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ENVIRONMENTAL CLEARINGHOUSE AS AN INSTITUTIONAL INCENTIVE FOR DATA AND INFORMATION SHARING AND CONFLICT REDUCTION IN THE MEKONG RIVER BASIN

By
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Abstract

Among the major competing stakeholders in the utilization of the Mekong River Basin water resources are the Mekong River Commission (MRC), the riparian countries and their national Mekong Committees (NMCs), the ADB-Greater Mekong Sub-region, the ASEAN-Mekong Basin Development Cooperation, the Forum for Comprehensive Development of Indochina and AEM-MITI Cooperation for Economic Development. Poor data and information sharing as well as lack of coordination among the stakeholders remains a major concern and source of tension in the basin amid concomitant environmental degradation. Sustainable development advocates warn that the basin risks being swept into regional conflict if effective cooperative data sharing mechanism is not put in place to reverse this trend. This paper is part of an ongoing research develop a prototype Internet based *Environmental Clearinghouse (ECHS) and Environmental Clearinghouse Nodes (ECHSN) as incentives for* guaranteeing coordinated activities, facilitating access to data and information, reducing environmental degradation, promoting cooperation and minimising conflict among the stakeholders. This paper discuss the operations of the ECHS and ECHSN, their merits and types of geospatial data and information incorporated in them.

Introduction

The fragmented and stand alone development approach among the competing and proliferating stakeholders in the Mekong River Basin (MRB) disregards resource sustainability, the ecological and economic interdependence of the basin's system. Concomitant to this non-cooperative zero-sum game of win-loss/loss-loss situations which perpetuate divergence of interests, endanger the basin's food and environmental security and, as well as provoking conflict. Joern Kristensen, the Chief Executive of the Mekong River Commission) argues that 'the four countries and their institutions have pursued their own development plan without much consideration of what the impact might be on other countries sharing the basin (Watershed, 1999). As institution of environmental responsibility, the state of affairs in the basin is aggravated by the lack of effective integrated environmental management facility (EMF). This in turn makes regional compliance in geospatial data collection, monitoring, reporting and exchange largely unsystematic and informal. Advances in information technology and the increasing use of the Internet has raised awareness among geospatial data producers and environmentalists of the need for a multi-agency cum user-friendly search tool that would facilitate data sharing and at the same time save time and network overload. An effective EMF that has the potential for fostering coherent and collective management of data within a multi-layered institutional system such as MRB is *Environmental Clearinghouse (ECHS)*.

An environmental clearinghouse is a distributed and electronically connected network of geospatial data producers, managers, and users (Nelson, et al. 1996; San Francisco Bay Conservation and Development Commission, 1998). It is a decentralized system of servers located on the Internet containing standardized formatted or structured descriptions of existing digital spatial data. These structured digital data, known as metadata describes the geospatial data stored in the *ECHS*, and promote consistent query of information across multiple users at different sites (Heery, 1996). *ECHS* being web-based, metadata indexing is usually in the form of HTML (HyperText Markup Language), SGML (Standard Generalized Markup Language) or HGML (Hyper Graphics Markup Language). These allow detailed entry, access and delivery of information. *ECHS* is not necessarily a central location where geospatial data is stored. It could be considered analogous to the worldwide web being a distributed, electronically connected network of web sites. An environmental clearinghouse has the ability to facilitate interaction and to provide a forum for environmental information to multiple users and acts as an electronic gateway to other on-line environmental databases or nodes. A clearinghouse node is one electronic location (one server) that provides search access to metadata stored at that location. Thus, the fundamental goal of the Mekong Environmental Clearinghouse is to provide access to digital spatial data through metadata, which facilitates coordinated activities of institutions and organizations that generate, manage and use digital geospatial data in the basin.

Merits of Mekong Environmental Clearinghouse

A number of advantages accruable to developing Mekong ECHS Include:

- *Enhanced coordination of activities.* A major criticism against the development institutions with environmental responsibility in the MRB is poor coordination of information. ECHS provides the fulcrum for coordinated partnership in comparative analysis of environmental issues that permits clarification and suggestion for best practices in terms of data and information requirement, technologies and policies to be deployed. Instead of competing with the Mekong River Commission, the ADB-Greater Mekong Sub-region (GMS), the ASEAN-Mekong Basin Development Cooperation (ASEAN-MB), the Forum for Comprehensive Development of Indochina (FCDI) and AEM-MITI Cooperation for Economic Development and Industrial Cooperation Committee (AMEICC) can use their operational scales to complement each other and enhance overall cooperation among them. This could reduce duplication, generate and maximise economies of scale in data collection, analysis, and research. The operational scale and emphases of ADB- GMS in particular and the ASEAN-MB can enhance the activities of MRC and vice versa. Figure 1.1 illustrates relationships in Mekong ECHS.

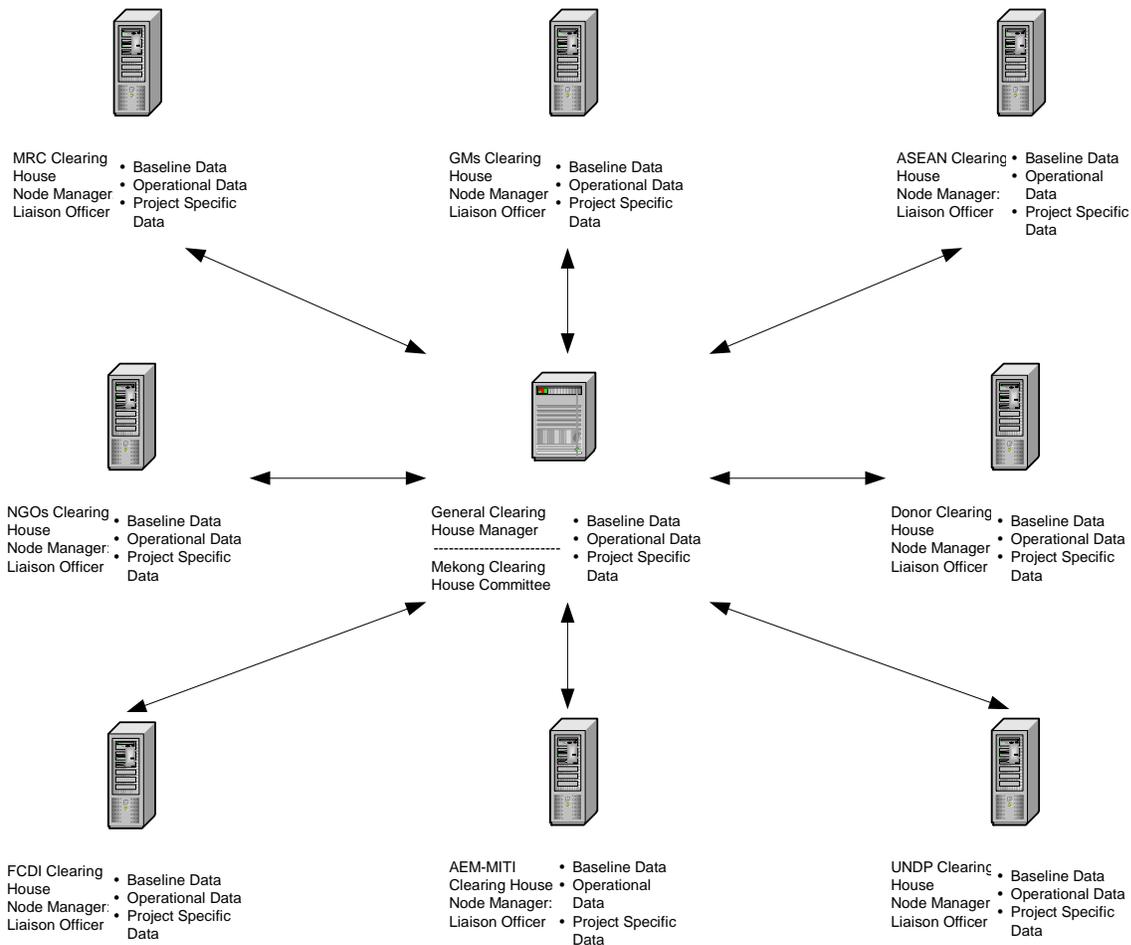


Figure 1.1: Mekong Environmental Clearinghouse

- Facilitate build up of ready to use data and information as well as sharing them among participating geospatial data producers and users in the basin.* This is necessitated by the acknowledgement that cooperation among the riparian countries as well as the institutions in the basin is characterized by inadequate information and knowledge base (MRC, 1999). There is no adequate knowledge base with clear interpretations, guidelines, and good practices for analyzing the physical, ecological, social and economic conditions that are important for good planning and water resource management. The exchange of data and information among the countries and the Mekong River Commission Secretariat has remained informal and limited because there is no underlying protocol to promote sharing (*ibid*). As the ECHS metadata are often systematically collected, classified, structured and available in the condition of ready-to-use, the fundamental utility of ECHS becomes the facilitation of transfer and the sharing of high quality and comparable data among participating organisations. Through improved coordination, GMS can provide the MRC with relevant baseline, operational and project specific data and information it may have particularly those from Myanmar and the Yunnan province of China. For example GMS have carried out some investment feasibility studies and detailed designs of development projects. Data and information on these projects could be useful for MRC in their basin planning, river monitoring and pre-investment studies for basin-wide

projects. Conversely, GMS can also gain access to MRC's data and information for their feasibility studies and detailed project designs, benefit from the MRC expertise and knowledge base in environmental protection and sustainable development.

ASEAN is made up of ten countries, which include five Mekong countries with China only a dialogue partner. ASEAN shares similar conceptual aims as the MRC - economic development through sustainable development. Organs within the ASEAN Institutional Framework for Environmental Cooperation such as the ASEAN Summit (ASEAN Heads of States/ Government); ASEAN Ministerial Meeting on the Environment (ASEAN Environment Ministers), ASEAN Senior Officials on Environment, Working Group on Nature Conservation and Biodiversity and Working Group on Multilateral Agreements are important forums which ECHS could provide mechanism for the MRC to reach out to China and articulate and share data on environmental issues of regional concern.

- *Facilitates compliance monitoring and reporting.* Participating ECHS organisations, having common environmental problems usually sign a memorandum of understanding (MOU) on the format and type of metadata to be placed in their ECHSN and have an obligation to share and make them accessible to members. The accessibility of these metadata makes each participating ECHS organisation a “watch dog” over the other in terms of monitoring compliance and reporting which also enhance transparency and accountability that represent key fundamental canons of good of environmental governance. The National Mekong countries (NMCs) of Thailand, Vietnam, Cambodia and Laos are responsible for co-ordination of investigations of the lower Mekong basin. These responsibilities include making and advising on policies and programmes related to Mekong water resources. ECHS being a repository of data and information will enable each NMC to monitor, audit and evaluate the implementation of projects or activities related to measures for ameliorating the environmental impact of the other.

Donor countries with their agencies and NGOs are important partners for coordinated and effective cooperation in use of the Mekong resources. The bulk of the operational budgets of the MRC come from donor countries and agencies and, increasingly, in recent times, most of these donor countries and agencies have started to finance GMS projects. Some of these agencies include: the Australian International Development Assistance Bureau (AIDAB); the Economic and Social Commission for Asia and the Pacific (ESCAP); the Swedish International Development Agency (SIDA); the Canadian International Development Agency (CIDA); and the International Development Research Centre (IDRC).

In the coordinated environment of ECHS, these donor countries and agencies can use their financial position to influence both the MRC and GMS to take adequate measures to protect the environment in their operations. One way could be to insist for a detailed, transparent and audited environmental impact assessment as a precondition for grants and also the involvement of the local people in the planning and implementation process of major projects. Access to the geospatial data available in the ECHS affords the donor countries the opportunity to monitor and influence both the MRC and the GMS.

The relevance of NGOs is underscored by the fact that they are usually very close to the grassroots people and can often offer alternative views that may well represent the wills and aspirations of the locals that are directly affected or may be vulnerable to any

construction project. In addition, some local and international NGOs in the basin have been involved in a series of studies on environmental impacts and are in the position to offer reliable data and information that may be necessary not only in the planning and construction of projects but also a reliable database for assessment and monitoring.

- *Facilitate dispute resolution.* Data is of critical importance in resolving disputes. Thus, data and information in the depositories of the Mekong ECHS and ECHSN can be used for conflict analysis, negotiation and bargaining settlements.
- *Cost savings.* Connection to Environmental Clearinghouse reduces duplications and overlaps, thereby saving cost and time in data production and analysis. More so, countries and institutions with less capacity to process certain data can benefit from shared knowledge of other participating members.
- *Facilitate participatory environmental management.* Managing ecological interdependence requires a fair amount of participation from the key stakeholders. The interoperability nature of ECHS offers a forum for multi-sectoral partnerships, pluralistic inputs and participation of the interests that may be affected by changes in environmental conditions to partake in policy-making and planning, project implementation, environmental impact assessment (EIA) and awareness creation. Essentially, pluralistic inputs and participation are imperative in environmental conflict and resolution. This is justified by the fact that no one party or narrow grouping of parties possess the knowledge necessary to resolve environmental disputes successfully. Thus, a wide spectrum of representation encourages more effective policy-making. It broadens the range of social actors involved in the environmental decision-making loop, encourages convergences of approach, and facilitates the search for achievable solutions (Vlachos, 1994; Hamacher, 1996; Glasbergen, 1998b; and Glasbergen, 1998a). This also has the potential to foster the Mekong spirit of “transnational common” and increase the compliance rate, as ECHS participants who have reached an agreement together on an issue are much more likely to stick to and comply to the rules and principles of the agreement.

Mekong Environmental Clearinghouse Architecture And Operations

For effective interoperability among stakeholders, the Mekong Environmental Clearinghouse would require a search and retrieve protocol known as Z39.50-1995 which is installed with an ISite Z39.50 server software, developed by the Center for Networked Information Discovery and Retrieval (CNIDR) in North Carolina. A simplified prototype of the Mekong ECHS architecture is shown in Figure 1.2. The ISite Z39.50 software is specially developed for indexing or structuring of metadata involving coordinates, dates, times and numeric values as well as enabling search matching and retrieval/download of these metadata between or among clearinghouse nodes. Hence ISite is an integrated Internet based software package which includes a text indexer/search system (Isearch) and a Z39.50 communication tool to access data from the databases (Nelson, et al. 1996). In addition, each organization implementing a clearinghouse node is required to have access to multi-user computers such as UNIX or Windows-NT where the server software, interfaces, and metadata stored.

Clearinghouse nodes are usually connected to the Internet via dedicated high-speed data connection known as Hypertext Transport Protocol (http) of not less than 56KB. The main clearinghouse may be located within the Mekong River commission or managed under contract by a clearinghouse service provider within a Java gateway. Once each clearinghouse node is registered and connected to the clearinghouse at MRC, it is provided with a hostname, port number/code, index name and set of scripts that enables gateway access to all Z39.50 servers or nodes. A question that is often asked is why not use the existing text-based catalog indexing technologies such as CD-ROM.

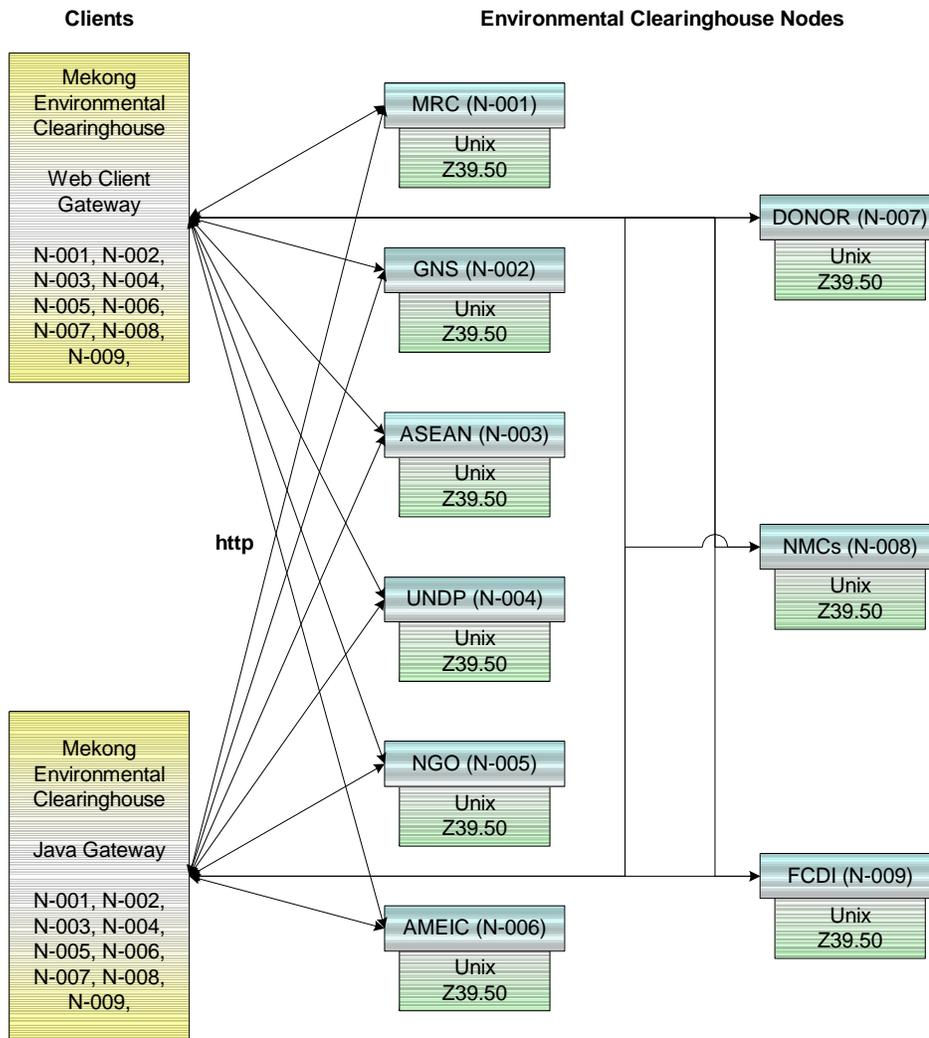


Figure 1.2 Mekong Environmental Clearinghouse Architecture

While some of these technologies can enable indexing required for text search matching metadata stored in HTML, the ISite Z39.50 has the advantage for enabling indexing involving coordinates, dates and times, and other numeric values, as well as saving more time for spatial data search and retrieval.

Mekong Environmental Clearinghouse Geospatial Data and Information

Among the characteristics of geospatial data (metadata) required for the Mekong Environmental Clearinghouse are: *Identification information* which involves the originator for example the MRC, (Title and publication information as well as online linkage); *Data/information description* including abstract if any, keywords, purpose, status – complete or in progress, last update, spatial domain – bounding coordinates; *Data Quality* such as attribute accuracy, standard consistency; *Categories* such as baseline data, project specific, operational data, maps; *Distribution information, liability, format specification; contact information in the form of* mailing address, website - URL:<http://www> ----, and ordering information if fees are required. Generally, in deciding the type of geospatial data and information to be exchange in the clearinghouse, it is necessary that the participating organizations focus their attention on areas of strong mutual interdependence which may include the following:

Hydro-meteorological data: Hydrologic and meteorological data constitute a base for planning, development and operation of water resource projects. As a result, information about the quantity and quality of the water available and its annual and seasonal distribution is of vital importance. These may include hydro-meteorological data and information on the mainstream and tributaries, such as water level and discharge, siltation rate, climatic data, particularly rainfall, temperature, humidity, cloudiness and possibly, ground water level. The exchange of these data can help the countries understand and monitor physical factors that impact the River Basin. The data will form a substantial base for the formulation of the water allocation rules among the member countries. Also, the operations of dam and reservoirs, analysis of irrigation water demand, water withdrawal and water diversions, and maintenance of minimum flow in the basin will depend on the analysis of readily available hydro-meteorological data.

Water use data: This data should show the total consumptive water by each country and large scale water projects. To this end, water demands and allocation on a sectoral and project basis will be important. Reservoir storage capacities and withdrawable amounts in dry seasons are also important.

Water quality data: The examples of water quality data include physio-chemical water parameters (pH, salinity, temperature, turbidity, sediment load, phosphorus, nitrates, heavy metals, *E Coli*, inorganic pollutants). Exchange of these data could encourage awareness among countries and agencies of water quality conditions in the basin, the possible causes, the sources of pollution and when and where pollution could cause damage.

Fishery data: The data needed to be exchanged here includes possible obstacles to fish migration, the causes and sources of declining fish population, and the species of fish that are in danger of extinction.

Feasibility and EIAs studies: This includes data containing detailed environmental impacts on communities, ecosystem, recreation and tourism and amelioration measures and;

Land use and erosion data: This includes data and maps on land use characteristics and riverbank erosion particularly the border areas. Exchange of these data can enable member

countries to understand and keep track of the physical dynamics of the riverbank mostly those associated with anthropogenic factors.

Conclusion

The coordination and the streamlining of activities between the MRC and the ADB - Mekong Sub-region, the ASEAN-Mekong Basin Development Cooperation, the Forum on the Comprehensive Development of Indochina, and the AEM-MITI Cooperation for Economic Development and Industrial Cooperation Committee (AMEICC), the donor agencies and the NGOs is necessary for effective regional cooperation. This will reduce overlap and duplication in planning, facilitate technical cooperation, guarantee collaboration that ensure that the projects under these various initiatives are not conflictive and competitive but complementary and reduce environmental impacts. This paper demonstrates that a web based Mekong Environmental Clearinghouse has the potential and fulcrum to facilitate the interoperability that is required to share high quality data and information critical for these institutions to achieve the above.

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