



Trans-boundary Environmental Impact Assessment of Hydroelectric Resources Exploitation in Multi-Jurisdictional River: A Case Study of the Lancang-Mekong River

Li Xikun and Shu Min*

Abstract— This article focuses on one of the most effective ways to manage trans-boundary environmental problems caused by multi-jurisdictional river exploitation – trans-boundary environmental impact assessment (TEIA) – how it can be used to realize rational exploitation of hydroelectric resources in Multi-jurisdictional River, to promote sustainable development, and how it can work in the case of the Lancang-Mekong River.

Keywords— hydroelectric resources exploitation, Lancang-Mekong River, trans-boundary environmental impact assessment

1. INTRODUCTION

At 4,909 kilometers, the Lancang-Mekong River is the world's 10th-longest and 8th-highest river. From a source of approximately 5200 m above sea level in the Tanggula Mountains on the Qinghai-Tibet Plateau [1], the Lancang-Mekong River flows 2190 kilometers through China's southern provinces of Qinghai and Yunnan, and then it flows a further 2719 kilometers through Myanmar, Lao PDR, Thailand, Cambodia, and Vietnam. During this journey, the downstream Mekong first forms the boundary between Myanmar and Lao PDR, and then the boundary between Lao PDR and Thailand. After turning into the south territory of Lao PDR, the river again forms the boundary between Lao PDR and Thailand. Then, it flows into Cambodia. Here the downstream Mekong connects with Cambodia's Great Lake the Tonle Sap Lake through the Tonle Sap River. At last, the river flows into the Mekong delta of Vietnam where it pours out into the South China Sea.

As the most famous river system in Asia, hydropower resources have been regarded as the most important resource of the Lancang-Mekong River. This river has a massive drainage area of about 795,000 square kilometers, with an annual discharge of approximately 475, 000 million cubic meters and total water power reserves of around 90 million kW across six countries. For example, the Upper Mekong, which is known as the Lancang River of China, is mostly turbulent in the cataracts and gorges, with theoretical reserves of hydro energy of about 36.56 million kW. The Lan-cang River is estimated to have a capacity to generate 320.3 billion kWh of hydropower electricity annually [2].

From 1957 to 1970, hydro projects within the Subregion, which altogether were estimated to be able to generate 2.5 million kW of hydropower and to irrigate over 0.5 million hectare areas, had been completed over

the Lancang-Mekong River. From 1971 to 1980, in Thailand, Lao PDR, Cambodia, and Vietnam, other hydroelectric power engineering projects which could totally provide over 3.27 million kW of electricity had been finished [3].

Up to now, there have been established three main Lancang-Mekong River development cooperation systems. The Mekong River Commission (MRC) was established formerly in 1950's and reorganized by the 1995 Agreement on the Cooperation for the Sustainable Development of the Mekong River Basin. The other two are Greater Mekong Subregion Cooperation (GMS) implemented in 1992 and ASEAN—MEKONG Basin Development Cooperation (AMBDC).

More recently, countries along the Lancang-Mekong River has taken hydroelectric resources exploitation in this river as a very important way to lift their citizens out of poverty and backwardness, to develop industry and technology, and to revitalize the economy. Simultaneously, various environmental problems, especially trans-boundary environmental problems emerge during the exploitation process have been becoming a cause for world concern. Therefore, this article focuses on one of the most effective ways to manage trans-boundary environmental problems caused by multi-jurisdictional river exploitation – trans-boundary environmental impact assessment (TEIA) – how it can be used to realize rational exploitation of hydroelectric resources in Multi-jurisdictional River, to promote sustainable development, and how it can work in the case of the Lancang-Mekong River.

2. ENVIRONMENTAL IMPACT ASSESSMENT

An environmental impact assessment (EIA) is a report or evaluation of the likely or possible human environmental health impacts and ecological health impacts that a project or proposed activity may have. The purpose of this procedure is to ensure that the environmental impacts of decisions are taken into account by decision-makers before the decisions are made. During the process of EIA, the public is supposed to participate in decision-making and give their opinions towards the project or proposed activity.

According to the UNEP Environmental Impact

Li Xikun is a professor of Faculty of Law, Kunming University of Science and Technology, Yunnan, China. Fax: 86-871-3801942; email: lixikun@kmust.edu.cn

* Shu Min (corresponding author) is a lecturer of Faculty of Law, Kunming University of Science and Technology, Yunnan, China. Fax: 86-871-3383699; email: shuminsophie@yahoo.com.cn

Assessment Training Resource Manual, an EIA usually begins with the proposal of a project or a proposed activity which may have environmental impacts. Then it comes into the "screening" step, in which it must be determined whether an EIA is necessary for this relevant project. The output from the screening process is often a document called an Initial Environmental Examination / Evaluation (IEE). This is usually a preliminary assessment of whether the project has potentially significant environmental impacts. If it has or it has been legislated that an EIA is necessary, then an EIA is required [4].

For project or proposed activity in which an EIA is required, the party has to submit relevant EIA documents to illustrate what kind of environmental, as well as social, economic, and cultural issues should be considered and which alternatives should be included in the EIA. This is so-called "scoping" process. In this process, the public is supposed to participate into providing opinions and suggestions for possible significant environmental impacts and other kinds of impacts of relevant projects. Theoretically, these opinions and suggestions are considered to be very important and essential for decision-making. Moreover, scoping is perhaps the most important step in an EIA. It is important for two reasons. First, it helps to pinpoint problems early, allowing mitigating design to be made before expensive detailed work is carried out. Second, it helps to ensure that detailed prediction work is only carried out for important environmental issues. If key issues are identified and a full scale EIA considered necessary then the scoping should include terms of reference for further studies. Equally it may be the end of the EIA process once the impacts are found to be insignificant.

In the following draft Environmental Impact Statement (EIS) process, further prediction, investigation, and analysis works start. These works include formal collection of data and materials to identify or evaluate possible or potential environmental impacts, as well as other social, economic, and cultural effects and their alternatives. Besides the professional and technical advice given by institutions of government, experts, and other authorized agencies or horizontal researching organization, public input are also considered to be significant. According to the UNEP Environmental Impact Assessment Training Resource Manual, methods of public participation include hearing of assessment, investigation, questionnaire, and so on. After examined by government agencies and the public, a final EIA is well prepared. Although the final EIA may not decide by itself whether to approve or deny the relevant project or proposed activity, it is a very important tool and judgment basis for government and decision-makers to decide whether to approve, deny, or approve conditions original project or proposed activity.

In order to make the most of the experience and knowledge gained, the last stage of an EIA is to carry out an Environmental Audit sometimes after completion of the project or implementation of a program. The audit includes analysis of the technical, procedural and decision-making aspects of an EIA. Lessons learned and formally described in an audit can be very helpful in

future EIAs and building up the expertise and efficiency of the concerned institutions.

The most significant difference between EIA and Trans-boundary Environmental Impact Assessment (TEIA), or we could say the greatest obstacle to realize TEIA is that TEIA involves international and trans-boundary elements. This may cause problems rising in international cooperation, national security for specific countries, state sovereignty, and international democracy. Other problems like language obstruction, trans-boundary public participation, and differences or handicaps existing in different countries' environmental standards may occur as well [5].

3. POTENTIAL ENVIRONMENTAL IMPACTS OF HYDROELECTRIC RESOURCES EXPLOITATION IN THE LANCANG-MEKONG RIVER

Up to now, the hydroelectric resources exploitation in the Lancang-Mekong River has quite satisfied Southeast Asian countries' needs for electricity power. However, at the same time, various environmental and other kinds of impacts and problems are getting more and more obvious.

Dam constructions have changed minimum discharge of the Lancang-Mekong River, which may cause climate change and influence the ecosystem. Figures collected from 2004 UN Symposium on Hydropower and Sustainable Development shows that during 1962-1992 the minimum discharge of the Mekong on Thai-Lao border was 752 CMS (Cubic Meter per Second); however, during 1993-2003, after the construction of Manwan dam across the Lancang River in China, the minimum discharge on Thai-Lao border has decreased to only 569CMS (Cubic Meter per Second) [6].

The irrational hydroelectric exploitation has also ruined the biodiversity of the Lancang-Mekong River Basin and made significant changes to the ecosystem of the Lancang-Mekong River. For example, as most kinds of fish in this river are migratory species, they have to migrate to the upstream for reproduction depending on annual river flow. Therefore, the water fluctuation caused by dam construction inevitably results in a great decline of fish, which means a great decrease in food security for local people as well as the disruption of riparian countries' economic and social structures. The 136 MW Pak Mun Dam, which was completed in 1994, was built by the Electricity Generating Authority of Thailand with US\$24 million in financing from the World Bank. This hydroelectric dam is located near the mouth of the Mun River, the largest tributary of the Mekong River which runs through Ubon Rachathani, a northeastern province of Thailand. According to the World Commission on Dams' study in 2000, of the 265 fish species recorded in the Mun River watershed before 1994, 77 species were migratory and 35 species are dependent on habitat associated with rapids. However, the latest survey recorded just 96 species in the upstream region of this river. Out of 169 species which has not been found in the present catch, at least 50 species of rapid dependent fish have disappeared. Over 51 species

have been caught less significantly since the completion of the Pak Mun Dam, and the families of many species greatly declined. The fish catch directly upstream of the dam has declined by 60-80% after the completion of the project [7]. The rapids in the river, where the migratory fish used to lay their eggs, were destroyed. The fish ladder which had been installed to help the migratory fish is criticized by the local villagers as being completely ineffective. Furthermore, the original number of household to be displaced for the dam was originally said to be 262 families, but in reality, 912 households have already been relocated, 780 of which have lost all or parts of their land. In addition, there are more than 2500 families who are protesting against the damage to their fisheries.

In addition, the long-term economic benefit of hydroelectric construction has also been considered to be over exaggerated. A report made by Probe International in Canada lists ten reasons why the World Bank should not finance the Nam Theun 2 Power Company in Lao PDR. Among all those reasons, "proponents have failed to demonstrate Nam Theun 2 economic viability" has been listed on the top [8].

Due to fact that the Lancang-Mekong River itself is a living ecosystem, environmental impact towards this river can not be caused by only one country. Any significant environmental impacts, as well as social, economic, and cultural impacts happen in one country will influence other riparian countries remarkably or potentially. Therefore, it is necessary for us to develop a rational and sustainable structure of hydroelectric resources exploitation in this river. A sound framework of Trans-boundary Environmental Impact Assessment which can help to prevent irrational resources exploitation and to reduce significant trans-boundary environmental impacts from happening is an effective way for constructing such a sustainable hydropower resources development structure.

4. INTERNATIONAL AND REGIONAL PRACTICES AND CONVENTIONS OF TEIA

Sources of Law: International Law and Conventions

Although principles of the EIA system has been developed and adopted by both international environmental agreements and national laws of specific countries, the TEIA process is not yet well-developed. In the past few decades, the international society has taken great efforts to realize the construction and establishment of the TEIA process, especially the TEIA in international watercourse and trans-boundary freshwater. Treaties, conventions, and agreements have been signed and put into force. International organizations such as United Nations Environment Programme (UNEP), the Organization for Economic Cooperation and Development (OECD), and the World Bank have addressed issues of the TEIAs and endeavored to push forward the construction of a sound frame of the TEIA process. These treaties, conventions, agreements, and documents are the direct sources of law of the TEIA system.

Early in the Principle 21 of the 1972 Stockholm

Declaration has provided that "States have, in accordance with the Charter of the United Nations and the principles of Environmental law, the sovereign right to exploit their own resources pursuant to their own environmental policies, and the responsibility to ensure that activities within their jurisdiction or control do not cause damage to the environment of other states or of areas beyond the limits of national jurisdiction." This could be regarded as one of the earliest international source of law for the TEIA system. Other recent international Conventions such as the 1992 Convention on Biological Diversity (CBD) [9] and the 1982 United Nations Convention on the Law of the Sea (UNCLOS) [10] also clearly mandate to invoke the TEIA process into relevant trans-boundary projects or national proposed activities which may have trans-boundary or international impacts.

Usually, the TEIA process is used for special projects or proposed activities which may have significant adverse trans-boundary or international environmental impacts. Examples are projects which may have great adverse trans-boundary effects on biodiversity, marine areas, and freshwater systems. The United Nations Convention on the Law of the Non-Navigational Uses of International Watercourses of 1997 establishes and approbates a relatively complete system of TEIA for trans-boundary freshwater areas, which includes the basic principles and concepts of the TEIA process, as well as notification, exchange of technical data and information between relevant countries. Article 12 "Notification Concerning Planned Measures with Possible Adverse Effects" of this Convention enacts: "Before a watercourse State implements or permits the implementation of planned measures which may have a significant adverse effect upon other watercourse States, it shall provide those States with timely notification thereof. Such notification shall be accompanied by available technical data and information, including the results on any environmental impact assessment, in order to enable the notified States to evaluate the possible effects of the planned measures."

Regional Practices and Conventions of TEIA

European and North American countries have commonly adopted regional agreements or conventions that provide regulations of the TEIA process. In the past years, Western Europe has made great contribution all along to the TEIA system construction. In 1985, the European Community adopted a Council Directive on the assessment of the effects of certain public and private projects on the environment. The Directive included a few general provisions that could apply to trans-boundary effects [11].

On the basis of the Council Directive, and taking into account work on environmental impact assessment carried out under the auspices of the United Nations Economic Commission for Europe (UNECE), three conventions focus mainly on protection and the TEIA system of trans-boundary watercourses are adopted and open for signature in Europe. These conventions are UNECE Convention on the Protection and Use of

Transboundary Watercourses and International Lakes (the Helsinki Convention), the Convention on the Environmental Impact Assessment in a Trans-boundary Context (the Espoo Convention), and the Convention on Access to Information, Public Participation and Access to Justice in Environmental Decision-making (the Aarhus Convention).

North America has a longer EIA history; however, its experience on the TEIA system is not as rich as that of Europe. The TEIA process of trans-boundary watercourse in North American has been mainly established upon settlements of problems occurring in the trans-boundary rivers and lakes, such as the Columbia River and the North American Great Lakes, between the United States and Canada. In North America, the basic international framework addressing TEIA is the North American Agreement on Environmental Cooperation (NAAEC), which was signed by Canada, the United States, and Mexico and entered into force on January 1, 1994 as a sub international environmental cooperation agreement of the North American Free Trade Agreement (NAFTA), and the North American Commission on Environmental Cooperation (NACEC) established by NAAEC. The NAAEC is an agreement focuses on the notification of relevant information and consultation between parties during the TEIA process, and on the mitigation of potential adverse effects of proposed projects which are likely to have significant adverse trans-boundary impacts [12]. Later in June 1997, another TEIA agreement "Trans-boundary Environmental Impact Assessment Agreement (TEIAA)" has been drafted by Canada, the United States, and Mexico.

Practices of TEIA to the Lancang-Mekong River

Although there are no specific regional conventions and agreements on the topic of the TEIA system in the Lancang-Mekong River, we do have some experience on this issue. On the one hand, almost all of the riparian countries of the Lancang-Mekong River have their respective domestic law on EIA (not TEIA) no matter specifically or sweepingly. On the other hand, in 1995, Cambodia, Lao PDR, Thailand, and Vietnam has signed the Agreement on the Sustainable Development of the Mekong River Basin which requires the riparian nations to provide timely notification and consultation prior to implementing any projects using the river. This agreement is not a direct regional document but emphasizes on the TEIA process, and also provides regulations which are very similar to the requirements of constructing TEIA system. Moreover, international organizations such as the MRC and the GMS also take great efforts to push forward the monitoring and auditing organisms of trans-boundary impacts and pollutions, as well as to establish general structure of TEIA. NGOs also play important roles in this process.

5. CONSTRUCTION OF TRANS-BOUNDARY ENVIRONMENTAL IMPACT ASSESSMENT OF HYDROELECTRIC RESOURCES EXPLOITATION IN THE LANCANG-

MEKONG RIVER

To discuss on this topic, we have to above all nail down some of the premise problems. First, the TEIA process is supposed to do with the problem of trans-boundary environmental impacts which includes trans-boundary pollution. However, trans-boundary pollution just presents one distinct and visible aspect of trans-boundary environmental impacts and trans-boundary environmental impacts mean much more than trans-boundary pollution. Then, what is the nature of trans-boundary environmental impacts? This question has always been an obstacle of practicing TEIA. Article 1 of Helsinki Convention on the Protection and Use of Transboundary Watercourses and International Lakes defines trans-boundary impact as "any significant adverse effect on the environment resulting from a change in the conditions of trans-boundary waters caused by a human activity, the physical origin of which is situated wholly or in part within an area under the jurisdiction of a Party, within an area under the jurisdiction of another Party. Such effects on the environment include effects on human health and safety, flora, fauna, soil, air, water, climate, landscape, and historical monuments or other physical structures or the interaction among these factors; they also include effects on the cultural heritage or socio-economic conditions resulting from alterations to those factors;" The Espoo Convention on the Environmental Impact Assessment in a Transboundary Context states trans-boundary impact as "any impact, not exclusively of a global nature, within an area under the jurisdiction of a Party caused by a proposed activity the physical origin of which is situated wholly or in part within the area under the jurisdiction of another Party" [13].

Any trans-boundary environmental impact, not necessarily to be globally, which needs TEIA is usually supposed to be significant adverse impact that may influence two or more countries. Thus, before practicing the TEIA process, we need at least to know what kind of projects or proposed activities, include projects and proposed activities on the hydroelectric resources exploitation, in the Lancang-Mekong River are considered to have significant adverse trans-boundary environmental impacts. This list comes from two origins. One is provisions laid down by regional conventions or agreements, which identify the specific projects and proposed activities that are considered to have significant adverse impacts and need TEIA. Another origin is opinions come from different national governments and the public, as well as NGOs and other organizations that are able to give correct judgments [14].

Notification and Screening

The absence of a regional convention or agreement on TEIA in the Lancang-Mekong River is an obvious gap in the trans-boundary environmental management in this river. Before we have such a convention, any origin country for a proposed activity that includes hydroelectric resources exploitation activity, which is likely to cause a great trans-boundary environmental impact in the Lancang-Mekong River, in its river basin,

and in the environment of the riparian countries, shall notify any riparian country (that is considered to be an affected country) and provide relevant information as early as possible about the nature and possible impacts of this activity to ensure adequate and effective investigation and consideration are made.

Then it follows the next step which is similar to EIA's screening. The potentially affected countries shall, according to the information and materials provided by the origin country, initiatively investigate and research the possible impacts they may suffer, notify and consult their citizens and public; provide their position on the necessity of the TEIA and suggestions, along with reasonable evidence and data, to the origin country.

Subject Party to Submit TEIA

The subject responsible for submitting the TEIA of hydroelectric resources exploitation, i.e. who is going to initiate and prepare the TEIA documentation, is generally the origin country for the proposed activity. The specific party to take over this work could be the national government or authorized agency. In some particular cases, the TEIA may be prepared by NGOs, IGOs, and other trans-state actors.

Scoping

Scoping stage in TEIA occurs before the drafting of a formal TEIA document when the relevant countries commonly agree that a TEIA is necessary for the proposed hydropower exploitation project based on a preliminary determination made from the notification and screening process. Scoping is the process of determining which are the most critical issues to study and further research into, and will involve riparian countries / public participation to some degree. It is at this early stage that TEIA can most strongly influence the outline proposal. This stage includes a deeper investigation and assessment of factors and alternatives that need to be considered in the TEIA document.

A major activity of scoping is to identify key interest groups, both governmental and non-governmental, of the possible affected countries. The public, especially people or communities who are affected shall be encouraged to express their attitudes, comments, and suggestions to the project. Consultation and public participation are considered to be essential, especially for hydroelectric resources exploitation projects in the Lancang-Mekong River for they may have ad hoc significant adverse trans-boundary environmental impacts. In this situation, public participation in different jurisdictions can be conducted by different countries and their governments.

The main techniques used in scoping are baseline studies, checklists, matrices, and network diagrams. These techniques collect and present knowledge and information in a straightforward way so that logical decisions can be made about which impacts are most significant.

Different countries and areas have different experiences toward the scoping process of TEIA. In Europe, the consideration of alternatives is a central

focus of the scoping stage [13]; while other countries such as Netherlands, Canada, and Denmark have ruled the requirement of consultation and public participation at the scoping stage by regulation; countries such as the United States emphasize the recommendation and broad consultation practice and public participation, though not required.

Preparation of the TEIA Documentation

Any TEIA documentation of hydroelectric resources exploitation projects or proposed activities shall basically contain a description of the nature and characteristics of the project or proposed activity, and its purpose; possible alternatives; and the environment that is likely to be affected and its possible or potential environmental impacts. Also included in the documentation are other uncertainties that result from gaps of knowledge or lack of technologies; mitigation measures which can be taken to control the adverse environmental impacts; and suggestions whether to proceed with the projects or not. Conclusion and suggestions of the TEIA on whether to approve, deny, or approve with conditions original project or proposed activity shall be made with discretion according to reasonable and adequate data, references, materials, as well as maps and graphs collected from all relevant countries and areas. The Espoo Convention can be used for reference in this part.

Consultation and Public Participation after Distribution of the TEIA Documentation

The key to realize this step is to figure out when, how, to whom, and in what languages to carry out the public summons of the TEIA documentation. After the preparation of the TEIA documentation, the origin country shall provide the documentation to people and communities which likely to be affected by the project or proposed activity. The origin country shall also provide possible affected countries with the TEIA documentation in the affected countries' respective languages or in a generally used language no later than informing its own public. The concerned countries shall distribute the documentation to relevant national authorities and their people who may be affected or living in the affected areas according to their domestic laws.

After the distribution of the TEIA documentation, specific countries shall arrange the third round of consultation and public participation. In this round, people and the public to be affected in relevant countries have right to know possible alternatives for relevant hydroelectric exploitation projects, mitigation measures which would be taken, and at what expense. They also have right to express their own experiences and opinions on if the TEIA documentation is efficient enough and their attitude whether to approve or deny the proposed activity.

In the whole process of TEIA, governments of origin country and other affected countries shall guarantee the democracy and equality of public participation to ensure that the public and people in the areas likely to be affected to give their own and true concerns and

comments.

In order to ensure that people who may be affected by a proposed hydroelectric resources exploitation project or activity have an equal opportunity to voice their concerns, we suggest riparian countries to promote either harmonization or nondiscrimination, which essentially is an equitable safeguard ensuring that all affected people to have equal opportunity to participate in environmental decision-making.

Final Decision

As we have discussed before, the greatest obstacle to realize TEIA is that TEIA involves international and trans-boundary elements. Therefore, the process or result of TEIA may cause problems rising in international cooperation, national security for specific countries, state sovereignty and so on. In order to settle these problems, we must fully understand that the Lancang-Mekong River is first a multi-jurisdiction river. Different reaches of this river belong to different countries and different state sovereignty. To carry out a specific hydroelectric resource exploitation project or not is first the origin country's domestic affair. Thus, efforts to promote international and regional cooperation must be ensured to guarantee that no national security may be infringed, and therefore achieve international justice and equality.

The final decision of a TEIA process may be to approve, deny, or approve with conditions the proposed project or activity pursuant to the outcome of TEIA documentation.

Post Decision-making Analysis and Cooperation

If the final decision has been made to approve or approve with conditions the proposed project or activity, then further post decision-making work such as monitoring and analysis should be executed based on the cooperation of all relevant countries throughout the whole process of project construction and afterwards. Once any new potential significant adverse environmental impacts, which have never been noticed or have been listed as uncertainty during the former TEIA process, have been discovered, such information shall be immediately notified to the origin country, and if necessary, the undertaking project shall be stand-down and new TEIA or other emergent measures shall be taken.

6. BRIEF CONCLUSION

In the past few decades, various countries and regions have endeavored to establish a sound framework of TEIA and great experiences have been gained. However, the TEIA system has not been formally and officially practiced in the Greater Mekong Subregion and in the management of the Lancang-Mekong River. In the future, more work is needed for establishing such a frame, as well as seeking for stable financial resources to practice the TEIA, as well more efforts should be taken to reduce and dilute the unjust political factors and characteristics which may be adulterated to the TEIA process. The legality of TEIA system and conventional

means of relief for disputes should be further and broadly explored.

REFERENCES

- [1] Liu Shaochuang; Lu Pingli; and Liu Donghui. 2007. Pinpointing source of Mekong and measuring its length through analysis of satellite imagery and field investigations. *Geo-Spatial Information Science* 31: 51-56.
- [2] Huang Guangchen. 2004. *The Lancang River & the Nu River*. Baoding, China: Hebei University Press.
- [3] Wang Xiaoming. 2001. The Environmental Impact of Hydroelectric Resources Development of the Mekong. *Southeast Asian Studies* 2001 (3): 10-11.
- [4] Environmental Impact Assessment Training Resource Manual. *UNEP Documents* [On-line serial], 3. Retrieved June 2002 from the website: <http://www.unep.ch/etb/publications/EIaman/IntroManual.pdf>.
- [5] Shu Min and Li Xikun. 2006. Analysis on Transboundary Environmental Impact Assessment of Transboundary Freshwater. *Journal of Kunming University of Science and Technology (Science and Technology Edition)* 2006 (31):432-438.
- [6] Chainarong Sretthachau and Pianporn Deets. 2003. Downstream Impact of Hydropower and Development of an International River: A Case Study of Lancang-Mekong. *Papers for the United Nations Symposium on Hydropower and Sustainable Development* [On-line serial], 3. Retrieved October 24th, 2004 from the World Wide Web: <http://www.irn.org/basics/conferences/beijinghydro/pdf/searin.pdf>.
- [7] WCD Case Study: Pak Mun Dam Mekong River Basin Thailand Final Report in November 2000 [On-line serial], from the World Wide Web: http://www.centre-cired.fr/forum/IMG/pdf/F8_PakMunDam.pdf.
- [8] Gráinne Ryder. 2004. Ten Reasons Why the World Bank Should Not Finance the Nam Theum 2 Power Company in Lao PDR. *Probe International Backgrounder*. 2004(6): 1-2.
- [9] The United Nations Convention on Biological Diversity. 1992. Article 14 Impact Assessment and Minimizing Adverse Impacts [On-line serial], 3. Retrieved October 12th, 2006 from the World Wide Web: <http://www.cbd.int/convention/about.shtml>.
- [10] The United Nations Convention on the Law of the Sea. 1982. Article 12 Protection and Preservation of the Marine Environment [On-line serial], 3. Retrieved October 12th, 2006 from the World Wide Web: <http://www.lawofthesea.net/convention.htm>.
- [11] Angela Z. Cassar and Carl E. Bruch. 2004. Trans-boundary Environmental Impact Assessment in International Watercourse Management. *N.Y.U. Environmental Law Journal*. 2004 (10): 169-244.
- [12] The North American Agreement on Environmental Cooperation. 1997. Article 10 (7): a-c [On-line serial], 3. Retrieved October 12th, 2006 from the World Wide Web: www.worldtradelaw.net/nafta/naaec.pdf.

- [13] The Espoo Convention on the Environmental Impact Assessment in a Transboundary Context. 1991. Article 1 (viii). [On-line serial], 3. Retrieved October 12th, 2006 from the World Wide Web: <http://www.unece.org/env/eia/eia.htm>.
- [14] Neil Craik. 2006. Deliberation and Legitimacy in Transnational Environmental Governance: The Case of Environmental Impact Assessment. *N.Y.U. International Law and Justice Working Papers* (Global Administrative Law Series). 2006 (10).

