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Title: Towards determining common interest: mapping social context in order to develop large-scale watershed planning and management policies.

Abstract: For the past thirty years the international environmental movement has been calling on nations to address the global environment crisis and the global water crisis by implementing policies to address and reverse unsustainable development practices. In attempts to develop integrative approaches to managing land, water and ecological resources, national policies for water resource management are increasingly recognizing large river basins as the appropriate management unit. Many developing countries are now in the process of reforming laws and restructuring governmental institutions in order to plan and manage natural resources at the watershed level. The move to large-scale watershed management presents special challenges, as the geographic area comprising the basin will inevitably contain a vast social landscape of competing interests and political boundaries that dictate past and present water resource use. The São Francisco River Basin, which crosses Brazil's water-scarce Northeast, is one such socially complex region where uncontrolled water use has led to environmental degradation and conflicting water usage. The Brazilian Government is currently developing an Integrated Watershed Management Plan for the Basin. A detailed understanding of the social context driving water use within the basin should be considered a necessary element of this planning process. The policy sciences methodology for mapping the social context of a national resource problem is applied to the São Francisco River Basin. A controversial plan to divert the river is used as the overlying conflict. Findings suggest that the multiple participants lack awareness of others participating at the watershed level, especially with regard to the broad participation of civil society organizations and the significance of international participation. Recommendations for improving the planning process include the development of an updated and comprehensive map of the social context and the recognition of the myths used by different interest groups as they seek to advance special interests. Civil society organizations involved in the planning process are encouraged to seek linkages with groups operating outside the basin that express similar values with regard to water and natural resource use.

Keywords - Latin America, Brazil, São Francisco River Basin, Water Resource Management, Policy Sciences

Advances in ecology have revealed the physical unity within a watershed prescribed by the intimate interactions of climate, water, soils, topography, geology, flora and fauna. Changes to

any one factor will cause reactions that can be measured within the water system – such as water quality, discharge, and sediment load.[1] Natural resource managers have used the ecosystem idea –which considers the ecological community and its physical environment as a unit – as justification for the coordination of land and water management. While the term ecosystems has been used to describe interactions within various geographic boundaries, in the field of water resource management the watershed has come to be recognized as the appropriate unit for integrated ecosystem management.[2]

Since the 1970's the global community has been experiencing the environmental consequences of industrialization and rapid population growth in a variety of ways that illustrate the intrinsic link between land and water use. Some of these include: loss of crop yields due to soil degradation; groundwater depletion; more severe droughts/ flood cycles due to erosion and deforestation; habitat and biodiversity loss; deteriorating wetlands, flood plains and coastal ecosystems due to damming and diversion of water and changing land uses; and climate fluctuations caused by global warming. Water quality is declining while demand for water increases along with urbanization and irrigation-dependent agriculture. The international community now acknowledges that we are in the midst of an environmental crisis and at the brink of a global water crisis.[3]

At the 1992 Earth Summit the international community addressed the environmental crisis by outlining a strategy for sustainable development. Chapter 18 of Agenda 21 called for the integrated management of land, water and ecosystems on a basin or sub-basin scale. Ensuing

[1] Hubbard Brook experiments.
[2] Teclaff 379.

international conventions represent global commitments by countries to implement policies aimed at reversing the course of environmental degradation.[4] River basin management was specifically mandated and funded by the 1995 "Washington Declaration" which adopted the Global Program of Action for the Protection of the Marine Environment from Land-Based Activities (GPA).[5] Under the GPA mandate countries are able to request international assistance in order to address land-based activities that affect coastal waters and transboundary rivers and wetlands.[6] Water-related projects most of which involve some aspect of river basin management and water policy reform are underway in 131 countries.[7]

The trend towards large-scale watershed management is worldwide phenomenon. Many European countries- including Spain, Italy and France - have adopted watershed planning and management as part of domestic policy. Russia, Ukraine, Poland, Hungary, Slovakia, Vietnam and some Latin American countries have followed suit, adopting various versions of the French model for watershed management.[8] Water reform is on the agenda for a host of developing countries as well. Many developing countries are now in the process of reforming laws and

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[3] Duda and El-Ashrey 115-117.
[4] Conventions include the Convention on Biological Diversity, the UN Framework Convention on Climate Change, the UN Convention to Combat Desertification and the UN Convention on the Law of the Sea. Add years??
[5] Teclaff 371
[6] The UN financing entity for environmental projects is the Global Environment Facility (GEF). GEF implementing partners are the World Bank, the United Nations Environment Program (UNEP) and the United Nations Development Program (UNDP).
[7] For a list of GEF Projects related to water resources see GEF website: http://www.gefweb.org/meetings/WaterForum/International%20Waters.pdf also get UNDP data from Brad Gentry.
[8] The French Ministry of the Environment has established a worldwide network of river basin organizations. Particpating countries include: Algeria, Argentina, Australia, Bolivia, Brazil, Canada - Québec, Chile, Colombia, Spain, Russian Federation, France, Hungary, Indonesia, Italy, Jordan, Kazakhstan, Kenya, Latvia, Morocco, Mexico, Uzbekistan, Panama, Peru, Philippines, Poland, Czech Republic, Rumania, and U.S.A. See website at: http://www.inbo-news.org/friobang.htm

restructuring government institutions in order to plan and manage natural resources at the watershed level.[9]

The move to large-scale watershed management presents special challenges, as the geographic area comprising the basin will inevitably contain a vast social landscape of competing interests and political boundaries that dictate past and present water resource use. The Sao Francisco River Basin, which intersects Brazil's water-scarce Northeast, is one such socially complex region, where uncontrolled water use has led to environmental degradation and conflicting water usage.

The Sao Francisco, Brazil's third largest river, crosses five Brazilian states and empties into the Atlantic Ocean. Its watershed, encompassing 640,000 km^2, forms 8% of Brazil's total land area, an area comparable to the drainage basin of the Colorado River in the U.S. A controversial federal plan to divert part of the river to the semi-arid North of Brazil recently sparked a massive public campaign decrying the diversion plan and demanding the revitalization of the river. Civil society organizations celebrated victory in July of 2001 when President Henrique Cardoso announced the abandonment of the diversion plan and designated funding for a new federal initiative, the "Plan to Conserve and Revitalize the Sao Francisco River".

The Brazilian government, with assistance from the UNEP, is currently developing an integrated watershed management plan for the Sao Francisco River Basin. The basin has been selected as the demonstration project for the implementation of the GPA in Latin America.[10] The

[9] add list of countries or reference to UNDP web site??
[10] UNEP 2001

development of the integrated management plan is proceeding through the implementation of 30 pilot sub-projects. These projects are gathering scientific and social information about specific sections of the watershed, conducting feasibility studies and promoting public participation and involvement in the planning process.[11] Given the magnitude and social complexity of the Sao Francisco watershed, policy makers, such as those involved in the development of the integrated watershed management plan, as well as the numerous stakeholders within the region, would benefit from an analytical methodology that would allow them to grasp a "big picture" of the present situation.

The policy sciences provide a methodology for analyzing and mapping policy processes and are particularly effective in addressing such complex policy problems. Developed over fifty years ago by Harold Lasswell and colleagues at the Yale Law School, the policy sciences evolved from research in many disciplines – including anthropology, law, political science, and sociology. A policy science perspective describes the foundation of all policy as "the ongoing interaction of people in their efforts to achieve what they value". [12] Adherents of the policy sciences define the function of governance in a democracy as the "clarifying and securing of the common interest through policy decisions."[13]

Originally conceived of as general guide for the shapers of U.S. public policy in Washington[14], the interdisciplinary problem-solving method outlined by the policy sciences has been applied worldwide to problems in multiple policy arenas including natural resources, social service,

[11] Personal conversation with Jorge Rucks, Area Chief for Latin American Region II, Unit for Sustainable Development and Environment, Organization of American States (OAS). The OAS, under contract with the UNEP, is in charge of the execution of the Integrated Watershed Management Plan.
[12] Clark 8

science policy, communications, war, revolution, human rights, international law and national defense.[15] Within the field of natural resource policy, applications include planning for species and ecosystem conservation, environmental health policy, protected lands management, endangered species protection, participatory planning among others. [16]

We believe that the application of the policy sciences framework could provide valuable information to those involved in carrying out large-scale watershed planning and management. The Sao Francisco River Basin was selected as a case study for applying the policy sciences methodology to a complex watershed planning process. For purposes of this study, we restricted our analysis to just one aspect of the policy sciences framework - the social process - and present a map of the social context of the Sao Francisco River Basin. Based on our results, we then make recommendations to those involved in the planning process.

Methods

The following table describes the elements and questions involved in social process mapping:

Element	Questions to Ask
Participants	Who is participating? (Individuals, Groups, and Institutions) Who would you like to participate? Who is demanding to participate?
Perspectives	What are the perspectives of those participating? Of those you would like to see participate? Of those making demands to participate? What would you like their perspectives to be? Perspectives include: Demands – what participants want Expectations – or assumptions about past and future Identifications – or on whose behalf are demands made
Situations	In what situations do participants interact? In what situations would you like to see them participate?

[13] Brunner 18 Should I cite to a journal article instead of here??
[14] Did I made this up?? ☺
[15] Clark 8 - should I list all citations???
[16] Clark – fields selected from case studies presented in book.

	Ecological or geographic information, Temporal dimension Institutionalization, Crises or intercrises
Basic Values	What assets or resources do participants use in their efforts to achieve their goals? All values, including authority, can be used as bases of power. What assets or resources would you like to see participants use to achieve their goals?
Strategies	What strategies do participants employ in their efforts to achieve their goals? What strategies would you like to see used by participants in pursuit of their goals? Diplomatic (negotiation), Ideological (ideas), Economic (goods), Military (arms)
Outcomes	What outcomes are achieved in the continuous flow of interactions among participants? Who is indulged in terms of which values, Who is deprived?
Effects	What are the new value-institutions, if any? Are new practices put into place? Are old practices maintained? What forces promote new practices? What forces restrict new practices?

Source: Lasswell 1971, Willard and Norchi 1993 in Clark 2002.

The policy sciences allow for data to be gathered on social processes from multiple sources. Methods are similar to social science descriptive qualitative methods and rely on interviews, participant observation and archival and document analysis.[17] The above table served as a guide for data collection. The author collected data from multiple sources about each of the elements listed above for the purposes of answering the corresponding questions. For the purpose of interviews a survey was developed adapting the questions from the table to the specific case of the Sao Francisco River Basin (for English translation of questionnaire see Appendix A). The author conducted 14 interviews in Brazil during July and August of 2002. For a list of groups interviewed see Appendix B. Other sources used included academic papers, government documents, newspapers, interest group propaganda, Internet websites, magazine articles, technical reports, court documents, books, maps, pamphlets, letters, newsreels, telephone conversations, charts and tables.

[17] Isaac and Michael 218 check this source! Taken from Cromley dissertation.

Triangulation was the principle method employed in the validation and analysis of data. The author used three types of triangulation – data, methodological and interdisciplinary triangulation.[18]

Mapping Social Context: Revealing the Social Dynamics dictating Water Resource Use in the Sao Francisco River Basin

The following does not assume to be an exhaustive or complete map of the social context of the Sao Francisco Watershed, but instead seeks to serve as a model to illustrate how one may choose to apply the social process framework to a large-scale watershed for the purpose of policy making. It is also hoped that the information presented will serve to motivate (inspire?) those involved in (development of the Integrated Watershed Management Plan for the Sao Francisco River Basin) the policy process to better inform themselves about the complex social arena within which they operate.

Element 1: Participants

Participants identified are restricted to those individuals, groups and institutions having a significant influence at the level of the entire watershed. Participants are divided into three social sectors: government, business and civil society. Participants originated from five different levels of geographic influence (or political jurisdictions?): international, national, watershed, state and local. Interviewed participants identified most of the participants but some, particularly

[18] Janesick 214-215

\the international participants listed, were identified from other sources.

Table 1 lists participants according to social sector and political jurisdiction:

Table 1.

	Government	Business	Civil Society
International	UNEP Organization of American States US Bureau of Reclamation	World Bank Interamerican Development Bank Japan Bank for International Coop.	International Rivers Network NGOs - environ. and dev.
National	National Water Agency Nat. Sec. of Water Resources Ministry of the Environment Ministry of National Integration Ministry of Culture Brazilian Institute for the Environ. Revitalization Proj. Steering Com. Ministry for the Public Powerful Individuals: Sen. Antonio Carlos Malgalhoes Sen. Francisco Bezeirra Pres. Luiz Inacio Lula da Silva	Brazilian Agricultural Research Comp. Professional Associations	Rural Workers Unions (Contag) Catholic Church (and others) Movement of those affected by Dams National Assoc. for Indigenous Action
Watershed	SF River Basin Committee SF Valley Hydroelec. Co. CHESF SF Valley Devt Co.-Codevasf Powerful Individuals - Theodomiro	Manoel Novaes Institute Irrigation Buisnesses Fish farming Business	SF River Basin Committee Permanent Forum for Defence of SF Environmental NGOs Irrigation Associations Water users in General
State	State Governments State Secretaries of Water State Environmental Agencies Universities Powerful Individuals - State Reps: Edson Duarte, Wellington Diaz	Minas Gerais St. Energy Co. Minas Gerais Auto Industry Minas Gerais Federation of Merchants, Industry, Agri & Service	Environmental NGOs Development NGOs
Local	Municipalities Urban Centers (Prefecturas) Prefect - Belo Horizonte, Fortaleza	Industry Tourism Groups Miners Fishermen Organizations Irrigation Associations	Riverside Communities Rural Farmers, Workers Fishing Communities Navigators Indigenous Groups

Element 2: Perspectives

(determine the perspectives of the participants, identities, expectations and demands, also myths and counter myths)

Identities

The presentation of participant identities assumes identification by association. That is a participant provides information about their own identity by revealing the social context within their perceived environment. For example, the Ministry of the Environment, when asked to identify groups with influence on water use in the basin, revealed its strict association with other government agencies and a more distanced relationship with civil society organizations.

The matrix presented in Table 2 shows the groups participants identified as having an influence or interest the use of water in the Sao Francisco Watershed. The x's mark what participants were identified by the sources consulted. The matrix indicates that most groups are not aware of the full spectrum of participants involved at the basin level.

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Participants	SFWC	CPT	ANAI	GBA	C'vasf	CHESF	MMA	IBA	IJN	CRS	UFPE	MIN	ANA	EMB	other sources
Federal Government Agencies	X	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Watershed Level	X			x		x	x	x			x	x	x		x
State Governments	X	x				x	x				x	x	x	x	x
Local Government						x					x	x	x	x	x
Civil Society Organizations	X	x	x	x				x	x	x	x	x	x		x
Unions	X	x		x						x		x	x		x
Universities	X								x	x	x		x	x	x
Urban Centers (Prefecturas)	X			x				x		x		x	x	x	x
Powerful Individuals				x						X		x			x
Underrepresented Populations	X	x	x	x	x	x	x	x		x	x	x	x	x	x
International		x	x	x						x		x			x

Sources:	Title of Person Interviewed:
1 - São Francisco Watershed Committee	President
2 - Catholic NGO - Comisão Pastoral da Terra	Director
3 - Indigenous NGO - Asociação Nacional de Ação Indigenista	Director
4 - Environmental NGO - Grupo Ambientalista da Bahia	Executive Coordinator
5 - São Francisco Valley Development Company	Environment Coordinator
6 - São Francisco Hydroelectric Company	Coordinator of Executive Advisory Committee
7 – Ministry of the Environment	Viceminister, also Exec. Sec. of Committee overseeing the River Revitalization Project
8 – Brazilian Institute for the Environment	Coordinator of Water Resources
9 – Federal Research Center for Northeast - Instituto Joaquín Nabuco	Principle Environment Researcher
10 – International NGO - Catholic Relief Services	Program Manager for Semi-arid Region
11 - Federal University of Pernambuco	Coord. of Water Resource Group, Research Prof.
12 - Ministry of National Integration	Minister and National Coordinator
13 - National Water Agency	Director
14 - Brazilian Agricultural Research Company	General Manager
15 - Other sources consulted include newspaper and journal articles, websites, technical reports, legal documents, promotional publications, maps, letters, bulletins, books, and magazines.	

Expectations

Anti-diversion:

"The last twenty or thirty years have reeked enough havoc on "Old Frank". Clearcuttings, pollution from industrial waste and toxins from agricultural chemicals, irrigation mega-projects to promote high value exports crops, extensive single stand eucalyptus plantations, large dam construction, combined with a lack of an educational policy promoting preservation, have altered the natural cycles of ebbs and flows "cheias e vazantes", difficulted fish reproduction, impeded the natural irrigation and fertilization of land and allowed the proliferation of epidemics."
---Edson Duarte Bahia State Representative (Green Party)

"The São Francisco hás no water to give. Diversion, Were against it. Look, the region needs water for 2 million irrigation farmers."
- José Theodomiro de Araújo, President Sao Francisco Water Committee

Pro-diversion…

Demands –

Antidiversion
Increased participation, abandonment of diversion plan, revitalization of the Sao Francisco, reforestation, improved sanitation,
Prodiversion
Government response to problem of water scarcity in the Northeast
Energy and water for irrigation and urban centers

Myths used to support diversion

a. Diverting the river north will solve water problem in Northeast
b. Water is not a scarce resource in Brazil, it is only scarce in the North

c. Northern states deserve diversion – its been promised to them for a century.

Myths used to argue against diverision

d. Sao Francisco is the national river of unification – the history of the river is the history of Brazil, the river was the "road" to conquest of the Brazilian interior
e. River is the source of life for the Sertão "cowboy", frontier zone
f. Counter myth: Water is a scarce resource that should be protected

Element 3: Situations describe the situation and how it affects the participants, zones of interaction, sequence of events, existence of any crisis

After its discovery by Américo Vespúcio in 1501 the Sao Francisco River served as both lifeline and highway for the Portuguese colonization of Brazil's interior. The river has continued to play an important role in the development of Brazil and carries the title "the river of national unification" due to its position as the only major river located entirely within the State of Brazil. The Sao Francisco winds through five states, forming in the highlands of the central state of Minas Gerais and arching 2,700 km across the northeastern states of Pernambuco, Bahia, Alagoas and Sergipe. Development within the Sao Francisco River Basin is concentrated in and around the urban metropolis of Belo Horizonte, where 4.1 million of the basins 14 million people are located.

The hydroelectric potential of the Sao Francisco was developed through a series of large dam constructions beginning in 1954 and continuing until 1994. The current 10,356 MW capacity of hydroelectric plants along the river supplies electricity to the entire Northeast and parts of Central Brazil. The Sobradinho Reservoir- incidently the world largest artificial lake – was created in 1979 upon completion of the Sobradinho Dam and has since supported the development of a powerful fruticulture economy. Irrigation programs in the semi-arid region proximate to the reservoir were initiated by the Sao Francisco Development Company, a government corporation modeled after the U.S. Tennessee Valley Authority.[19]

58% of the river basin intersects the semiarid northeast region known as the "drought polygon".[20] This arid to semi-arid "sertao" region extends beyond the Sao Francisco Basin into adjacent northern states of Piauí, Ceará, Rio Grande do Norte and Paraíba.[21] Severe periodic droughts prompt problematic mass migrations of impoverished rural inhabitants from the sertao to the Amazon Basin and urban centers in wealthier central and southern Brazil. The Brazilian Government's long-postponed solution to the "national" problem of water scarcity in the sertao has been a partial diversion of the Sao Francisco. First proposed in 1895 – diversion would be a monumental feat – the existing plan developed by the Brazilian Government in 1989 with World

[19] Personal Conversation with

[20] While the rest of Brazil has plentiful rainfall, this region receives less than 800mm of precipitation a year. Rainfall occurs only during the summer months – from December to March, and some years the rain fails completely causing severe droughts. Regioes fisiograficos. Vale do Sao Francisco. Sitio Oficial do Codevasf http://www.codevasf.gov.br/vale/identificacao.htm, Accesed Mar 28, 20

[21] The drought polygon or sertao region lies within the states of Piauí, Ceará, Rio Grande do Norte, Paraíba, Pernambuco, Alagoas, Sergipe, and Bahia. Its characteristic landscape is the caatinga, or thorny scrub forest. The chief occupation of the region is stock raising. While the nine state region holds 28% of Brazil's total population, it contains 50% of Brazil's poor. Brazil's famous Landless Movement – Movimento Sim Terra – was begun by poor farmers from this region. "Sertão." The Columbia Encyclopedia, Sixth Edition. 2001. http://www.bartleby.com/65/se/sertao.html. Accessed Mar. 28,2002; Brazil, the north-east: politics, water and poverty. The Economist, August 29, 1998, 36-38.

Bank and TVA assistance calls for two separate canals carrying water over 2100 km. Cost is an estimated $1 billion U.S. [22]

The politically powerful state of Ceará leads the water-scarce northern states in their national lobby for diversion. Political opposition to the diversion plan is championed by political alliances from the State of Bahia, led by former Senator Antonio Carlos Malgalhães. Under former President Henrique Cardoso (who promised to complete diversion in his 1994 and 1998 election campaigns) Senator Fernando Bezerra from the pro-diversion State of Rio Grande do Norte was appointed Minister of National Integration - the government agency charged with implementation of the diversion plan. In 2000 the Brazilian Congress finally conceded to ardent demands for diversion allocating funds for construction to commence in 2001.[23]

Opponents to diversion mounted a fervent national campaign to bring attention to the plight of the Sao Francisco exposing the ongoing environmental crisis within the basin. Decades of receiving toxic contaminants discharged from the "Iron Quadrangle" – a valley in Minas Gerais boasting the largest concentration of mines and industries in Brazil, a deforestation rate of 97% in the upper reaches of the watershed, untreated raw sewage discharged from 503 riverine municipalities, the construction of some 300 dams, agricultural run off and sedimentation had taken its toll. The river's decline was evidenced by eutrophication, oligotrophication of coastal waters, reductions in fish populations and numbers, intrusion of coastal waters…

[22] "Projeto São Francisco: Um projeto para todo Brasil." Official site of the Ministry of National Integration. www.integracao.gov.br/ptsf/index.shtml. Accessed May 8, 2002.

Environmentalists, church leaders, civil society organizations, indigenous groups, rural communities and the State governments of Bahia, Sergipe and Alagoas united to argue that further diversion of the Sao Francisco would be the straw that broke the camels back. Action required in the Sao Francisco Basin was not further aggression but instead a rescue mission. Newspaper articles, television newscasts and documentaries, websites, seminars and workshops, legal injunctions, debates and a petition to UNESCO to have the Sao Francisco recognized (and protected) as a World Heritage Site were among the many methods used to gain public support to save the river.

The river began to plea its own case in May of 2001 as a severe drought in the region prompted the Governor of Bahia to declare a State of Emergency in affected municipalities located along the banks of the once mighty river. That same month, Minister Bezerra resigned from the Ministry of National Integration, accused of accepting bribes and President Cardoso ceded to public pressure to save the river, announcing a $ 70 million Reales "Plan to Conserve and Revitalize" the Sao Francisco. By July of 2001 the waters at Sobradinho had reached the lowest point ever recorded in the reservoir's 23-year existence, requiring the closing of downstream power plants and contributing to a national energy crisis. President Cardoso publically announced that he was abandoning the diversion project. In April 2002 opponents to diversion celebrated victory as the Brazilian Senate approved a 20 year fund at $ 210 million Reales per year for the Revitalization and Sustainable Development of the Sao Francisco River Basin.

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[23] "Venda da Chesf dá verba para transpor rio." Folha Dinheiro, página B-1, June 10, 2000.; "Transposição do S.Francisco custa R$ 10 bilhões." Gazeta Mercantil, página A-9, June 24-25, 2000. "FHC vai deixar obra bilionária inacabada."- Folha de S. Paulo, página A-8, February 11, 2001.

The story is not over yet however. The powerful and well-funded Ministry of National Integration admits that diversion has only been postponed – not abandoned – and continues ongoing efforts to secure financing and approval for diversion.[24] The newly –elected president Luis Inácio da Silva also promised during his campaign to carry out the diversion project and he appears to have personal motive to do so: he was born in the impoverished sertão region of Pernambuco and migrated with his family to São Paulo seeking a better future. In the meantime the revitalization program is slowly taking off – reforestation programs are underway and the Revitalization Committee – an Interagency Committee with representation from the Ministry of Environment, the National Water Agency and the Brazilian Institute for the Environment is making plans and outfitting local offices.

In the midst of all the controversy over diversion the development of the Integrated Watershed Management Plan has been ongoing. Brazil passed a new national water law in 1997 designating the river basin as the "territorial unit for the implementation of the National Water Resource Policy and the National System of Water Resource Management" water resource management. [25] Under the directive of the newly restructured National Water Agency, watershed committees are being organized throughout Brazil to supervise water resource management. The new water law stipulates: "water resource management should be decentralized and include participation from the public sector, water users and communities." The Sao Francisco Watershed Committee is presently being organized and the current debate is over what groups will have representation on the Committee. The water committee will determine the water use within the basin and establish charges.

[24] Dec 2001 alternative proposal under consideration would divert the Tocantins River to the Sao Francisco so that diversion north can proceed. In Feb 2002 MIN negotiated loan from Spain for diversion project.

Base Values

Im not sure how to do this section – I can think of two ways given the information I have

1- Spotlight a few of the groups I interviewed and detail their resources –

2- Generally describe resources by sector according to the following outline

D. Basic Values: describe value resources of participants

1. Government resources
    a. Standard Resources in Region – various agencies operating budgets and available manpower
    b. Special "Revitalization Campaign" – 40 million
    c. Additional International Support – GEF funding, potential funders
2. Civil Society resources
    a. Local Manpower and financial resources
    b. Media and General Public Support
    c. Financial dependence on International support
3. Business resources
4. International resources

Most influential participants	Least Influential participants
Hydroelectric Companies (federally owned) Government Agencies – National Water Agency Irrigation Companies (federally sposonered)	Fishermen Riverside communities Rural poor

[25] Politica

Element 5: Strategies

what strategies are being used by the participants and how are they deploying base values to affect outcomes.

Prodiversion Strategies

Northern States that advocate diversion are using political loyalties, lobbying at congressional level and playing up the myth that diversion will solve development problems such as rural poverty and unemployment. Diversion is sold to international business interest as a profitable investment – the World Bank and Spanish Banks. Also diversion is also marketed as being a more economically efficient compared to current spending for drought relief.

Antidiversion Strategies

Newspaper articles, television newscasts and documentaries, websites, seminars and workshops, legal injunctions, debates and a petition to UNESCO to have the Sao Francisco recognized (and protected) as a World Heritage Site were among the many methods used to gain public support to save the river.

Element 6: Outcomes

choices or decisions made – how were the individual or institutional participants either indulged in certain values and deprived of other

1997 National Water Law – all participants seem to agree that the law on paper is good – doubts exist over how effectively it will be implemented.

2001 Plan to Conserve and Revitalize the Sao Francisco – viewed by all participants as a successful decision - doubts exist over how effectively it will be implemented

Element 7: Effects

identify post outcome effects in terms of values or institutions, have new practices appeared or old practices been diffused or restricted.

New practices:

"The behavior of the population has changed a lot, people are aware of the scarcity. Aware of water scarcity at a global level and in the region. Brazil contains 8% of the world´s water resources. The Northeast has only 3% of the nations water. The media and the people are aware of this, the topic of water has been much discussed in the last five, ten years. There wasn't this concern before in schools, on the streets."

- José Theodomiro de Araújo, President Sao Francisco Water Committee

The expansion of irrigation – economic boom

International/national interest in conserving water/environment

Global Water crisis and resulting new Brazilian water law

Old practices:

Military regime

Lack of concern about water quality and quantity

Pending Issues -

Formation of Sao Francisco Watershed Committee

Completion of Integrated Watershed Management Plan

Privatization of Water – institution of tariffs

Privatization of Hydroelectric Companies

Analysis and Recommendations

Common interest here is implied by goals of new water law:

Assure adequate water availability to actual and future generations

Rational and integrated use of water resources – including water transport – in line with sustainable development

Prevent and defend critical hydrological events from naturally occurring or resulting from inappropriate use of natural resources.

Regarding diversion national interests beyond the watershed are pushing for diversion. New law theoretically supports opponents of diversion as legal unit for water resource management is the watershed, watershed committees are given management role, and environmental consequences are recognized.

Recommend understanding how values drive water use in the region – recommend that policymakers and participants develop a realistic, updated comprehensive map of the social context so that policy process will be more realistic and inclusive.

The social context of resource use extends beyond the geographic boundary of the watershed: the power of participants who operate at scale beyond or outside the physical watershed boundary. Examples: International interests, powerful political alliances, nearby regions lacking water and national energy demands.

Recommend all participants to recognize the role of international participants – other countries are also struggling with water reform – linkages can be established not only between governments or governments and multilateral institutions but also among civil society interests and environmental coalitions. Business??

Also what is working – we need more information about successful watershed planning and management – many plans have been completed but are they being implemented – better large scale analysis – policy sciences provides an already existing – proven effective framework for analysis.

REFERENCES

Adger, W et al. 2001. Advancing a Political Ecology of Global Environmental Discourses. *Development and Change*. 32: 681-715.

Brunner, R.D. et al. 2002. Finding common ground: governance and natural resources in the American West. Yale University Press, New Haven.

Clark, TW 2002. The Policy Process, a practical guide for natural resources professionals. New Haven: Yale University Press

Clark, T.W., Willard, A.R. and C.M. Cromley. 2000. Foundations of Natural Resources Policy and Management. Yale University Press, New Haven.

Duda A.M. and M.T. El-Ashrey. 2000. Addressing the Global Water and Environment Crises through Integrated Approaches to the Management of Land, Water and Ecological Resources. *Water International.* 25(1): 115-126.

GEF Projects related to water resources. Global Environmental Facility website. www.gefweb.org/meetings/WaterForum/International%20Waters.pdf, last accessed Dec. 16, 2002.

Issac S and W.B. Michael. 1995. Handbook in Research and Evaluation. Educational and Industrial Testing Services, San Diego.

Janesick, V.J. 1994. The interpretation of documents and material culture. Handbook of qualitative research. N.K. Denzin and Y.S.Lincoln, eds. Sage Publications, Thousand Oaks, CA. pp. 209-219.

Lasswell, H.D. and M.S. McDougal. 1992. Jurisprudence for a Free Society: Studies in Law, Science and Policy. Yale University Press, New Haven.

McCully, P. 1996. Silenced rivers: the ecology and politics of large dams. Zed Books, London.

Office International de L'eau. The International Network of Basin Organizations http://www.inbo-news.org/, accessed Dec. 14, 2002.

Petts, G. 2001. Sustaining our rivers in crisis: setting the international agenda for action. *Water Science and Technology*. 43(9): 3-16.

Politica Nacional de Recursos Hidricos, Lei No. 9, 433, 8 Janeiro 1997.

"Projeto São Francisco: Um projeto para todo Brasil." Official site of the Ministry of National Integration. www.integracao.gov.br/ptsf/index.shtml. Accessed May 8, 2002.

Slocombe, D.S. 1998. Lessons from experience with ecosystem-based management. *Landscape and Urban Planning*. 40: 31-39.

Teclaff, L.A. 1996. Evolution of the River Basin Concept in National and International Water Law. *Natural Resources Journal*. 36: 359-391.

United Nations Environment Programme (UNEP) Project Document. Sept. 15, 1999. Integrated Management of Land-based Activities in the Sao Francisco Basin. Project no: GF/1100-99