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Hydropower Development, Economic Growth and Social Equality: Mekong Region

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This Working Paper Series present papers in a preliminary form and serves to stimulate comment and discussion. The views expressed are entirely the author's own and not that of the S. Rajaratnam School of International Studies (RSIS).

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Abstract

The Lower Mekong Basin has an estimated total hydropower generation potential of nearly 30,000 MW. However, it constitutes only about six to eight percent of the total estimated demand in the Lower Mekong Basin by 2030. According to high demand of electricity, the government of Cambodia, Vietnam and Laos has developed their hydropower potential for supplying in their country and exporting to neighbor countries. Through this hydropower development, the economic growth in countries is speeded up. Anyway, hydropower has negative impact on the natural resources and it services which will effect on the community who rely on these resources and services. In the case of Yali Falls, the Cambodian people lost their property, animal, crops and family member as a result of flood. The dam has also made them lose their income from fish and increase their spending to buy meat for domestic consumption.

Even there is huge impact from dam, the government's decision-making focuses on economic profits than environment and social concerns. The way of this decision making has made the social and environment suffer while hydropower development in the Mekong and its tributary is posing a huge threat to river ecosystems, aquatic life, water quality as well as threatening the livelihoods of millions people.

To minimize the impact of hydropower dam on the effected community, the well design of hydropower scheme, good management of dam construction and well hydropower project operation should be applied. Greater participation from the affected communities and civil society should be encouraged. The livelihood of the replaced people is to recover or improve from the existing one. Both government agencies and the hydropower project developers should be made more accountable to their decisions.

Biography

Mr Kesa Ly obtained his Master's Degree in Development Studies from the Graduate Institute of International and Development Studies in Switzerland and his Master's Degree in Agronomy from the Royal Academy of Cambodia. From 2013 to 2014, he attended the Post Graduate Research Programme on Adaptation to Climate Change at the UNESCO-IHE, Netherlands as a post-master's researcher.

Kesa has many years of experience in managing research projects. He has worked in various positions and institutions namely as Independent Monitor Team Leader at ADB, Research and Development Unit Manager at PRASAC, Research and Development Advisor at Life With Dignity, In-country Analyst at Euromonitor International, Research Fellow at M-POWER and ASEAN-Canada Junior Research Fellow at the S. Rajaratnam School of International Studies, Nanyang Technological University. He has also provided consultancy services to national organizations, international organizations and government and donor agencies in the field of food security, climate change, water resources management and hydropower.

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Acronyms

CEPA	Culture and Environment Preservation Association
CNMC	Cambodia National Mekong Committee
EIA	Environmental Impact Assessment
Fact	Fisheries Action Coalition Team
ICEM	International Centre for Environmental Management
MRC	Mekong River Commission
MW	Megawatt
WWF	World Wildlife Fund
3S Rivers	Sesan, Sre Pok and Sekong River

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I. Introduction

Hydropower development in the Mekong has positive impact on economic growth and negative impact on environment and effect community. In fact, many hydropower dams are constructed and planned to be constructed along the Mekong river as response to the increasing demand for electricity in Laos, Vietnam and Cambodia. The increasing electricity supply with cheap price will contribute to the economic growth in the country. For Cambodia, there is one site in operation stage and two sites in construction stage. Cambodia develops these hydropower project for reducing the electricity price and expanding the electricity supply in the country particularly in rural area where there is no electricity. By making electricity price lower as other countries in the region, hydropower project contributes to increase the investment in Cambodia for the economic growth. In Laos, the potential of hydropower development is around 26,000 MW which is mostly exported to Thailand, Vietnam and China (IR, 2013). Laos uses the income from these hydropower projects for developing their economic growth. In Vietnam, the hydropower potential is approximately 31,000 MW (Suhardiman et al, 2011). Vietnam uses the electricity from these hydropower projects for responding to the high demand of electricity in the country.

However, hydropower projects have potential to destroy wetland ecosystems and seriously threaten the quality and security of water. The project also affect other water-related resources namely fish as sources of livelihood and the quality of arable land for agricultural products. According to there are about 60 million people live in Lower Mekong Basin Countries (MRC, 2011), the hydropower will impact on their livelihood because their livelihoods are still largely rely on river resources. If natural resources productivity is reduced, the countries which are mostly at risk are Cambodia and Lao PDR (ICEM, 2010). Traditional livelihood systems will likely be adversely affected and thus a grave concern for indigenous people living along the Se San, Se Kong and Srey Pok tributaries. In the case of Yali Falls, Cambodians have died as a result of floods caused by test operations of hydroelectric projects. Their property has also been lost. There has been an increased spread of diseases that might be related to deteriorating water quality, coupled with the general deteriorating health of Cambodians. Since then, Cambodians feel a sense of insecurity as they do not know when the next flood will occur.

In many countries, environmental protection was never a priority for national level decision makers which makes the decision making is not effectiveness in ensuring sustainable development because the final decision making by senior government officer may power over the official EIA-based processes (Foran et al., 2010). In response to these issues, this paper explores 1). the impact of hydropower development projects on social, environment and economic; 2). the improvement of hydropower development for encouraging the economic growth and integration in the region without increasing inequality; and 3). A way of improving hydropower development in the Mekong.

I. Methodology

This research was conducted from December 2012 to July 2013 which used two methods for collecting data namely focus group discussion and individual interview. The focus group discussion was used for collecting data from the affected communities in Cambodia and the individual interview was used for collecting data from the affected people in Laos and Vietnam, staff of MRC, other river basin organizations and governments in the Cambodia, Laos and Vietnam. Besides prepare data collection, the documents related to the hydropower development, economic development, globalization, integration, inequality and ASEAN issues which were prepared by the river basin organizations, academic institutions, government, UN, other organizations and other independent researchers were reviewed and used in this research.

This research was conducted with river basin organization namely MRC, CNMC, WWF, World Fish, Fact, 3S Rivers Protection Network, NGO forum, CEPA, etc. The other targets of this research were government officials and effected communities in Ratanakiri province

(Cambodia), Champasack province (Loa PDR) and Kon Tum province (Vietnam). The total number of respondent who were working in river basin organizations and governments was about 20 people. Eight focus group discussions were conducted with the affected communities from hydropower scheme in Adoung Meas district and Ta Veng district in Ratanakiri province. The individual interview was conducted with the community in Khoun district, Champasack province, Lao PDR and Ngo Choi district, Kon Tum province, Vietnam. The total number of respondent was about 180 people.

II. Findings

2.1. Overview of Hydropower Development Projects in The Mekong

The water resources in the Mekong were developed as hydropower for industrial expansion while there is no competing vision to replace the hydropower development. This wide-spread vision of large scale hydropower dam for industrial development in the region was introduced by US, Soviet and Chinese planners during Cold War (Lebel et al, 2007). In fact, the Lower Mekong Basin has an estimated total hydropower generation potential of nearly 30,000 MW (Bird and Phonekeo, 2008). Among these generation potential, the 12 proposed mainstream projects could produce up to 14,697 MW of electricity which constitute only about six to eight percent of the total estimated demand in the Lower Mekong Basin by 2030 (Cronin & Hamlin 2012).

For Cambodia, there is potential to construct more than 26 new hydropower projects in 3S basin. Among these projects, the largest hydropower projects proposed, planned and approved on the 3S Rivers within Cambodia namely Lower Sesan 2 (400 MW), Lower Sesan 1/5 (96 MW) and Lower Sekong (190 MW), Lower Srepok 3 (300 MW), Lower Srepok 4 (220 MW), Lower Sesan 3 (375 MW). There are also a number of smaller dams planned for tributaries of the 3S rivers, such as the Prek Liang 1 (64 MW) and Prek Liang 2 (64 MW) (Grimsditch, 2012). For the mainstream of the Mekong River, two dams are planned to constructed in Cambodia namely Stung Treng (980 MW) and Sambor (2,600 MW). These dams are longer than the other dams which require resettling over 29,000 people from the flood area of the reservoirs. It would make the poverty in Cambodia more sever particularly the poor in Stung Treng and Kratie province. Anyway, over 1 million fisheries-dependent people in both Mekong River and Tonle Sap Lake could lose their livelihoods one their main occupation as fishing (ICEM, 2010).

For Lao PDR, The water resources in Lao represent 23,000 MW of exploitable potential hydropower, 15,000 MW of which are “internal” to the country and 8,000 MW representing Lao PDR’s share in mainstream Mekong development undertaken jointly with other riparian countries (Stenhouse and Bojö, 2010). National leaders in Laos as well as some key leaders in Thailand and Vietnam are working together with project developers for extracting this hydropower potential for domestic use and export to Thailand and Vietnam (Lebel et al, 2007). For domestic use, the government plans to provide electricity to 90% of all households by 2020 would increase electricity demand, as would the government’s initiative of encouraging investment in mining, commercial, and industrial enterprises (ADB, 2010). In response to this demand, about 1,838 MW of hydropower generation capacity has been installed, with another 1,372 MW under construction, 3,041 MW in the advanced planning stage with commissioning targeted before 2015, and more than 3,300 with completed feasibility studies (Fraser, 2010). These capacities are produced from 42 projects which are in different stages of implementation, though as many as 90 hydropower projects are being planned in total (WB, 2010). Among these projects, the seven plants under construction, with 1,145 MW will be exported to Thailand and Vietnam and 227 MW for domestic supply (Fraser, 2010).

For Vietnam, Vietnam has rapid demand for electricity with the growth rates about 15% per annum. The generation capacity is expected more than tripled between 1995 and 2005 with the capacity from 2,796 MW in 1995 up to 9,255 MW in 2005 (SEA, 2008). In order to meet this demand, Vietnam has been focusing on hydropower development due to hydropower is the largest contributor to electricity production in the Vietnam. The hydropower will play an

important role in the nation's energy mix making up 23% of total installed capacity by 2025 (ICEM, 2010). According to this role, since 2010, around 50% of Vietnam's hydropower potential was extracted and 83% of hydropower potential will be used by 2025. The estimated installed capacity of these hydropower potential projects is about 31,000 MW (Suhardiman et al, 2011).

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2.2. *Hydropower and Economic*

Cambodia uses diesel fuel as the principal source of electricity generation which makes energy price highest in the region and the world (EURONET, 2012). In order to reduce this price, all potential hydropower projects are developed under the investment from foreign companies, particularly Chinese companies while hydroelectricity is a cheap and sustainable energy source (Rehan, 2008). In the long term, the improvement of power supply and reduction of power price could be significant because of its benefits for economic growth and employment through absorbing the Foreign Direct Investment (ICEM, 2010). Moreover, the unemployment in Cambodia can be reduced based on the increasing of foreign direct investment in Cambodia. Lower electricity prices can encourage the growth of small and medium enterprise in Cambodia, which contribute substantially to economic growth and poverty reduction in Cambodia.

Hydropower has impact on the people who live along the 3S rivers especially for those who live a long Se San river in Stung Treng province and Ratanakiri province. According to the research study, the Cambodian people have died in the flood waves as a result of the initial operational tests of Yali Fall project. They also lost their property, animal and crops as a result of the flood. Since then, they feel insecurity as they do not know when the next flood wave will come. Furthermore, the villagers have stopped fishing due to the reduced fish population in the river. Before the dam was constructed, they could get 2-20 kg of fish per day from this river for domestic consuming and selling (about 2 USD per kg). The dam has made them lose their income from fish and increase their spending to buy meat for domestic consumption. As such, the impact of hydropower dam should be minimized in order to reduce the inequality between the downstream and upstream community. The government and developers of hydropower projects should provide more support for the affected communities in recovering their livelihood from the resettlement.

2.2.1. *Laos*

The Government of Lao PDR believes that development of hydropower potential in Laos will strongly contribute to socio-economic development in the country, for instant, the 12 operated hydropower projects are the second highest source of export revenue for the country. Nam Teoun 2 has generated about US\$160 million for 8 months which contribute about three percentage to the Lao economy in 2010 (PEI, 2010). Hydropower has now become a major contributor to economic output and government revenues and it beliefs that hydropower can generate earnings for the state which necessary to fund poverty reduction program, support pro-poor and sustainable environment protection activities (UN, 2013). The deputy Prime Minister of Laos stated that "building dams to generate electricity for both domestic use and export will benefit not only Laos, but the region in term of economic growth. As the revenues begin to flow from hydropower development, Laos will spend this money to improve the living conditions of its citizens in order to remove its people from poverty by 2015" (CPWF, 2013).

Yet, the hydropower policy in the Lao PDR has the major weakness of clear guidelines on the transparency of project development that leads to lack of accountability for the affected people (ADB, 2010). 293 villages will be directly affected totally about 100,000 people who currently live on the land that is to be inundated about 3,086 square km from the 42 planned dams (WB, 2010). In fact, one village, Nam Han, was directly located in what would become the reservoir area for the Houay Ho dam and other 12 villages with about 2,500 people were relocated out of the watershed areas of the Houay Ho, Xe Pian and Xe Namnoy Rivers (HHPC, 2010). Over 41,000 people were replaced as the result of Ban Chat, Bac Me, Huoi Quang and Lai Chau scheme. These schemes require special attention in term of resettlement (SEA, 2008).

In 2005, Laos adopted a National Policy and laws related to hydropower sector namely environment and social sustainability, environmental and social impact assessments, resettlement and public participation but these laws and policies remain unenforced. Base on high corruption in the country, dams have left a legacy of broken promises and uncompensated losses. As a result, tens of thousands of Laotians lack sufficient food to eat, clean water to drink and income to meet basic needs (IR, 2013). These impacts make through the resettlement, fisheries losses and water quality problems. In fact, the Theun Hinboun and Houay Ho hydropower projects have been operating for almost a decade but the impact of these dams were not solved yet. It has increased the vulnerability of people rather than improve their economic and social development. Through these phenomena, tens of thousands of vulnerable ethnic minority people have died or suffered due to ten year impacts associated with resettlement and many more expected to be impoverished long into the future (Lawrence 2008). The dam has also made highest stunt and malnourishment (over 50 percent) among children in Laos who are from household more depend on wild foods and subsistence rive production through the loss of land, forests and other resources (WB, 2010).

2.2.2. *Vietnam*

According to the Government's energy development strategy, policies and incentives, the energy sector has the most impressive growth rate of all sectors (EVN, 2008). This demand has risen roughly 300% in the past ten years due to the increasing population, living standards, industrialization and rapid economic growth (Anh et al, 2012). The capacity of Vietnam's power system need to double in next five years to meet the demand growth projected at 16 percent per year during 2006-2010 (WB, 2013). In ordor to meet this demand, highest priority is the development of hydropower potential rather than thermal-power, gas, nuclear energy, import of electricity, or alternative energy (STIMSON, 2013). By 2020, the government estimates that all hydropower plants of the nation will generate a total capacity of 13,000-15,000 MW which is maintaining the dominant role of hydropower up to 62% of the country's energy supply. Thus, the investment opportunities are still available for both current industry players and new investors (STIMSON, 2013; Anh et al, 2012).

Yet, hydropower plants in Vietnam have been developed without proper assessment and planning of the detrimental effects to the environment and livelihood of local people. As a result, the impact of hydropower plants on environment especially water resources cannot be fully estimated. Anyway, several hydropower plants in Vietnam were constructed before 2005 when the environment protection law did not exist. Hence, strategic environment assessment was not applied. In the case of hydropower Plant in Huong River, the plant has caused much pollution in the river and reduced seafood output by 50-70 percent compared to when the plant had not been built before 2009. Some fish species that is high economic value have also disappeared (SAIGON, 2013). Moreover, the displacement and resettlement due to hydropower development has caused transitory or chronic food insecurity for affected families. Displaced people cannot produce food to supply their families' requirements because of their relocation to new localities with limited agricultural land and poor quality. Food has often become less available compared to the old situation where they could easily obtain food from various sources, such as fishing, hunting, collecting from forests, cultivating rice, cassava, and raising animals on common grass and forest lands (Pham et al, 2011).

2.3. *Hydropower's Impact in the Mekong of Cambodia, Vietnam and Laos*

2.3.1. *Flood*

Large reservoirs with certain storage capacity reserved for flood routing can reduce the peak flow in the downstream rivers during floods (Jordan et al, 2012). However, according to the study, the downstream communities of Yali Dam have faced big flood which make their houses completely in water. During flooding, they have moved from their homes to stay in mountain. The villagers said that the water raised very quick because of broken one gate of Yali dam and they could not take most of their properties along with them. They did not get information about the flood from neither the Yali dam developer nor the local authority so that they could not prepare themselves for reducing the risk from this flood. As the result, they have lost their family members, animals, fruit trees, houses, crops and other materials. Even they have lost many necessary belongings in their families, they just got rice, oil, noodle, medicine and tent from the Red Cross, government and civil societies. This amount of distribution is too small compare to what they lost. The effected community should get more support than this in term of food, water, medicine distribution and flood recovery support (seed, seedling, animal and medicine). The early warning system should be developed for them in order to reduce the effect when the next flood comes.

2.3.2. *Impact on Fish*

For Cambodia, fisheries are the fundamental natural resource, industry and food source for Cambodian people (MRC, 2009). After the dam constructed, Cambodia would face reduction in capture fisheries highly which would have a significant impact on macro-economic and poverty reduction. The fisheries are declined broadly as there are 300,000 tonnes of fish lost in Cambodia which equals to 150% of the current total livestock production (ICEM, 2010).

This study found that some villagers live downstream of Yali dam have stopped fishing because of the decrease of fish broadly in the river. Before the dam constructed, they could get 2-20 kg of fish per day from this river for domestic consuming and selling (about 2 USD per kg). Some villagers still catch fish but they observe that the amount of fish decreases broadly. Thus, the dam has made them loss of their income from catching fish and increasing the expenditure of buying meat for domestic consumption. To cope with this issue, they have found new jobs that are normally far from their home and dangerous namely go to forest and migrate to city, provinces and other countries. In Cambodia, civil societies have tried to train the affected communities about fish raising but fish raising is not easy as fishing in the river, the community said. Hence, there are only few villagers who raise fish. To cope with this issue, the communities in Sesan district migrate to city and other countries for selling labor after they finish cultivating rice crop. The other family members who stay at home grow vegetable and raise chicken for feeding their family and selling for extra income.



Laotian fishing in the border between Cambodia and Laos next to Doung Sahong Hydropower Dam. Photo: Ly Kesa

2.3.3. Water Quality

Hydropower development is a major concern of maintaining river water quality and its aquatic ecosystem (Bhatt et al, 2011). This caused by the strongly change of the temperature, suspended sediment, dissolved oxygen and the concentration of other dissolved materials in dam outlets from what flows into the reservoir (Dittmann et al, 2009). The water quality was also diminished because of changes in water depth, velocity and nutrient levels (Karin et al., 2009). Lack of oxygen at the bottom of the river could result in the generation of hydrogen sulfide and methane (Singh, 2002). The mercury is in a harmless inorganic form in many soils which finally effect on the human health. Bacteria could feed on the new mercury mater and transform into methyl mercury which passes up the food chain from plankton to fishes and from fish to other species including humans (McAllister et al, 2001).

Generally, the villagers live along the river use water from the river for drinking, bathing, cooking and washing cloth. They use water for raising animal and irrigating the crops as well. When water quality in the river is destroyed, these people will be suffered and the most vulnerable to this impact is the women and children as they are susceptible to disease. Anyway, the women and children are responsible for collecting the water therefore if they cannot use the water in the river, they will meet difficult to collect water from other sources which usually taking time than collect water from the river. In fact, the community in Andoung Meas district, Ratanakiri province, Cambodia said that they stop using the water in the river because the water from river makes their skin problem (e.g. itchy). Before the dam was constructed, they can use the water from the river that is no problem with their skin and health. As their observation, this problem has been happen when the Yali dam was constructed. Thus, they have changed to use the underground water from well for bathing, washing, cooking and drinking. However, the number of well is limited in their community for using. In contrast, the villagers in Taveng district, Ratanakiri province and Khoun district did not recognize any problem with water quality. They still use water from the river for their consumption in the family.



Children take bath in Sekong River, Laos.
Photo: Ly Kesa

2.4. The Improvement of Hydropower Development for Less Inequality

The research study found that a number of issues are important for improving the hydropower management in Cambodia, Vietnam and Laos. Through the improvement, the impact of the hydropower will be minimized.

2.4.1. Resettlement and Access to Information

In Cambodia side, communities live in upstream of lower Se San 2 dam worry about this dam construction as they do not know when and where this dam will be built. They do not know where the resettlement place and infrastructure facilities in the new place particularly the new house whereas the villagers live in Khoun district do not worry about this problem.

In Laos, the villagers in Khoun commune, Khoun district have been earning more money through running the business namely hotel, guest house, restaurant, guide, souvenir shop and other businesses as there are many tourists come to visit the Mekong Dolphins which are

closed to this commune. The income of these villagers from tourists will be decreased broadly when the Doung Sahong hydropower dam is built as this dam will effect on these Mekong Dolphins. However, the villagers did not know what will happen with their business when the dam is built in Se San River.

Actually, the displaced people do not want to move from their own village because they do not know how to live if they cannot catch fish and collect forest products in the new resettlement place. They use to earn money by fishing and collecting forest products in the forest while they are living in their villages. They do not have other skills for earning money in the new place. Thus, the community wants to participate in the resettlement decision-making process because they want to voice their needs and concerns in relation to their livelihoods. They want to choose the place that is appropriate for their new lives and can enable them to continue their farming, fishing, and doing other business. If possible, they want to choose the new place that is appropriate for them to live and to work as they have did in their communities. The new place of resettlement should be consulted with wide range of effected people in order to make the right decision for selecting the new place. The effective participatory resettlement in Cambodia is achievable if there is the strong commitment from government for helping the effected people and the advocacy from the effected community to government and company. Thus, the effect of community from dam will be minimized.

The information about the dam construction is necessary for the community as they live in the affected community. In the absence of information, rumor and interpretation will appear which can create fears about what may happen once the project gets under way (WB, 2004). The unclear information about the dam construction and the involuntary resettlement also increases the concern of community that they cannot invest in their farm or other businesses. This problem makes the community lost their income and opportunity to expand their business. The study research found that the communities live along Se San river and Sekong river were unaware of the hydropower project plans including the site and size as well as the resettlement plans. In fact in Cambodia, although they attended workshops and meetings with the local authority and Provincial Department of Industry, Mine and Energy about the hydropower project development, they were not presented this information clearly. If communities know better about the dam plans, they can better participate in the decisions regarding the dam building. They can also know clearly who would benefit and who is asked to bear the risks. Thus, the clear plan about dam construction has to be informed the affected communities in order to make them decide if they want to stay and make further investments in their farms. Through this information sharing, they will not invest in their farm and grow crops which they cannot get yield before they have to move from their villages. The commune councilor and village chief should responsible for disseminating this information to their villagers to make the villager aware well about hydropower development plan and other related information.

2.4.2. Assessment Studies

According to law in Cambodia, an environmental impact assessment shall be carried out on all projects and activities, either private or public, and shall be examined and evaluated by the Ministry of Environment before being submitted to the government for a decision. This assessment shall also be applicable to those existing activities and those that are under process, and for which their environmental impacts have not yet been assessed. Public participation in the environmental impact assessment process is considered necessary in recognition that people's concerns should be considered in the project decision-making process (RGC, 1999).

However, in reality, most civil society groups in the Mekong concerned about the accuracy of Environment Impact Assessments of hydropower development projects. The research study found that in the Mekong Sub-region, there is usually a lack of information about the impact of hydropower projects on the environment and social issues in the EIA report. Even though some impacts are written in the report, the size of the impacts is usually presented as smaller than the

reality that is voiced by the community. The processes to engage the participation of the community in the EIA process is also inadequate.

To improve the shortage of information, civil society should review EIA report and coordinate the participatory research with the community about the impact of hydropower development project on environment and social. The findings of this research should be used for crosschecking the EIA findings and providing critical input to the EIA report. Anyway, the decision-making improvement of the dam means that the EIA should be conducted with the full participation from the affected communities and a wide range of stakeholders in the 3S region. The EIA should not just focus on the economic return from dam but also highlight the negative impacts and risks from the project on community and natural resource.

2.4.3. Dam Water Releases and Early Warning System

Early warning systems are an important element in disaster risk reduction for dams. The objective of early warning systems is to empower individuals and communities threatened by hazards such as sudden dam water releases to have sufficient time to act and reduce the possibility of personal injury, loss of life, damage to property and loss of livelihoods (Rogers & Tsirkunov, 2010; UN, 2006).

According to the experience of dam-related flood in 2009 by Yali dam, the community could not prepare anything because they did not know the information about flooding in advance. This mistake has made the community suffered from the flood more severe than it could be. Until now, there is still no early warning system for the affected community. If there is next flood, the community will be suffered seriously again. Moreover, some of affected people live in downstream of Yali dam are the ethnic minority who has less capacity in adapting to the flood and drought. There is extremely need support from the government, civil society and hydropower developer for them to cope with this disaster.

The information about dam water releases has to reach the downstream communities well in advance to give them time to remove property and also to alert children who maybe use the river and are at greatest risk of being washed away by the floodwaters. Moreover, the community should have a chance to participate in the early warning system. The local authorities and the hydropower developer have to take responsibility for developing and supporting the early warning system.

2.4.4. Multi Use of Reservoir

For the case of the dam in 3S Rivers, the water in reservoir can be used for agriculture purpose namely growing rice, growing vegetable, growing other cash crops and fishing. The irrigation scheme can be constructed by using the same reservoir with hydroelectricity plant which gives the chance for farmers to grow crops especially rice crop two or three times per year. Besides growing crops, they can catch fish in the reservoir by using legal fishing material. The fish community can also be mobilized for the



Cambodian farmer grow vegetable in Sekong River. Photo: Ly Kesa

sustainable use of fish source in the reservoir. Most of the civil society staff stated that the dam in the 3S Rivers should be developed as multipurpose dam. Hence, the effect of dam will be minimized and the effected community will get benefit from the dam.

2.5. *The Ways of Improvement*

2.5.1. *Advocacy*

Advocacy is a tool that is used by citizens to claim their rights particularly right to water, housing, and land. In Cambodia and Laos, the land, rivers and other natural resources used in common by local communities is often encroached upon or taken away by the government through the granting of “economic land concessions” to private companies or the granting of sites to hydropower developers. Local communities often have to negotiate with the government to reclaim their lands or rivers that usually they have been using for a very long time across several generations.

In the case of hydropower, civil society groups and local communities have tried to negotiate with the government to stop building large dams that are environmentally and socially destructive and that destroy local people’s fish-based livelihoods. The government has mostly refused to listen, so further advocacy efforts have focused on improving governance processes such as hydropower planning and decision-making as well as looking at other issues of energy policy, EIA studies and information dissemination. The groups work to bring perspectives from the local level, feedback and requests from the affected communities to decision makers and the hydropower developers. Moreover, information is uploaded in their websites for broad dissemination. Civil society groups also provide input and comments to researchers or consultants who undertake the EIAs so that the EIAs can better reflect the various perspectives about the dam project and its impacts.

2.5.2. *Research and Information Dissemination*

Evidence-based research can play a key role in enabling civil society groups to gain access to the policy making process. The civil society in Mekong Sub-region who works on the policy issues aware about the importance of research for supporting the advocacy efforts even though they may face many constraints under the current political environment (Rasmussen, 2010). For hydropower, the research findings can be used for informing or influencing the hydropower decision makers as well as bringing awareness about the 3S Rivers to larger public in Cambodia, Vietnam, Laos and internationally. These studies are evidence that the communities and civil society groups can use in negotiating with the government and the hydropower project developers. Some civil society groups in the Mekong have also conducted EIAs in parallel with the government or the dam developer for disseminating to the communities and informing them about the potential impacts as well as for improving the official EIA. The communities thus also raise their own awareness about the rivers and natural resources being used and shared for supporting their livelihoods.

III. Conclusion

Hydropower in the Mekong has been contributing to the rapid economic growth in Cambodia, Laos and Vietnam as today it demands huge electricity products. In response to this growing demand, the governments have planned to absorb all hydropower potentials in their countries. The electricity from these hydropower projects will be exported to other countries for the national revenue and used in country for driving economic growth. However, while hydropower contribute to the economic growth, it impacts on social and environment in these countries and in the Mekong seriously.

The economic growth is the priory of the Government of Cambodia, Laos and Vietnam, therefore, the decision making related to the investment of natural resource is focused on economic rather than environment and social. According to hydropower is the core sector for development of energy in these countries which contributes to the economic growth, the decision making of hydropower development is focused on economic as well. The way of this decision making has made the social and environment suffered while hydropower development in the Mekong and its tributary is posing a huge threat to river ecosystems, aquatic life, water

quality as well as threatening the livelihoods of millions people including ethnic communities. The good governance measures are still lacking such as the genuine participation of local people in decisions before the dam is built, or their inputs and perspectives in the planning and management of the dam once built. In fact, the downstream communities of Yali Dam have faced big flood that make their houses completely in water which make they lost their family members, animals, fruit trees, houses, crops and other properties.

Both local communities and civil society groups have been involved in advocating the halting of such destructive, large-scale hydropower development in the 3S Basin and the Mekong River. Moreover, debate has included the ways of avoiding, minimizing, mitigating or providing compensation for the people affected by these dams. However, for the government, economic growth is the key priority while the protection and sustainable use of natural resources of the country is not the priority. Thus, it is not surprising that the government's decision-making focuses on economic profits than environment and social concerns. Through these challenges, the community has lost their land, crops, fish, water quality, houses and other infrastructures in their communities. The community also face problem of involuntary resettlement due to the inequality of compensation. This kind of economic-priority led development thinking and decision-making to expand hydropower has distributed the risks and impacts on the communities depending on lands and rivers for their livelihoods. The minimal or sometimes complete absence of participation of these communities and civil society groups in dam decision-making processes has also contributed to worsening these impacts.

To minimize the impact of hydropower dam on the affected communities, the well design of hydropower scheme, good management of dam construction and well hydropower project operation should be applied. The multi use of reservoir particularly for irrigation, fishing and fish raising should be considered during design phase and applied during operation. Greater participation from the affected communities and civil society should be encouraged and taken into account in deciding on dam projects. The local perspectives should also be incorporated into prepare the EIA and related studies involving the hydropower project. If the resettlement cannot be avoided, the resettlement process should be participated from the replaced people. The livelihood of the replaced people is to recover or improve from the existing one. In order to make this happen, both government agencies and hydropower project developers should be made more accountable to their decisions that often affect livelihood of millions people. Greater transparency is vital for improving decision-making processes and helping the affected people to better understand the risks and losses as a result of the dam project. The government and hydropower project developer should responsible for improving the livelihood of effected communities in order to recover from what they are suffered. The government and effected communities should meet regularly to talk about challenges in community and possible solutions. The intervention of these actors should be based on the result of this meeting.

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