensity of severe storms that will flood the coastal cities and cities located near the river deltas. In the

Mekong River Basin countries, the different geographical positions of the six countries will have different effects of the CC in each country. In the Danish International Development Agency (Danida) report on Cambodian development cooperation, the report stated the possible increase in frequency and intensity of the floods in the lowland areas near the Mekong River and its tributaries caused the reduction in crops production. For the forestry sector, the combined effects of the changes in temperature and rainfall changed the soil water availability. In addition, the changes enhanced by the deforestation would lead to the disappearance of some forest ecosystem. From the human health perspective, the high rate of infectious diseases like malaria and dengue fever spread by mosquitoes would be increased because more mosquito breeding grounds were created by the larger amount of rainfall. The 435km Cambodian coastal zone also faced danger from the rising sea level. The port facilities, tourism, fisheries, and salt farms could have negative impacts. The swelling sea and temperature rise threatened the coral reefs and mangrove forest.[7] Cambodia is caught between the water from the north and the rising tide from the south, furthermore, the country has emerged from the civil war not too long ago, and the desperation for help is tremendous. These challenges motivated the author to focus on Cambodia to research and improve the water resources management in Cambodia through academic means.

The Finnish research found that the villagers living along the floodplains of Cambodian biggest lake called Tonle Sap Lake had adapted to the regular seasonal variation to the water level and enabled to eke out a living by fishing or rice cultivation or both.[8] It is highly possible for the villagers living along the floodplains of the Mekong River and its tributaries have adapted to the changing water level too as the flooding water is considered as a natural resource that provides the villagers a living. With CC, the flood may last longer and reduce crops harvest by submerging the crops in the water for too long, and the villagers reside along the floodplains will feel more uncertain in how to cope with sudden change of the water regime. Thus the hypothesis is the Cambodian government may have policy or strategy to

[7] Danish International Development Assistance, *Climate change screening of Danish development cooperation with Cambodia*, Danida, Denmark, 2008, p. 14.

[8] P Nuoteva , M Keskinen & O Varis, Water, livelihoods and climate change adaptation in the Tonle Sap Lake area, Cambodia: Learning from the past to understand the future, *Journal of Water and Climate Change*, 01.1, 2010, p. 89.

alleviate the suffering of the villagers due to the more devastating flooding caused by CC by taming the flooding.

The Cambodian government can provide the first line of defence by enacting policies to strengthen and prepare their citizens to defend against CC. The CC is neither short term nor predictable, the policies set are required to review and re-adjust to cope with different situation arising from the impacts. The research interest is finding out what kind of policies does the government in the poor country has to help its citizens to adapt CC and its effects.

This leads to the research question: **In the face of the CC threat of intensifying the flooding in Mekong River, does the Royal Government of Cambodia has flood adaptation policy to help the villagers cultivating crops along the Mekong River floodplains to adapt to the more severe flooding?**

2.2.1 Objectives of the study

This thesis is not going to offer advice to authorities or international NGOs or donors but to shine a light on the present situation on policy and its impacts on the local community but the set of the complex social, economical, and political layers interwove with policies are beyond the scope of this thesis. The other objective is to promote the public and international discussion and close observation that may bring forth a collective and bureaucratic change for the flood management policy improvement.

2.3 Scope of the study

In addressing the research question, there is a need to explain the extent of the areas that the research question covers.

2.3.1 Climate Change impacts on villagers living along Mekong River

Cambodia has 80% of its population living in rural areas, and majority of this population engaged in agricultural as their livelihood occupation. The Mekong River is ranked the 10th river on the table of the world's great rivers based on the average annual flow discharging at the mouth.[9] The rainy season will tend to bring more water into the river, causing the river to swell and flood the river floodplains easily. Therefore, it is natural these villagers living along

[9] MRC, *Overview of the Hydrology of the Mekong Basin*, Mekong River Commission, Vientiane, 2005, p. 9.

the Mekong River face the risk of the flood every year. On the other hand, the villagers can access easily the water from the river for their farming lands too. In this line of thinking, the villagers are more readily to accept the adaptation policy for flooding and even can contribute their own adaptation strategy into the government or institution policy. In this paper, when referring to policy, it refers to the official government or institutions policy. It can be legislation, guideline, principle, or rule to guide decisions and achieve positive outcomes in the short term or long term period. Flooding is an annual event in Mekong River, to ensure there is a long-term effective policy; the Royal Government of Cambodia (RGC) is the best-chosen management team to handle the long-term effect of flooding. A sustainable policy to the villagers means the Government can help them to minimize the flood damage to their agricultural crops every year. The CC is an added negative variable to the Mekong River, and can be seriously destructive to the villagers living along the Mekong River. Potentially, CC brings in more rain and creates added severe flooding for many years down the road. Only a good sustainable policy enacted by the government can combat the flooding along the Mekong River. Through the introduction of Cambodia Development Resource Institute (CDRI), Kampong Cham Province with Mekong River running though is chosen. In the province, Kampong Siem District with 2 villages-Speany Thmey and Annthak Neal villages with crop cultivation along the Mekong River floodplains are chosen to conduct the research.

2.4 Limits

The area of subjects that the research question can cover is immense, thus, there is a need to limit what areas will be covered and will not be covered.

2.4.1 The institutional organisations who can help the Cambodian villagers

The villagers' need to eat to survive and to protect their crops from flooding is their first priority. Adaptation describes as measurements to reduce the vulnerability of the natural or human environments from upcoming Climate Change effects while the mitigation is looking ways to reduce or change resources to cut greenhouse gas and emissions. Therefore, the adaptation is more important to research on than the mitigation. The area of research is closer to the Mekong River and the flooding is more of the problem than compared to drought. In drought period, the water can be retrievable easier from the mighty river. Hence, drought policies will not be brought out in this paper. The Mekong River Commission (MRC) is regional institution sanctioned and supported by Cambodia, Lao People's Democratic Republic (PDR), Thailand and Vietnam to develop regional equitable cooperative approach in

utilizing the water and water related resources of Mekong River in a sustainable and economically way.[10] China and Myanmar are involved with MRC but are not participating in the decision-making of the policies; as a result China and Myanmar are not considered to have an impact. All the MRC policies will be able to meet the overall goals of the 4 countries' water resources policies after going through negotiations and consultations. Therefore, the link of the water resources policies between the MRC and each country needs to be scrutinized carefully. The Cambodia National Mekong Committee (CNMC) is the national institution reported directly to RGC. CNMC assist and advise RGC in the formulation of the strategy and policy in planning, investigation, management, restoration, and development in water resources and natural resources in Mekong River Basin (MRB).[11] CNMC is also coordinating the MRC programmes in Cambodia and forms the bridging link between the MRC and RGC. The Cambodia Development Resource Institute (CDRI) is an independent Cambodian development policy research institute that produce objective development research papers and reports ranging from economy to rural livelihoods issues.[12] The unique position of CDRI provides a direct insight of the development process in the reality of Cambodia.

2.4.2 Cambodian governance system and the villages

Cambodia is chosen for this paper due to being one of the poorest among the 4 countries and 79% of its population living in the rural area. The rural population has a subsistence economy based on rice production, wild fisheries, livestock and wild life.[13] The correct development policies of water resources for rural population will improve the livelihood of the rural population and alleviate the poverty. The policies implemented in Cambodia go from the National level to the Provincial level, next to District level, next to the Commune level, and finally to the village level. It is important to learn how the policies are implemented between each level to next and what kind of support can each level provide to the next level. There are two villages chosen belonging to the same district and have slight different in their

[10] MRC, *State of the Basin Report 2010*, p. 228.

[11] 'About the MRC', *mrcmekong.org*, viewed on 18 August 2010, < http://www.mrcmekong.org/about_mrc.htm#NMC>.

[12] 'About CDRI', *cdri.org.kh*, viewed on 18 August 2010, < http://www.cdri.org.kh/index.php/about-cdri>.

[13] MRC, *State of the Basin Report 2010*, p. 43.

geographical positions. One village is located near to the Mekong River while the other is located more inland by 3 kilometres away from the Mekong River. However the same river tributary connects the villages also bring in water from Mekong River to their fields. The villages are chosen to compare what kind of response and adaptation they have in dealing with flooding and flooding management policy.

2.4.3 Organisations which are not affiliated with Cambodian Government

Greater Mekong Subregion (GMS) is funded by Asian Development Bank (ADB) to build subregional economic cooperation among the 6 countries – Cambodia, People's Republic of China (PRC), Lao People's Democratic Republic (PDR), Myanmar, Thailand, and Vietnam. The projects carried out are meant to increase trade among the countries and spread beyond water management field into telecommunication, tourism, transport, energy and other fields. As a result GMS and ADB are not taken into consideration. World Bank (WB) and United Nations Development Programme (UNDP) tend to fund and execute large-scale projects like dam construction and large irrigation. The large size approach may not be suitable to scale down to village level. Each village has each own set of problems and need it own set of solutions. Thus, WB and UNDP policies and water resources are not going to be included in this paper. The Non-Governmental Organization (NGO) tends to have a short term live span project in Cambodia; however, there are NGOS like World Wide Fund for Nature (WWF) and Red Cross that can run their project for long period of time. Yet, the NGOs are focusing on many aspects of development besides water resources, so the NGOs will not be examined for the analysis.

2.5 Methodology

The thesis was largely based on the qualitative research methods. It approached from the literature review, political governance structure, policy implementation and impacts, interviews of the relevant persons, and case studies analysis. There were almost no approaches that used numerical measurements in this thesis. The quantitative research tended to base on numbers and statistical procedures to extract the meaning from the observable facts to obtain description or test the hypothesis.[14] The procedures were replicable by other researchers who followed the same steps.

[14] G King, RO Keohane & S Verba, *Designing social inquiry: scientific inference in qualitiative research*, Princeton University Press, New Jersey, 1994, p. 3.

As the world was not separated into simple and complex activities but different layers of complexity depending on the observation made on the activities, the activities could be the result of the intricate interaction of many activities coming together at the given spatial and temporal.[15] They could not be counted as a single entity or unique event that could be studied in a systematic way through exercising of certain general laws in a straightforward manner. The qualitative research was more suitable to apply to reach a valid inference by using methods that revealed tremendous amount of information such as the transformations in the political and social were always occurring and the information was not fixed in pattern or number, hence, there was a need to describe what had happened and understood the events before the analysis could begin.

2.5.1 Methods in application

The Participatory Rural Appraisal was the principal methodology used in the fieldwork and could be viewed as qualitative research method. PRA used a series of techniques to collect data. It was a cost effective method because it was considered as a middle path between the lengthy traditional academic research and short rural research. It usually encompassed an outsider to facilitate exchange of information, promoted local community self-awareness and knowledge in planning, and empowered the local people to take the responsibility for their own development.[16] Though PRA was an offshoot of Rapid Rural Appraisal (RRA), there was a difference between them. The information was extracted and owned by the outsider in RRA while the information was owned by the local community but shared with the outsider.[17] PRA generated an impressive amount of information of evidential value than the quantitative survey techniques.

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[15] ibid., p. 10.

[16] Participatory research for sustainable livelihoods: A guide for field projects on adaptive strategies-Participatory Rural Appraisal, viewed on 23 December 2010, <http://www.iisd.org/casl/CASLGuide/PRA.htm>.

[17] BB Bhandari, *Participatory Rural Appraisal(PRA)*, Institute for Global Environmental Strategies, Japan, 2003, p.11.

The methods in this thesis started with a secondary data reviews to source for the latest information about the flood situations and CC linkage, the institutional response, and the local villagers' adaptation ability. The PRA approach was used to seek out the information from the Cambodian government officers, research institute, and villagers. The 5 categories from the method of policy assessment were used to analyze the policies and compare with other case studies of natural resources management in order to judge the effectiveness.

2.5.2 Secondary data review or literature review

The reviewing of the books, journals, newspaper articles, reports and maps showed the general direction of the research. The scientific data conducted by various international institutes, academic and Cambodian organizations provided the evidence of how CC and its impacts could influence the Mekong River. The findings of the reviews pointed out the current RGC response to flood and CC, and what policies had enacted to mitigate the effects of flooding and CC. The literature review also sharpened the focus of the research question.

2.5.3 Interviews with government officers, researchers, and villagers

The interviews were conducted in a semi-structured style with questions centered around the topic and in an open-ended manner to elucidate current and detail information. A translator was hired to facilitate the interviews and transcribe the Khmer (national language of Cambodia) notes into English. The group interviews for 5 to 10 persons were held and individual interviews were carried out to seek an in-depth understanding of the subject. Participant observation gave the opportunity to learn what the life was like in the flooding conditions from the villagers' perspectives. Venn diagrams were used to analyse the institutional power in the flood management from bottom up views of the villagers and the diagrams helped to triangulate the effectiveness of the flood management. The transect walk was given to provide a visual clue of where and how high the flooding water could reach.

2.5.4 Case studies comparison in policy and implementation analysis

The case studies from other natural resources management in their policies and effectiveness in Cambodia would be compared with flood water management and the policy implementation. The horizontal policy integration, vertical policy integration, participation, implementation mechanism, and monitoring and evaluation for national policy assessment developed by Assistant Professor Reinhard Sturer and Associate Professor André Martinuzzi

would be used to analyse policies to reveal the correlation between the flood and other natural resources management.[18]

[18] R Steurer & A Martinuzzi, Towards a new pattern of strategy formation in the public sector: first experiences with national strategies for sustainable development in Europe, *Environment and Planning C: Government and Planning*, 23, 2005, p. 460.

3 The link between floods and Climate Change

3.1 The flood from the mighty river

The flooding has occurred annually throughout the Mekong River Basin in Cambodia. The precipitation of the monsoon rainy season from May to October that lead to fast rising of the Mekong River starting from May and cause the annual flooding along the river.[19] It is positive when the flooding has brought along fertile sediments and left these rich natural fertilizers when the Mekong water receded. The annual inundation of the floodplain along the Mekong River and Tonle Sap or the Great Lake gives rise to enormous biomass to support the fishery.[20] Table 3.1 shows the amount of rice harvest and fish caught. There are immeasurable or intangible goods and services of the flooding like the pollution control, recreational usage, and habitats for migratory species. The large flood plain of Cambodia along the Mekong River provides many rural Cambodians living along the river to farm subsistence for a living. It is destructively negative when the flooding causes loss of life, property damage, and destroying agriculture crops. The Tables from 3.2 to 3.4 show the negative impacts of top 10 natural disasters in Cambodia from 1900 to 2010 in terms of: number of people killed, number of people affected and economical cost. Flooding was high up on the 3 Tables as one of the top disasters.

Table 3.1 Rice and other crop production and fish catch during 1998-2008

Year	Rice		Other crops (1,000 ton)	Fish	
	Wet season (1,000 ton)	Dry season (1,000 ton)		Total (1,000 ton)	Inland (1,000 ton)
1998	2,870	636	556	115	73
1999	3,330	708	773	122	76

[19] T Sakamoto, HV Nguyen, A Kotera, H Ohno, N Ishitsuka, M Yokozawa, 'Detecting temporal changes in the extent of annual flooding within the Cambodia and the Vietnamese Mekong Delta from MODIS times-series imagery', *Remote Sensing of Environment*, 102, 2007 p. 295 – 313.

[20] MRC, *Annual Mekong Flood Report 2008*, Mekong River Commission, Vientiane, 2009, p. 11.

2000	3,210	814	761	284	231
2001	3,280	823	773	296	246
2002	2,920	907	760	441	385
2003	3,840	873	1,140	421	360
2004	3,140	1,040	1,200	382	309
2005	4,730	1,250	1,470	327	250
2006	4,970	1,290	3,250	410	324
2007	5,360	1,360	3,540	517	422
2008	5,750	1,370	3,540	471	365

Source: MRC, 2008

Table 3.2 Top 10 Natural Disasters in Cambodia for the period 1900 to 2010 sorted by numbers of people killed

Disaster	Date	No. of people killed
Flood	31-Jul-1994	506
Epidemic	Jul-1998	475
Flood	11-Jul-2000	347
Epidemic	Jul-2007	182
Flood	22-Aug-1991	100
Flood	30-Sep-1996	59
Epidemic	16-Apr-1999	56
Flood	15-Aug-2001	56
Epidemic	Jun-1992	50
Flood	18-Aug-2002	29

Source: EM-DAT: The OFDA/CRED International Disaster Database for Table 3.2

Table 3.3 Top 10 Natural Disasters in Cambodia for the period 1900 to 2010 sorted by numbers of total affected people

Disaster	Date	Total No. people affected
Drought	Jun-1994	5,000,000
Flood	11-Jul-2000	3,448,053
Flood	15-Aug-2001	1,669,182
Flood	18-Aug-2002	1,470,000
Flood	30-Sep-1996	1,300,000
Flood	22-Aug-1991	900,000
Drought	Jan-2002	650,000
Drought	Apr-2005	600,000
Flood	2-Aug-1999	535,904
Epidemic	Mar-1992	380,000

Source: EM-DAT: The OFDA/CRED International Disaster Database for Table 3.3

Table 3.4 Top 10 Natural Disasters in Cambodia for the period 1900 to 2010 sorted by economic damage costs

Disaster	Date	Damage (000 US$)
Flood	11-Jul-2000	160,000
Flood	22-Aug-1991	150,000
Drought	Jun-1994	100,000
Drought	Jan-2002	38,000
Flood	15-Aug-2001	15,000
Flood	30-Sep-1996	1,500
Flood	10-Aug-2007	1,000
Flood	2-Aug-1999	500
Flood	18-Aug-2002	100

Storm	1-Nov-1997	10

Source: EM-DAT: The OFDA/CRED International Disaster Database for Table 3.4

3.2 Duality of Flood: Flooding benefit outweighs the flooding cost

So far there are costs that negatively portray the flooding, let consider from another perspective of flooding. A 'normal' flood in Cambodia is generally considered to bring more benefits than costs in a given year. A simple measurement is to use the economical values in terms of money generated from flooding versus the cost of damage generated from flooding. Using the figures from the Annual Mekong Flood Report 2008, Cambodia's rice harvest yielded more than 6,264,000 ton in 2006. The rice cultivation occupied 90% of the cultivated land, and 32% of these cultivated land lies in the floodplain areas. Using the price of the US$500/ton in 2008 and 2,004,480 ton of rice (6,264,000 X 0.32) was harvested from the floodplain areas.[21] The flood beneficial economical value from the rice is US$1,002,240,000 or equivalent to US$1 billion. Table 3.5 shows the graphical calculation.

Table 3.5 calculations of the economical values of rice harvested from floodplains areas

Total harvested rice (ton)	% of rice harvested from floodplain areas	Amount of rice harvested from the floodplain areas (ton)	Price at 2008 US$500/ton	Economical value of rice in 2008 (US$)
6,264,000	32%	6,264,000 x 032 = 2,004,480	500	2,004,480 x 500 =1,002,240,000

Source: Self-tabulated table for calculation

The damage cost rising from the flood in 2008 in Cambodia was US$6 million.[22] The economical value of rice alone is US$1 billion compared to the flood damage cost of US$6 million. This is a very clear indication of the flood benefit greatly outweighs the flood cost in Cambodia in an economical sense. This is clear duality of flood in Cambodia that floods can be a good occurrence to have unlike in other countries whereas the flood is usually viewed as negative event.

[21] The World Bank, *Global Commodity Markets: Review and price forecast*, World Bank, 2010, p.20

[22] MRC, *Annual Mekong Flood Report 2008*, p. 30.

3.3 The perspective and potential impacts of the Climate Change in Cambodia

The increase in carbon dioxide, one of the main Greenhouse Gases (GHG) in the atmosphere, is considered to be the main contributor to the global warming. The global warming will change the climate that human lives in. The CC has posed an additional challenge to the Cambodia government and its people. This section examines what kind of effects the CC will have on the flooding in Cambodia and what are the awareness and action of RGC on CC.

3.3.1 Global perspective and potential impacts of CC in Cambodia

The Intergovernmental Panel on climate Change (IPCC) had written the most commonly cited publication on Climate Change called "IPCC's Fourth Assessment Report (AR4)." However, the information on water and CC are scattered throughout AR4 report. A Technical Paper was written in 2008 to provide a compact and integrated paper focusing on the water and CC simply titled "Climate Change and Water." This technical paper projects that there is an increase in maximum monthly flow of the Mekong water ranging from 35% to 41% in the basin level. The lower estimated value is for the years 2010 to 2038 and higher estimated value is for the years 2070 to 2099, comparing with the 1961 to 1990 levels. On the other hand, the minimum monthly flow is going to decline by 17 to 24% in the basin with lower estimated value for the years 2010 to 2038 and higher value for the years 2070 to 2099, and using the 1961 to 1990 baseline to compare. These data suggests that there are potentially higher flooding risks during the raining wet season and higher possibility of water shortages in the dry season.[23] Next, the paper will continue to explore what are the resultant studies of other organizations on CC in Mekong Basin.

The Consultative Group on International Agricultural Research (CGIAR) is a multi-institutional research for development in agricultural program that believes in changing the way the water is managed and used to increase food productivity and security in agriculture can help to meet the international goal of eradicating the poverty. CGIAR launches an Initiative called the Challenge Program on Water and Food (CPWF) to increase water productivity in the agriculture at the local, system, catchment, sub-basin and basin levels. One of the high priority basins is the Mekong basin. The paper written on the Mekong basin uses

[23] BC Bates, ZW Kundzewicz, S Wu & JP Palutikof, *Climate Change and Water*, Technical Paper of the Intergovernmental Panel on Climate Change, IPCC Secretariat, Geneva, 2008, p. 87

model with input of parameters possibly affected by the CC like rainfall distribution shows that the rainy wet season will be shorter but more intense, and longer and more intense dry season. Therefore, the paper strongly suggests flood and water shortage are going to be aggravated. The flow of the Mekong water will affect agriculture and food production tremendously.[24]

From the collaboration of Japan University of Yamanashi, International Centre for Water Hazard and Risk Management (ICHARM) of UNESCO and Australia engineering company Sinclair Knight Merz, their joint research based on one climate model under one future scenario bring out the changes associated with increase number of wet days in all the subbasins of the Mekong River basin, with the magnitude and frequency of flood are expected to change greatly.[25] The flooding is expected to increase in almost every sub-basins of Mekong River. The results highlight the need to put the policies, infrastructure and mitigation strategies in place as soon as possible to protect the Mekong River basin against increased flooding that could happen in the future.

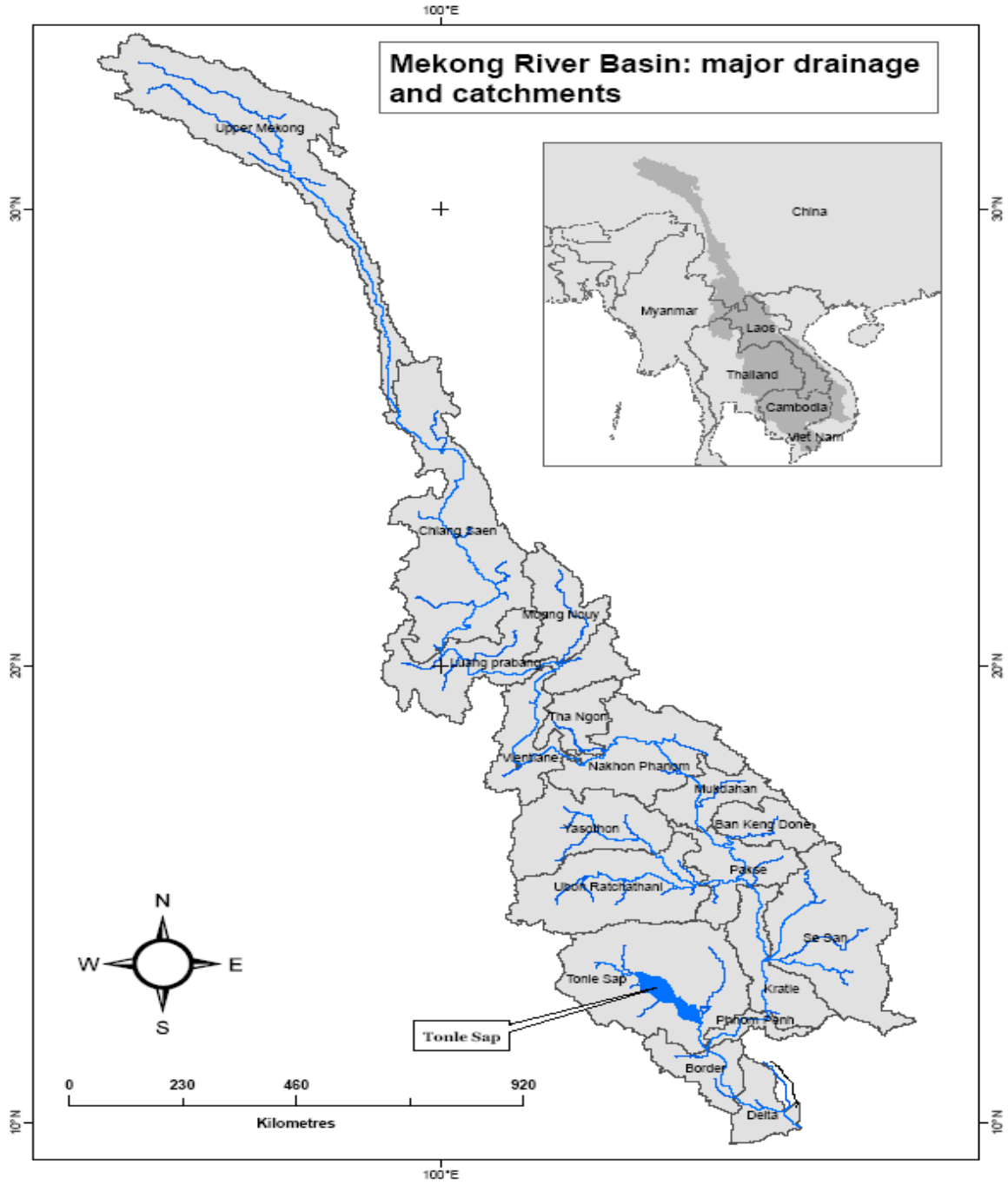
Australia's Commonwealth Scientific and Industrial Research Organization (CSIRO) is the national science agency that uses scientific research to apply solution to wide spread of problems existed in our society and promotes a healthy environments and lifestyles. One of their diverse groups of researchers completed the report "the Mekong River Basin Water Resources Assessment: Impact of Climate Change" in 2008. The report separates whole Mekong basin into 18 catchments and uses water account model to provide an understanding of the basin function. The water account model brings in the seasonal and annual variability, and also other factors like climate change, land use change, and dam construction. The model can be modified and customized to suit any particular situation or variables in the basin. The assessment of one catchment particularly the Phnom Penh catchment is more important in this thesis as the problems and interviews of the villagers and government officials are from this

[24] M Kirby, M Mainuddin & J Eastham, 'Water-use accounts in CPWF basins: Simple water-use accounting of the Mekong Basin', *CPWF Working Paper: Basin Focal Project series*, The CGIAR Challenge Program on Water and Food, Sri Lanka, 2010, p. 1 – 26.

[25] AS Kiem, H Ishidaira, HP Hapuarachchi, MC Zhou, Y Hirabayashi & K Takeuchi, 'Future hydroclimatology of the Mekong River Basin simulated using the high-resolution Japan Meteorological Agency (JMA) AGCM', *Hydrological Processes*, 22, 2008, p. 1382 - 1394

catchment as shown in Table 4.5. The report list out the potential impacts of the CC by 2030 is the increase in temperature, annual precipitation, annual runoff, and also a high probability of increased flooding and flooded area.[26]

Figure 3.1 The Mekong Basin with the 18 catchments used in the water account model



Source: Eastham et al., 2008

[26] J Eastham, F Mpelasoka, M Mainuddin, C Ticehurst, P Dyce, G Hodgson, R Ali & M Kirby, p. 23 – 67.

3.3.2 The Royal Government of Cambodia perspective on Climate Change

The first MRC Summit and International Conference held in Hua Hin in Thailand on 2nd to 5th April 2010. The International Conference had a theme called "Transboundary Water Resources Management in a Changing World" started from 2nd to 3rd April 2010 drew about 300 participants from other international river basins , water experts, international organizations, regional and local professionals to meet, share and recommend ways to improve the water resources management and development. These meetings, exchanges and their outputs were synthesized and presented to the leaders of the Lower Mekong countries. The important issues raised out were how the common water resources could benefit the Lower Mekong countries with economy, environment, social prosperity, and how Mekong River Commission could act as the pivotal common cooperative mechanism that manages the Mekong water. In addition, the Climate Change posed a challenge in the Mekong River Basin bringing expected impacts like increased floods and droughts in the basin.[27]

The International Conference prepared the MRC first Summit started on 4th to 5th April 2010. The Prime Ministers of 4 Lower Mekong Countries agreed to rise to the challenge of the Climate Changes and united to work with MRC to integrate Climate Change adaptations into the development of water resources. Not only the 4 nations would work with MRC, but also cooperated with other development partners like ADB, World Bank, ASEAN to promote sustainable development of Mekong River Basin and its benefit usage. One positive outcome was the joint Declaration to cooperate and work towards in sustainable Mekong water in future and set a 9 priority areas of action plan. The 2 main priority areas were how CC threatened the livelihood and identified potential partners to work together to address CC. Cambodian Prime Minister Hun Sen presented his separate speech that Cambodia wanted more activities of MRC to reduce the poverty of people living along Mekong River, and

[27] 'MRC International Conference: Transboundary Water Resources Management in a Changing World 2-3 April 2010', Hua Hin, Thailand CONFERENCE SUMMARY 3 April 2010', viewed on 28 August 2010, < http://wwww.reliefweb.int/rw/rwb.nsf/db900sid/MUMA-84794D?OpenDocument>.

tackle the problem of the regional Climate Change leading to more flooding.[28] The actions were needed in formulating robust adaptation strategy in the development plans.

3.3.3 Cambodian Government action on CC

The Royal Government of Cambodia organized their first National Climate Change Forum on 19th to 21st October 2009. The aim of the Forum was to raise awareness of Climate Change is affecting both environment and development progress of Cambodia.[29] The Government believed the threats are real and needed assistance from all different organizations to mitigate and adapt to the Climate Changes.

The RGC strongly expressed their political commitment to resolve the Climate Change issues by having Prime Minister Hun Sen presiding over the forum and invited over 200 policy makers, water resources practitioners, academia researchers, Cambodian relevant ministries, Non-Governmental Organizations (NGOs) within Cambodia and outside of Cambodia, and private sectors. The impressive list of participants ranged from: the United Nations Environment Programme, Danish International Development Agency (DANIDA), Swedish International Development Agency (Sida), Asian Development Bank, French NGO Groupe Energies Renouvelables, Environnement et Solidarietés (GERES), United Nations Framework Convention on Climate Change (UNFCCC), World Bank, Oxfam, World Fish Centre, Australia National University, United Nations Economic and Social Commission for Asia and the Pacific (UNESCAP), German Federal Ministry for the Environment, Nature Conservation and Nuclear Safety, and International Union for Conservation of Nature (IUCN).

The experiences and knowledge were critical to Cambodia to learn and replicate the successful measures to adjust to new conditions arising from Climate Change and maintain healthy and sustainable ecosystems while having society and economy progress. The Forum not only hoped to facilitate the sharing and learning of all the participants' know-how and capability, but also built relationship and partnership, and network to form a comprehensive

[28] 'Remarks by Samdech Akka Moha Sena Padei Techo Hun Sen: Prime Minister of the Kingdom of Cambodia', First MRC Summit, Hua Hin, Thailand, 5 April 2010, viewed on 28 August 2010, <http://www.mrcsummit2010.org/mrc-summit-statements.html>.

[29] 'First Cambodia National Climate Change Forum (NCCF) 19 – 21 October, Phnom Penh, Cambodia',viewed on 3 September 2010, <http://new.weadapt.org/wiki/Cambodian_National_Climate_Change_Forum>.

supporting system to help Cambodian in overcoming the challenges and risks of Climate Change.[30] The sessions and panel called for broad range of issues like renewable energy development, low-carbon emission society, financial aid for Climate Change, Climate Change links to poverty and gender, adaptation for agriculture sector, and adaptation in fishery sector. The spectrum of development issues touched on regional and local level. In the end, all issues are linked together on how to help Cambodia to survive in the future changes of the Climate.

[30] ibid.

4 Mekong River Commission responses to Climate Change

4.1 MRC as the focal point

The Mekong River Commission (MRC) was renamed in April 1995 after 4 countries consisted of Cambodia, Lao, Thailand and Viet Nam signed the Agreement on the Cooperation for the Sustainable Development of the Mekong River Basin. The Mekong River cooperation between the 4 countries had been formed back into 1957, the names of the cooperation had been known as Mekong Committee and later Interim Mekong Committee. With the formation of MRC, two dialogue partners are People's Republic of China and Union of Myanmar. The MRC is an intergovernmental collaboration body of the 4 member countries to manage and harness the Lower Mekong River Basin water resources in a sustainable way. The MRC uses the IWRM-based development strategy for the management of the Mekong River Basin. The MRC is the focal point for the 4 member countries to share information, technical guidance and provide mediation for conflicts, and thus able to share, use, manage and protect Mekong River basin resources in an equitable and sustainable way for economic growth and poverty reduction.[31] The MRC seems to be a suitable candidate to provide the policy for the flood adaptation to the villagers living along Mekong River in Cambodia.

4.2 Flood Management and Mitigation Programme and Component 4

A deeper investigation of the MRC shows there is a programme within MRC that deal exclusively with the flood management. The Flood Management and Mitigation Programme (FMMP) is set up to prevent and decrease the citizens' suffering and losses due to floods, while preserving the environmental benefits of the floods too.[32] One of the 5 components of FMMP is to strengthen the Flood Emergency Management in all level of the authorities in disaster management. The Flood preparedness and mitigation are the keys in the flood Emergency Management. There are elements proposed that can help the villagers living along the Mekong River to adapt to floods induced by Climate Change. The element of protection is to build structural measurements like dikes or embankments to reduce the likelihood of the floods, and the element of prevention is to adapt any future development to the risk of

[31] MRC, *State of the Basin Report 2010*, p. 228 - 231

[32] MRC, *7th Annual Mekong Flood Forum: Integrated Flood Risk Management in the Mekong River Basin*, MRC Regional Flood Management and Mitigation Centre, 2009, p. 13 – 16.

flooding.[33] Unfortunately, the proposed projects using the above-mentioned elements are selected to be in the Kandal, Prey Veng, Kratie and Svay Rieng Provinces but not in Kampong Cham Province.

The Federal Ministry of Economic Cooperation and Development of Germany through the Deutsche Gesellschaft für Technische Zusammenarbeit (GTZ) and the European Commission Humanitarian Aid Department (ECHO) had funded the proposed projects, with the technical support provided by the Asian Disaster Preparedness Center (ADPC).[34] They were carried out from the mid 2008 to December 2010 to serve as a good example for Provincial, District and Commune disaster management committees to learn and replicate in other flood prone areas. In this way, the projects would strengthen the capacity of the disaster management committees in all levels in the flood preparedness and mitigation.

The projects had been carried out in the Kandal, Prey Veng, Kratie, and also Kampong Cham Province in Cambodia. These projects were funded by foreign nations and technical support provided in few selected provinces, it means other provinces may not have the flood risk management programmes running at all. Will Kampong Cham Province show the evidence of the programme has been carried out? The other chapters in this paper will reflect whether the projects are effective or not.

4.3 Climate Change and Adaptation Initiative

As the CC had been strongly suggested to impact the Lower Mekong River Basin 4 countries signaled a willing cooperative initiate to adapt to the new situation posed by the Climate Change. The MRC was chosen to be the ideal organization to lead the 4 countries to address the Climate Change issue. On March 2009, the MRC and 4 countries endorsed the Climate Change and Adaptation Initiative (CCAI) with partnerships of foreign and domestic donors and institutions.

The CCAI was completed through consultation from identifying the need and priorities of the 4 countries, National Mekong Committee, foreign and domestic NGOs, universities and

[33] MRC, *7th Annual Mekong Flood Forum: Integrated Flood Risk Management in the Mekong River Basin*, p. 178

[34] ibid., p. 177.

development partnerships like ADB and GTZ. The target sectors were the agriculture, water management, irrigation, forestry, hydropower, navigation, natural disaster management and fisheries.[35] The MRC appointed its Environment Division to be the focal point to develop the CCAI and integrate CCAI into all the relevant programmes of MRC. The CCAI was focusing on the planning and implementation of the Climate Change adaptation of the water resources management in LMB countries.[36] It would develop tools to assess and support the planning process, and select the pilot sites locally in all 4 countries to demonstrate adaptation, planning and implementation phases integrated with local knowledge. The demonstration sites were to scale up and replicate national and basin wide if the projects were successful.

At the time of this report, the intermediate phase had began from the 2009 to end of 2010 to set up organization structure, develop tools for assessment, find and prioritize partnerships, and identifying possible demonstration sites in each of the 4 countries. The next Phase 1 commenced from 2011 and ends in 2015 to adapt new process and implement projects, from which the feedback was generated to improve the tools. The Phase 2 launched from the 2016 and lasts to 2020 to test the possibility of up-scaling the projects from demonstration sites to national and basin wide level while the feedback continued to improve the tools. Phase 3 was the last phases to get ready to hand the planning and implementing process to each LMB countries national agencies from 2021 to 2025.[37]

Though CCAI was the most direct effort by MRC to address the water management under the Climate Change conditions, it was too early to tell whether the CCAI would be a success and whether LMB countries were going to replicate the projects in their own countries and changed their flood management policy.

[35] MRC, *Climate Change and Adaptation Initiative: Framework Document for Implementation and Management*, Mekong River Commission, Lao PDR, 2009, p. 5.

[36] ibid., p. 3.

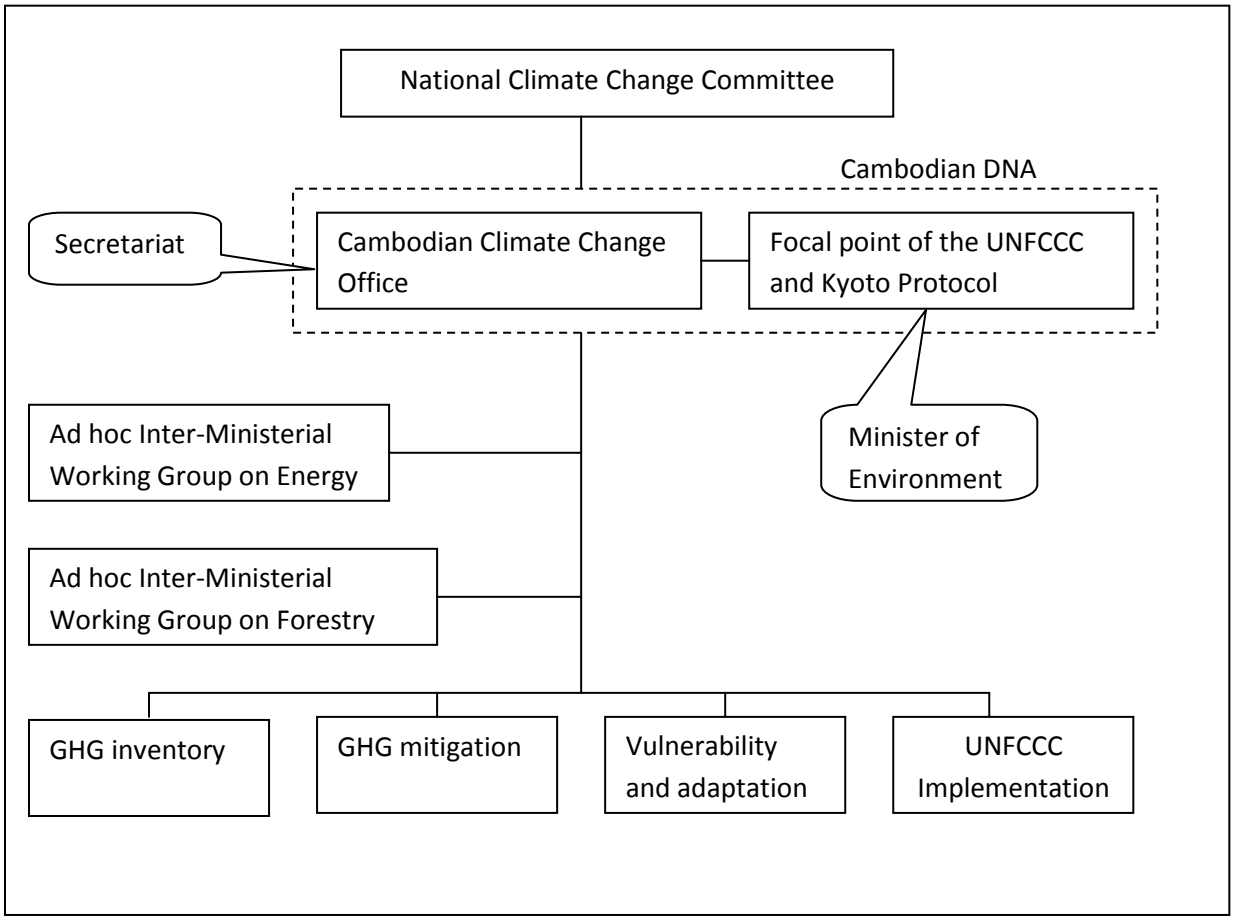
[37] ibid., p. 16.

5 Findings from the Cambodian National officials' perspectives

5.1 Cambodian Government responses to Climate Change

The Cambodian Government had begun to resolve the Climate Change issues in 1995. First the government ratified the United Nations Framework Convention on Climate Change (UNFCCC) on December 18 in 1995 and agreed to follow the Kyoto Protocol in 2002. The government developed its own National Adaptation Programme of Action to Climate Change (NAPA) to increase its adaptive capacity to changing climate conditions. After NAPA was approved by the Cambodian Council of Ministers in October 2006, the government submitted it to UNFCCC in March 2007. The Cambodian institutional layout and policies to address Climate Change will be discussed in the following sections. Figure 5.1 shows the institutional structure arrangements that have been established to manage the climate change activities in Cambodia.

Figure 5.1: Cambodian Institutional Arrangements for Climate Change



Source: MRC Regional Synthesis Report, 2009

5.2 Cambodian institutional response to Climate Change

5.2.1 Cambodian Climate Change Office

The Ministry of Environment (MOE) is the focal point of the Climate Change within Cambodia. One government entity was set up only to tackle climate change. The Cambodian Climate Change Office (CCCO) was established on June 23, 2003 within the Department of Planning and Legal Affairs of Ministry of Environment to resolve the CC issues. CCCO is a technical body that has broad mandate to support all technical activities related to execution of the UNFCCC and other climate change relevant tasks. In other tasks, CCCO is also the Secretariat for MOE in climate change matters and serves as the Designated National Authority (DNA) under the Kyoto Protocol for Clean Development Mechanism (CDM) (fig.5.1). The CCCO has to facilitate and coordinate donor funded and private sector activities relevant to Climate Change with other government ministries and agencies. For example, CCCO organizes inter-ministerial technical working groups specialized in sectors like forestry and energy with climate change themes (GHG inventory, GHG mitigation, Vulnerability and adaptation, and UNFCCC implementation). CCCO aims to be the initial contact point for projects relating to CDM project and climate change activities in Cambodia.[38] The most important task for CCCO currently has been raising awareness of climate change matters among the government agencies and ministries, and trying to raise funding for adaptation and mitigation activities from donors.[39]

5.2.2 National Climate Change Committee

The Ministerial Sub-decree creates the National Climate Change Committee (NCCC) on April 24, 2006. The committee is made up of senior policy makers. While CCC is a technical body, the NCCC is senior policy-making body.[40] The NCCC is the inter-ministerial agency and consists of Secretaries and Under-Secretaries of the State from 19 Ministries and government agencies with power to manage climate change adaptation and mitigation activities. The

[38] Danish International Development Assistance, p. 2.

[39] International Centre for Environmental Management, *Climate Change Adaptation in the Lower Mekong Basin Countries: Regional Synthesis Report*, Mekong River Commission, 2009, p.26.

[40] Danish International Development Assistance, p. 17

NCCC meets twice a year or more frequently as needed. The NCCC has given prescribed authority to prepare, coordinate, and monitor the implementation of the policies, legal instruments, strategies, and plans and programmes of government relating to the climate change. There is some overlap of authority between DNA, NCCC and CCCO that helps to provide continuity for the climate change activities implementation and aids in harmonizing the plans without duplication and less loss of resources.

5.2.3 Department of Meteorology and Department of Hydrology and River Works

The Ministry of Water Resources and Meteorology (MOWRAM) has two departments responsible for the river water movement forecast and weather forecast. The Department of Meteorology (DOM) is in-charge for the meteorological data collection and weather forecasting. However, the DOM uses the data obtained from Internet and contains only simple weather and temperature conditions for the weather forecasting.[41] A national rainfall forecasting is not going to happen soon as there are shortages of funds, lack of training and poor management of automatic rainfall stations that have been installed by different projects.

The Department of Hydrology and River Works (DHRW) has 7 out of 40 monitoring stations working to collect hydrological data collection due to lack of operation and maintenance funds. The hydrological forecasting time is only 3 days. The data collected is shared with other 3 Lower Mekong countries and Mekong River Commission. A Flood Forecasting Bulletin is sent to the public media and government agencies everyday around 9:00am. The MRC receives from DHRW's Flood Forecasting Bulletin and sends its flood forecast to DHRW. There are no integration of the weather and hydrological forecasting in one single centre but DHRW and DOM have to present their forecasting separately. Therefore, DHRW and DOM are not likely to track how CC impacting on weather and hydrology on their own and offer reliable data and forecast to the general public.

5.2.4 National Adaptation Programme of Action to Climate Change

The national Adaptation Programme of Action to Climate Change (NAPA) can be the most effective Government policy to combat the negative impacts of climate change. The formulation of NAPA was done by consultations from policy-makers to local village level. A nation-wide survey of more than 700 households, NGOs, and local authorities was conducted

[41] MRC, *7th Annual Mekong Flood Forum*, p. 62.

in 17 provinces. The climate hazards like flood, drought, windstorm, high tide, and malaria and the adaptation needs were identified during the survey. The prioritization of proposed projects for adaptation was conducted through national and provincial consultations. The leading government agency will depend on its suitability for the project. The criteria for prioritization are sustainability, improvement of livelihoods, water availability, food security, and responsiveness to immediate community needs and use of appropriate technology. There are 39 projects within 4 segments that are agriculture and water resources, coastal zone, and human and cross sectoral. There are 20 projects ranking as high priority and need an amount of USD130 million for implementation (see Annex 1).

The main problem with NAPA is that the projects depend on the donor funding especially from outside of Cambodia to finance the implementation of the 20 high priority and 19 medium or low priority adaptation projects.[42] In 2008, only 1 project on the water resources management secured funding from Least Developed Countries Fund managed by the Global Environment Facility (GEF) and the rest of the projects are still waiting for funding.

5.2.5 Other National Development Policies

Though NAPA is a realistically achievable list of projects to adapt to impacts of climate change, the other National policies of Cambodia do not integrate Climate Change into their policies. The Royal Decree on the Creation and Designation of Protected Areas (1993), the Law on Environmental Protection, and Natural Resource Management (1996), Forestry law (2002), and Electricity Law (2001) do not mention climate change. According to the Regional Synthesis Report done by International Centre for Environmental Management (ICEM) in 2009, the National Strategic Development Plan 2006 to 2010 and National Poverty Reduction Strategy 2002 do not make any reference to climate change matters.[43]

5.2.6 National Committee for Disaster Management in Cambodia

Natural disasters like flood, drought, landslide, forest fire, and windstorm are common occurrences in Cambodia. Cambodia has vast land of floodplain and prone to flooding. Flooding can easily damage public infrastructure, reduce agricultural production, and cause loss of life and property. As a result, Royal Cambodia Government established the National

[42] International Centre for Environmental Management, p. 32.

[43] ibid.

Committee for Disaster Management (NCDM) in 1995. NCDM is an inter-ministerial body comprised of members from certain number of ministries and armed forces, but all ministries and governmental agencies concerned will work with NCDM as needed in the emergency situations. According to the Policy Document of NCDM, the role and responsibilities of NCDM are not only to help to provide timely and critical emergency relief to victims after disasters strike, but also to develop guidelines on prevention and mitigation measures to reduce the possible impacts before disaster hit. In terms of Climate Change induced flooding, NCDM may coordinate with CCCO to develop prevention measurements to help villagers living along the Mekong River to cope with severe flooding.

5.3 Answers to the Research Question

Among the 20 high priority projects of NAPA, there were 3 projects would able to provide protection against flood for the villagers living along Mekong River in the Kampong Cham province where the interviews were conducted with the government officials and local people (Annex Table 1). The first project built dikes to protect settlement and agricultural fields from flood, the second project raised awareness and responsiveness of the villagers to reduce their vulnerability, and the third project constructed drains and gates to channel the flooding water away from roads and crop fields.

These NAPA projects could be served as preventive and mitigation measures. Building dikes, drains, and gates system to keep out the flooding water from houses and farmlands was to prevent destructive impacts of flood. Enabling the villagers to recognize and prepare to face the dangers of flooding and in turn lead to reducing the intensity of flooding. NCDM had the mandate to develop preventive and mitigation measures to help the villagers to adapt to climate change. However, the literature reviews showed that the focus was only on the post disaster emergency relief carried out by the NCDM only. The Ministry of Environment (MOE) report on the NAPA highlighted that the National policies did not integrate Climate Changes but only focused on the post disaster emergency relief.[44] In the regional synthesis report produced by the International Centre for Environmental Management of Australia and the MRC Environment Programme team for the initial phase of the MRC Climate Change and

[44] Ministry of Environment, *National Adaptation Programme of Action to Climate Change*, Royal Government of Cambodia, Phnom Penh, 2006, p. 4.

Adaptation Initiative (CCAI), the report stated the Cambodian government took action to provide emergency relief only after the disaster has occurred.[45]

The CCCO is the technical body to implement climate change related projects while NCCC plays the role to prepare, coordinate and monitor the policies, plans and programmes relating to climate change. There are approved projects in NAPA to help the villagers living along the Mekong River to adapt to severe flooding caused by Climate Change. It seems that there is a strong supportive 'yes' to the research question that Cambodian government has flooding adaptation policies to help the villagers living along the Mekong River to adapt to the Climate Change induced flood.

In the actual practice, the Cambodian government focuses only providing on the emergency relief after the flood has happened. The NAPA projects for Kampong Cham are supposed to prevent and prepare to adapt to reduce the future damages from the intensive flood brought by the climate change. However, the NAPA projects are not implemented because there is no support of financial funding from the donors. The CCCO is not able to implement any NAPA projects without donors' funds, and NCCC is not able to prepare, coordinate and monitor any NAPA projects if they are not able to start.

The research question is asking: "In the face of the CC threat of intensifying the flooding in Mekong River, does the Royal Government of Cambodia have flood adaptation policy to help the villagers cultivating crops along the Mekong River floodplains to adapt to the more severe flooding?" At this stage, the research question has half of the answer as in the flood adaptation policy exists, the government institutions exist to implement the policy but the flood prevention and adaptation projects in the NAPA policy cannot be started as there is not funding to support the projects. The Cambodian government through NCDM will provide the relief aid to the villagers after the flood strikes and destroys the property, agricultural crops, and causes the loss of human and farm animals' lives. NAPA policy is the best tool RGC have presently to resist CC. The developed nations have pledged to fund developing nations to overcome the CC problems and this presents a research opportunity on how the funding can be mobilized to use for NAPA policy. It is time to turn to interviews from the field trip to provide the other half of the answer to complete the whole answer.

[45] International Centre for Environmental Management, p. 22.

6 Findings from the Government officers' and villagers' perspectives

6.1 From the interviews and field trip

Out in the field and from the interviews, the reality would uncover and provide the other half of the answer to the research question. Was there only post disaster emergency relief given after only flood hit the villagers; the only help from Cambodian Government policies?

6.2 The structure of the Cambodia governance system

To understand how the policies are implemented in the Cambodian governing system, there is a need to step back and look at the Cambodian policy framework. A brief understanding will be given here and explain the role and responsibilities of the national and sub-national governance level at below.

6.2.1 The National level and the Sub national level

The national level described here refers to the Royal Government of Cambodia. The preceding level of governance structure below the national government consists of the provincial, district and commune level. They are the primary responsible bodies to disseminate and implement the policies from the top to the ground. The governmental agency responsible for the handling of the policy and its implementation would be discussed and explained clearly in this chapter. This leads to a question of the role of flooding played in Cambodia.

After 1993, Cambodia emerged from civil war as a socially and political broken nation, the rural population distrust leadership and poverty was wide spread. A Seila program with the aid of UNDP, Cambodia Area Rehabilitation and Regeneration Project (CARERE) WAS launched to develop rural areas and build the legitimacy of the local government. The Seila program was successful to reduce the poverty in rural areas and encouraging local participation while gaining the citizens' recognition of the local government. This program made a deep impact on the Cambodian public administration.[46] The Law on Management of Commune/Sangkat Administrative and the Law on Elections of Commune/Sangkat Councils was passed in 2001 across the nation to promote democracy, development and service delivery to the rural population by enabling leaders elected by the local to work to solve the

[46] A Henry, *Cambodia's Seila Program: A Decentralized Approach to Rural Development and Poverty Reduction*, World Bank, 2004, p. 12 – 14.

problems faced by the local.[47]

The initial setup of Commune/Sangkat Councils proved to be successful as local villagers can hold the elected representative accountable for the local development, and the villagers could participate and express the their preferences in the budget planning for the community projects. The law contributed to the security and peace while the development projects brought about the economic growth to the local areas, and central government in capital city was strengthened, stabilized, and legitimized by the reform in the Commune/Sangkat Councils. This help to push Royal Government of Cambodia to continue the decentralization and deconcentration reform further.

The Strategic Framework for Decentralization and Deconcentration (D&D) Reforms established in 2005 is the policy of the RGC that guides the process of governance reform at three tier levels of governance management in the provincial/ municipal, district/khan, and commune/sangkat levels. The Reforms divide the power and the duties between the each different levels of administration. The Framework aims to 1) give the power, duties, resources to councils of the three tier levels to strengthen and expand the democracy; 2) encouraging people especially women, indigenous groups and vulnerable groups to participate in decision-making processes in all three tier levels, holding the three tier levels of administration to be accountable to public, and increasing citizens' oversight of the 3 administration levels; 4) ensuring the citizens to monitor the public services to meet their needs and priorities. 5) reducing the poverty through strengthening the local capacity to use resources.[48]

In 2008, the Organic law for the Capital, Provincial, Municipalities, District and Khans Administrative Management was adopted. The reform changed from purely central planning and implementation of policy towards sub-national level into the Provinces, Municipalities, Districts and Khans and including the Capital city to be more respectful, responsive and in-tune with the needs of the local people. The D & D framework divided the role and responsibility of each tier of the governance as shown below.[49] The Central government or the

[47] RGC, *National Program for Sub-National Democratic Development(NP-SNDD) 2010 – 2019,* Royal Government of Cambodia, Phnom Penh, 2010, p.2.

[48] RGC, NP-SNDD, p. 8 – 9.

[49] ibid., p. 4.

RGC residing in the Capital City establishes the national policies and also national priorities for the whole country.

- The Provincial government is the planning and coordinating agent with budgetary capacity to carry out the policies in the rural and urban areas. They are accountable for the national policy implementation and transfer of resources and delegation of authority.
- The Municipalities, Districts and Khans administrations are to respond to the needs of the Commune and Sangkats. They are the governmental administration staffs in their territories.
- The Commune and Sangkats are the public elected bodies to governing the local people. They have some limited budget from the RGC and can start their development projects deemed as they seen fit according to their needs. They can hold the Capital, Provincial, Municipalities, District and Khans administrative officials accountable to the local people by participating in the decision-making meetings, their right to access information, right to monitor, and right to receive reports from these higher tiers of administrative staffs.

As shown below in Fig. 6.1, the during the interview the Staff from Cambodia Development Resource Institute (CDRI) hand-drew to show me the structure of RGC and how the policy is implemented from the national down to commune in matching words description of the structure found in the NP-SDNN version. CDRI can be viewed as a window to see Cambodia from a non-judgmental perspective.

Fig. 6.1 Cambodian governance structure

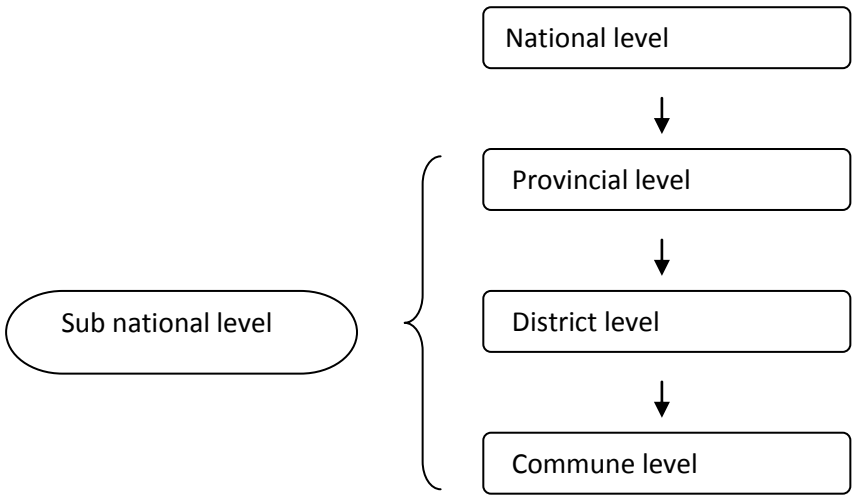


Fig. 6.1 CDRI interviewed personnel hand-drew structure of Cambodian Government

6.3 The need to interview all sub national governmental levels and villages

The literature review so far had been pointing my research question towards the national government in Phnom Penh has policies to help local villagers to adapt to the flooding brought about by CC, yet the implementation stage suffer setbacks as not much progress can push the top 20 high priority projects forward. The reason for interviewing the provincial down to commune level officers and finally the local villagers will help to give insights on what are the real adaptation policies exist and what are the officers actually doing to help the local villagers to adapt, and from the villagers themselves on how they are trying to resolve the flood problems themselves.

The Provincial level interview with 2 directors from dam and irrigation units, and deputy director of the Provincial Water Resources and Meteorological Department of Kampong Cham explained there were no actual activities to prevent or help to villagers to adapt to the flooding, but only help like money, petroleum for the boats, food stuffs, and Cambodian Red Cross donation arrived after the flooding struck.[50] They also said that the villagers had learnt from their ancestors to live with the flood and the villagers usually moved to the higher and safer ground before the flood arrived.

The District chief of the Kampong Siem also pointed to the same situation of helping the villagers after the flooding arrived and subsided, the relief arrived were from the Provincial level, and there was also help from the NCDM staff to clean the wells after flood level went down.[51] The best adaptation strategy the District could provide was to raise the warning by the radio and relaying the warning through the commune leaders when the water level would reach the critical height of 15m and above and advised the villagers to go to elevated ground.

The main sub national governmental bodies had shown that the main effort is focus on the post flood disaster management not the prevention of or adaptation to the flood. The Kien Chrey Commune had their own funding from the RGC to implement their choice of projects, but there is not extra funding allocated to combat the flood. The Commune was powerless to help the villagers in adapting to the flooding except to ask the villages to listen to the warning

[50] Kampong Cham Provincial Water Resources and Meteorological Department, interview, 21 May, 2010, 1 hour.

[51] Kampong Siem District, interview, 24 May 2010, 45minutes.

advice from the radio or television programme.[52]

The interviews of two different villages from the same district was to find out what kind of impacts the flood will have on different villages that were geographically located differently from each other. The Speang Thmey Village resides along the Mekong River with a highly elevated road constructed in 2004 running in parallel with the Mekong River. The other Annthak Neal Village is located about 5km inland away from the Mekong River and rests on the low-lying ground compared to the Speang Thmey Village. This geographical difference meant that the Annthak Neal Village is always the first place to be flooded and last for the flood to recede.

The Speany Thmey Village had depended on themselves to adapt to the flood and made use of the surroundings to escape from the suffering brought by the flood. This village used to make their way up to the hill for safety when the flood came. Now they built their house on very tall wooden poles or concrete pillar as shown in Picture 6.1, and the villagers also built a makeshift wooden floor at the middle of the house to live in between the ceiling and the makeshift floor when the floodwater reached the level of the original wooden floor. Next, they moved their livestock on the highly elevated road outside their houses and took care of their livestock living on the road until the flood subsided. The house and the road were their strategy to adapt to the flood.[53]

The Annthak Neal Village had the some of the highly elevated houses and these households would also build the makeshift wooden floor and live in between the roof and makeshift floor while their livestock would be moved to the hills. For those villagers who could not afford to build the houses in this way would seek shelter in the hills together with their livestock. These two villages were depending on the relief that arrived after the flooding. The two villages had not received any help in adaptation projects to the flood from the sub national governments but they received the food, petroleum for the small boats, some health care, and restoration of their wells from the NCDM staff after the flood hit.[54]

[52] Kien Chrey Commune, interview, 21 May 2010, 1 hour.

[53] Speany Thmey Village, interview, 22 May 2010, 1 hour.

[54] Enthak Nel Village, interview, 23 May 2010, 1 hour.

Both villages were asked to participate in the Venn diagrams to find out the institutional power the villagers believed who could execute the flood adaptation management in their villages. This triangulation confirmed the facts the villagers had said in their interviews earlier that there was no flood adaptation policy to help them.

Pict. 6.1 The concrete poles, and the house with the ramp leading to the elevated road

Source: Author took the picture during the visit

6.4 The second half of the answer

The sub national governmental bodies had been shown through the interviews that they were not able to provide the pre-flood adaptation policies to help the villagers to prevent or adapt the flood and only capable to give assistance to the villagers in post flood disaster situations. The actual beneficiaries from the adaptation policies to flood were the villagers, but they had been counting on themselves to adapt to the flood. The strong evidence from the field supported the first half of the answer to the research question that there were no physical

implementation of the flood adaptation policy from the NAPA policy to help the villagers living along the Mekong River to adapt the Climate Change induced flooding, only the post flood disaster relief aid was made available to the villagers when the flood struck. In other words, the flood adaptation policy existed only on the NAPA document and the listed projects in the policy would only be started if there were funding available from the donors especially the foreign donors.

7 Analysis of the Cambodian Government policies and their impacts

7.1 Analyzing method for policy and its effectiveness

The previous chapters had shown the role and responsibilities of the different ministries in relating to the flood management. Each ministry also played its part in the event of the flood disaster but in the uncoordinated and un-concerted manner. This chapter would look into the working mechanism and the real impacts of the ministries' policies in other natural resources management in Cambodia and whether they showed the same implications as the flood management policies.

For the analysis of the national resources management policies, the Steurer and Martinuzzi assessment method was used. Initially, this method of political assessment strategy was used to analyze and assess the policy of the sustainable development in European countries, especially on how to assess all policy levels and processes of sustainable development integration in national strategies. This paper argued that the same analyzing method could be applied to the national resources management policies in Cambodia as both the sustainable development and natural resources management policies focused on the long term sustainability of the natural resources and human continuous extraction from the natural resources for development and survival needs. The sustainable development policies safeguarded the economical growth in a social acceptable mode and preserved the nature and its resources for future generation use.[55] The natural resources management policies were to provide the villagers' needs of the natural resources for their lives and livelihoods in a long term period.

7.1.1 The definitions of the 5 categories for assessment of policy

There were 5 categories to evaluate the policy and its process. First, the horizontal policy integration needed the continuous cooperation between the ministries and generally between the political administrative branches in all the governmental ministries. Second, the vertical integration asked for a working partnership between the national government and sub national governmental bodies, with the goals and actions of the policies from higher political level coordinated with lower governmental branches. Third, implementation meant that turning the

[55] United Nations, United Nations Conference on Environment and Development (UNCED), 1992, viewed on 20 December 2010, < http://www.un.org/geninfo/bp/envirp2.html>.

objectives of the policies into concrete tools to ensure the flood measurements were considered in to the daily policy-making. Forth, the participation brought together governmental bodies and non governmental bodies like business leaders, academic personnel, civic society, foreign aid groups into policy making related to strategy formulation and implementation. Fifth, the monitoring and evaluation were the follow up and improvement of the present management by providing diagnostic conclusions and recommendations.[56]

The thesis used the case studies of other natural resources and water related resources in Cambodia to view and analyze the policies implementation, their results and effectiveness, and to understand what had happened in the real world. The case studies were analyzed according to the Steurer and Martinuzzi assessment method.

7.1.2 Case 1: The forest extraction

The lead agency in the Ministry of Agriculture, Forestry and Fisheries (MAFF) was the Department of Forestry and Wildlife (DFW) given the task to protect forests and wildlife by devising and implementing the forest laws and policies, managing the forest inventory and evaluating of the forest conditions, and other relevant activities. On the other hand, the Ministry of Environment had authority over 3.3 million hectares of the forests. These two ministries had the authority to manage the forest and were responsible to run the forest sustainable way. However, both national ministries were powerless to stem the tide of destructive logging in the protected areas. They could not work together to resolve the troubling issues. The coalition of the provincial government, military, and logging companies undermined their authorities. The horizontal policy integration between the two ministries was simply not existed at all.[57]

The concessions were given to timber companies to extract the forest resources in a sustainable manner. The provincial government offices oversaw the operation and ensured the timber royalties are paid to the national treasury. The vertical integration in theory would enhance the smooth sustainable resources removal. In practice, some of the payments were

[56] Steurer R & Martinuzzi A, p. 457.

[57] T Thy De Lopez, Natural Resource Exploitation in Cambodia: An Examination of Use, Appropriation, and Exclusion, *Journal of Environment and Development*, 11; 4, 2002, p. 365.

given to the military commanders who control the provinces, and another part of the payments was given to the high-ranking officers or ministries from the provincial level that issues the cutting permit. The military commanders and government officers were expected to transfer some of the payments back to superiors in the capital city. The corrupted practice had been prevailing in the governance of the Cambodia. The revenues from the logging did not go straight to the treasury but shared with armed forces and provincial government.[58] The logging companies illegally cut more than they are allowed to and still protected from any legal prosecution as they paid more money to government officers and military commanders than to the National Treasury. The more revenues the logging firms have the larger the sum of the money the government and military officers were able to gain. Thus, the vertical integration had been abused for personal monetary gains at the expense of the national revenue.

The RGC had issued 3 decrees to ban un-processed wood exportation in order to promote more wood-processing industry for local economy. The decrees were ignored and the un-processed wood was shipped to Thailand and Vietnam for furniture making.[59] The implementation of policy and decree was not strongly enforced. The participation of the local communities and civic society were not present in any decision-making, formulation and implementation of the policy, instead they were not allowed to participate at all. The local villagers were not permitted to cut trees, collect firewood, timber for construction, medicine, wood resin and any forest products for own use from the designated forest for logging. There were hired military personnel and armed employees to guard the forest and keep the villagers out. The policy did not call for to include the participation of the NGOs, local communities and academic staff.

The monitoring and evaluation of the forest policies had not been practiced strictly. The logging firms in Cambodia had been successfully gaining the military and political support, rapidly stripping the forests, and avoiding the environmental obligations. At the time of the writing of this article, the path of deforestation in Cambodia had strongly followed the forestry extraction pattern of Indonesia, Philippines and Solomon Islands, leaving a path of

[58] ibid., p. 369.

[59] ibid., p. 365.

destruction behind for the local communities.[60]

This case of forestry appropriation in Cambodia had happened in 2002, and corruption is the daily part of lives in the government sector and business sectors takes corruption as a part of doing business. The next case will bring us to later year in examining the policy and the government involvement.

7.1.3 Case 2: The governance of the Tonle Sap Lake fishery

The Tonle Sap Lake provides the fish for most of the Cambodian people. The inundated areas around the lake serve as the spawning ground for the fishes and as the fertile floodplains for the crop planting during the rainy season. A fishery conflict had started in 1990 between the poor subsistence fishermen and powerful private fish lot owners. The private fishing lot owners had to bid for the fishing areas for the right to fish for certain time of the year and allowed the subsistence fishermen to fish at the same area for the rest of the year. However, the lot owners refused the fishermen the right to enter to fish. The fishermen complained to the local authority but no actions were taken. Therefore, the conflict continued and the pressure faced by the authority was mounting.[61]

From the official power delegation, the CNMC was supposed to be the main government agency to manage the natural resources in the Mekong Basin and Tonle Sap Lake. Instead, it is often by-passed by other ministries.[62] MOWRM sees itself to be the primary leader in drafting water policy, legislations and regulations regarding irrigation, flood, drought and other water relating matters. The Fisheries Department from MAFF was tasked to license and manage the fishing lots. The horizontal policy integration of these 3 agencies was weak and each agency was highly compartmentalized. There was no clear definition of role and responsibility and overlapping of functions was common.[63] None of the 3 agencies could help to diffuse fishery conflicts.

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[60] ibid., p. 369.

[61] P Sokhem & K Sunada, The Governance of the Tonle Sap Lake, Cambodia: Integration of Local, National and International Levels, International Journal of Water Resources Development, 23, 2006, p. 408.

[62] ibid., p. 407.

[63] ibid., p. 408.

In line with the deconcentration policy, the Fisheries Department and MOWRM had established their offices at the provincial and district levels to foster a closer relation with local communities. The lack of enforcement of laws and financial means hindered the officers from carrying out their duties. The vertical policy integration of the policy was rendered to non-existent.

The rich private fishing lot owners participated by bribing the governmental officers to prevent any meaningful reform in the fishery policy.[64] The poor fishermen had the disadvantage as they do not have the money to pay off the officers to speak up for their rights. The participation in the fisheries policy could only worked for selective people who had the money to motivate the government officers to work for their cause instead of the participation of the general public to serve majority of the Cambodian people better. The participation of the policy was limited to the rich fishing lot owners and not the poor fishermen. The fisheries law was weak and the implementation of the fisheries law was not strictly followed. In addition, the corrupted officers were prepared not to do anything to curtail the conflicts.

Finally, under the command of the Cambodian Prime Minister, the 536 000 hectares or 56% of the fishing lots were open up for subsistence fishermen to fish in 2000.[65] The fishermen were encouraged to form community fisheries to co-manage the fisheries. The conflict was only reduced and not solved completely. The community fisheries were not able to enforce and monitor the fisheries regulation. The private fishing lot owners only had the right to use the lot for 2 years before the lot was released back in to the market for another auction, therefore, the lot owners engaged in unsustainable behaviour to try to catch as many fishes as possible. There was no monitoring program in place to control the devastating act.[66]
The fishery reform in 2000 was enacted due to the intervention of the Prime Minister and not from the policy development in response to the conflicts. It was clear that by 2006 the journal which represented the case study highlighted the cooperation between the different ministries was still very weak and they lacked of the technical and financial means to carry out duties in

[64] ibid., p. 407.

[65] ibid., p. 412.

[66] ibid., p. 411.

according to the needs of the local communities they intend to serve. Each ministry or agency has its own priorities, values, and perceptions, which led to difficult to assimilate each other into a single entity acting coherently.

7.1.4 Case 3: The seizing of agricultural land in Tonle Sap Lake floodplain

In agricultural development policy, the irrigation projects managed by the Cambodian government and financially supported by Asian Development Bank had been growing in numbers and these concessions were granted to private investors too. On the other hand, privately funded irrigation projects had been taken place in the Tonle Sap Lake floodplain. These lands submerged underwater for a long period of time and re-surfaced with a high concentration of nutrients when the water receded, had been under traditional communal use for local communities without clear ownership or cultivation. With increased road accessibility and land value, the private investors were working with the Cambodian rich and powerful elites to capture the floodplain areas for irrigation projects from the local villagers.

Though the national government had supported agricultural development for building irrigation and related structures like reservoirs and embankments, but there was different view concerning which government agency should have to responsibility to manage and develop these floodplains. The MOWRM was more interested to build large-scale irrigation projects and more keen to encourage private land concession at the floodplains, while MAFF would like to have more diversified and smaller-scale agricultural growth.[67] The horizontal policy integration between the 2 main ministries was virtually none as they competed for the authority over the floodplains.

The vertical policy integration was to enable the provincial officers to oversee the legal and proper conversion of floodplains into agricultural development but the officers had their doubts about the legitimacy of the floodplains the private owners acquired and had verified that many private irrigation structures were built illegally.[68] Still, they could not stop acquisition of the lands and the construction of irrigation structure.

[67] M Keshinen, M Käkönen, P Tola & O Varis, The Tonle Sap Lake, Cambodia: water-related conflicts with abundance of water, *The Economics of Peace and Security Journal*, 2, 2007, p. 56.

[68] ibid, p. 51.

The implementation of the policy did not take in account of the customary user rights of the local communities. The floodplains could be used as the grazing lands for the cattle and paddies for planting the floating rice varieties.[69] The policy seemed to look at the floodplains in term of profitability and productivity not the state of livelihood from the local farmers and fishermen perspectives.

The villagers were excluded from the participation in the policy. Their lands were not officially titled to the local villages as communal land and were taken forcefully by private owners. The villagers were not able to get proper compensation for their loss and had no influence to stop the construction of the irrigation projects on these lands.[70]

In the monitoring and evaluation of the policy, the provincial officers were worried about how the construction of irrigation projects would affect the livelihood of local people because there was not proper assessment of what impacts the irrigation projects would bring.[71] The floodplains were not clearly demarcated with land title or cultivation. The private investors and rich elite found that the local communities were not strong to challenge them and stop them from taking the floodplain lands away. The rivalry between MOWRM and MAFF happened in 2007 showed the weakness in intergovernmental cooperation and control when the floodplain lands were converted from common to private holdings.

7.2 The common deficiencies of the past and present policy implementation

The highly compartmentalized ministries in Cambodia had been seen in the 3 case studies. The ministries had set their own goals, values, and perception. They could not integrate each other policies and even competed with each other. It was not surprised that silo effect had forged them to function as an individual unit and not able to perform together as a team. The case in this paper showed that NCDM worked alone as the first government agency to response to flood emergency. It had not work with ministries to aid the villagers to adapt to the flood as preventive measures. It displayed the weakness in the horizontal policy integration.

[69] ibid., p. 52.

[70] ibid., p. 51.

[71] ibid.

The rich and powerful investor and elites in the Cambodia could get the support from the national government to district level officers to work for their cause. They had the money and power to allow them to grab floodplain lands from the villagers, to prevent the poor fishermen from exercising their rights to fish, and to threaten the villagers who dared to venture into their forests for harvesting timber and non-timber products. The poor farmers and fishermen were left to fend for themselves. The villagers interviewed for this paper were often left to their own device to figure out a way to survive the flood along with some help from the government, and had no help in adapting to the more deadly flood under the CC. The weak governance institutions existed form 1990. First, the ministries could not stop the destructive logging of the forests. Second, they could not reinstate the fishermen their rights to fish in the commercial lots. Third, they did not prevent the illegal appropriation of floodplain lands from the local communities. From the vertical policy integration analysis, the lead agency in NAPA policy was also seen incapable to build embankments, dikes, and flood management schemes by their own to prevent more flood damages in the future for the villagers living along the Mekong River floodplains. The local villagers were not given any responsibility in the implementation of the policy that were supposed to help them to adapt the flood and CC as there were no projects to start with in Kampong Cham.

From the 3 cases studies, there was a strong correlation that the government officers from the national to district level were inept to implement their activities demanded by the policy in the natural resources management, and they operated in their own domain of influence but not in cooperative domain together. The common failures in the past policy and management in other natural resources management extended to the present policy and implementation of the Cambodian flood adaptation management through NAPA. If the lead ministries did not have the funding required for the NAPA projects, it would not start the projects that could reduce the impacts of CC on the villagers. On the other hand, the lead ministry could work with other ministries that had similar or overlapping role and responsibility, and resources available to launch the project. The collaboration arrangement could be agency with resources gave the financial support while the resources poor ministry provided the manpower and technical support.

8 Conclusion

The Climate Change impacts are going to affect Cambodia from the coast to inland. There is a duality of the yearly flooding along the Mekong River which brings benefits to the villagers by releasing the natural fertilizers and water supply to grow the crops, and the flooding also brings destructive impacts to the villagers by flooding the crops, properties, and drowning human and livestock. The duality of the flooding has been part and parcel of the villagers' lives. However, the yearly flood enhanced by the Climate Change turns into a more unpredictable flooding that has the magnitude of the destructive forces not to be taken lightly.

The literature review showed that MRC is in a good position to help the villagers as their FMMP projects have the elements to strengthen the villagers' ability to adapt to the flooding, but these projects are carried with financial funding from the foreign donors and only few selected provinces and districts have gained the benefits. Another MRC strategy in helping Cambodia to adapt to CC is the Climate Change Adaptation Initiative. As the phase has only begun recently with demonstration site in Cambodia, it is too early to analyze CCAI impacts and whether RGC would implement the successful CCAI projects in their flood adaptation policy.

The existing NAPA policy of RGC is the best policy in flood adaptation policy for the villagers in the Kampong Cham Province. Without donor funding support, there is hardly any progress to implement the projects needed for Kampong Cham Province. And there are many villages stretching along the Mekong River within Kampong Cham Province and this thesis has just only covered two villages, therefore, the need for helping other villages to adapt to the flooding might be greater.

The interviews from the sub national governmental bodies and the villagers had shown that the RGC did help the villagers mainly by providing the relief aid after the flooding has covered the villages. The NCDM was working with other sub national governmental departments and Red Cross send food, tents, petroleum, and medicines to the villages. When the villagers were not able to flee to the higher ground due to flood, the NCDM used the boats to transport the villagers to the safe areas. The preventive measures taken by NCDM before the flood hit were to inform the to-be affected villagers to leave for a safe and higher ground.

The answer to the research question was split into 2 main parts. First, there was a national government policy –NAPA policy to help villagers who live along the Mekong River floodplain to adapt to the severe flooding brought by Climate Change. The policy existed and called for building dikes, culvert and embankments to block and direct the water away but was not being implemented fully due to lack of funding. Second, the current help given by the RGC and sub national governmental levels was through National policy in disaster management but is mainly focused on the post disaster emergency relief. A proverb goes: "Prevention is better than cure", it was usually better to stop the flood from submerging the villages and farms to lessen the damages than to try to repair the damages after flooding had happened. The government's policy also reflected the duality of the use of resources in which the RGC had the resources to patch up the damages but no resources to prevent the damages from happening. The Cambodian government's overlapping policies emphasized a need to harmonize the policies to aid the villagers in adapting to CC and the unpredictable floods. The NAPA and NCDM policies were complementing each other to assist the villagers to overcome flood in which NAPA works with prevention measurements while the NCDM took care of the post disaster measurements. If NCDM could divert some of its resources to the lead ministry for the NAPA projects, both policies might harmonize and help to make the villagers' lives less brutal in the turbulent CC.

9 The alternative way to help the villagers

It seems that without millions of US dollars, the NAPA policy will not be able to start at all. The villagers living along Mekong River would be subjected to more extreme flood without any help mobilized from the government or NGO. It is not possible to influence the national government to allocate some money of the Cambodian fiscal budget to the NAPA policy and not depending on the foreign financial aid to start the NAPA policy. However, it is possible to start small and from the bottom up using the community based group to generate the same effects as the NAPA policy will have if the policy is able to start.

The district chief stressed that any foreign help to the villagers in Cambodian is welcome and appreciated. The emphasis is that the local authorities always welcome any form of help to improve the lives of the villagers, and the local villagers appreciate any domestic and foreign organization that comes to enhance their living conditions greatly.

9.1 The starting of the small organization and community group

The mode of organisation to be set up can be small that needs less funding and are more willing to work with the villagers for long term timeline. This is not a one-time project and the organization disappear, instead it stays long to help the villagers to build the initial capability, and form community based self sustainable group (community group for short) and return periodically to review and improve the community group. The operation method for the organisation is inspired by the WaterAid organisation based in United Kingdom that works with local partners to help poor people in the world to access to safe water and sanitation.

9.2 Common goal for the villages

The common goal of the villages in this paper suggested for a system of drainage and gates to handle the flood as explicitly listed as one of the top 20 priority projects of NAPA. For the villagers to participate and learn to build, the system of drainage and gates need not to be of high technology and expensive to build, but simple and durable technology using the local knowledge and raw materials such as wood and concrete that can be sourced locally.
The main goal is to form community group to participate, own and run the drainage and gate systems by themselves that will lead to long-term sustainability, becoming less depending on others.

9.3 Change and empowerment of the villagers

The seed of change first must come from within the villagers. Once the villagers understand the change needed to achieve the common goal for the village, they will change their attitudes and beliefs too.[72] This organization hopes to empower the villagers to recognise the potential they have. By using their local knowledge and technology in building the system of drainage and gates supplemented by updated knowledge, the villagers will believe more in their own abilities.

9.4 Participation, ownership and a helping hand of the villagers

When the villagers participate in building their own system, they are more motivated to take responsibility to maintain and operate under their own management.[73] This creates a strong incentive in ownership and keen to maintain the system of drainage and gates to keep out the extreme flood and prevent damages to their agricultural crops for long term.

A long-term commitment is needed to teach and guide the villagers' community to learn how to build, how to operate and maintain the system collectively. The organisation wants to enable the community group to continue to run the system after building of the drainage and gates have completed, and the organisation has left. The community group is unlikely to be provided by external funds to run the system, but it can collect enough revenue cover operating expenses like buying raw materials for repair and transportation of the raw materials. The community group will be able to help other villages facing the similar situations by sharing their knowledge and know-how with them, and in hope the similar community groups can sprout and multiply in other villages to solve their own problems.

9.5 Facilitation and action of the organisation

The organisation is acting as a facilitator to help the villagers to recognise and harness the potential they have, their own resources and strength of a community group they have to solve problems they faced in their village.[74] The villagers cannot wait for foreign or local NGOs to

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[72] N Meas & J healy, *Towards understanding: Cambodian villages beyond war*, Southwood Press, Australia, 2003 p. 53 – 58.

[73] JICA Task Force on Aid Approaches, *Capacity Development Handbook: For Improving the Effectivness and Sustainability of JICA's assistance*, Japan International Cooperation Agency, 2004, p. 8.

[74] JICA Task Force on Aid Approaches, p. 8.

arrive to help them as the flood will be back year after year, thus it is better to start now building the community group to devise and solve their own problems rather than letting others to do for them. In this line of thought, the organisation builds a bottom up approach to meet the some of the goals of RGC in NAPA policy and help the villagers to adapt to the Climate Change induced flooding.

10 A self-critique of the thesis

The thesis seems to use a normal PRA method like interviews and literature review in this research. There are other possible conceptual methods suitable for investigating the research question proposed like adaptive capacity and Soft System Methodology that were taught in the programme.

The adaptive capacity is the human making adjustment through planning or reaction in private or public strategy to response to the climate effects which can bring harms or benefits. This method looks to be more suitable for use in the thesis research question.[75]

Yet the time and resources needed to explore and utilize the method is long and demanding, the limit of the fund, resources and time for this master thesis do not allow the luxury to make full use the adaptive capacity method.

From another aspect, interviews and literature review offer a faster way to gain more insights of the issues surrounding the RQ. The author of this thesis also points the nature of the research question required extensive beforehand reading to familiarize with the social, political and environment policy issues of Cambodia to gain understanding of the problems they face first, then one can step into the field to ask correct questions, and the time spent on the background reading has consumed much of the time that can used in the field to apply the method.

In retrospect, the author feels a loss of opportunity to apply methods that are taught in IWRM programme, but there is an urge to complete the thesis.

[75] GC Gallopin, 'Linkages between vulnerability, resilience, and adaptive capacity', *Global Environmental Change*, 16, 2006, p. 293 – 303.

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The guidelines for the thesis requested the referencing to be footnotes style. Thus, the author chose the documentary-note (Oxford) system of referencing based on the Style manual for authors, editors and printers of the sixth edition printed in 2002.

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Annex 1 Summary of the 20 High Priority NAPA Activities

The green highlighted cell under the Project Title indicated the flood adaptation projects for the Kampong Cham Province.

Non Health Activities

Project Title	Objectives	Location	Time-frame	Estimated Budget, US$	Agencies Involved		Status
					Lead	Cooperating	
1. Rehabilitation of a Multiple-Use Reservoir in Takeo Province	To improve water storage capacity for multiple uses including irrigation, water supply for urban areas, recreational uses and enhanced aquatic biodiversity.	Takeo	3 years	4,000,000	MOWRAM	MoE, MAFF, MIME and MRD	This is a new initiative.
2. Rehabilitation of Multiple-Use Dams in Takeo and Kampong Speu Provinces	To improve water management for multiple uses including irrigation, water supply rural communities, recreational uses and aquatic biodiversity enhancement.	Takeo, Kampong Speu	2 years	2,500,000	MOWRAM	MoE, MAFF, MRD and local authorities	Minor repairs have been conducted since the 1980s by local authorities. MOWRAM plans to undertake a detailed study of this project.
3. Community and Household Water Supply in Coastal Provinces	To provide safer water for rural communities in coastal areas; and To reduce the incidence of water-related diseases.	Kampot Kep and Koh Kong	1 year	1,000,000	MRD	Commune councils, NGOs	Wells and ponds have been constructed in Kampot and by FAO, Food for Hunger, UNICEF and the WFP. Some NGOs have also distributed filters.
4. Development and Rehabilitation of Flood Protection Dikes	To protect settlements and agricultural fields from flood.	Battambang, Kampong Cham, Kandal, Kratie, Pursat, Sihanoukville and Svay	3 years	5,000,000	MOWRAM	MPWT, local authorities and NGOs	MOWRAM has developed protection structures in a number of provinces.

		Rieng					
5. Rehabilitation of Upper Mekong and Provincial Waterways	To reduce risks caused by Mekong floods To improve fishery	Provinces along upper Mekong, Koh Kong, Prey Veng, Pursat	3 years	30,000,000	MOWRAM	MPWT and local authorities	Provincial waterways rehabilitation has been carried out by MOWRAM

Project Title	**Objectives**	**Location**	**Time-frame**	**Estimated Budget, US$**	**Agencies Involved**		**Status**
					Lead	**Cooperating**	
	resources To improve rural livelihoods by supplying sufficient water for irrigation and domestic uses; and To improve provincial water transportation.	and Svay Rieng					with support from ADB, JICA and WB Banteay Meanchey, Battambang and Kampong Speu
6. Rehabilitation of Multiple-Use Canals in Banteay Meas District, Kampot Province	To enhance water storage capacity for general use in the village during the dry season.	Kampot	1 year	1,500,000	MOWRAM	NGOs and local authorities	In Kampot, the construction wells and ponds has been undertaken with the assistance FAO, Food for Hunger, UNICEF and WFP.
7. Vegetation Planting for Flood and Windstorm Protection	To reduce flood and windstorm damage to property and crops.	Kampong Thom, Kampot, Kratie, Sihanoukville, Takeo, Prey Veng, Battambang and Banteay Meanchey	3 years	4,000,000	MAFF	MoE and local authorities	In the 1980s, MAFF started promoting the plantation of Acacia and Eucalyptus throughout the country including in coastal areas. Need to promote indigenous species.
8. Strengthening of Community Disaster Preparedness and Response Capacity	To ensure preparedness for and effective response to climate hazards at the community level; and To reduce climate hazard risks for local	Banteay Meanchey, Kampong Cham, Kampong Speu, Kampot, Kandal, Prey Veng, Svay Rieng and Takeo	5 years	5,000,000	NCDM	MoH, local authorities and NGOs	NCDM has prepared a strategic plan mentioning community disaster preparedness. Oxfam worked on a comprehensive disaster management programme

	communities.						in Takeo Province including preparedness, mitigation and reduction.

Project Title	Objectives	Location	Time-frame	Estimated Budget, US$	Agencies Involved		Status
					Lead	Cooperating	
9. Water Gates and Water Culverts Construction	To regulate flood water around the newly rehabilitated road network; and To minimise road and crop damage caused by flood.	Banteay Meanchey, Kampong Cham, Kandal, Kratie, Prey Veng, Siem Reap, Svay Rieng and Takeo	2 years	10,000,000	MPWT and MOWRAM	Local authorities	The construction of water gates and culverts has been undertaken by some NGOs and NCDM selected provinces.
10. Safer Water Supply for Rural Communities	To provide safe water in sufficient quantities for rural communities; and To reduce the risk of contracting water-related diseases.	Battambang, Kampong Cham, Kampong Speu, Kampong Thom, Kandal, Kratie, Prey Veng, Ratanak Kiri and Takeo	3 years	5,000,000	MRD	MoH, local authorities and NGOs	The construction of wells and ponds in selected areas has carried by CONCERN, CRCD, FAO, UNICEF, WFP, etc. In some places, locally made water filters have been provided by some NGOs.
11. Development and Improvement of Small-Scale Aquaculture Ponds	To ensure food security in the areas where wild fish stocks are insufficient to meet demand; and To increase the income of people living in these areas.	Kampong Cham Kampong Speu Kandal, Kratie, Sihanoukville and Svay Rieng	3 years	4,000,000	MAFF	Local authorities and NGOs	Limited implementation of aquaculture. MAFF has provided extension service training to villagers about fishpond cultures, as well as culture in Kandal, Prey Veng, Svay Rieng and Take
12. Promotion of Household Integrated Farming	To increase agricultural productivity; and To improve villagers' incomes,	Banteay Meanchey, Battambang, Kampong Speu, Prey Veng, Svay	3 years	2,500,000	MAFF	Local authorities and NGOs	MAFF with support from ADB has implemented similar projects in selected areas of

	food security and livelihoods in the areas affected by flood and drought.	Rieng and Takeo					Banteay Meanchey, Battambang, Pursat and Siem Reap. Some NGOs implemented similar project Prey Veng and Svay Rieng

Project Title	**Objectives**	**Location**	**Time-frame**	**Estimated Budget, US$**	**Agencies Involved**		**Status**
					Lead	**Cooperating**	
13. Rehabilitation of Coastal Protection Infrastructure	To increase agricultural production in coastal areas.	Kampot, Kep, Koh Kong and Sihanoukville	2 years	2,000,000	MOWRAM	MOWRAM's Provincial Departments and concerned NGOs in collaboration with local authorities	Damaged coastal protection structures have been identified and initial limited repairs conducted. GRET has repaired the Prey Nob polder in Sihanoukville and operates with local communities.
14. Development and Improvement of Community Irrigation Systems	To provide sufficient water for rice farming; To reduce the risk of crop failures from water shortage; and To enhance food security and assist in eliminating poverty among rural people.	Banteay Meanchey, Battambang, Kampong Cham, Kampong Chhnang, Kampong Speu, Kampong Thom, Kampot, Kandal, Kratie, Prey Veng, Pursat, Ratanak Kiri, Siem Reap, Svay Rieng and Takeo	3 years	45,000,000	MOWRAM	MOWRAM's and MAFF's Provincial Departments, local authorities	A number of governmental non-governmental organisations and other donors such as ADB, APS (Italian Government), Japanese Government, etc., built medium-scale irrigation schemes in several provinces, including Battambang, Kampong Cham, Kampong Speu, Kampong Thom, Prey Veng, and Svay Rieng.
15. Community Mangrove Restoration and Sustainable Use of	To stabilise shoreline; To reduce sea water intrusion; To reduce coastal erosion; and	Kampot, Kep and Koh Kong	3 years	1,000,000	MoE	NGOs, local authorities and SEILA	There are at least three modules of similar community based natural resource

Natural Resources	To protect coastal areas from storm.						management established and/or functioning coastal areas with support from IDRC /MoE and DANIDA.
16. Community Based Agricultural Soil Conservation in Srae Ambel District, Koh Kong Province	To reduce soil erosion from agricultural land in the coastal watershed; and To increase food security.	Koh Kong	3 years	2,000,000	MAFF	MAFF's Provincial Department, local authorities and NGOs	AFSC has worked with local communities in Srae Ambel the following areas: sustainable agriculture, and community forestry and fisheries.

Health activities

Project Title	Objectives	Location	Time-frame	Estimated Budget, US$	Agencies Involved		Status
					Lead	Cooperating	
17. Production of Biopesticides	To reduce malaria incidence by introducing biopesticides	CNM and CPE	5 years	3,000,000	CNM	CPE, University of Health Sciences, RUPP and NGOs	Limited biopesticide research has been conducted in Cambodia.
18. Development of Healthcare Centres and Posts	To assist the Ministry of Health in developing healthcare centres and posts in high risk malaria regions and in areas highly vulnerable to climate change.	Selected villages in high risk malaria regions	3 years	750,000	MoH	CNM and local authorities	Budget constraints have limited MoH construction of healthcare centres and posts.
19. Provision of Safe Water in High Risk Malaria Regions	To reduce risk of mosquito bites while collecting water from rivers and streams; and To provide communal water sources.	Selected villages in high risk malaria regions and in areas highly vulnerable to climate change	3 years	100,000	MRD	NGOs and international organisations	MRD in collaboration with NGOs and international organisations has constructed wells in a number of provinces
20. Malaria Education and Mosquito Habitat Clearance Campaigns	To raise public awareness of malaria prevention and treatment; To promote behavioral changes towards malaria prevention and treatment; and	Kampong Thom, Koh Kong, Mondul Kiri, Preah Vihear, Pursat, Ratanak Kiri, and Siem Reap	3 months fromFeb. to Apr.every year	500,000 per year	CNMC	MoH Provincial Departments, local authorities and concerned NGOs	This project complements existing malaria education by CNM, HU and PFD under the global fund.

	To reduce the extent of mosquito habitats.						

Source: Ministry of Environment, National Adaptation Programme of Action to Climate Change, 2006

Annex 2 Interviews and interviewees

The name list below is the Cambodian people whom have been interviewed for this thesis. The names appeared are not due to ranking order or power exalting from the official title but listed in the chronological order who is interviewed first.

2.1 Government official

Mr. Chhoun Bunarith, Deputy Director of Kampong Cham Province Water Resources and Meteorological Department, 21 May 2010.

Mr. Oun Sary, Director of Kampong Cham Province Irrigation Unit, 21 May 2010.

Mr. Seng Sophat, Director of Kampong Cham Province Hydropower Dam Unit, 21 May 2010.

Mr. Kem Dy, Head of Kampong Siem District, 24 may 2010.

Mr. Kol Vathana, Deputy Secretary General of Cambodian National Mekong Committee, 2 June 2010.

Mr. Hak Socheat, National Coordinator for Flood Management and Mitigation Program, Cambodian National Mekong Committee, 2 June 2010.

2.2 NGO, local officials and villagers

Mdm. Chea Chou, Research Associate of CDRI, 17 May, 2010

Mrs. Chan Thoul, leader of Kien Chrey Commune, 21 May, 2010.

Mr. Seang Sean, Deputy leader of Kien Chrey Commune, 21 May, 2010.

Mr. Muk Chay Vath, Committee member of the Kien Chrey Commune, 21 May, 2010.

Mr. Vat Nhil, Committee member of the Kien Chrey Commune, 21 May, 2010.

Mr. Yan Ra, Committee member of the Kien Chrey Commune, 21 May, 2010.

Mr. Ngoun Bunheang, Police in the Kien Chrey Commune, 21 May, 2010.

Mr. Korn Rorn, Head of the Speang Thmey Village, 22 May, 2010.

Mrs. Neang Sok, Speang Thmey Villager, 22 May, 2010.

Mrs. Nou Nary, Speang Thmey Villager, 22 May, 2010.

Mr. Yim Yean, Speang Thmey Villager, 22 May, 2010.

Mr. Pil Try, Speang Thmey Villager, 22 May, 2010.

Mrs. Oeng Kimsay, Speang Thmey Villager, 22 May, 2010.

Mrs. Thach, Speang Thmey Villager, 22 May, 2010.

Mr. Ly Bunthoeurn, Head of the Annthak Neal Village, 23 May 2010.

Mr. Phy Norn, Annthak Neal Villager, 23 May 2010.

Mrs. Kim Nhor, Annthak Neal Villager, 23 May 2010.

Mrs. Pheang Sithat, Annthak Neal Villager, 23 May 2010.

Mrs. Thoeurn Chinda, Annthak Neal Villager, 23 May 2010.

Mr. Nea Kimlang, Annthak Neal Villager, 23 May 2010.

Mrs. Ban, Annthak Neal Villager, 23 May 2010.

Mr. Heng Thab, Annthak Neal Villager, 23 May 2010.

Mrs. Huo Sokhy, Annthak Neal Villager, 23 May 2010.

Mr. Ban Nay, Annthak Neal Villager, 23 May 2010.

Mr. Nay Nang, Annthak Neal Villager, 23 May 2010.

Mrs. Van Nhor, Annthak Neal Villager, 23 May 2010.

Mrs. Yem Theang, Annthak Neal Villager, 23 May 2010.

Mrs. Heang Eang, Annthak Neal Villager, 23 May 2010.

Mr. Sedara Kim, Senior Research Fellow of CDRI, 28 May 2010.

2.3 Translator for the interviews

This student from Royal University of Phnom Penh was the key personnel to this thesis, without him translating and ferrying me around on the scooter in the villages, the information would not be collected and this report would not be written. The author expressed his sincere gratitude to Mr. Kong Sopheak for the days spent translating and nights spent transcripting the texts.

2.4 Key persons for establishing the contacts in Cambodia

Mr. Chem Phalla, Mr. Sedara Kim, and Mdm. Chea Chou of Cambodia Development Research Institute had been the initial contacts to author and introduced the governmental officials to the author. Without their help, the author would not learn the warmth and friendliness of Cambodia and her people.

Annex 3 Questions used during the researchers' and officials' interviews

Name:

Official title:

Department:

1) What do you think of the Climate Change? Do you feel it is a real threat? From what media like radio, television or Internet, etc., you come to know of Climate Change?

2) What have your department done to get ready to prepare for the Climate Change?

3) Can you see in what role you department can help villagers if the Climate Change arrives?

4) What do you wish to ask from Central government of Cambodia in order to help villagers when the natural disaster like flood hit?

5) Have you ask for help in dealing with Climate Change? Whom can you approach? Which ministry or government agencies have come to help the villagers?

6) Does NCDM come down here to help and when do they arrive?

7) Can you approach the government officials from the national government, provincial, and district level?

8) Are there prevention projects to help villagers to adapt or overcome flooding problems?

9) Are there flood management policy in you can use?

10) What projects are related to water resources and management going on in your province, district, and commune?

11) What do you do to prepare for flooding that comes almost yearly?

12) Do you notice any changes in weather, temperature, water level or Mekong River?

13) Do you know any foreign organizations come down here to help with flooding?

14) Are there local organization also helping to solve the flooding problems?

Annex 4 Questions used during the villagers' interviews

Name of village:

Village names:

1) Do you hear or know about Climate Change?

2) From where and whom, have you come to know about Climate Change?

3) Who can you approach to ask for help in flooding?

4) What do you do when the flood submerges you fields? How can you survive?

5) What is most important thing to do when you know flood is coming?

6) Do you have enough resources to deal with flood like enough food for family, money to fix the house, and buy the seeds?

7) What do you grow in you fields?

8) Do you have enough clean water to use during flooding?

9) Who can help you the most?

10) How do you approach the officials when there is a need?

11) What do you grow in you fields?

12) Do you have extra job besides working in you fields?