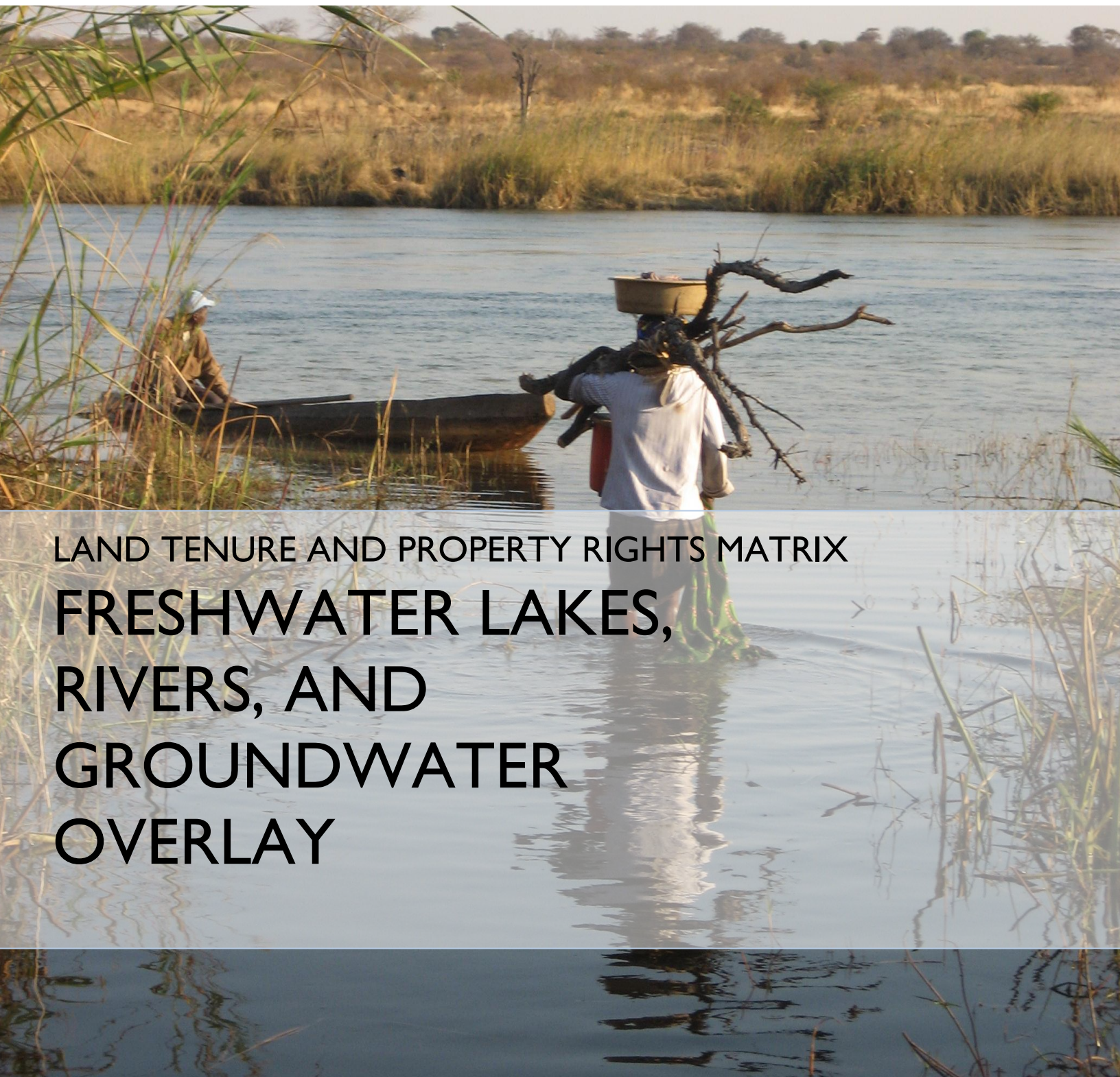




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LAND TENURE AND PROPERTY RIGHTS MATRIX
**FRESHWATER LAKES,
RIVERS, AND
GROUNDWATER
OVERLAY**

SEPTEMBER 2013

This tool was prepared by Tetra Tech on behalf of USAID, under the Property Rights and Resource Governance Program under the Prosperity, Livelihoods and Critical Ecosystems (PLACE) Indefinite Quantity Contract (IQC) Contract No. EPP-I-00-06-00008-00, Task Order 002.

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AND GROUNDWATER
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DISCLAIMER

The author's views expressed in this publication do not necessarily reflect the views of the United States Agency for International Development or the United States Government

CONTENTS

CONTENTS	I
ACRONYMS.....	III
PREFACE	V
INTRODUCTION	VII
1.0 RESOURCE CONFLICT AND DISPLACEMENT	I
1.1 LTPR ISSUE	I
1.2 ILLUSTRATIVE INTERVENTIONS	3
1.3 READINGS.....	5
2.0 WEAK GOVERNANCE	7
2.1 LTPR ISSUE	7
2.2 VOLUNTARY GUIDELINES WITH RESPECT TO TRANSBOUNDARY MATTERS	9
2.3 ILLUSTRATIVE INTERVENTIONS	10
2.4 READINGS.....	12
3.0 INSECURE TENURE AND PROPERTY RIGHTS	13
3.1 LTPR ISSUE	13
3.2 ILLUSTRATIVE INTERVENTIONS	16
3.3 READINGS.....	17
4.0 INEQUITABLE ACCESS TO WATER RESOURCES	19
4.1 LTPR ISSUE	19
4.2 ILLUSTRATIVE INTERVENTIONS	21
4.3 READINGS.....	23
5.0 POORLY PERFORMING WATER MARKETS.....	25
5.1 LTPR ISSUE	25
5.2 ILLUSTRATIVE INTERVENTIONS	27
5.3 READINGS.....	28
6.0 UNSUSTAINABLE NATURAL RESOURCES MANAGEMENT/ BIODIVERSITY LOSS	29
6.1 LTPR ISSUE	29
6.2 ILLUSTRATIVE INTERVENTIONS	31
6.3 READINGS.....	33
ANNEX A: FRESHWATER LAKES, RIVERS, AND GROUNDWATER MATRIX OVERLAY, SUMMARY TABLES.....	35

ACRONYMS

ADR	Alternative Dispute Resolution
EIA	Environmental Impact Assessment
FAO	Food and Agriculture Organization of the United Nations
GIS	Geographic Information System
IDP	Internally Displaced Population
IQC	Indefinite Quantity Contract
IWRM	Integrated Water Resources Management
LTD	Land Tenure and Property Rights Division
LTPR	Land Tenure and Property Rights
MIS	Management Information System
NRM	Natural Resources Management
PLACE	Prosperity, Livelihoods and Critical Ecosystems
PRRGP	Property Rights and Resource Governance Program
USAID	United States Agency for International Development
USG	United State Government

PREFACE

Resource tenure and property rights challenges are present in almost every country where the United States Agency for International Development (USAID) works. In many countries, tenure and property rights problems are so grave that they create political instability, violence, population displacement, famine, and environmental destruction, which significantly undermine or prevent successful implementation of many USAID programs. Over the last decade the demand to address property rights issues has increased from both USAID field missions and host country governments. The increase in demand is due, in part, to a growing awareness among development practitioners of the role played by property rights (and natural resource access and use) in economic growth, governance, and conflict and resource management.

USAID and its partners have learned a great deal over the last three decades about the relationship between property rights and economic growth, productivity, and to a lesser extent, natural resource management and conflict. There are several important lessons learned from the last decade of research and policy work on property rights with a particular emphasis on land and resource tenure.

1. **Land tenure and property rights (LTPR) systems are fundamental to a wide variety of development outcomes.** Secure land tenure improves food security, economic growth, and natural resource management and reduces the impacts of conflict and climate change. Securing the rights of women, youth and vulnerable populations and broadening their access to resources complements and deepens the impact of interventions aimed at improving these outcomes. This is the case for people across the economic spectrum from smallholder farmers to urban manufacturers. An effective land governance and property rights system is fundamental to the broad process of economic and political development.
2. **Weak land governance systems limit economic growth; threaten good natural resource management; often promote conflict; and pose special problems for vulnerable groups, including minorities, indigenous people, the poor, and women.** Recognition of customary rights to land resources and the devolution of management authority improves land and resource governance and is crucial to sustainable natural resource management. Although many countries have effective and secure land governance and property rights systems, in numerous places, systems and rights are weak. The results of these weaknesses include conflict over land and resources, corruption associated with poorly functioning land governance systems, resource degradation, and limited economic growth.
3. **In development programming, property rights are most frequently dealt with in the context of land tenure reform, but they are increasingly being addressed through more integrated projects.** Programming decisions made in a variety of sectors that consider land tenure can have profound impacts on land use and natural resource management, agricultural systems, and infrastructure development.
4. **Too often, LTPR reforms are measured in terms of outputs rather than impacts** (e.g., measuring the number of land titles that have been issued as opposed to focusing on market performance and investment increases, reduced conflict, or improved use of sustainable management practices). This focus on outputs prevents USAID from fully understanding the efficacy and potential cross-sectoral benefits of its property rights reforms and programs. A greater emphasis on impact evaluation is needed.

5. **The ultimate objective is to secure property rights that will promote economic growth, food security, natural resource management, and stability.** Security of tenure can be achieved through a variety of approaches and should result in greater confidence that property rights will not be indiscriminately taken or unjustifiably restricted. Securing land and resource rights can be achieved through a variety of legal, administrative, and judicial means. It may require legal reform in one context and dispute resolution in another. USAID promotes the implementation of “secure enough” tenure rights and does not consider land titling or land formalization as the ultimate objective.

Issues and constraints regarding property rights vary from region to region, and they will continue to evolve over time. The most volatile of USAID-presence countries—and those that are often in the greatest need of property rights reform—are fragile states. Since property rights are so closely linked to development agendas across the globe, there is a need to understand how these rights shift as economies move through the stages of economic growth and democratization (and, in some cases, from war to peace) and how these shifts require different property rights interventions.

In light of these common concerns and issues, a whole-of-government approach to addressing land tenure and property rights has been developed through USAID and the Millennium Challenge Corporation (MCC). USAID’s LTPR Division (LTD) coordinates issues of LTPR programming with other USAID bureaus, US government (USG) entities, and multilateral organizations. USAID currently works in close to 30 countries around the world to promote land governance systems (both formal and informal) that enable broad-based economic growth, human rights protection, and effective natural resource management. Because weak land governance systems compound vulnerability, our efforts are particularly beneficial for vulnerable groups. These efforts are investing over \$800 million to strengthen the land tenure and resource rights of men, women, and children in the developing world.

BOX A. ILLUSTRATIVE USAID LAND TENURE PROJECTS

- Afghanistan Land Titling and Economic Restructuring
- Biodiversity Conservation of Public Lands in the Brazilian Amazon
- Egypt Financial Services Project
- Ethiopia Land Administration Program
- Ghana Commercial Agriculture
- Indonesia Marine and Climate Support
- Liberia Property Rights and Artisanal Diamond Development
- Property Rights and Resource Governance (Global)
- Rwanda Land Project
- Tajikistan Land Reform
- Timor Leste Strengthening Property Rights
- Ukraine Land Titling Initiative
- Uganda Supporting Access to Justice, Fostering Peace and Equity

See *USAID Land Tenure and Property Rights Portal* (<http://www.usaidlandtenure.net>)

INTRODUCTION

A FRAMEWORK FOR LAND TENURE AND PROPERTY RIGHTS

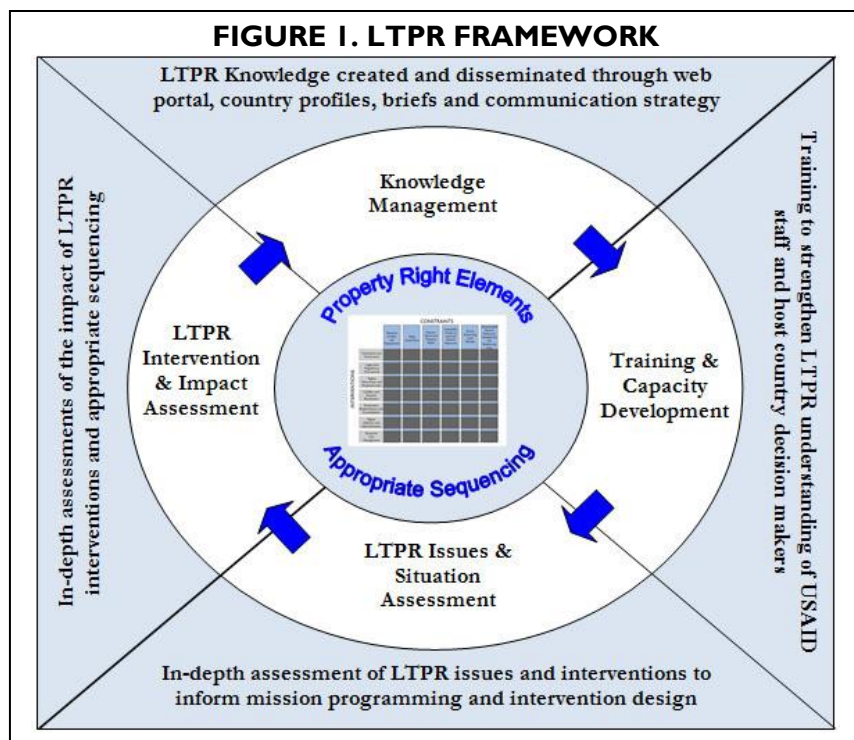
USAID has developed a suite of tools and methodologies designed to enhance the understanding and programming of LTPR challenges and activities to advance USG Development Objectives in a number of areas, including food security, global climate change, conflict mitigation and women's economic empowerment. This body of work has been highly experimental, consultative, and developmental and has grown commensurate with growth of US investments in this sector.¹

This work includes four components as summarized below, and are meant to be mutually reinforcing as illustrated in Figure 1: LTPR Framework.

1. **The LTPR Framework** serves as the overarching conceptual methodology tying together overarching themes, definitions, tools, assessments, designs, and training programs that USAID uses to improve LTPR programming and capacity building. The Framework also includes:

LTPR Matrixes—A Methodology for determining USAID-recommended interventions for different asset and social classes (e.g., men and women); and a methodology for identifying constraints and opportunities.

LTPR Intervention Sequencing of land tenure and land reforms tailored to each country, region, or project context that leads to stronger and more efficient property rights systems. Beyond identifying interventions to address LTPR constraints, sequencing in addition requires assessment of appropriate scale, timing, and ordering.



¹ This body of work updates tools that were originally produced under the *Lessons Learned: Property Rights and Natural Resource Management* contract

The **LTPR Glossary** is a guide to key LTPR terms and concepts, gathered from frequently cited international references.

2. **LTPR Assessment Tools—A Methodology for Assessing LTPR Constraints and Interventions—** includes two tools to guide USAID mission programming:

LTPR Situation Assessment and Intervention Planning (SAIP) Tool, which is a diagnostic and programming tool to help USAID missions understand and assess LTPR issues and determine how these contribute to or impede realization of Development Objectives; and

LTPR Impact Evaluation Tool, which provides a methodology for designing evaluations to determine the outcomes and impacts of land and natural resource tenure and property rights programming, whether as a project's main focus or a component of a broader set of goals.

In addition to these Framework and assessments tools, USAID has developed:

3. **LTPR training materials**, which include short courses and other trainings to transfer knowledge and best practices about land tenure and property rights and strengthen LTPR knowledge, capacity, and understanding of USG program staff and implementing partners. Curriculum may be found on the LTPR web portal at www.USAIDlandtenure.net; and,
4. **LTPR Knowledge Management**, which consists of USAID Program Briefs on land tenure projects, LTPR Country Profiles, Issues Briefs, films, and LTPR research. This can be found at the *USAID Land Tenure and Property Rights Portal* (www.usaidlandtenure.net), which serve as the foundation for LTPR knowledge management within the Agency.

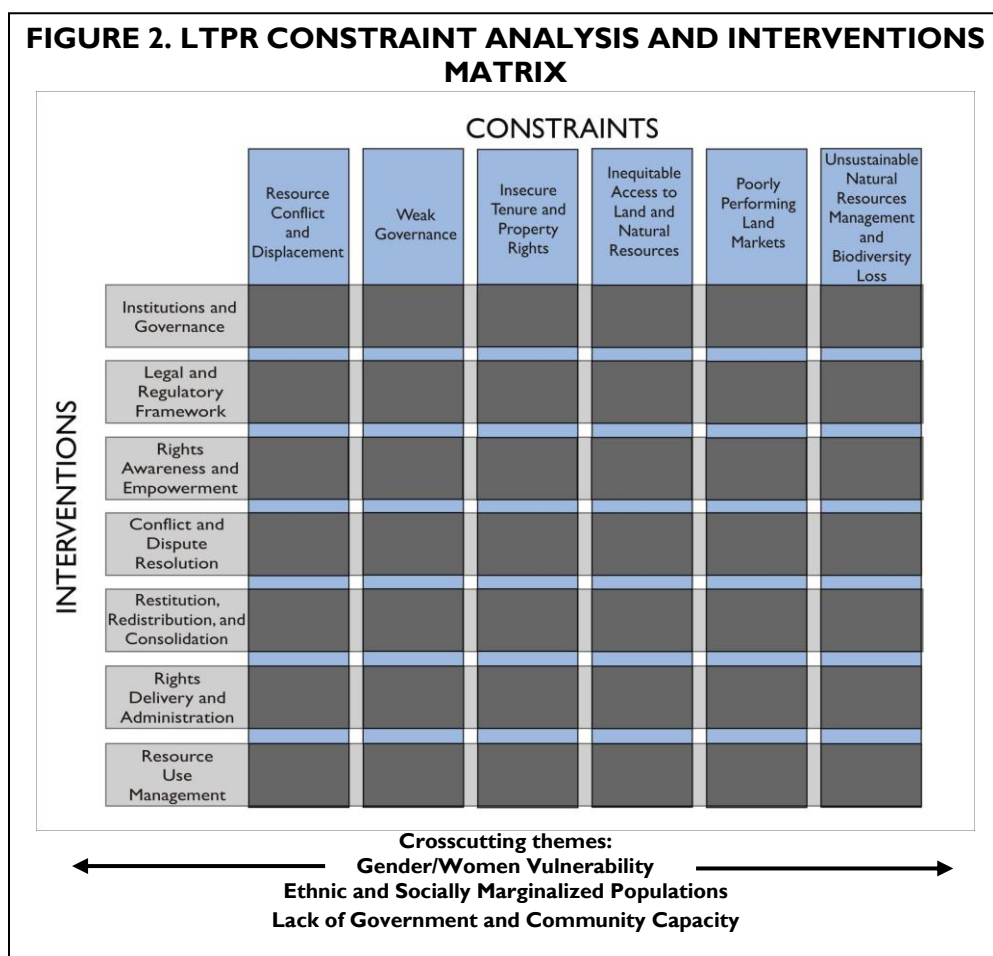
The **intended audiences** for all of these tools are USAID missions, USAID Washington Bureau staff, and other USG personnel who seek to understand how property rights issues may be affecting program outcomes, how to design interventions that can help address those issues, and how to evaluate the impacts of those programs to inform new program development. The tools may likewise prove useful to a range of development practitioners outside the USAID sphere who encounter property rights challenges in their work and seek to understand and address them more effectively.

This report presents the **Matrix Overlay for Freshwater Lakes, Rivers, and Groundwater**, one of the sub-tools comprising the Land Tenure and Property Rights (LTPR) Matrix and LTPR Framework, which are elaborated in the document *Land Tenure and Property Rights Framework* (USAID, September 2013). Both the LTPR Matrix and LTPR Framework are briefly presented here to contextualize development of a base Matrix that is used to harmonize the population of five Matrix overlays—Land Tenure and Property Rights; Freshwater Lakes, Rivers, and Groundwater; Minerals; Trees and Forests; and Women, Land, and Resources—that serve the conceptual foundation for USAID LTPR programming. This document presents the matrix *Freshwater Lakes, Rivers, and Groundwater Matrix: Overlay constraints and interventions*. The population of other overlays is contained in companion volumes.

LTPR MATRIX: A TOOL FOR VISUALIZING THE LTPR UNIVERSE

As early as 2004, USAID felt the need for a conceptual framework that would simply and eloquently help USAID and contractors identify and assess LTPR issues (constraints) and “toolboxes” of interventions to address those constraints. Land tenure and property rights is concerned with questions of access to land and

natural resources, the distribution of rights to those resources within society, the security of tenure held by various individuals and groups over these resources, and the sustainability of their use.



The current generation base LTPR Matrix described in this section is aimed at addressing these questions and is the conceptual backbone of all interventions that follow. The Matrix illustrates a fairly complex but finite set of LTPR themes, constraints, and interventions. It is not meant to be read sequentially from left to right, nor from top to bottom; rather, it provides a menu of constraints and interventions to be considered within the realm of LTPR programming. The base Matrix consists of six categories of LTPR issues and potential constraints, three crosscutting constraints, and seven categories of policy and program interventions.

CATEGORIES OF LTPR CONSTRAINTS

1. **Resource Conflict and Displacement (Column 1)** – Conflict over access and use of land and natural resources often resulting in landlessness, squatting or population displacement due to macro causes of genocide and war, social and ethnic conflict, climate change, and resource scarcity.
2. **Weak Governance (Column 2)** – Deficiencies in capacity to manage and/or disparities in power, influence, and wealth that lead to mismanagement, lack of accountability, and inability of individuals, communities, legal entities and groups to act upon and defend their rights in land, resources and property.

3. **Insecure Tenure and Property Rights (Column 3)** – The consequence of inadequate rights awareness or the perception of having too few rights, inadequate duration of rights, or inability to protect rights from encroachment by others due to problems of open access, weak governance, rights inequality, weak statutory and customary tenures, and expropriation without fair compensation.
4. **Inequitable Access to Land and Natural Resources (Column 4)** – Disparities in access and control over resources between classes and gender that are often affiliated with poverty and social strife and result in problems of landlessness, uneconomical and fragmented holdings, squatting, informal settlements, and weak and unsustainable livelihoods.
5. **Poorly Performing Land Markets (Column 5)** – Absent/weak sales, rentals, sharecropping, and exchanges that restrict the transfer of resources between willing sellers, buyers, lessors, and renters thereby constraining economic growth, or that fail to serve the poor and disadvantaged due to imperfect information, lack of capital, unequal bargaining power, or risk of distressed sales.
6. **Unsustainable Natural Resources Management and Biodiversity Loss (Column 6)** – Overharvesting or degradation of land, water, forests, pasture, and wildlife resulting in unsustainable use and biodiversity loss, or in the context of minerals, environmental degradation and practices that abuse or usurp the rights of communities/miners due to weak property rights and governance systems.

Crosscutting Constraints:

7. **Gender/ Women Vulnerability (Crosscutting)** – This constraint category further nuances other constraint columns in the matrix by asking the question of LTPR constraints for whom, and addresses discrimination in property rights, land access, land markets, and ability to sustain natural resource management by women and men.
8. **Ethnic and Socially Marginalized Populations (Crosscutting)** – The constraint categories to the left in the matrix are further nuanced in this constraints column by the questions of LTPR constraints to marginalized and disenfranchised populations including among others HIV/AIDS affected households, pastoralist societies, indigenous populations, and post-conflict and climatically vulnerable populations discriminated against or left behind by political and economic change, or needing LTPR support or protection in face of political, economic and climatic shocks.
9. **Lack of Government and Community Capacity (Crosscutting)** – This constraints category relates to the identification and development of human capital in service to land property rights reforms.

CATEGORIES OF LTPR INTERVENTIONS

1. **Institutions and Governance (Row 1)** – Institutional arrangements that improve the governance of property rights from central to local levels by establishing rule of law, devolving authority, decentralizing decision making, ensuring impartiality of the judiciary, providing for citizen participation, and ensuring accountable and democratic governance.
2. **Legal and Regulatory Framework (Row 2)** – Interventions that provide individuals, groups, communities, or legal entities with important legal rights of ownership, usufruct, exclusion, and transferability, and typically focus on legal and regulatory reforms that increase clarity of rights, strengthen rights ownership, and provide for legal recourse and due process.

3. **Rights Awareness and Empowerment (Row 3)** – Interventions aimed at raising citizen awareness and understanding of their property rights as well as the procedures and facilities available to claim, defend and enforce those rights. Illustrative interventions include mass media, human capacity training, communication strategies and informational meetings targeting beneficiaries.
4. **Conflict and Dispute Resolution (Row 4)** – Formal and informal conflict mediation and dispute resolution strategies and mechanisms aimed at mediating conflict, resolving disputes, dispelling or averting violence, providing effective legal recourse and enabling compensation in the event of resettlement and public takings.
5. **Restitution, Redistribution, and Consolidation (Row 5)** – Land reform and resettlement to redress land concentration, privatize ownership, reconstitute rights, resettle displaced populations, or consolidate small, fragmented units into larger ones with the aim of redressing historical injustices and achieving a more fair, equitable, and productive land and agrarian structure.
6. **Rights Delivery and Administration (Row 6)** – Effective and low-cost land administration interventions that connecting rights to land, resources and property in law with the exercise of those rights in practice and focus on improving the effectiveness and reach of government in support of rights registration, land demarcation, surveying, mapping, and cadastral development.
7. **Resource Use Management (Row 7)** – Strengthened property rights and governance to improve land and natural resources management, conservation and bio-diversity protection, or land use planning for municipal/urban development, and include such interventions as participatory decision-making, zoning, trusts, conservancies, protected areas and co-management models.

The Base Matrix in Figure 2 serves as the template for regularizing and developing empirical overlays for five natural and human resource domains in Figure 3:

- Land Tenure and Property Rights;
- Freshwater Lakes, Rivers, and Groundwater;
- Minerals;
- Trees and Forests; and
- Women, Land, and Resources.

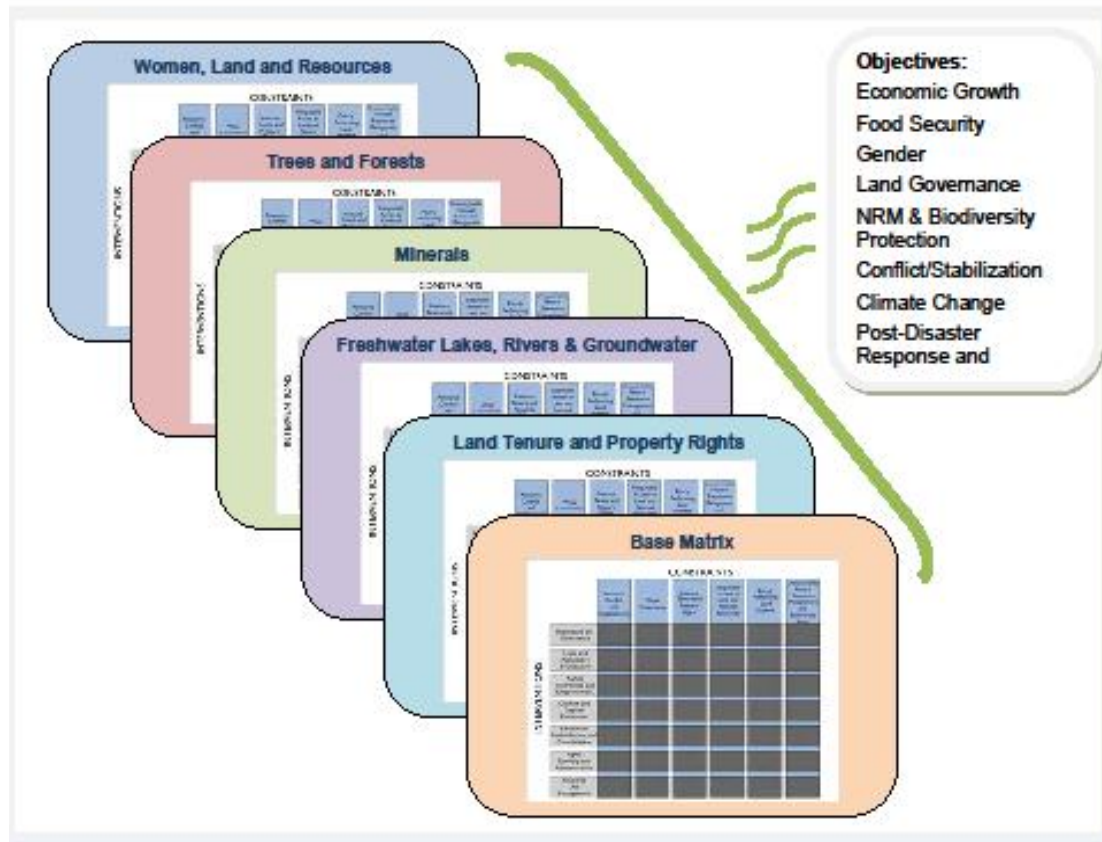
Each of these overlays is a standalone Matrix. Other domains are possible: pastures, wildlife, fisheries, and coastal areas. The overlay approach allows expandability by adding additional overlays in the future (e.g., coastal areas) as demand warrants.

MATRIX OVERLAYS

In this document, sections 1.0 to 6.0 populate the *Water Matrix Overlay* with salient issues and key interventions, and link these to information sources for easy reference. Annex A provides summary tables on issues and interventions extracted from the overlay which serve as useful tools for training exercises or as “quick sheets” when undertaking assessments. Overlays and quick sheets for resource domains can be found in the following overlays, all developed under the USAID Property Rights and Resource Governance Task Order:

- Overlay 1: Land Tenure and Property Rights Matrix;

FIGURE 3. LTPR CONSTRAINT ANALYSIS AND INTERVENTIONS MATRIX



- Overlay 2: Freshwater Lakes, Rivers, and Groundwater Matrix;
- Overlay 3: Minerals Matrix;
- Overlay 4: Trees and Forests Matrix; and
- Overlay 5: Women, Land, and Resources Matrix

Each overlay is organized into chapters (see Sections 1.0 to 6.0) centered around constraint categories which:

- Provide an overview of issues and sub-issues related to respective constraints;
- Describe various policy and program interventions USAID recommends bundled according to intervention categories;
- Explain how the Food and Agriculture Organization of the United Nations (FAO)'s *Voluntary Guidelines on the Responsible Governance of Tenure of Land, Fisheries and Forests in the Context of National Food Security* addresses the constraint; and
- Include a list of related reading for each topic.

USAID programmatic recommendations are guided by the following principles:

- Land tenure and property rights systems that recognize, record, and administer a multiplicity of statutory and customary land tenure and property rights, whether held by individuals, groups or legal entities;

- Land tenure and property rights systems that protect the rights of women and other marginalized groups in society;
- Fully participatory processes to define, delimit, record, and administer land tenure and property rights and obligations;
- Market-mediated approaches to provide access to land;
- Land governance systems that are reasonably accessible, in terms of location and cost, to all members of society;
- Land governance systems that allow and support the creations of transparent and effective land markets, including land sales, leases, and the use of easements and other mechanisms; and
- The equitable application of laws, regulations, and administrative practices for all market participants.

Importantly, the US government does not support the following: expropriations and forcible evictions/relocations (or the use of compulsory purchase/resumption) that violate rights to due process and do not award prompt, adequate and effective compensation or that take private property for private purpose.”

The specific interventions mentioned in the Matrix and overlays, while illustrative, nonetheless serve to accelerate or expand thinking when needing to conduct “how to” courses and transfer knowledge in training programs, help to target or focus questions or lines of enquiry when conducting LTPR assessments, or recommend appropriate intervention strategies whether by way of making recommendations or formulating project designs. The Matrix is thus the conceptual framework for ordering and clarifying thinking on LTPR constraints and interventions, and the causal linkages between them.

I.0 RESOURCE CONFLICT AND DISPLACEMENT

INTERVENTIONS	CONSTRAINTS					
	Resource Conflict and Displacement	Weak Governance	Insecure Tenure and Property Rights	Inequitable Access to Water Resources	Poorly Performing Water Markets	Unsustainable Natural Resources Management and Biodiversity Loss
	Institutions and Governance					
	Legal and Regulatory Framework					
	Rights Awareness and Empowerment					
	Conflict and Dispute Resolution					
	Restitution, Redistribution, and Consolidation					
	Rights Delivery and Administration					
	Resource Use Management					

I.1 LTPR ISSUE

Although violent conflict over water resources is rare, tensions are evident—between nation-states, citizens and their governments, or between multiple groups sharing water from the same source. As economies grow and demands for water increase, water per capita levels have fallen from 9,000 to 7,800 cubic meters between 1989 and 2000, and expected to drop to 5,100 cubic meters by 2025. Meanwhile, the allocation of water rights is rapidly shifting to governments and corporations, sparking increasing outbreaks of controversy and civil unrest.

SUB-ISSUES

Upstream-downstream watershed conflicts. An individual's or group's rights to and use of a resource impact the use and quality of resources held by others, and their health and safety. Conflicts often emerge in watersheds when land and resource users upstream take actions that affect residents and resource users downstream—e.g., overgrazing or clearing of trees upstream contributing to downstream soil erosion, pesticide use upstream poisoning the drinking water of downstream users, or excessive water capture upstream depleting supplies downstream. Sometimes spillovers in watershed environments filter upstream. Downstream livestock for example can contribute to eutrophication of basin waters, which in turn can upset the entire watershed ecosystem and contribute to its gradual desertification.

Transboundary and riparian conflicts over water capture and quality. Water conflicts are not limited to small watersheds or water sources contained within administrative boundaries, but can span large areas and cross international boundaries. Transboundary conflicts erupt when two or more countries bordering the same water source have failed to form mutually acceptable agreements governing access, withdrawal, and other use rights, or those agreements have been breached. Countries positioned closer to the water sources, with greater technical capacity to extract water, or with the capacity to impose economic or political sanctions often act to deprive other riparian countries, invoking disagreements and sometimes conflict. Although the media has issued ominous forebodings of international “water wars”, some of the most water-scarce and potentially volatile regions have avoided violent conflict through inter-country agreements and strong norms of compliance, such as international agreements established between Israel, Jordan, and the Palestinian Authority over water sharing.

Groundwater access conflicts. In many water rights regimes, rights to land include sub-surface rights to groundwater. Conflict is not generally an issue when water supply is plentiful and groundwater extraction does not impinge on the needs of others. Conflicts tend to arise in water-scarce environments, or when private interests consolidate control over sub-surface water at the expense of others, often without their knowledge or without consultation.

Competition for control over water points and sources. Many conflicts have arisen in arid and semi-arid regions between competing water users over access to water points. Some of the most visible are conflicts among pastoralist groups and between pastoralists and farmers to such resources as boreholes, shallow wells, salt licks, water tanks, and watering sites. Customary rules governing water sharing often suffice to prevent or overcome conflicts, but can be challenged when water scarcity becomes acute (e.g., due to prolonged periods of drought), grazing pressures increase, traditional authority is weakened, or competition emerges from outsider groups who do not vest legitimacy in local norms and authorities.

Conflicts over irrigation water. For farmers holding irrigated land, those with parcels located close to the headwaters of canal irrigation systems are better positioned to capture reliable and adequate water supply. Even when rules specify the amount of water each parcel is entitled to, those at the tail end of the system can be deprived of their allocation in times of water shortage, or due to excessive water off-take at the system's head. Conflicts between head- and tail-end users are exacerbated by weak enforcement or through bribes or political power by elites situated at the head of the irrigation system. Besides conflicts over water distribution, other irrigation conflicts concern maintenance of canals and other system infrastructure, failure to abide by rules to ensure equitable and timely flow, and unauthorized extraction (e.g., for domestic uses), among others.

Competition between urban and rural users of water. Urbanization in developing countries is occurring at unprecedented rates. About half of the world's population now resides in urban areas. At the same time,

irrigated agriculture accounts for 70 percent of freshwater use worldwide, with withdrawals tripling over the past 50 years. Calls to reduce water supply for agriculture to meet increasing demand for water in cities are fiercely contested by rural water users and their supporters. At the same time, growing demands for food in urban areas mean that irrigation water demand is unlikely to diminish, setting the stage for heightened risk of conflict over urban-rural water use.

Construction of dams and river diversions displacing peoples. Dam construction plays a major role in rural electrification, water supply, irrigation, and economic growth. Diversions of river systems are frequently undertaken to provide critical water supplies to expanding urban areas. Yet, these mega-projects can also impose considerable socioeconomic costs, particularly when people are displaced, lose access to resources they depended on for their livelihoods, or fail to be compensated for their losses. An estimated 40 to 80 million people have been forcibly displaced by dam construction globally. Indigenous populations and the very poor are particularly vulnerable to displacement caused by dam construction. Environmental losses can also be enormous. The World Commission on Dams review of the effectiveness of large dams concluded that the consequences of many of these projects were unacceptable and often avoidable.

Displacement resulting from flooding, drought, and climate change. Floods due to natural disasters have contributed to property loss and mass displacement. Examples are the tsunami that struck Indonesia, Sri Lanka, India, and Thailand in 2004, the torrential flooding that swept Myanmar in 2008, and the recurrent devastating floods in Bangladesh. Prolonged droughts and resulting famines also induce forced migration. It is anticipated that the impacts of climate change could unleash unprecedented magnitudes of displacement: 200 million environmental refugees by 2050, according to one estimate (Myers, 2005).

1.2 ILLUSTRATIVE INTERVENTIONS

The range of possible interventions relevant or applicable to this particular issue constraint can be quite broad depending on circumstances, and the need in any policy context to carefully adapt, target, sequence and nuance interventions according to institutional context and need. The interventions cited below are thus generalized and illustrative. The reader is further encouraged to review interventions for other constraint categories as well as a single intervention can be relevant to multiple constraints, particularly in contexts when multiple constraints across columns of the matrix are present or when of bundle of interventions across rows is required. Issues and interventions should thus be addressed holistically rather than concentrating on a single column or row.

Resource Conflict and Displacement	
Institutions and Governance	<ul style="list-style-type: none"> • Create multi-stakeholder negotiation platforms. Engage different interest groups in the basin/watershed in integrated water resource management (IWRM) planning, including clarifying spatial and temporal rights to water resources. • Support multi-stakeholder policy dialogue. Support engagement of local voices in policymaking to influence decision making on water rights and on dam construction/river diversion. • Encourage transparency and inclusiveness. Reform decision-making processes at local, national, and international levels so that they are transparent and inclusive. • Support participatory decision making. Engage users in defining the rules governing water withdrawal. Ensure all are aware of the rules and the means exist to sanction those who break them. • Strengthen cooperation between authorities. Support cooperation between formal and non-formal authorities in clarifying and enforcing rights, especially to regulate rights and access of interests that fall outside the command of non-formal authorities, or in cases where power of traditional authorities has diminished.

	Resource Conflict and Displacement
	<ul style="list-style-type: none"> • Establish payments for ecosystem services. Set up arrangements that incentivize people to act in ways that result in improvements in water quality and quantity, and thereby reduce tensions between system stakeholders. • Strengthen local dispute resolution institutions. Develop linkages and increase information sharing between state, informal, and local dispute resolution bodies. Whether customary or formal, ensure dispute resolution forums are accessible by the least powerful and perceived by all as fair and effective.
Legal and Regulatory Framework	<ul style="list-style-type: none"> • Strengthen water rights and rights enforcement. Reform legal frameworks to clarify rights to groundwater, irrigation, or common pool water resources to ensure equitable access and provide the foundations for restitution. Further, articulate legal basis for assigning water rights to individuals, groups, communities, governments, and private companies, and provide legal basis for enforcement of those rights. • Legally protect customary rights. Provide statutory backing to non-formal rights regimes that clarify and provide for equitable withdrawal and other water rights. • Conduct law review forums. Conduct information forums to acquaint the judiciary with relevant case law on water rights. • Broaden access to justice. Provide training and capacity building to expand the reach of justice, and enable and empower individuals and groups to take advantage of these services. • Forge and leverage international treaties. Use multilateral water treaties that provide benefits to interested parties to cooperate, reduce corruption, and incentivize compliance. • Formalize rights to compensation. In cases where government has a legitimate public interest in restricting or expropriating existing water rights, such expropriation should be based upon clearly defined due process, including public hearings; fair, prompt, and prior compensation; and possibility of administrative or judicial appeal.
Rights Awareness and Empowerment	<ul style="list-style-type: none"> • Increase public awareness. Use media and consultation to inform affected peoples about proposed diversion/dam construction projects; resettlement programs; and their rights, benefits, and recourse. • Strengthen advocacy. Mobilize and strengthen the capacity of water user associations, civil society groups, and less powerful interest groups to articulate their interests and negotiate rights. • Encourage civil society engagement and public debate. Invest in public education and consultation on issues to encourage widespread public debate and engagement.
Conflict and Dispute Resolution	<ul style="list-style-type: none"> • Increase access to legal assistance. Provide technical and financial support for legal assistance that protects disputing parties who are disadvantaged economically or in terms of power. • Support alternative dispute resolution (ADR). Promote neutral third party mediation or arbitration as a tool to manage conflict. • Conduct stakeholder forums. Involve disputing interest groups in open dialogues to (re)negotiate water use rights, and resolve conflicts. Create inter-riparian dialogue forums to resolve transboundary water conflict. • Strengthen restitution and compensation systems. Develop equitable and reliable restitution and compensation programs to settle grievances and resolve conflict. • Create inter-riparian dialogue forums. Organize forums to facilitate transboundary water management, and support neutral third party mediation of competing interests in the interest of conflict prevention. • Support development of multilateral water treaties. Support forums and negotiations concluding in treaties or other formal agreements that clarify rights, share benefits, offer incentives to encourage compliance, and provide legal recourse to handle infractions.
Restitution, Redistribution, and Consolidation	<ul style="list-style-type: none"> • Resettle displaced populations. Resettle populations involuntarily displaced by public takings for public infrastructure development. Offer voluntary settlement to populations displaced by resource conflict, climate change and natural disasters, including refugees, displaced transhumant groups, and internally displaced populations (IDPs).

	Resource Conflict and Displacement
	<ul style="list-style-type: none"> • Develop strategies and plans for relocation. Consult with affected populations and potential receptor sites prior to relocation to determine relocation options and accompanying support systems. • Compensate for state takings. Establish systems for full and fair value compensation of assets and livelihoods lost by takings either in cash or in-kind. • Devise water-sharing agreements. Facilitate negotiation of water-sharing agreements among claimants seeking restitution or redistribution. • Reconstruct property and/or records. Reconstruct public infrastructure, private property and/or records destroyed by conflict where necessary and justified.
Rights Delivery and Administration	<ul style="list-style-type: none"> • Document water rights. Document rights of individual and group water users (including whole communities) through water rights registration or contracts to clarify and secure rights. • Secure records to document assets. Take measures, including digitization, to secure public records such as contracts, concessions, titles, and other documents that establish water rights to avoid their destruction or loss during conflict. These records are critical evidence in dispute resolution proceedings. • Create use restrictions to control spillovers. Create resource use restrictions that control the spillover of negative effects to other users, or strengthen enforcement of existing restrictions. • Support mapping of property claims. Use maps and other tools to make visible and known claims of different stakeholders, including overlapping claims. Use these tools as a basis for negotiating restitution or redistribution of conflicting water rights.
Resource Use Management	<ul style="list-style-type: none"> • Establish payment for ecosystem services programs. Establish payments for ecosystem services to compensate landholders who protect water resources that provide benefits to others. • Promote water conservation technology. Institute measures and employ technologies to increase water use efficiency (e.g., drip irrigation, wastewater recycling, water efficient appliances) and supply (e.g., desalinization) thereby reducing competition for water and the need for dam construction and diversion. • Adopt water reclamation measures. Establish programs to reclaim land and water resources damaged by dam construction, river diversions and other actions precipitating conflict. Provide compensation where full reclamation is not possible. • Control water quality degradation and support enforcement. Promulgate regulations and support enforcement mechanisms that prevent land use practices that degrade water quality and availability and contribute to conflict. • Support assessments and strategic planning. Conduct ex-ante social and environmental analysis to determine likely impacts of dam construction and associated economic and social costs, including the potential for unleashing conflict. • Develop early warning systems. Improve early warning and early action systems to mitigate flooding, drought and other negative climate change impacts.

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2.0 WEAK GOVERNANCE

INTERVENTIONS	CONSTRAINTS					
	Resource Conflict and Displacement	Weak Governance	Insecure Tenure and Property Rights	Inequitable Access to Water Resources	Poorly Performing Water Markets	Unsustainable Natural Resources Management and Biodiversity Loss
	Institutions and Governance					
	Legal and Regulatory Framework					
	Rights Awareness and Empowerment					
	Conflict and Dispute Resolution					
	Restitution, Redistribution, and Consolidation					
	Rights Delivery and Administration					
	Resource Use Management					

2.1 LTPR ISSUE

Institutions for managing and administering water cut across different scales: from international to local communities, from governments to private sector entities, to local water user associations. While good governance can be a challenging goal in any context, the physical characteristics and behavior of water can make it especially difficult to govern, necessitating widespread collective action among interests that are often divergent or competing.

SUB-ISSUES

Challenges with managing/governing a mobile resource. Water is very different from land. It traverses landscapes in the form of rivers and groundwater tributaries, and therefore across property and administrative

boundaries, nationally and internationally. Water also takes on solid, liquid, and gas forms; rainwater that falls in one area derives from evaporation in another. Because of these factors, assigning rights to water is difficult—and is the reason why water is sometimes called a fugitive resource. When water becomes increasingly scarce, long-standing systems of riparian rights and appropriation rights to water can permit more powerful actors to control water resources at the expense of the less powerful. Multi-stakeholder negotiation platforms that attempt to level the playing field among interest groups and establish a more equitable system of water rights have demonstrated some success when all interest groups have a stake in their success.

Legal pluralism and contradictory rules governing water access and management. In many rural areas of developing countries, water access and allocation are governed by community-based rules that extend back for generations and have adapted over time. Many of these rely on community membership as a basis for appropriating water. Yet, as competition for water rises, nations are increasingly expanding statutory law to govern water rights and allocation or strengthening the power of state authorities to enforce formal law. This introduces alternative authorities for decision making and multiple systems for access and allocation. In some cases, these multiple legal systems coexist and provide opportunities for people to appeal to different rules and authorities to assert their interests. However, other times they conflict with or are used to disadvantage less powerful claimants. South Africa offers one example of where the state legally recognizes customary institutions for water governance.

Weak systems of administration for managing public water supply and sanitation. In the 1980s, many developing countries undertook decentralization approaches, transferring control from central to municipal governments or even farmer-managed irrigation systems. Efforts to decentralize water resources management have sought to improve service delivery by locating authority closer to water users. However, decentralization has run up against severe capacity constraints as local governments are expected to acquire sufficiently qualified staff and financial resources to assume the roles once held by higher levels of government. While exceptions exist, utilities, including water, are renowned for their inefficiency. In developing countries, they often lack capable or sufficient human resources, technical, and/or financial resources; rely on a weak tax base; and are victims of diminishing public sector capacity due to high external debt. Because water production is highly capital intensive and the infrastructure for water supply is not easily transferable to other uses, water utilities are highly conducive to monopoly power.

Overlapping jurisdictions and lack of institutional coordination. River basins and watersheds often span two or more governance boundaries (including international boundaries), which often have competing interests as well as different rules and rights regimes, challenging integrated water management. Problems arise, for example, when upstream stakeholders in one jurisdiction impose externalities on another, and those affected lack the power to hold upstream users accountable. Successful water and watershed management depends on coordination of sectoral interests among government authorities—for example, agricultural, forestry, mining, and industrial policies and interventions that impact water regeneration capacity and water quality. Yet, different sectors typically operate with narrow, sectorally defined targets and are vertically accountable, hindering incentives for inter-sectoral collaboration. Moreover, various institutions have mandates for water supply and management, such as ministries of water resources, urbanism, industry, agriculture, or the environment, as well as parastatals and local government authorities. These institutions can compete with one another, particularly when their mandates for water management are vague or overlapping.

Inadequate data or information to guide decision making. Sound water management decisions require accurate, place-based information on water quantity and quality, and land use in catchment areas. Surface water and groundwater are often mobile and their conditions can change rapidly, requiring regular monitoring

and hydrological models to inform decisions on water resource development, management, and use. The concealed nature of groundwater makes it especially challenging to monitor. Developing countries are particularly deprived of adequate flows of hydrological, hydrogeological, and land use data to inform effective water allocation and management.

Centralization and lack of citizen participation in decision making. Collective rural water supply systems (including for irrigation purposes), in which government authorities have the upper (or the only) hand in determining rights to water often result in poor compliance with rules governing the system. Weak decision-making power and rights also diminish the incentives of users to contribute to operations and maintenance of the system. Traditional public and private management of water supply has tended to exclude public participation in governance. Although decentralization of water management has occurred in a number of countries, it has generally not been accompanied by increased citizen oversight and accountability. In some cases, decentralization has expanded opportunities for governments to turn water provisioning over to private sector management, thereby weakening the capacity for local citizens to hold utilities accountable.

Weak local institutions for collective water management (including maintenance of water infrastructure). Because water tends to be a landscape-level resource crossing many boundaries, effective management requires collective action among disparate users, interests, and authorities. Whereas localized institutions can be quite effective, engendering collective action over large distances tends to be much more challenging. Local institutions can often be brought together to agree on a common set of rules for water governance. However, all too often they lack the power to enforce one another's compliance or lack a mutually reinforcing incentive structure to ensure compliance.

Weak dispute mediation systems to secure enforcement of water rights. Local dispute resolution institutions may be adequate to resolve water rights disputes between neighbors, but are powerless when mediating disputes between community members and urban elites, industries, or governments. When pursuing claims through formal law, authorities in charge of enforcing formal water rights are frequently weak, or lack incentives to defend rights of ordinary citizens, especially the poor or socially marginalized.

2.2 VOLUNTARY GUIDELINES WITH RESPECT TO TRANSBOUNDARY MATTERS

While the *Voluntary Guidelines on the Responsible Governance of Tenure of Land, Fisheries and Forests in the Context of National Food Security* (Voluntary Guidelines) implicitly address water rights governance through sections related to land, forests, and fisheries, water rights per se is not specifically addressed. However, Section 22, in the context of national food security, covers transboundary matters related to lakes and rivers that traverse the span of political boundaries:

1. “States should cooperate, in the framework of appropriate mechanisms and with the participation of affected parties, in addressing tenure issues related to land, fisheries and forests which traverse national boundaries. States should ensure that all actions are consistent with their existing obligations under national and international law, and with due regard to voluntary commitments...In States where transboundary matters related to tenure rights arise, parties should work together to protect such tenure rights, livelihoods and food security of the migrating populations while on their respective territories.
2. States and other parties should contribute to the understanding of transboundary tenure issues affecting communities, such as with rangelands or seasonal migration routes of pastoralists, and fishing grounds of small-scale fishers, which lie across international boundaries.

3. Where appropriate, States should harmonize legal standards of tenure governance, in accordance with existing obligations under national and international law, and with due regard to voluntary commitments...Where appropriate, this should be coordinated with relevant regional bodies and with affected parties. States, with the participation of the affected parties as appropriate, should develop or strengthen existing international measures to administer tenure rights that cross international boundaries. Where appropriate, they should coordinate with relevant regional bodies”

2.3 ILLUSTRATIVE INTERVENTIONS

The range of possible interventions relevant or applicable to this particular issue constraint can be quite broad depending on circumstances, and the need in any policy context to carefully adapt, target, sequence and nuance interventions according to institutional context and need. The interventions cited below are thus generalized and illustrative. The reader is further encouraged to review interventions for other constraint categories as well as a single intervention can be relevant to multiple constraints, particularly in contexts when multiple constraints across columns of the matrix are present or when of bundle of interventions across rows is required. Issues and interventions should thus be addressed holistically rather than concentrating on a single column or row.

	Weak Governance
Institutions and Governance	<ul style="list-style-type: none"> • Strengthen civil society. Expand the capacity and role of civil society in advocacy, promoting good governance, and assisting government with community mobilization for service delivery. • Facilitate decentralization and local governance. Support transition to local control over water management. Identify local solutions to problems and promote transparent and inclusive decision making that strengthens collaboration between local government and community leaders as they clarify and enforce rights. • Reinforce water governance authorities. Create and strengthen water governance authorities that support an integrated approach to water management and can objectively mediate disputes between competing jurisdictions. • Support water user associations. Create, strengthen, and mobilize local water user associations, including those of farmer-managed irrigation systems. Build their capacity to determine and enforce access and withdrawal rights. • Enable local governance. Empower communities with the necessary financial resources, and technical and organizational capacity to govern local water resources. • Streamline administration. Clarify mandates and responsibilities within and between government agencies and parastatals. Identify points of collaboration, train staff, and institute incentives that reward collaboration and improve governance.
Legal and Regulatory Framework	<ul style="list-style-type: none"> • Legitimize collective rights. Recognize collective rights to water resources in law, replacing less equitable riparian and appropriation regimes. • Build on customary law and practice. Build on socially legitimate local principles, rules, institutions, and practices for formalizing water allocation and management to enhance compliance. • Enforce water-sharing agreements. Establish effective monitoring and enforcement systems for water-sharing agreements. • Streamline dispute resolution processes. Clarify and formalize the relationship between customary regimes and statutory law, including stipulating when disputes must be heard by customary authorities and under what circumstances parties can appeal to civil authorities and the courts.
Rights Awareness and Empowerment	<ul style="list-style-type: none"> • Hold stakeholder forums. Create mediated multi-stakeholder negotiation platforms where interest groups can voice concerns, negotiate water rights, and reach compromise solutions on spatial and temporal rights to resources when

	Weak Governance
	<p>planning interventions such as dam construction or river diversion.</p> <ul style="list-style-type: none"> • Strengthen rights communication. Build capacity of water management authorities to communicate rights to stakeholders effectively and respond to concerns. • Institute downward accountability. Restructure water management institutions to be downwardly accountable to water users and other stakeholders. • Empower communities. Empower communities with necessary financial resources, and technical and organizational capacity to govern local water resources effectively.
Conflict and Dispute Resolution	<ul style="list-style-type: none"> • Increase access to justice. Undertake measures to ensure local water users have access to authorities and bodies who can resolve disputes ably and fairly (e.g., free or low-cost legal assistance). • Capacitate local authorities. Build capacity of and structure incentives for local administrative and judicial authorities to resolve disputes effectively and fairly. • Bolster ADR. Develop, or identify and strengthen ADR systems that are fair and transparent, accountable, and accessible to the economically disadvantaged.
Restitution, Redistribution, and Consolidation	<ul style="list-style-type: none"> • Support regulatory reforms that promote equality. Alter distribution of water rights by legal and regulatory reforms that define beneficiaries and their allocations, and enforce off-take through strengthened monitoring and enforcement. • Support local organizations in managing water rights. Mobilize individuals into water user associations and other community groups to enforce water off-take and schedules to redistribute water effectively from current users to those registered or targeted in regulations or water distribution schedules. • Compensate aggrieved parties suffering lost rights. Through legal recourse or community action, identify infringements and compensate those adversely affected by increasing access to justice in courts, through water boards, or community tribunals. • Negotiate water-sharing agreements. Negotiate agreements that impose water quotas and otherwise restrict water off-take, effectively redistributing rights within the population. • Consolidate water rights management. Consolidate water rights and water management under a water board, utility, or other institute to allocate and distribute water, collect rents, and maintain infrastructure—operating under principles of transparency, accountability, and good governance.
Rights Delivery and Administration	<ul style="list-style-type: none"> • Support water records systems and revenue collection. Support development of water registration systems that set water quotas and schedules, monitor off-take, set fees and record revenue to help support water rights distribution and manage revenues for sustainability. • Streamline institutional mandates. Among centralized and local institutions charged with water governance, ensure division of responsibility, clarify points of institutional collaboration, and train staff to carry out their mandates appropriately. • Strengthen enforcement of contracts and laws. Build capacity and incentives of local authorities to uphold laws and contracts assigning water rights.
Resource Use Management	<ul style="list-style-type: none"> • Adopt integrated water resources management. Promote the adoption of IWRM approaches that embrace whole ecosystems and their governance. • Promote participatory land use planning. Promote participatory land use planning, co-management models, conservancies, and other mechanisms that promote good local governance of water resources. • Establish payments for ecosystem services. Set up arrangements that incentivize water users to modify behaviors in ways that contribute to sustained ecosystem benefits. • Strengthen interagency coordination. Build the capacity of water supply and management institutions—whether ministry staff, utility personnel, municipal government officials, or members of local water management associations—to enhance coordination and efficiency of operations.

Weak Governance	
	<ul style="list-style-type: none"> • Improve application of water measurement technology. Increase quality research on social and economic dynamics that provides vital information for predicting water demand. Improve the use of technologies for water measurement by governments and other governance institutions.

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3.0 INSECURE TENURE AND PROPERTY RIGHTS

INTERVENTIONS	CONSTRAINTS					
	Resource Conflict and Displacement	Weak Governance	Insecure Tenure and Property Rights	Inequitable Access to Water Resources	Poorly Performing Water Markets	Unsustainable Natural Resources Management and Biodiversity Loss

3.1 LTPR ISSUE

Water is a public good in the sense that all human beings have a right to water to sustain their life and livelihoods. However, it cannot be conceived as a pure public good since one individual's use of water often interferes with the rights of another. Such may radically occur when a river is dammed or diverted, or more subtly when appropriation or contamination affects downstream users (as when pumping groundwater below the water table makes water unavailable to others). Rights can be affected indirectly as well, as when production of greenhouse gases contributes to climate change, which in turn leads to droughts, storm surges,

and floods that undermine people's access to adequate, safe, and reliable sources of water. For this reason, water tenure insecurity frequently derives from the off-site actions of those with greater power, wealth, and technology, who are capable of appropriating water to serve their interests, even if this occurs at the expense of others.

SUB-ISSUES

Weak property rights or inability to enforce rights. Administrative systems for water allocation often fail to protect the rights of all who are entitled to water. Riparian law, which water-rich countries often use, grants rights to persons holding property adjacent to watercourses. Although riparian rights holders are expected to respect the rights of other riparian rights holders, there tends to be little or no regulation of the quantity of withdrawals, thereby causing problems for downstream users. Moreover, those not adjacent to the water course are often excluded from water rights. "Prior appropriation" models, employed by some water-poor countries to govern surface water rights, grant higher priority for withdrawals to those who established rights first, disadvantaging those who acquired water rights more recently. Public trust doctrines often overlay these models, whereby the state has the capacity to override private water rights if they are deemed to infringe on the public interest. Public trust is also used to protect public access to certain water resources. Most countries employ public allocation models, whereby government retains the right to administer water resources. Decisions on who is allocated water rights and for what purposes are made by government, based on established guidelines or laws. When employed in the public interest, public allocation models have their merits. However, they can also be inefficient and used for political purposes, jeopardizing the tenure security of rights holders. Regardless of the administrative system, however, the capacity of governments to regulate and enforce water rights is often limited, leading to tenure insecurity.

Legal pluralism. A multiplicity of tenure regimes results in insecurity when users claim water rights under different, conflicting, sets of rules or law. For example, those claiming rights to water from a given river may include irrigation water user groups, industry, women drawing water for domestic use, water utilities, religious groups, or an entity managing protected wetland. The water rights of these groups may be protected under various international, state, and customary laws that are not harmonized with one another. Problems over the security of water rights arise when one group's water usage influences the quantity or quality of water available to other rights holders/users. Water scarcity may aggravate such problems. In areas where pastoralists and farmers are both using water points, conflicts can arise when two different systems of customary rights clash. Resolving water conflicts in situations of legal plurality can be especially difficult because those who draw rights from different systems frequently also subscribe to different institutions for resolving conflicts and may not agree to have their cases heard by the same authority.

Problems in formalizing customary rights. Legal procedures to formalize customary water rights are often met with apathy, or failure to respond. Barriers include lack of awareness, unfamiliarity with legal procedures, or inability to submit claims due to literacy or transportation constraints. When new water legislation is introduced, the opportunity for submitting claims is often time bound, further limiting the ability of women and other disadvantaged populations to respond. Responsiveness may be further dampened by requirements for statutory rights holders to pay administration or abstraction fees. In some cases the conversion of customary water rights to statutory water rights carries unfavorable impacts such as strengthening the rights of those most able to navigate the formalization process to the detriment of customary right holders with less financial resources, education or power.

Unequal rights and elite bias. The realization of greater equity in water rights allocation is frequently hampered by the political influence of those benefitting from overexploitation, often for large-scale irrigation

or industrial use. Lack of clarity or enforcement of water rights can lead to water use dominance, for example by those with access to technology for extraction, upstream river water users, users living close to a given water source, and users with higher political capital or economic standing. Development projects that promote improving water availability may also privilege elites. For example, when controlled access systems developed by pastoral communities were replaced by open-access water infrastructure in Niger, the more powerful members of society took control over water points. Inequalities also prevail at the household level. Local norms often accord women weaker rights than men over water resources, even though they disproportionately bear the responsibility for ensuring adequate supply of domestic water for drinking, cooking, washing, bathing, and sanitation. Women rely on water for agriculture, livestock rearing, and small-scale enterprises, yet their claims are often overshadowed by those of men, government, and private sector.

Problems in fulfilling universal human rights to water as a basic need. Developing countries that have legislated and tried to implement a universal human right to water (e.g., South Africa, India, Argentina) have not yet succeeded. To secure a human right to water, governments need to ensure a range of measures that include but are not limited to minimum amount of water for domestic use; non-discrimination in availability, accessibility, and quality of water; safe access; monitoring of the right to water; and protection of the right of vulnerable and marginalized populations. Governments are hampered by insufficient funds for water infrastructure development, operations and maintenance, inadequate water sources, and insufficient infrastructure upkeep. Practical dilemmas arise over servicing certain groups, such as remote communities, communities residing in arid areas with poor groundwater, transient groups, and people residing in squatter settlements. With modern urbanization, vast concentrations of people reside in small geographic areas that often have limited water resources. Water resources to support cities are regularly sourced from areas further away, which may infringe upon customary water rights and water tenure security of those living in areas where the water originates.

Fluctuations in water availability and climate change. The transient nature of water is such that its availability and quality at the source changes throughout the course of a year, and from year to year. Variation in water availability and quality stems from natural and human-induced causes, including groundwater salinization, and water contamination. Climate change is of particular concern, which the scientific community forecasts will impact rainfall and the consistency of freshwater availability in many parts of the developing world. The United Nations estimates that by 2030, 47 percent of the global human population will be living in areas of high water stress. As the amount of water available to meet water rights claims decreases, rights cannot always be met.

Inaccurate water availability forecasting and overharvesting. Statutory water rights are often issued for a period that spans several decades. In some cases, these rights are allocated based on optimistic or incorrect forecasting of future rainfall and river flows. When the forecasted rainfall is not received, sufficient water may not be available to meet all claims or needs. This issue is particularly acute in increasingly arid areas where irrigation water rights have been over-allocated. Open access water systems do not attempt to regulate the extent of water use per user. This lack of regulation tends to exacerbate overexploitation by users who have the means and incentive to use large volumes of water, such as upstream water users for irrigation or industry. Because of the spatial dynamics of water in a river system, upstream users may overexploit the resource without feeling the effects of this overexploitation, even when downstream users and the natural resources system are deprived of sufficient water resources.

3.2 ILLUSTRATIVE INTERVENTIONS

The range of possible interventions relevant or applicable to this particular issue constraint can be quite broad depending on circumstances, and the need in any policy context to carefully adapt, target, sequence and nuance interventions according to institutional context and need. The interventions cited below are thus generalized and illustrative. The reader is further encouraged to review interventions for other constraint categories as well as a single intervention can be relevant to multiple constraints, particularly in contexts when multiple constraints across columns of the matrix are present or when of bundle of interventions across rows is required. Issues and interventions should thus be addressed holistically rather than concentrating on a single column or row.

	Insecure Tenure and Property Rights
Institutions and Governance	<ul style="list-style-type: none"> • Streamline water management and planning institutions. Integrate and streamline overlapping institutional mandates to improve operating efficiency and governance and to prepare for the devolution of authorities related to the allocation and protection of water rights. • Devolve authority. Pass decision making over water rights and resource management to lower levels of government and communities. • Strengthen legal recourse. Strengthen the capacity of the judiciary, courts, and magisterial systems to clarify and protect property rights for all citizens. • Strengthen civil society. Expand the capacity and role of civil society in rights advocacy and protection, and provide for citizen participation in decision making.
Legal and Regulatory Framework	<ul style="list-style-type: none"> • Develop water policy. Develop policy to guide clarification, distribution, redistribution, or protection of rights as foundation for legal and regulatory reform. • Clarify and strengthen legal rights. Clarify and formalize, in law, rights of ownership, usufruct, exclusion, and transferability—including customary rights—to strengthen tenure security, provide for legal recourse, and ensure fair and equitable allocation of water. • Harmonize mandates and improve interagency coordination. Harmonize legal mandates for water regulation across government agencies and from national to local levels. • Bolster local governance. Strengthen water management rights of local user groups.
Rights Awareness and Empowerment	<ul style="list-style-type: none"> • Increase public awareness. Use media and consultation to inform affected peoples about their rights, benefits, and recourse. Conduct awareness campaigns on rights formalization opportunities. • Support water rights advocacy. Strengthen capacity of civil society groups and less powerful interest groups to articulate their interests and negotiate rights. • Conduct stakeholder forums. Hold multi-stakeholder forums to negotiate and clarify rights. • Promote community mobilization and participatory governance. Support water user associations to devolve authority to the community, community owns and manages public wells, enforcing water off-take within context of irrigation systems via community mobilization, information awareness, and enforcement.
Conflict and Dispute Resolution	<ul style="list-style-type: none"> • Support ADR. Promote neutral third party mediation or arbitration as a tool to manage conflict. • Make legal aid accessible. Provide legal assistance to aid those with less power, wealth, or technology in securing their water rights. • Improve access to formal justice. Simplify and streamline judicial procedures for hearing and settling cases of water rights disputes. Undertake measures to reduce opportunities for judicial corruption and practices that disadvantage less powerful rights holders.

	Insecure Tenure and Property Rights
	<ul style="list-style-type: none"> • Monitor water disputes and support their resolution. Maintain a national database on disputes that have been formally and informally resolved. Identify and address commonly disputed areas through monitoring with special emphasis on vulnerable populations such as indigenous groups, women, and children.
Restitution, Redistribution, and Consolidation	<ul style="list-style-type: none"> • Redistribute water rights. Implement laws and regulations following legal reform to redistribute water rights (e.g., from upstream to tail end water users of canals, from agricultural to urban users, or from concessions to communities). • Restitute water rights. Secure the return of water rights to affected parties following dispute resolution, or in the context of removing populations from rivers and streams undergoing infrastructural improvements (dams) or land reclamation. • Compensate for state takings. Establish systems for full and fair value compensation of assets and livelihoods lost by takings either in cash or in-kind.
Rights Delivery and Administration	<ul style="list-style-type: none"> • Formalize water rights. Institutionalize the sanctioning of negotiated local water rights by the state. • Recognize individual rights. Formalize individual or group rights through use of registry records, water-sharing contracts, or public notaries. • Register customary rights. Engage communities in demarcation and registration of customary rights under oversight or decision-making authority of elected body. • Empower water user associations. Enable water user groups to negotiate and enforce water off-take, collect fees, and invest in water supply infrastructure. • Incentivize water conservation. Incentivize conservative water use with reduced fees for low volume users.
Resource Use Management	<ul style="list-style-type: none"> • Institute collaborative management. Use collaborative models for managing water resources (e.g., co-management, water user associations) to strengthen participatory decision making, negotiate resource sharing contracts and other agreements, and enforce compliance with established rights and restrictions. • Improve information management. Promote the use of MIS and GIS systems to monitor water stocks and flows, record user rights, and improve water availability forecasting for rights allocation. • Strengthen water resources and use monitoring. Improve systems to monitor water extraction and pollution in accordance with rights and regulations, particularly by intensive water users such as industry and commercial agriculture. • Support watershed and urban water planning. Support regional water sharing agreements, master planning to help site public or community wells and collect fees for upkeep, and integrated watershed management, among others.

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4.0 INEQUITABLE ACCESS TO WATER RESOURCES

INTERVENTIONS	CONSTRAINTS					
	Resource Conflict and Displacement	Weak Governance	Insecure Tenure and Property Rights	Inequitable Access to Water Resources	Poorly Performing Water Markets	Unsustainable Natural Resources Management and Biodiversity Loss
	Institutions and Governance					
	Legal and Regulatory Framework					
	Rights Awareness and Empowerment					
	Conflict and Dispute Resolution					
	Restitution, Redistribution, and Consolidation					
	Rights Delivery and Administration					
	Resource Use Management					

4.1 LTPR ISSUE

Water constitutes one of our most basic needs, yet an estimated 1.1 billion people are without access to safe water necessary for survival. On the other end of the spectrum, industries like mining and manufacturing consume 20 percent of the world's freshwater resources, while agriculture accounts for 70 percent of withdrawals. According to the Food and Agriculture Organization of the United Nations (FAO), 85 percent of the wealthiest 20 percent of the world's population have access to water that is piped into the household, while only 25 percent of the poorest 20 percent of the world's population have such access. Meanwhile, on

average, the poor pay significantly more for water than the rich do, up to 10 times more per liter in some cases. Gender as well as poverty plays an important role in access. As competition for water rises in the face of economic growth and increased scarcity, women—who disproportionately bear the responsibility for assuring water for domestic use—often lose water rights to more vocal and powerful stakeholders, such as male farmers demanding water for irrigated crops, industries with high water needs, and governments looking to supply water to meet the needs of expanding urban populations. Women’s interests often fall to the bottom of the priority list (or do not feature in it at all) when it comes to negotiations over water rights.

SUB-ISSUES

Regional inequality in water distribution. The distribution of freshwater sources in the world is highly unequal. South America has the most abundant supply contributing to approximately 32 percent of the world’s supply of freshwater, while the Middle East is the most water-scarce, with less than 1 percent of global renewable water resources. Countries plagued by high levels of water scarcity tend to have carefully crafted treaties for sharing limited supplies of water between countries. They also tend to be highly dependent on food imports in lieu their ability to feed their populations through domestic agricultural production.

Climate change and increasing uncertainty in seasonal water supply. The forces of climate change are already contributing to increases in the duration and variability of drought and the intensity of storm systems and flooding. Whereas droughts diminish governments’ and people’s ability to secure water in general, floods wreak negative impacts on water quality and safety. As climatic changes become more severe, disparities in access and rights to water will undoubtedly worsen. Intense changes in the variability of water supply mean increased riskiness of agricultural production, translating to precarious livelihoods for rural populations and fluctuating domestic and global food supplies. Vulnerable populations and female producers, who most heavily rely on marginalized lands, are most susceptible to resource degradation driven by climate change.

Disparate access to adequate water supplies, both quantity and quality. Unequal access to reliable and clean supplies of water is a growing problem worldwide. The poor, especially the female poor, usually pay the most for clean water, particularly when municipal water supplies fail to extend to low-income urban neighborhoods or surrounding peri-urban and rural areas. Users at the tail end of an irrigation scheme or residing downstream in a watershed typically suffer from highly variable water supplies. Just as the poor struggle with limited water availability, they also tend to endure the poorest water quality. Because poor people rely disproportionately on accessing water at its source, they are often the hardest hit victims of water contaminated by upstream farmers using fertilizers and pesticides, industrial waste dumped into rivers, groundwater contamination from mining, and other forms of water pollution. Yet, they typically lack the economic means or clout to assert their rights against more powerful actors or to demand water treatment systems. The result is a highly disparate distribution of clean, safe water between rich and poor.

Privatization of land contiguous to public waterways and water sources. In developing countries, the rural poor often access water from its source, such as springs, rivers, and irrigation canals. This water harvesting is primarily the job of women. Privatization of land that had once been communal can restrict women’s ability to access water and thereby impose negative impacts on their capacity to garden, raise livestock, generate income, and attend to the health and well-being of their families.

Marginalization of water rights claims by less powerful stakeholders. In rural irrigation systems, often the only formal water rights assigned are those for irrigation. Rights to the use of water for other purposes are often not formally recognized or even prohibited. These include such traditionally female-dominated uses as domestic consumption, home gardens, watering animals or small-scale enterprises—though sometimes

informal rights for these uses and users become established at the local level. Efforts to decentralize water governance, especially for irrigation, have led to the proliferation of water user associations. Women and farmers with fields outside the command area tend to be excluded from these user associations and decision making about the system, even though they often rely on irrigation system water to meet other needs. Although local organizations have formed around other water uses, rarely do they enjoy the formal support and power of irrigation associations. As a result, their priorities and water needs tend not to be addressed.

Lack of water supply infrastructure in poor or remote areas. Expansion of water supply networks is capital-intensive and costly. Costs of supplying water are lower where a high concentration of users exists, and where users are relatively close to the source. Cost recovery potential tends to be greater where users are more affluent. Utilities, therefore, have diminished incentives to invest in infrastructure and supply to areas that are more remote, less populous, and more impoverished, including urban informal settlements and small farmers on the periphery of areas characterized by larger farms. When utilities are privatized, incentives to supply poorer or more remote areas tend to diminish even further, since supplying these areas can be unprofitable. Lack of formal legal claims to land and housing can also deter utilities from supplying service to informal settlements because water provision historically encourages permanent settlement, and in some cases because the law mitigates against supplying untitled properties.

4.2 ILLUSTRATIVE INTERVENTIONS

The range of possible interventions relevant or applicable to this particular issue constraint can be quite broad depending on circumstances, and the need in any policy context to carefully adapt, target, sequence and nuance interventions according to institutional context and need. The interventions cited below are thus generalized and illustrative. The reader is further encouraged to review interventions for other constraint categories as well as a single intervention can be relevant to multiple constraints, particularly in contexts when multiple constraints across columns of the matrix are present or when of bundle of interventions across rows is required. Issues and interventions should thus be addressed holistically rather than concentrating on a single column or row.

	Inequitable Access to Water Resources
Institutions and Governance	<ul style="list-style-type: none"> • Decentralize water resource governance. Decentralize government structures, roles, and responsibilities from national to regional, municipal, and local levels to improve the management and allocation of water resources. • Develop and support international water treaties. Support regulated water markets that enable water transfers from water-abundant to water-scarce regions and countries without infringing on the water rights of ordinary citizens. • Ensure affordable water. Devise water rights regimes that assign citizens (especially the poor, both male and female) adequate water rights to meet their needs, regardless of ability to pay. • Create utility partnerships. Establish partnerships between utilities and communities for water supply and management. • Create and expand water user associations. Create or adapt local water user associations that are inclusive of all water users in the community. • Promote women-led community-based organizations. Mobilize women-led community-based organizations to spearhead local water management.
Legal and Regulatory Framework	<ul style="list-style-type: none"> • Reform legal water frameworks. Reform local water rights regimes to recognize claims of marginalized stakeholders.

	Inequitable Access to Water Resources
	<ul style="list-style-type: none"> • Improve delivery to poor/underserved populations. Reform legal frameworks to strengthen the capacity of the state to acquire and distribute water for the public good, particularly for serving poor and marginalized populations. • Promote equitable water distribution. Establish water rights regimes that require utilities to provide all citizens a minimum supply of clean water. Regulate water markets to ensure allocation that is more equitable. • Protect women's access to water and water rights. Develop and implement policies that recognize gender roles in water capture and use, and laws that protect women's access to water sources and their use rights.
Rights Awareness and Empowerment	<ul style="list-style-type: none"> • Engage the public in participatory decision making. Involve local citizens in decisions governing access to water, and whether to introduce or liberalize water markets. • Raise public awareness. Devise and implement awareness campaigns that inform citizens of their rights to water and procedures for defending those rights. • Foster collective action. Mobilize marginalized sub-populations, including women, to exert collective demands for water access and services and thereby increase their political potency. • Increase women's management capabilities. Enable women to serve as water managers, and to voice and defend their interests in water user associations through leadership and informed participation.
Conflict and Dispute Resolution	<ul style="list-style-type: none"> • Broaden access to courts. Strengthen the capacity and reach of the judiciary to mediate water rights disputes and uphold principles of equity and efficiency. • Provide for legal assistance. Facilitate broad access to formal and informal bodies that preside over water rights disputes through support for community paralegals and subsidized legal assistance. • Reduce bias in adjudication. Promote the inclusion of women in the judiciary and ADR bodies through education, training, and other measures to tackle gender bias and increase opportunities. • Sensitize authorities on gender roles and constraints in water policy. Educate judiciary and ADR authorities regarding gender roles in water capture and use, and apprise them of laws and policy that protect access rights for women and the poor.
Restitution, Redistribution, and Consolidation	<ul style="list-style-type: none"> • Establish subsidies for the poor. Establish subsidies targeting the poor based on volume consumed (block rate pricing systems) and/or the socioeconomic profile of residential areas. Institute connection subsidies to facilitate access of poor households, including those headed by women, to the water supply network. • Penalize tax polluters. Tax point-source polluters. Provide tax incentives to reduce non-point source pollution • Control unbridled water resource exploitation through regulation. Implement regulations and enforcement mechanisms to limit water capture by public and private interests. • Incentivize water utilities to provide affordable water to the poor. Provide economic incentives to water utilities to extend and maintain the supply network to reach low-income and remote users.
Rights Delivery and Administration	<ul style="list-style-type: none"> • Formalize water rights. Formalize the rights of users of common pool water resources through water rights registration or contracts (either formal or informal) to secure rights and broaden access for the poor and marginalized. • Establish water use quotas or tariffs. Develop consumption restrictions that curtail water mining or off-take that hampers equitable water distribution. • Remove gender bias in water access. Among water user associations and other local bodies that administer water, establish rules for access to common water sources that treat women's water uses on par with those of men and protect

	Inequitable Access to Water Resources
	secondary water uses (e.g., use of water from irrigation canals for cooking/washing).
Resource Use Management	<ul style="list-style-type: none"> • Conduct environmental planning. Implement environmental master planning to restructure water allocation and regulate off-take to ensure fair and equitable distribution of water resources. • Strengthen coping strategies. Increase government and community capacity to adapt to and cope with climate change impacts. • Support water-efficient technology creation and diffusion. Support water-efficient technologies and practices, such as rainwater harvesting, drip irrigation, water demand management, and the integration of drought-resistant food alternatives into local diets. • Preserve or strengthen common water property management. Protect common property resources that house critical local water supplies, especially for the poor.

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5.0 POORLY PERFORMING WATER MARKETS

		CONSTRAINTS					
		Resource Conflict and Displacement	Weak Governance	Insecure Tenure and Property Rights	Inequitable Access to Water Resources	Poorly Performing Water Markets	Unsustainable Natural Resources Management and Biodiversity Loss
INTERVENTIONS	Institutions and Governance						
	Legal and Regulatory Framework						
	Rights Awareness and Empowerment						
	Conflict and Dispute Resolution						
	Restitution, Redistribution, and Consolidation						
	Rights Delivery and Administration						
	Resource Use Management						

5.1 LTPR ISSUE

Since the 1980s, there has been a growing movement to embrace tradable water rights as well as the privatization of water infrastructure and supply services. Both trends have sparked considerable controversy in developing countries. Proponents of privatization argue that it increases efficiency, reduces waste and overuse, and enables better distribution in response to consumer demand. Others argue that privatization and tradability have contributed to soaring water costs and that allocations are based on ability to pay, thereby burdening the poor to satisfy a fundamental human need. Civil protests have broken out in reaction to

dramatic rate hikes associated with water privatization and removal of subsidies. Water subsidies have their drawbacks, namely imperfect targeting and their potential to lead to squander. But their removal can cause rates to exceed what the least economically empowered can afford. The efficacy of subsidies can also depend on what types are applied, with some being more effective at targeting the poor than others. Market-based payment for ecosystem services mechanisms are also being applied in an effort to increase the supply and quality of water, and to improve ecosystem health. Yet these mechanisms continue to face several challenges.

SUB-ISSUES

Failure of water privatization to serve the poor. Privatization of water systems, water management, and infrastructure generally involves the transfer of ownership of these systems and responsibilities from public entities to private corporations. Typically focused on provision of urban water, and sometimes water for irrigation, privatization holds promises of cost recovery and greater efficiency. However, profit motives combined with regulatory failures often mean that the poor are the main losers when privatization of utilities occurs, either because of substantial tariff increases and the consequent disconnection for non-payment, or exclusion from connection due to high costs or failure to offer service to the areas where the poor reside. Hence, privatization of water provision is often hotly contested by civil society. Efforts to privatize and establish markets for water in developing countries are most prevalent in Latin America, where they have also proven highly controversial. Privatization of water provision and removal of subsidies can also cause rates to exceed what the least economically empowered can afford.

Risks of transferable water rights and voluntary exchanges. Enabling water rights to be tradable involves separating rights to land from rights to water and allowing those who are assigned water rights to sell those rights to others. Trade in rights to water can range from a regime that is highly regulated to one that embraces free markets with minimal regulation. Free market approaches for allocation of water have been both lauded and severely criticized. Proponents of water markets have pointed to efficiency gains resulting from reduced state intervention and channeling a scarce commodity to its most valuable uses through markets. Detractors argue that characteristics of water, namely its mobility and transformability, increase the risk of negative impacts on other water users. Industries that depend on large amounts of water or that profit from selling it (e.g., mining, paper, bottled water) are often capable of paying higher prices to purchase water rights compared to municipal governments and their taxpayers. In practice, those who are less economically empowered and informed, including potential female customers, tend to be excluded from water markets.

Water subsidies regressive to the poor. The main elements that go into determining water prices include 1) the cost of water provision (including fixed investment and variable costs), 2) costs associated with treatment of water supply, 3) demand for water, and 4) price subsidies. Providers not subject to regulation will primarily take into account elements 1 and 3. The rationale for water subsidies is largely rooted in social equity objectives and arguments that poor households should not have to pay the same as non-poor households to have access to water, especially to meet basic human needs. Subsidies may be channeled through public or private utilities (typically mandated and often partially financed by governments) or may be provided directly to eligible consumers. Subsidies are often unintentionally regressive due to the lack of household connections in poor communities and the reliance on proxy income for subsidy targeting.

Difficulty creating water-based ecosystems services markets. Hydrology-based payments for ecosystem services seek to engage the private sector in mitigating damage to ecosystems and protecting water sources. Challenges to making such schemes effective include clearly measuring the services and their benefit to those making payments, articulating the scale at which the resources are managed, identifying the recipients of payment for use in water management, and determining how ecosystem services are defined and grouped.

5.2 ILLUSTRATIVE INTERVENTIONS

The range of possible interventions relevant or applicable to this particular issue constraint can be quite broad depending on circumstances, and the need in any policy context to carefully adapt, target, sequence and nuance interventions according to institutional context and need. The interventions cited below are thus generalized and illustrative. The reader is further encouraged to review interventions for other constraint categories as well as a single intervention can be relevant to multiple constraints, particularly in contexts when multiple constraints across columns of the matrix are present or when of bundle of interventions across rows is required. Issues and interventions should thus be addressed holistically rather than concentrating on a single column or row.

	Poorly Performing Water Markets
Institutions and Governance	<ul style="list-style-type: none"> • Decentralize water allocation and rights governance. Decentralize government structures, roles, and responsibilities from national to regional, to municipal, to local levels to improve management and allocation of water resources. • Create utility partnerships to expand water supply and distribution. Establish partnerships between utilities and communities for water supply and management. • Promote women-led community-based organizations. Mobilize women-led community-based organizations to spearhead local water management.
Legal and Regulatory Framework	<ul style="list-style-type: none"> • Develop water policy. Develop policy to guide the clarification, distribution, redistribution, or protection of rights as the foundation for legal and regulatory reform. Develop regulations for water pricing, fees, and off-take. • Initiate progressive water pricing. Devise water rights regimes that assign citizens (especially the poor) adequate water rights to meet their needs, regardless of ability to pay. • Assign value to water resources. Implement payment for ecosystem services arrangements based on valuation of the ecosystem benefits of water.
Rights Awareness and Empowerment	<ul style="list-style-type: none"> • Engage the public in water allocation/distribution decisions. Involve local citizens in decisions governing whether to introduce or liberalize water markets. • Raise public awareness. Devise and implement awareness campaigns that inform citizens of their rights to water and procedures for defending those rights. • Broaden participation in water auctions/distributions. Strengthen capacity of women and marginal groups to serve on water boards, participate in water auctions and pricing decisions, and voice their interests in water use management.
Conflict and Dispute Resolution	<ul style="list-style-type: none"> • Build capacity of the judiciary to handle water allocation issues. Strengthen capacity and reach of the judiciary to mediate water rights disputes and uphold principles of equity and efficiency. • Strengthen access to justice. Strengthen access to justice for citizens denied adequate access to water. • Mediate water market conflict. Mediate conflict between communities over water ownership, access, and transfer. Mediate disputes between and among families (e.g., via ADR). Establish community water boards to resolve issues related to water off-take, sales, or use.
Restitution, Redistribution, and Consolidation	<ul style="list-style-type: none"> • Implement cross water subsidies. Implement cross subsidies in which wealthier or high-use households (or neighborhoods) pay higher prices for water than poorer households/neighborhoods or those who consume less water. • Subsidize connection to water supply networks. Provide connection subsidies to eligible households to facilitate access of poor households, including those headed by women, to the water supply network and diminish potential for

	Poorly Performing Water Markets
	<p>regressive tariff subsidies.</p> <ul style="list-style-type: none"> • Apply volume-based water pricing systems. Charge progressive rates based on use; exempt amount of water determined to meet basic human needs.
Rights Delivery and Administration	<ul style="list-style-type: none"> • Segment water markets. Segment water markets among similar types of local users to allow for better access to market information and less tendency for more powerful users to monopolize markets. • Differentiate water services delivery. Implement fee schedules in which prices reflect the costs of supplying different qualities of services, such as community taps vs. direct household hook-ups. • Incentivize water services delivery. Reward companies for improved service, or extension or maintenance of networks to poor urban neighborhoods or rural areas, in particular small pumps, wells, and low-cost water infrastructure systems.
Resource Use Management	<ul style="list-style-type: none"> • Establish water payment for ecosystem services programs. Establish payments for ecosystem services mechanisms to curb water overuse and contamination through compensation to landholders who protect water resources that provide benefits to others. • Reduce water costs and waste to lessen demand. Introduce low-cost, efficient water capture technologies such as treadle pumps and technologies that reduce water demand (e.g., drought-resistant seeds and drip irrigation). • Improve water flow measurement and pricing. Install meters or systems to accurately record water flow at affordable levels. Introduce methodologies to value water resources for public water sale or to help set user fees. Use contracts or water sharing agreements to help regulate water off take.

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6.0 UNSUSTAINABLE NATURAL RESOURCES MANAGEMENT/ BIODIVERSITY LOSS

INTERVENTIONS	CONSTRAINTS					
	Resource Conflict and Displacement	Weak Governance	Insecure Tenure and Property Rights	Inequitable Access to Water Resources	Poorly Performing Water Markets	Unsustainable Natural Resources Management and Biodiversity Loss
	Institutions and Governance					
	Legal and Regulatory Framework					
	Rights Awareness and Empowerment					
	Conflict and Dispute Resolution					
	Restitution, Redistribution, and Consolidation					
	Rights Delivery and Administration					
	Resource Use Management					

6.1 LTPR ISSUE

Terrestrial and aquatic natural systems and organisms depend upon the availability of quality freshwater at particular times throughout the year, and are therefore vulnerable to changes in water availability that result

from unsustainable water management. Threats to biodiversity from unsustainable water resources management often originate from changes to water and sediment flows, reduced water quality, overextraction, and land use changes in catchment areas. When designing water rights allocation schemes, an integrated approach that considers the water needs of the natural resources base and ecosystem regeneration requirements not only generates environmental benefits, but helps to ensure long-term availability of water and natural resources to human populations over time.

SUB-ISSUES

Increasing demand coupled with decreasing supply of quality fresh water stocks. While the fresh water available for human consumption on the earth is relatively fixed, human population continues to grow, thereby decreasing the amount of fresh water available per person. Further, water is unevenly distributed around the world. Areas of dense human settlement do not inherently coincide with areas of fresh water abundance. Meeting human water requirements in areas of high population density can put extreme stress on ecosystems. Many water rights systems are not sufficiently robust to regulate and manage this increased demand. As the human population density increases in many areas, the number of people with informal rights to use water for drinking and for irrigation also increases. As rainfall decreases in certain geographies due to climate change, the amount of water use per farmer increases for irrigation. Some water rights regulation systems, such as “first in time, first in volume” do not regulate the amount of water withdrawals. Water rights regulatory systems that do regulate volume are insufficiently enforced.

Limitations of environmental impact assessments. The combined impact of multiple water users and/or polluters to a natural water system is insufficiently managed in most countries, even where those users have legal water rights. Most environmental impact assessments (EIAs) for a given infrastructure development, when carried out, focus primarily on individual impacts of the given project, rather than cumulative impacts introduced by multiple rights holders over space and time. Failure of EIAs to consider the impacts of the broader spectrum of water rights can lead to overextraction and increased pollution. For example, if acceptable contaminant loads are determined for a given volume of water, and less water becomes available in the system due to increased rate of withdrawals, then chemical concentration is greater, and water pollution can intensify significantly.

Inadequate capacity or resistance to adaptive water management. Adaptive capacity for water management implies the ability to adapt societal water use to conditions of water scarcity, to meet water needs of people and the natural resources base now and over the long term. Yet, cost and political factors frequently hamper adoption of adaptive measures. Technologies for improving water use efficiency may be expensive. Political will to raise water prices may be lacking. Certain water user groups may carry strong political weight to resist changes to their water allocation rights or pricing.

Weaknesses in regulation, monitoring, and enforcement. Poor water regulation, monitoring, and enforcement have contributed to overexploitation. Surface water regulations such as first in time, first in volume tend to promote unsustainable exploitation by a few. Many irrigation systems have no mechanism to cut off users for overextraction. Where regulations do exist, enforcement is often weak and complicated by the spatial dynamics of water resources. Groundwater extraction is particularly difficult to monitor and control—to mitigate unsustainable exploitation by water utilities, irrigators, and other users. Consequently, intensive water users and polluters seldom directly suffer the consequences of actions that negatively affect a water resource and its ecosystem, and thereby have insufficient incentive to improve the sustainability of their water use practices. Poor regulation and enforcement is complicated by overlapping institutional mandates.

Lack of institutional coordination and overlapping institutional mandates. In most countries, responsibilities for the management of water resources and for the provision of potable water to meet basic human rights overlap among several government agencies (e.g., Ministry of Water, Ministry of Health, Ministry of Public Works, Ministry of Agriculture, Ministry of Forestry, Ministry of Environment, local government, and village water committees). Lack of effective coordination among different agencies can easily lead to over-allocation of water, and subsequently to environmental degradation.

Environmental stresses and ecosystem service degradation created by infrastructure. The ecosystem services provided by surface water are disrupted by changes in water and sediment volume, quality, and flow. Large-scale water diversion infrastructure developed to meet the needs of water rights holders can have negative impact on these flows, particularly in water-poor geographies. Such infrastructure includes piping water at the source, damming river systems, or transporting water through canals or pipes to water-poor areas of human habitation. Stress to an ecosystem increases with expanded water diversion and use, leading to degradation of riparian vegetation, wetlands, delta, and coastal ecosystems. Balance is often lacking between meeting the short-term needs of water rights holders (and interests of private sector developers) through water infrastructure projects, and preserving ecosystem functions to ensure water and habitat needs are met in the future.

Groundwater depletion and contamination. Groundwater provides an estimated 50 percent of potable water supplies globally, with an even higher percentage in developing countries. Water tables are falling from overexploitation in many areas highly dependent upon groundwater for human needs, or irrigation (including most of the Middle East and North Africa, and much of Latin America and the Caribbean, India, China, Pakistan, and Mexico). This causes environmental problems such as saltwater intrusion and subsidence in coastal areas, with negative consequences on groundwater quality, tidal flats, salt marsh, and dune geomorphology, and the inundation frequency of coastal marshes and wetlands. Groundwater depletion primarily results from human overextraction, which is exacerbated by failures to assign or clarify groundwater rights and weaknesses in rights enforcement. Failure to regulate rights to pollute surface waters, air, and soils also result in groundwater contamination (e.g., through leaching of pesticides and fertilizers), which generate negative environmental and human health impacts.

Water quality reduction. Degradation of water quality through human action is a major threat to natural aquatic ecosystems. Primary sources of water pollution in developing countries include fecal contamination, industrial effluents, and agricultural and urban runoff. Although water rights holders contribute to some of this water contamination, statutory water rights holders are usually not required to refrain from water pollution. For example, most holders of irrigation water rights are not required to take actions that reduce nonpoint source water pollution, such as reduction of pesticide, herbicide, and fertilizer use, or establishment of buffer zones to reduce sediment runoff. According to the UNFPA, about 90 percent of sewage and 70 percent of industrial wastes are dumped untreated or undertreated into natural water bodies, often by water utilities, companies, and other entities with legal water rights.

6.2 ILLUSTRATIVE INTERVENTIONS

The range of possible interventions relevant or applicable to this particular issue constraint can be quite broad depending on circumstances, and the need in any policy context to carefully adapt, target, sequence and nuance interventions according to institutional context and need. The interventions cited below are thus generalized and illustrative. The reader is further encouraged to review interventions for other constraint categories as well as a single intervention can be relevant to multiple constraints, particularly in contexts when

multiple constraints across columns of the matrix are present or when of bundle of interventions across rows is required. Issues and interventions should thus be addressed holistically rather than concentrating on a single column or row.

	Unsustainable Natural Resources Management and Biodiversity Loss
Institutions and Governance	<ul style="list-style-type: none"> • Streamline overlapping institutional mandates. Integrate and streamline overlapping institutional mandates to improve operating efficiency and governance and to prepare for the devolution of authorities related to the allocation and protection of water rights. Harmonize institutional roles, responsibilities, and mandates to improve sustainable resource management. • Promote decentralization of water management and use decisions. Decentralize government structures, roles, and responsibilities from national to regional, municipal, and local levels to bring rights in and control over water and other natural resources closer to those who depend on them. • Devolve authority over water rights and allocation. Transfer decision making over water rights and resource management to lower levels of government. • Establish and support international water management agreements. Establish intergovernmental watershed or river basin management committees.
Legal and Regulatory Framework	<ul style="list-style-type: none"> • Clarify water rights and strengthen enforcement. Define property rights to riparian land and wetlands clearly in law. Enable state sanctioning of negotiated local water rights. • Provide environmental incentives. Guarantee incentives for water conservation in law. Adopt legislation that guarantees citizens' rights to ecosystem services and provides them clear and accessible means to defend these rights. • Adopt integrated water resources management. Incorporate an IWRM approach in water law and policy. • Regulate water pollution and overuse. Promulgate law and regulations that control dumping of chemical/sewage waste and regulate groundwater extraction.
Rights Awareness and Empowerment	<ul style="list-style-type: none"> • Raise public awareness. Implement awareness campaigns on water rights formalization opportunities. • Conduct water use and management stakeholder forums. Facilitate stakeholder forums for water rights negotiation and clarification. • Improve water rights and use advocacy. Strengthen capacity of civil society groups and less powerful interest groups to articulate their interests and negotiate water rights.
Conflict and Dispute Resolution	<ul style="list-style-type: none"> • Inform ADR. Educate stakeholders on considerations of environmental sustainability in the context of rights negotiation. • Provide legal aid. Provide legal representation for citizens and other environmental interests in rights arbitration systems. • Apply and enforce water and environmental regulations. Improve the upholding of environmental law in judicial procedures for settling water rights. • Recognize multiple, overlapping water rights. Acknowledge multiple rights to water and ecosystem services in the dispute resolution process.
Restitution, Redistribution, and Consolidation	<ul style="list-style-type: none"> • Purchase water rights for conservation. Provide and implement legal provisions for the acquisition of water rights through lease, purchase, or donation. • Impose water quality restrictions. Through regulations, monitoring, and public oversight, restrict water off-take through quotas, fees, or user access restriction.
Rights Delivery and Administration	<ul style="list-style-type: none"> • Monitor water (quantity and quality) use. Quantify volume of water used and amount of water for which rights are granted for a given natural water system. • Provide for community demarcation and registration of water resources. Allow local communities to apply for title to their water resources to generate incentives for sustainable water management. • Improve capabilities to value ecosystem resources. Quantify value of preserving

	Unsustainable Natural Resources Management and Biodiversity Loss
	<p>environmental water rights to the long-term sustainability of human economic and social wellbeing.</p> <ul style="list-style-type: none"> • Support statutory water rights enforcement. Legally require statutory water rights holders to employ water management practices.
Resource Use Management	<ul style="list-style-type: none"> • Improve adaptive water management. Identify impact of various use scenarios upon an entire river system. Improve capacity for adaptive water management in responding to climate shocks. • Promote co-management of water resources. Establish formal and informal regimes that assign non-exclusive rights to resource use among upstream and downstream users, such as the right to prohibit certain uses or practices. • Provide water conservation incentives. Provide economic incentives for stakeholders employing conservation measures such as reduced taxation for farmers who maintain vegetative buffer strips along water courses. • Support integrated water management. Facilitate multi-stakeholder negotiation of interest groups in watersheds engaged in IWRM planning. Support formal and informal regimes that assign resource rights to upstream or downstream users (e.g., rights to prohibit certain uses or practices). • Increase water use efficiency through improved water delivery systems. Promote measures that increase water efficiency and supply—such as desalinization, water treatment, and water efficient appliances—for urban areas to avoid the need for new dams.

6.3 READINGS

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ANNEX A: FRESHWATER LAKES, RIVERS, AND GROUNDWATER MATRIX OVERLAY, SUMMARY TABLES

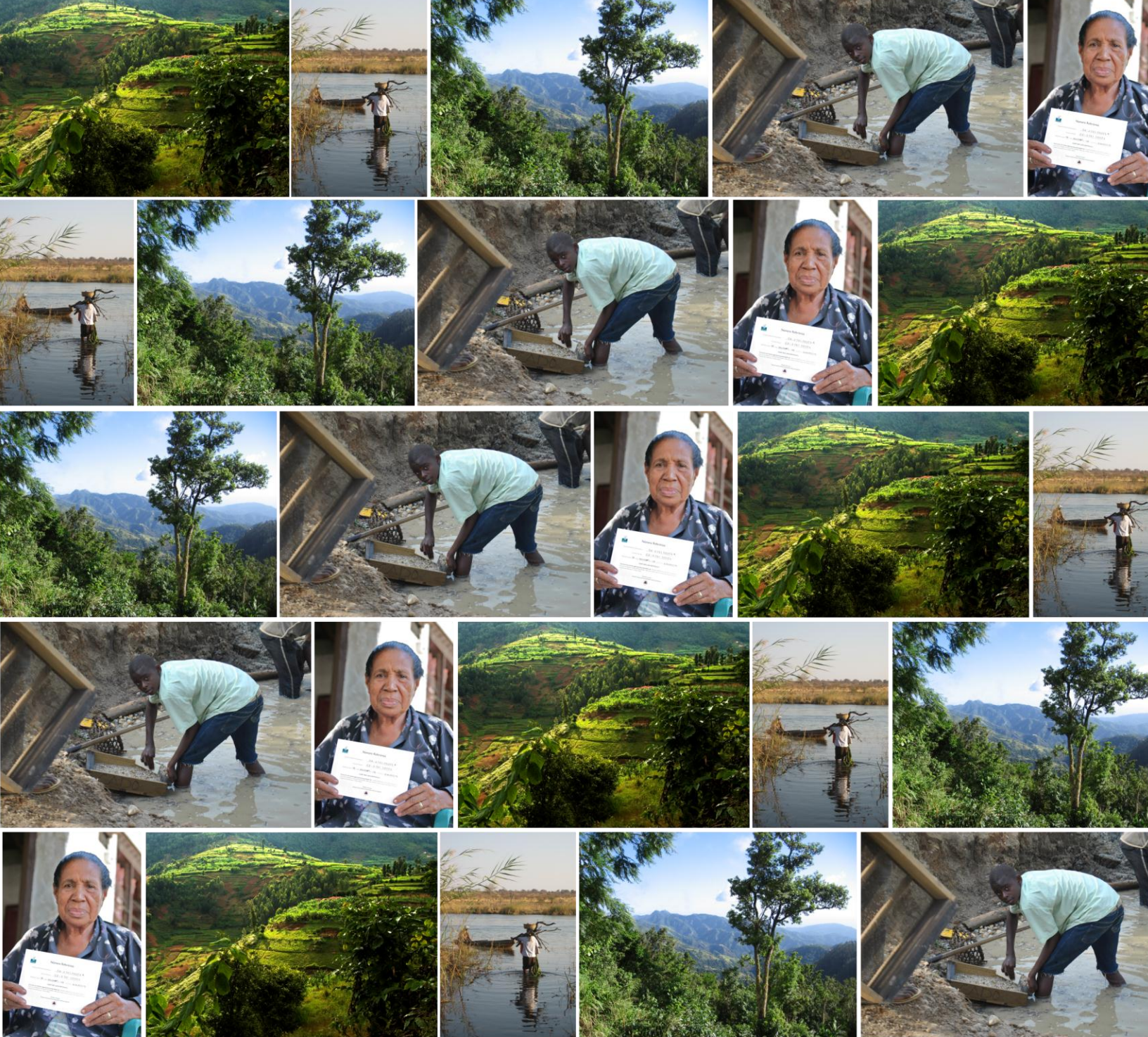
TABLE A.I. FRESHWATER LAKES, RIVERS AND GROUNDWATER OVERLAY: CONSTRAINTS AND COMMON SUB-ISSUES

Resource Conflict and Displacement	Weak Governance	Insecure Tenure and Property Rights	Inequitable Access to Water Resources	Poorly Performing Water Markets	Unsustainable Natural resources management and Biodiversity Loss
Upstream-downstream watershed conflicts Transboundary and riparian conflicts over water capture and quality Groundwater access conflicts Competition for control over water points and sources Conflicts over irrigation water Competition between urban and rural users of water Construction of dams and river diversions displacing peoples Displacement resulting from flooding, drought, and climate change	Challenges with managing/governing a mobile resource Legal pluralism and contradictory rules governing water access and management Weak systems of administration for managing public water supply and sanitation Overlapping jurisdictions and lack of institutional coordination Inadequate data or information to guide decision making Centralization and lack of citizen participation in decision making Weak local institutions for collective water management Weak dispute mediation systems to secure enforcement of water rights	Weak property rights or inability to enforce rights Legal pluralism Problems in formalizing customary rights Unequal rights and elite bias Problems in fulfilling universal human rights to water as a basic need Fluctuations in water availability and climate change Inaccurate water availability forecasting and overharvesting	Regional inequality in water distribution Climate change and increasing uncertainty in seasonal water supply Disparate access to adequate water supplies, both quantity and quality Privatization of land contiguous to public waterways and water sources Marginalization of water rights claims by less powerful stakeholders Lack of water supply infrastructure in poor or remote areas	Failure of water privatization to serve the poor Risks of transferable water rights and voluntary exchanges Water subsidies regressive to the poor Difficulty creating water-based ecosystems services markets	Increasing demand coupled with decreasing supply of fresh water stocks Limitations of environmental impact assessments Inadequate capacity or resistance to adaptive water management Weaknesses in regulation, monitoring, and enforcement Lack of institutional coordination and overlapping institutional mandates Environmental stresses and ecosystem degradation created by infrastructure Groundwater depletion and contamination Water quality reduction
<div> <div>←</div> <div> Crosscutting Constraints Gender / Women Vulnerability Ethnic and Socially Marginalized Populations Lack of Government and Community Capacity </div> <div>→</div> </div>					

TABLE A.2. FRESHWATER LAKES, RIVERS AND GROUNDWATER OVERLAY: INTERSECTION OF CONSTRAINTS AND INTERVENTIONS

LAND TENURE AND PROPERTY RIGHTS THEMES AND CONSTRAINT CATEGORIES							
LAND TENURE AND PROPERTY RIGHTS INTERVENTIONS		Resource Conflict and Displacement	Weak Governance	Insecure Tenure and Property Rights	Inequitable Access to Water Resources	Poorly Performing Water Markets	Unsustainable Natural resources management and Biodiversity Loss
	Institutions and Governance	Create multi-stakeholder negotiation platforms Support multi-stakeholder policy dialogue Encourage transparency and inclusiveness Support participatory decision making Strengthen cooperation between authorities Establish payments for ecosystem services Strengthen local dispute resolution institutions	Strengthen civil society Facilitate decentralization and local governance Reinforce water governance authorities Support water user associations Enable local governance Streamline administration	Streamline water management and planning institutions Devolve authority Strengthen legal recourse Strengthen civil society	Decentralize water resource governance Develop and support international water treaties Ensure affordable water Create utility partnerships Create and expand water user associations Promote women-led community-based organizations	Decentralize water allocation and rights governance Create utility partnerships to expand water supply and distribution Promote women-led community-based organizations	Streamline overlapping institutional mandates Promote decentralization of water management and use decisions Devolve authority over water rights and allocation Establish and support international water management agreements
	Legal and Regulatory Framework	Strengthen water rights and rights enforcement Legally protect customary rights Conduct law review forums Broaden access to justice Forge and leverage international treaties Formalize rights to compensation	Legitimize collective rights Build on customary law and practice Enforce water-sharing agreements Streamline dispute resolution processes	Develop water policy Clarify and strengthen legal rights Harmonize mandates and improve interagency coordination Bolster local governance	Reform legal water frameworks Improve delivery to poor and underserved populations Promote equitable water distribution Protect women's access to water and water rights	Develop water policy Initiate progressive water pricing Assign value to water resources	Clarify water rights and strengthen enforcement Provide environmental incentives Adopt integrated water resources management Regulate water pollution and over use
	Rights Awareness and Empowerment	Increase public awareness Strengthen advocacy Encourage civil society engagement and public debate	Hold stakeholder forums Strengthen rights communication Institute downward accountability Empower communities	Increase public awareness Support water rights advocacy Conduct stakeholder forums Promote community mobilization and participatory governance	Engage the public in participatory decision making Raise public awareness Foster collective action Increase women's management capabilities	Engage the public in water allocation/distribution decisions Raise public awareness Broaden participation in water auctions and distributions	Raise public awareness Conduct water use and management stakeholder forums Improve water rights and use advocacy
	Conflict and Dispute Resolution	Increase access to legal assistance Support alternative dispute resolution Conduct stakeholder forums Strengthen restitution and compensation systems Create inter-riparian forums Support development of multilateral water treaties	Increase access to justice Capacitate local authorities Bolster alternative dispute resolution	Support alternative dispute resolution Make legal aid accessible Improve access to formal justice Monitor water disputes and support their resolution	Broaden access to courts Provide for legal assistance Reduce bias in adjudication Sensitize authorities on gender roles and constraints in water policy	Build capacity of the judiciary to handle water allocation issues Strengthen access to justice Mediate water market conflict	Inform alternative dispute resolution Provide legal aid Apply and enforce water and environmental regulations Recognize multiple, overlapping water rights

	Restitution, Redistribution and Consolidation	Resettle displaced populations Develop strategies and plans for relocation Compensate for state takings Devise water sharing agreements Reconstruct property and/or records	Support regulatory reforms that promote equality Support local organizations in managing water rights Compensate aggrieved parties suffering lost rights Negotiate water-sharing agreements Consolidate water rights management	Redistribute water rights Restitute water rights Compensate for state takings	Establish water subsidies for the poor Penalize tax polluters Control unbridled water resource exploitation through regulation Incentivize water utilities to provide affordable water to the poor	Implement cross water subsidies Subsidize connections to water supply networks Apply volume-based water pricing systems	Purchase water rights for conservation Impose water quality restrictions
	Rights Delivery and Administration	Document water rights Secure records to document assets Create use restrictions to control spillovers Support mapping of property claims	Support water records systems and revenue collection Streamline institutional mandates Strengthen enforcement of contracts and laws	Formalize water rights Recognize individual rights Register customary rights Empower water user associations Incentivize water conservation	Formalize water rights Establish water use quotas or tariffs Remove gender bias in water access	Segment water markets Differentiate water services delivery Incentivize water services delivery	Monitor water (quantity and quality) use Provide for community demarcation and registration of water resources Improve capabilities to value ecosystem resources Support statutory water rights enforcement
	Resource Use Management	Establish payment for ecosystem services programs Promote water conservation technology Adopt water reclamation measures Control water quality degradation and support enforcement Support assessments and strategic planning Develop early warning systems	Adopt integrated water resources management Promote participatory land use planning Establish payments for ecosystem services Strengthen interagency coordination Improve application of water measurement technology	Institute collaborative management Improve information management Strengthen water resources and use monitoring Support watershed and urban water planning	Conduct environmental planning Strengthen coping strategies Support water-efficient technology creation and diffusion Preserve or strengthen common water property management	Establish water payment for environmental services programs Reduce water costs and waste to lessen demand Improve water flow measurement and pricing	Improve adaptive water management Promote co-management of water resources Provide water conservation incentives Support integrated water management Increase water use efficiency through improved water delivery systems
<div> <div></div> <div> Crosscutting Constraints Gender / Women Vulnerability Ethnic and Socially Marginalized Populations Lack of Government and Community Capacity </div> <div></div> </div>							



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