‘Problem of Fit’ between Institutions and Environment: Empirical Evidence from the Rhine River Basin

Tun Myint
Indiana University

Comments are welcomed at tmyint@indiana.edu

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Tun Myint
Indiana University

Institutional Affiliations:
Center for the Study of Institutions, Population and Environmental Change
School of Public and Environmental Affairs and School of Law
Indiana University
408 N. Indiana Ave.
Bloomington, IN 47408-3799
U.S.A.

Home:
2765 E. Bernice Dr.
Bloomington, IN 47401

Tel: (812) 824-9703

Abstract

Environmental governance is inherently a political process. It is a relatively unique political process because biogeophysical systems of environment are essentially non-human actors in the social-ecological system which is composed of both human and biogeophysical systems. Human actions are constrained by the rules of biogeophysical system in addition to human created rules. In order to analyze institutions-environment interaction, we need to conceptually treat biogeophysical systems of environment as an actor rather than a factor in environmental governance. Political process in governance of environment is about crafting institutions (governance strategies) to address both human problems and environmental problems simultaneously. Empirical and theoretical understanding of environmental degradation caused by human actions can be addressed by examining whether human institutions fit biogeophysical systems of environment. Young (2002: 56) coined this notion as “Problem of Fit.” Based on the empirical findings from the governance processes of the Rhine pollution cleanup regime, this paper argues that there are two parts in the problem of fit as a whole. The first part is that human institutions have to fit human systems (economic, political, and social contexts). The second part is that human institutions have to fit biogeophysical systems they address. The paper further asserts that if institutions fit human systems within which they operate, it is more likely to achieve the fit biogeophysical systems they address.

Keywords: The International Commission for the Protection of the Rhine, Transnational Environmental Governance, Institutions-Environment Interactions, and Sustainable Governance.
Introduction

Global system encompasses two systems – the earth system (environment) and the world system (institutions). To understand the challenges of environmental governance, it is important to appreciate the interconnecting and interacting elements between the nature’s earth and the human’s world (Choucri, 1993; Caldwell, 1999). As Lynton K. Caldwell (1999) eloquently stated, the word “earth” refers to the geophysical planet, its atmosphere, and electromagnetic outer space environment and its biosphere. The term “world” is an expression for institutional and cultural artifact of human creation and perception. The increasing activities of the world system (human institutions) reach to the limit at which the carrying capacity (or sustainability) of earth system is in decline (Stockholm Declaration, 1972; Ponting, 1991; Caldwell, 1999). Therefore, approaches to global environmental governance require understanding of interconnecting issues and elements between earth system (environment) and world system (institutions).

The fundamental issue that the environmental governance ultimately aims to address is sustainable use of natural environment. Sustainable development is defined as “development that meets the needs of the present without compromising the ability of future generation.” However, if we are to carry out such a task in the global context, we need to understand how the current world system functions within, and in relation to the earth system so as to identify linkages between institutions and environment. Therefore, theoretical and practical approaches to global environmental governance must not only focus on economic, social, and political contexts within world system but it must also include the impacts of world system activities imposed on the earth system. In other words, it needs to address whether human institutions of the world fit biogeophysical systems of the earth.

Environmental governance is inherently a political process. It is a relatively unique political process because biogeophysical systems of environment are essentially non-human actors in the social-ecological systems which are composed of both human and biogeophysical systems. Human actions are constrained by the rules of biogeophysical system in addition to human created rules. In order to analyze institutions-environment interaction, we need to conceptually treat biogeophysical systems of environment as an *actor* rather than a *factor* in environmental governance.

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1 This paper is based on the author’s original paper *Managing Complexities in Global Environmental Governance*, presented at the 2001 Berlin Conference on Global Environmental Change and Nation States, held on December 6-7, 2001. The first version of this paper is presented at the International Symposium on Large Area River Systems, February 11-14, 2003, Phnom Penh, Cambodia. Comments are welcomed at tmyint@indiana.edu

Political process in governance of environment is about crafting institutions (governance strategies) to address both human problems and environmental problems simultaneously. Empirical and theoretical understanding of environmental degradation caused by human actions can be addressed by examining whether human institutions fit biogeophysical systems of environment. Young (2002: 56) coined this notion as “Problem of Fit.” Based on the empirical findings from the governance processes of the Rhine pollution cleanup regime, this paper argues that there are two parts in the problem of fit as a whole. The first part is that human institutions have to fit economic, political, and social contexts of human systems. The second part is that institutions have to fit biogeophysical systems they address. The paper further asserts that if institutions fit economic, political, and social contexts of human systems within which they operate, it is more likely to achieve the fit to biogeophysical systems they address.

In this paper, part one will introduce theoretical puzzle for sustainable governance. In part two, I will discuss the analytical tool I am developing called Issues, Interests, and Actors Network framework by drawing insights from the literature of the Institutional Analysis and Development (IAD) framework developed at the Workshop in Political Theory and Policy Analysis at Indiana University and the Policy Sciences approach developed by Harold D. Lasswell and colleagues at Yale University. In part three, I will discuss the current state of the Rhine in brief. In part four, I will apply the tool developed and discussed in part two to unpack and decompose governance processes of the Rhine regimes. Finally, I will offer analysis to the case by answering the question posed – Can institutions that are created to address transnational environmental problems fit both economic, political, and social contexts of human systems on the one hand and biogeophysical system on the other.

Environmental Governance as a Theoretical and Policy Puzzle for Sustainability

The subject of global environmental governance has been chiefly dominated by the study of environmental regimes. Political scientists’ works advanced the study of international regimes. Their emphasis was to understand and theorize how international affairs may effectively be governed by regimes that are designed to achieve stated goals and objectives. Their interest is in how cooperation among sovereign states can be augmented in order to solve problems that are transnational in nature (Hisschemoller and Gupta, 1999: 151; Sprintz and Helm, 1999: 359; Martin and Simmons, 1998: 742). Peter Haas in 1989 posed the question: Do regime matter? Haas’ fundamental question challenged the study of regime to answer whether regimes make any difference to the international environmental affairs to which they address. Young (1999: 249) answered Haas’ question:

We can state without hesitation that regimes do matter in international society, so that there is nothing to be gained from perpetuating the debate between neo-institutionalists and neo-realisists about the ‘false promise of international institutions’ (Mearsheimer, 1994-1995).
If regimes do matter, are they effective? The later emphasis on the effectiveness of international regimes is multiplied by the emergence of globally concerned issues such as environmental degradation, trade disputes, disease control, and conflict resolution. These global crises not only require international cooperation but also demand action beyond traditional diplomacy. The traditional study of international affairs is confined to the study of power and diplomatic relations among sovereign states. However, regime analysts look beyond a realist approach to the study of international affairs and further advance a transnational perspective to global governance by drawing insights from the experiences of international environmental regimes (Young, 1997). As Michael Zürn asserted in a major review of the progress of research on international environmental politics, study of regime effectiveness has become the “driving force” (Zürn, 1998: 649) in the analysis of global environmental governance.

Environmental governance is a puzzle for sustainable development. This puzzle can be coined as a “Problem of Fit” (Young, 2002: 56) in dealing with governance of environmental issues. There are two parts in the “Problem of Fit” as a whole. The first part is whether the environmental regimes that are designed to serve human needs and desires fit the economic, social, and political contexts of human systems within which they operate. The second part is whether the environmental regimes fit the bio-geophysical systems they address. Therefore, the “problem of fit,” as a whole, must address these two parts simultaneously. In other words, regimes that are designed to solve global environmental problems must fit both human systems and bio-geophysical systems they address. This “fit” puzzle is a reason to investigate whether the International Commission for the Protection of the Rhine (ICPR) fit human systems and bio-geophysical systems is tries address.

**Methodology and Definitions**

Methodologically, to analyze and explain the environmental governance of the transnational environmental resources, it is important to understand the institutional linkages among various layers of transnational environmental regimes. With the lens of institutionalist theory, transnational regimes such as ICPR can be conceptually separated into three layers – local, national, and transnational layers. In each layers, issues, interests, and actors interdependently drive the governance processes. In order to analyze and explain how issues, interests, and actors interplay and what linkages between these layers are in the governance process, I will apply the framework of "scaling down" and "scaling up," i.e. a combination of both top-down and bottom-up approaches (Young, 1995). There are both formal (legal) and informal (strategic rules) institutional linkages between three layers of ICPR. Through these linkages, the issues, interests, and actors in each layer are interconnected and emerge as institutional drivers to operate the regime governance process.

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3 The term “institutional driver” refers to issues, interests, and actors that create and promote both constraints and opportunities for constructing rules-in-use in governance processes.
Defining Issues, Interests and Actors in Governance

Before I analyze how issues, interests, and actors interplay in transnational environmental governance of ICPR, it is necessary to clarify the definitions of these terms. “Issue,” according to the American Heritage Dictionary, is defined as “a point of discussion, debate, or dispute; a matter of wide public concern; culminating point leading to decision.” Based on this definition, I define “issue” as a problem or a matter that calls for solution. For the definition of “interest,” I consulted the online edition of the Oxford English Dictionary and it is defined as “the relation of being objectively concerned in something, by having a right or title to, a claim upon or a share in.” Based on this definition, I define “interest” as state of possessing reasoned stake or share in something. Actors are all concerned participants whose decision-making capacity and livelihood interests are affected by policy and law of governing institutions. “Actors” are participants who eventually become stakeholders in the governance process.

In governance processes, issues, interests, and actors interdependently shape one another. To animate definition of issues, interests, and actors, consider a driver in the car on the road. The driver (actor) cannot drive at the speed and the ways she or he desires. There is inevitable issue waiting ahead that is if the driver drives at the speed and ways she or he desires, the accident would occurs. If the accident occurs, there are consequences of injury, medical cost, and increase in car insurance that are in the interests of the driver. What is governing these issues, interests, and actors is rules that are formally established (traffic regulations) and informally presence rules (other drivers’ behaviors, road conditions and weather etc). In governance processes, these issues, interests, and actors interplay in complex web of rules. It is important to impersonate issues and interests as they relate to actors within the web of both formal and informal rules.

Analytical Framework

What govern the dynamic interplay of issues, interests, and actors are the institutions that are formally and informally established rules. To detect the institutions or rules-in-use in the dynamic interplay of issues, interests, and actors in environmental governance of ICPR regimes, two sources of literature serve as a starting point. The first is the work of Arthur F. Bentley who pioneered the study of “group interest” to explain political process of pressure groups on three branches of the United States government. In his work, The Process of Government, published in 1908, Bentley asserts, “there is no group without its interests… The group and the interest are not separate… if we try to take the group for analysis without interests, we have simply nothing at all” (Bentley, 1908: 211-213). For the study of governance processes of ICPR, the fundamental

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elements of analysis are issues, interests and actors within formally and informally established groups. The group interests cannot be ignored for analytical purposes for scholars and practical purposes for practitioners in ICPR. Bentley argues that special interests are “raw materials of politics.” I would further assert that they are raw materials of effective and open process of governance. Bentley believes that political campaigns of local activists and lobbyists, their acts of pressures and persuasion, conflict and collusion are not to be denounced or deplored but to be described and understood. Furthermore, interests are not only a driving force to lobbyist groups but also to governments. In a democratic governance system, interests of politicians and electoral representatives collectively become the engine of governance. Therefore, the study of governance process must analyze the dynamic interplay of interests in relation to issues and actors.

The second source of literature is the work of Harold D. Lasswell and his colleagues on the Policy Sciences approach developed at the Yale University. In a series of unpublished lecture notes that are compiled and documented at Indiana University School of Law in 1954, Lasswell and McDougal explain what they call “social process” as a mechanism by which “persons influence one another to pursue values.” They write:

When two persons influence one another, we speak of process as social. In a world shrinking at an ever-accelerating rate because of relentlessly expanding, imposing technology, the people of the globe as a whole constitute a world community, which in turn is composed of myriad of smaller communities. Acting as individuals and in concert, the participants in all social processes, large and small, pursue values through institutions using resources. (Lasswell and McDougal, 1954: Part II, Ch. I, p.1).

Social process, Lasswell and McDougal explain, is the mechanism by which individual persons (actors) pursue values in society. In essence, their assertion conveys that actors are mainly guided by the value they uphold in society. The Policy Sciences approach that Lasswell and his colleagues developed identified eight values – power, enlightenment, wealth, well-being, skill, affection, respect, and rectitude (Lasswell and Kaplan, 1950, Lasswell, 1971: 18). These eight values drive the way by which actors pursue their goals and objectives in governance processes. However, actors’ choices are always constrained by priorities of either issues or interests that are set in political contexts. Issues are socially and politically crafted. For instance, the issue of Rhine pollution was not in the political agenda of riparian countries until the Dutch government initiated establishment of transnational regime in 1950 (discussion in later sections). The investigative journalism and the specific-issue-oriented non-governmental environmental organizations often raised environmental issues to the policy agenda across institutional layers.

Issues, Interests, and Actors Network (IAN)

Interests are mainly economic driven, issues are socially and politically crafted, and actors are value oriented in the interplay of Issues, Interests, and Actors Network (IAN) framework. When there are strong presence of these issues, interests, and actors for a particular environmental problem in each layer of transnational regime, there is
likelihood of achieving an effective cooperation among actors for the environmental governance. In a world of highly interdependent heterogeneous forces that shape process of governance, the governance process has to be open process. The openness of the governance process is a crucial parameter for the fit of regimes to the social, political, and economic contexts within which they operate.

Network refers to a complicated intermingling of lines, linkages, passages, roads, individuals, and layers of institutions that make regimes possible to achieve certain objectives that require various independent elements (issues, interests, and actors) to work together in cooperation. If various issues, interests, and actors have to function effectively, there must be institutional arrangements that enable them to work in unison. This unison could be established when actors are willing and able to work with interests and issues transparently. Constructive cooperation of various actors is possible only when a free flow of information is possible and democratic that allows linkages between IAN to develop and design a transnational governance mechanism.

By analyzing regime governance with IAN framework, we will find that issues finally become agenda, interests become essentially organized interests, and actors become stakeholders (Figure I). The important assumption in the process is that although issues, interests, and actors are interdependent, they do not have absolute control over one another.

Figure I: Process of Issues, Interests, and Actors Network

For instance, the issue of water quality of the Rhine was not primary political and social concern in the context of pre-1950 Rhine regime. The issue of navigation and
fishing quota were perceived as problems for many countries at that time. The dominant existence of international Rhine treaties on the Navigation signed in 1868 and the Salmon Treaty signed in 1885 until the 1950s illustrate that the water quality of the Rhine was not a significant issues for the Rhine Regime. Only in the 1950, the government of the Netherlands took the water quality issue as a serious agenda for international affairs and initiated the establishment of ICPR in 1950. Even though the issue of water quality of the Rhine, \textit{a priori}, existed since industrialization began along the bank of the river, no political institutions raised as this issue to be solved by means of the international cooperation until the Dutch government politicized it. The interest in the cost of purification process for the water supplies companies in the Netherlands, the Dutch government’s interest was positioned to take water pollution issues into the international political agenda among the Rhine riparian countries. As a lowest downstream country, the Dutch government has its legitimate interest to raise it to the international level. I shall now apply IAN framework to analyze the governance processes of ICPR. Before I unpack governance process of ICPR into issues, interests, and actors networks within local, national, and transnational layers, it will be useful to review a brief history and outlook of the Rhine regime.

The Rhine and Its Pollution

The river Rhine originates in the Swiss Alps where two tributaries (the Hinterrhine and the Vorderrhine) flow down and collide head-to-head at the village of Reichenau-Tamin. From that point on, the Rhine flows weaving through valleys to reach the Lake Constance. This part of the Rhine is called the Alpine Rhine. After leaving Lake Constance, the river flows down to the city of chemical industries called Basel in Switzerland. This part of Rhine is known as the High Rhine. Along the Alpine and High Rhine until it forms Europe’s largest Waterfalls called the Rhinefall at the village of Neuhausen nearby the Schaffhausen, the river is wild, active, and dynamic in its course of flow.

The Rhine is Western Europe’s largest river, with 1,320 kilometers in length, beginning from its origin in the glaciers of the Swiss Alps. It constitutes the border between Switzerland, Liechtenstein, and Austria until it reaches the Lake Constance (Bodensee). It then continues to form the border between Germany and France after leaving Basel, Switzerland to flow through a large part of western Germany, and finally crosses into the Netherlands and pours into the North Sea. The Rhine’s catchment area covers 185,000 square-kilometers and encompasses parts of Italy, Luxembourg, and Belgium. The catchment area provides habitat for about 50 million people in addition to other living organisms.\footnote{See ICPR at http://www.iksr.org/icpr/61uk.htm , accessed on September 11, 2001.}

The Rhine offers a variety of uses for human and other inhabitants in various ways. In a historical context, the Rhine is important for water transportation and it still is densely used as a shipping route with the world’s largest seaport, located in Rotterdam, at its mouth. Although the problems with the quality of water in the Rhine were already
recognized in the 15th century, it was not until 20th century that the advanced stage of water pollution in the river became clearly apparent (Wierks and Schulte-Wülwer-Leidig, 1997). Europe’s industrialization process had great impact on the Rhine ecosystem structure and quality (Figure II). By the early 1960s, the pollution of the Rhine by organic substances had lowered the level of dissolved oxygen far below normal and as a consequence, almost all-aquatic life had disappeared from the river. Other threats to the Rhine ecosystem came from chemical industries located on the riverbanks. Large amount of heavy metal compounds, pesticides, hydrocarbons, and organic chlorine compounds being discharged into the river (Wierks and Schulte-Wuer-Leidig, 1997). This obviously caused further ecological problems, notably the disappearance of native fish species and the continual deterioration of the water quality. By the end of the 1960s, the Rhine earned unflattering reputation of being the “sewer of the Europe” (Wierks and Schulte-Wuer-Leidig, 1997). The international cooperation was inevitable mechanism to solve the pollution of the Rhine.

Figure II: Evolution of Institutions and Environment in Rhine River Basin, 1828-1963


Emergence of International Cooperation

The deterioration of the Rhine’s water quality and degradation of natural resources were the obvious reasons that the Rhine’s future laid in effective international cooperation. Looking at the historical evolution of the relationship between ecosystem of the Rhine and of human inhabitants, the end of World War II marked the beginning of the Rhine’s new chapter in its history. In 1950, with an initiative from the Netherlands, the
In the 1963 Bern Convention, the ICPR was entrusted with the following tasks:

- studying the nature, volume, and origins of the Rhine pollution;
- proposing to the governments of the parties appropriate measures to control pollution;
- preparing further agreements between the government of contracting parties;
- undertaking any other task jointly entrusted to it by the governments of contracting parties; and
- drawing up a yearly report on its activities.

In 1976, the ICPR agreement was amended to enable the European Economic Community (EC, the predecessor of the EU) to join ICPR. The EC’s accession to ICPR became inevitable in view of its newly developing environmental regulations particularly in the field of water pollution within EC jurisdiction. As a consequence of the new development of an environmental regulation regime within EC jurisdiction, its member states can no longer conclude agreements with non-EC states, such as Switzerland. Therefore, EC’s participation in ICPR was important for ICPR’s future as well as for the uniformity of EC’s environmental regulation regime itself. The EC commission, since then, fully participates in ICPR and shares its costs. In matters falling under EC competence, it exerts its voting right on behalf of those of EC member states in ICPR (all ICPR states except Switzerland). However, it is to note that the EC does not function as a member state within ICPR in matters for the implementation and administration of ICPR agreements and functions since these functions are left to the member states.

There are two types of regimes designed to govern rehabilitation process of the Rhine by the ICPR. The first type is legally binding regime. Two treaties were signed by national delegations of all riparian countries in 1976. These treaties are known as 1976 Chemical Convention and Chloride Convention respectively and they were to become binding treaties after ratification by member states. Chemical convention listed 82 chemicals in black list and gray list that were responsible for pollution of the Rhine. Chloride convention targeted elimination of Chloride discharges into the Rhine especially from the Alsace Mine (Mine de Potasse d’Alsace) in France which was then responsible for 35-40% of total discharge of Chloride into the Rhine (Verweij, 2000: 84).

The second type of Rhine regime was action-oriented (non-binding or soft law) type of regime established in 1987 after the Sandoz chemical accident on November 1, 1986 at the Basle, Switzerland where the Sandoz Company’s storage building was caught
on fire. The water that was used to extinguish fire flowed into the Rhine and it killed all species and polluted the Rhine downstream from Basle. The body of water flowed all the way into the North Sea and the damage was visible to public along the Rhine. The urgency of issue of Rhine pollution got into the media. Rhine pollution issue again became a serious political agenda of all environmental ministries of member states. After series of meetings among riparian states and consultation with industrial leaders including Sandoz industry, the ICPR decided unanimously to transform the Rhine regime from legally binding regime into action oriented Rhine Action Program (RAP) regime in 1987.

**Issues, Interests, and Actors in 1976 Chemical Convention**

The aim of the 1976 Chemical Convention was to reduce the pollution of the Rhine by gradually eliminating discharges of hazardous chemical elements including heavy metals from chemical industries, community sewage systems, and agricultural sector. The means of achieving these goals was to identify a black and a gray list of chemical elements based on the urgent need to reduce the polluting chemicals that were to be regulated. Black list was to include most toxic chemical substances and to be dealt in urgency to reduce discharge into the Rhine. The gray list was to include chemical substances that were less toxic but still need regulation. However, the implementation was met with difficulties.

At the transnational level within three decades of emergence of ICPR regime, the key issue was building trust among national delegations. Trust building among the member states took enormous amount of time and efforts according to Mr. Pieter Huisman, a former Secretary of the ICPR, who was actively involved and served as its Secretary from 1976 to 1981. Another important factor as to why the 1976 Chemical Convention was not successful was the lack of political will at the national level because the issue was perceived as international issue. Environmental issues at that time were not so important to the national economies while the industrialization was at its peak for building stronger economies in member countries. According to Mr. Huisman, getting all countries to come together at the meeting and to discuss the Rhine pollution was already significant enough at the beginning. However, this happened not entirely due to the national will but local “pressure groups” who were key players in raising issues of the Rhine pollution publicly at least in domestic level especially in the Netherlands.

Another issue at the negotiation meetings was the issue of whether the industries were capable, in terms of resource and technology, to comply with regulations to implement pollution reduction aimed by the Chemical Convention. The effluent limit regulation was applied to reduce discharge of pollutant chemicals. The effluent limits set the maximum allowable limit to the content of pollutant chemicals in the discharged wastewater from industries. This is different from the general water quality standard. If industries were to discharge wastewater into the Rhine, that contains pollutant chemical more than effluent limit, the effluent fee is accessed. For many industries, paying that effluent fee was not a major issue (Verweij, 2000: 116). However, the major issue was

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7 Personal interview with the author on July 5, 2001.
the capacity to reduce content of pollutant chemicals entirely. For ICPR, pressured by the downstream country, the Netherlands, the solution was not in accessing effluent fees but in cleaning the River Rhine by reducing discharge of 82 listed chemicals.

Meanwhile, German delegation was suggesting establishment of EU wide water regulations (Verweij, 2000: 83) because it has the largest industries base along the Rhine that were responsible for chemical pollution (Bernauer and Moser, 1996: 392). The sensible reason is that the German industries were behind the German delegation to establish EU wide standard. If the effluent limit applied only to the Rhine basin industries, they would be at a disadvantage to other EU chemical industries in the common market, which were not in Rhine basin areas, such as the British chemical industries (Dieperink, 1995; Bernauer and Moster, 1996: 392, Verweij, 2000: 83). Therefore, the EU regional approach was discussed. This analysis makes sense further when one contemplates as to why then European Community joined ICPR as a full-fledged member in 1976. Because EU became a member of the ICPR, it was feasible to discuss the regional approach for effluent limit as suggested by the German delegation. Analyzing 1976 Chemical Convention with IAN framework as illustrated in Table I, it is obvious that the issues, interests, and actors in three layers are disconnected and they were not linked as a network in the governance processes. Particularly obvious factor is that the key actors in three layers do not structurally acknowledge the importance of cooperation in the governance processes. As a result, the implementation of 1976 Chemical Convention faced obstacles.

Table I: Issues, Interests, and Actors Network in Chemical Convention

<table>
<thead>
<tr>
<th>Institutional Layers</th>
<th>Issues</th>
<th>Interests</th>
<th>Actors</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transnational</td>
<td>Chemical pollution of the Rhine (83 in black list)</td>
<td>Downstream pressure</td>
<td>ICPR</td>
</tr>
<tr>
<td></td>
<td>Building international cooperation</td>
<td>Cost of effluent limit</td>
<td>Germany and Switzerland</td>
</tr>
<tr>
<td></td>
<td>Industrial compliance</td>
<td>Regional approach for cost sharing</td>
<td>The Netherlands</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>National Delegations</td>
</tr>
<tr>
<td>National</td>
<td>Lack of political will</td>
<td>Cost of regulation</td>
<td>Ministerial</td>
</tr>
<tr>
<td></td>
<td>Lack of trust to other member states</td>
<td>Pressure from chemical industries</td>
<td>Municipal</td>
</tr>
<tr>
<td></td>
<td>Perceived as international problem</td>
<td>Pressure from water supply companies (the Netherlands)</td>
<td>Industries</td>
</tr>
<tr>
<td>Local</td>
<td>Drinking water supply</td>
<td>Cost of compliance</td>
<td>Chemical industries</td>
</tr>
<tr>
<td></td>
<td>Public health</td>
<td>Cost of drinking water</td>
<td>Water supply industries</td>
</tr>
<tr>
<td></td>
<td>Sewer image</td>
<td>Health risk</td>
<td>Communities of interests</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Recreation</td>
<td>Local NGOs</td>
</tr>
</tbody>
</table>

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The 1976 Chemical Convention eventually stalled due to the conflict that arose out of Chloride pollution between the Netherlands and France in 1979 when the Netherlands called back its ambassador from Paris for consultation (Verweij, 2000: 84). However, the major reason for failure of the 1976 Chemical Convention is that all the relevant issues, interests, and actors were not in the whole process of the negotiation and implementation. Neither NGOs nor the industries were invited and regarded as important actors in the process at national and transnational layers. ICPR regime was functioning with state-centered approach as if states were the most important players in the transnational environmental governance. In addition, the binding nature of regime design was an indicator that member countries did not trust each other or there would have been serious free-rider problem if it were to be structured in non-binding nature. A lesson from the 1976 Chemical Convention is that the environmental governance cannot be successful without participation of all relevant issues, interests, and actors across three layers of regime.

Issues, Interests, and Actors in 1976 Chloride Convention

The main agenda of the Chloride Convention focused on the Alsatian mine company in France, which was responsible for 35 to 40 percent of the total discharge into the Rhine. The chloride (salt) discharges were especially harmful to the interest of several Dutch water companies, flower growers, and the port of Rotterdam as a result of salinization caused by the chloride. Therefore, the Chloride Convention focused on the discharge of chloride from the Alsatian Mine. According to the negotiated treaty, the discharges of the mine company were to be cut by 60 kg/s in three phases. In this process, the salts that were not discharged into the Rhine were to be injected into the Alsatian earth. The estimated cost was 132 million French francs. The agreement was that the Netherlands would finance 34 percent of the project, Germany and France would each pay 30 percent of the costs, and the Switzerland would pay remaining 6 percent. For a number of years, French government was reluctant to consider Alsatian salt and the Rhine issue into the agenda of national parliament for ratification. French government faced two issues at the national parliament. The first was the rising unemployment in France and the second was the labor-strikes in Alsatian mine. As a result, France was unable to honor the agreement. This condition caused direct conflict with the Netherlands as it was facing heavy pressure from local water supply industries, farmers, and the port of Rotterdam. The Dutch government recalled its ambassador from Paris in 1979 as a sign of diplomatic urgency and consultation. The relationship between France and the Netherlands reached to the high level discontent in light of the Chloride Convention.

The 1976 Chloride Convention is the least favorite topic that leaders of ICPR today want to talk about. When asked about the 1976 Chloride Convention, the current deputy Secretary of the ICPR, 8 indicated it as “the worst experience” of the ICPR regime because it caused many other obstacles for other important issues that are far from

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8 Personal interview with the author on July 25, 2001.
chloride issue. As if the whole ICPR regime was stalled, no other issues were possible to discuss due to intense conflict on chloride issue. The key problem once again was the lack of political will within member states, especially in France. On top of that, low levels of trust and cooperation among the member states and non-state actors alike were also the reasons for difficulties. Similar to the experience of the 1976 Chemical Convention, IAN framework analysis (Table II) finds that the issues, interests, and actors across layers of ICPR regime were not linked to one another. The disconnection can be clearly detected as the transnational layer is dominated only by state delegations and ICPR. This lack of dynamic processes of network of IANs across all layers obviously caused difficulties in implementation of the 1976 Chloride Convention.

Table II: Issues, Interests, and Actors in 1976 Chloride Convention

<table>
<thead>
<tr>
<th>Institutional Layers</th>
<th>Issues</th>
<th>Interests</th>
<th>Actors</th>
</tr>
</thead>
</table>
| Transnational        | •Conflict between NL and FR  
                    •International cooperation  
                    •ICPR’s role challenged | •Cost of operation  
                    •Downstream pressure  
                    •Defining responsible party to pay for cleanup | •ICPR  
                    •France  
                    •The Netherlands  
                    •National Delegations |
| National             | •Lack of political will  
                    •Unemployment in labor strike in France  
                    •International problem | •Damage to farm land  
                    •Pressure from water industries  
                    •Pressure from Alsatian mine workers  
                    •Faith of ICPR regime | •Diplomats  
                    •Ministries  
                    •Municipals  
                    •Water supply and mining industries |
| Local                | •Drinking water supply  
                    •Public health  
                    •Agriculture | •Cost of water purification  
                    •Loss of agricultural land from salinization in NL | •Local farmers  
                    •Alsatian mining industry in FR  
                    •Water supply industries in NL  
                    •NGOs |

**Issues, Interests, and Actors in the Rhine Action Program**

The historic transformation for the ICPR regime’s further development as an effective transnational regime was perhaps sparked by the Sandoz chemical accident. Former Secretariat of the ICPR, Mr. Pieter Huisman in an interview, called Sandoz spill as a “gift from the heaven” in terms of raising awareness of the seriousness of the rehabilitation of the Rhine. This disaster received large press coverage, and the ICPR
parties reacted swiftly. On November 12, 1986, the ministers jointly held meetings and assessed the remedial process. At the same time, Sandoz’s chief executives joined the ministerial meeting and explained what went wrong. As the incident triggered a wave of publicity in all the countries bordering the Rhine, political attentions was altered and within a very short-time leading to more than three ministerial conferences addressing the issue of the Rhine pollution. The Sandoz accident in 1986 set a “policy window” for ICPR to transform the regime from legally binding nature to the action-oriented nature (Dieperink, 2000: 350).

The combination of political opportunity, the Sandoz accident, the pre-existence of an institutional framework, and the extensive and responsive preparatory work carried out by the ICPR laid the foundation for the emergence of the Rhine Action Program (RAP). The Rhine Action Program for Ecological rehabilitation had the following four goals to be attained by the year 2000:

- the Rhine ecosystem should be improved to such an extent that higher species, such as salmon and sea trout, return to the Rhine;
- the production of drinking water from the Rhine must be guaranteed for the future;
- the pollution of river sediments must be reduced to such an extent that at any time sludge may be used for land fill or may be dumped at sea; and
- the improvement of the ecology of the North Sea must be a requirement of the North Sea Program.

RAP’s first goal, enabling the return of species such as salmon, is perhaps the most ambitious of its four goals since salmon are migratory fish and require different river habitats for spawning, nursery, and migration. The return of salmon is further complicated by the fact that they require unobstructed passage in the river for upstream migration, a condition that has been eliminated due to the weirs, locks, and dams regulating the river. Salmon are also dependent on river species that require varied habitats and are sensitive to pollution. Therefore, the reintroduction of the salmon presupposes high water quality and restored hydrological and morphological conditions (ICPR, Rhine Action Program). Since the return of salmon requires the restoration of a complex set of conditions, the ICPR has elaborated on its first goal in the Ecological Master Plan for the Rhine. The salmon was the symbol of the Rhine Action Program as it launched slogan of “Salmon 2000” denoting the salmon to return into the Rhine by the year 2000.

Table III: Issues, Interests, and Actors Network in the Rhine Action Program

<table>
<thead>
<tr>
<th>Institutional Layers</th>
<th>Issues</th>
<th>Interests</th>
<th>Actors</th>
</tr>
</thead>
</table>
| Transnational        | • Transparency of all Rhine issues  
• NGOs participation and public education  
• Monitor member states’ | • Ecological loss  
• Revitalization of the Rhine ecosystems  
• To maintain and increase coordination | • ICPR  
• EU  
• National Delegations  
• Local NGOs |
In the formulation and implementation processes of RAP, the participation of all relevant actors in the Rhine basin was invited and their important roles were recognized. The analysis of RAP by applying IAN framework shows that the ICPR regime as a whole improved its mechanism of governance by incorporating actors across all layers to share information and to comment on program implementation processes. As we can see in Table III, actors from local layers were incorporated into national and transnational layers in RAP formulation and implementation processes at least by opening the door to local industries, NGOs and participants to comment on the work of ICPR. These linkages among actors are clearly reflected in linkages among issues and interests. The issues and interests of local, national, transnational layers are linked in RAP as opposed to the previous two legally binding regime. For instance, ICPR regime recognizes the fact that the implementation of reduction of chemical pollution in the Rhine requires participation and resources capacity of local industries and non-governmental organization in RAP. With this realization, local and non-state actors were encouraged to participate in various working groups of RAP. Therefore, in Rhine’s history, the RAP is the first of its regime type that begin to enhance the fit of regime to economic, political, and social contexts within which ICPR operates.

After agreeing to decentralize the working nature of ICPR under RAP, member states are required to report progress to ICPR annually. The implementation of RAP was to be self-executed by member states although ICPR secretariat may referee when states fail to produce annual report or progress. As a way to serve as referee, ICPR made these national reports available to public, media, and NGOs so that public awareness and participations can be promoted to achieve democratic solutions. For the solution to solve reduction of discharges of different pollutant chemicals, RAP identified 22 chemicals as priority pollutant chemicals to be reduced significantly from discharging into the Rhine (Statusbericht Rhein, ICPR Publication, 1991:118-119; Verweij, 2000: 115). For the physical barriers to the fish passage in the Rhine, the rule was made that the weirs and locks have to be reduced the size to open at least six to ten feet wide area in addition to navigation route. None of the rules agreed under RAP were binding at the transnational level, national governments were responsible to carry out the implementation of the
agreed rules. By decentralizing as such, national governments were held responsible at
the court of public opinion and non-government watch groups. However, ICPR has
authority to make rule-changing and recommendations as needed and requested by states
following specific procedures such as a state can request for delay to produce annual
report. All of these rules are made by consultations with scientists, consulting firms, and
inputs from industries.

In the decision making of Rhine Action Program, ICPR cannot take any legal
actions if states fail to comply with ICPR soft law or rules that are prescribed to
implement. ICPR however can issue in annual reports categorizing which countries are
meeting the target they agreed to implement the rules they agreed in prescriptions. ICPR
again can serve as referee if states or industries are not complying with prescribed rules
by way of press release, announcements, reports, and recommendations. In fact ICPR is
now legally assigned to do such kind of monitoring (Article 2 of Bern Convention, 1999).
However, states can take legal actions against industries and individuals if they fail to
comply with effluent limit. The assigned agency or department, that is responsible for
monitoring implementation of RAP programs, has to issues warning to industries if they
fail to comply with domestic regulations. Meanwhile, drinking water industries also use
public shaming methods against chemical industries if upstream chemical industries were
cought in their water quality monitoring stations and if those industries fail to corporate
and comply with the requests. According to Dr. Stoks of WRK in the Netherlands, their
monitoring stations capture water from the Rhine at almost real time and can analyze the
content of chemicals in the water. Thus they are able to determine which chemicals come
from what upstream industries. When they find unusual increase in amount of pollutant
chemicals from a specific upstream industry, they would directly contact the upstream
industries and persuade to take action before going through formal channel of national
delegations and ICPR to solve the issue. When asked what the downstream water
industries would do if upstream industries fail to respond to their communication and
request, Dr. Stoks responded that they would issue press release and publish the findings
in the media so as to get attention of upstream industries. At the same time, the drinking
water industries also recognize upstream chemical industries that strive to achieve
eventual cleanup of the Rhine by improving technology or spending resources. For
instance, in 1992, the IAWR recognized a German chemical industry AG Bayer by
publicly issuing recognition award for its contribution to the restoration of the Rhine

ICPR as a whole however is responsible for maintaining at least eight monitoring
stations that watch pollutant chemical content in daily basic at each station from which
water is taken and examined in assigned labs to separate chemicals and to determine
sources of them. If these monitoring stations find specific chemical suspected from
particular industry, ICPR then can inform member state where the industry is located.
The member state’s assigned agency has to carry out issuing warning or taking action.
Member states are also responsible to make sure the right staffs are hired to carry out the
job; appropriate resources are allocated to be able to carry out execution of
implementation. ICPR cannot prescribe exactly how much a state must spend on

9 WRK stands for Watertransportmaatschappij Rijn-Kennemerland. It is a Dutch Water Supply industry.
10 IAWR stands for Internationale Arbeitsgemeinschaft der Wasserwerks in Rheineinzugsgebiet. IAWR is
the umbrella organization of drinking water supply industries in which WRK is a member.
monitoring activities of 22 priority chemicals. Coordination and cooperation among various actors were increased in RAP as issues and interests of actors are recognized by the ICPR regime.

By 2000, the success of the RAP was reported. The UNESCO Courier in June, 2000 called the success of RAP as the “Miracle of the Rhine,” reporting the findings of scientists that salmon and other species of fishes had returned the Rhine’s water (Weber, 2000). Long before, some scholars have already made positive appraisals of RAP in achieving its goals (Dieperink, 1995, Bernauer and Moser, 1996: 389-390). The environmental medias watching the ICPR’s programs reported RAP as a “model for future,” (Glass and Snyder, 1996). Salmon were reported to have found in the Rhine water again as early as 1994. The European Union which is a member of ICPR issued a water directive in July 2000 being inspired and modeled after the success of RAP. All of these appraisals were encouraging to the ICPR states and the Secretariat in Koblenz.

**Rhine Governance and ‘Problem of Fit’**

The illustrated experiences of transnational environmental governance in the Rhine support the fact that partial answer, if not total answer, to the question of why previous two legally binding regimes – 1976 Chemical and Chloride Conventions – failed in achieving the stated goals is the lack of interconnectedness and institutional linkages among issues, interests, and actors across three layers. The Rhine Action Program transformed (not replaced) the two legally binding regimes into a mechanism of governance that opened up the door to the participations of various relevant actors. The Rhine Action Program fits better to the political, social, and economic contexts within which it operated. Previous two legally binding regimes did not fit the structure of problem contexts of the Rhine regime because they ignored important issues, interests, and actors from especially local layers as we have observed in IAN framework analysis. As a result, the previous two regimes failed to achieve the goals they address which is the clean up of the Rhine.

The empirical evidences found in the experiences of the Rhine highlight the importance of enhancing wider participation of relevant actors. The institutional arrangements that are designed to address environmental problem need to fit human system that is they have to enhance wider participation among relevant actors and stronger institutional linkages across layers. At the same time they have to achieve the goals to fit biogeophysical system. According to the empirical evidences we found in the governance of the Rhine Action Program, the institutions that fit human system tend also fit biogeophysical system they address. Meanwhile, the institutional arrangements that do not fit human system failed to fit biogeophysical system as we found in the case of 1997 Chemical and Chloride Convention regimes.

**Conclusion**

The experience of the International Commission for the Protection of the Rhine (ICPR) in governance of transnational environmental resources illustrated above provides
rich lessons for how we might enhance the fit between institutions and environment. It is important that institutions fit economic, political, and social contexts. The institutions then can achieve the fit to biogeophysical systems they ultimately try to address in environmental governance and sustainable use of natural resources. The preliminary findings from the Rhine suggest that the first part of fit to human system can be enhanced by promoting and providing political and legal contexts in which all relevant actors can participate in decision making and implementation processes. IAN matrix tables demonstrated in analysis of the Rhine above can be used as a map for management and to study the enhancement of governance and the achievement of sustainability by detecting linkages among issues, interests, and actors across layers of governance. I would argue, would reservation on generalization, that the dynamic presence of IANs in each layers of transnational environment governance is crucial to the success of the regime in carrying out the goals and to achieve sustainable use of natural resources that the environmental regime eventually aim to address. As practitioners, managing the linkages among IANs across all layers will be important task in achieving the goals of transnational regime. As theorists, ignoring the IANs in analysis of transnational regime such as ICPR will lack crucial empirical evidences that connect to the theoretical understanding of how institutions fit both human systems and biogeophysical systems they address.
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