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SWP
SUSTAINABLE WATER PARTNERSHIP

Toolkit #1

IMPROVING WATER SECURITY

A process to address "too little, too much, too dirty, too erratic"

WINROCK INTERNATIONAL
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The CEO Water Mandate

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PREFACE

Water Security Is Essential to Life and Humankind, by Supporting:

Public health: Safe drinking water, sanitation, and hygiene (WASH) are the most fundamental human needs.

Economic growth: Income generation and poverty alleviation heavily rely on water availability for agriculture, energy production, transportation and other livelihood activities.

Environmental sustainability: Natural ecosystems rely on water; they rapidly deteriorate when deprived of natural flows, directly affecting public health and livelihoods.

Political stability: When basic health and livelihood needs are not met, the strain on populations affects the legitimacy and sustainability of governing authorities and can lead to civil unrest.

Disaster risk reduction: Floods, landslides, droughts, tsunamis, and harmful algal blooms can be catastrophic events that claim lives, affect local economies, and may multiply due to climate variability and change.

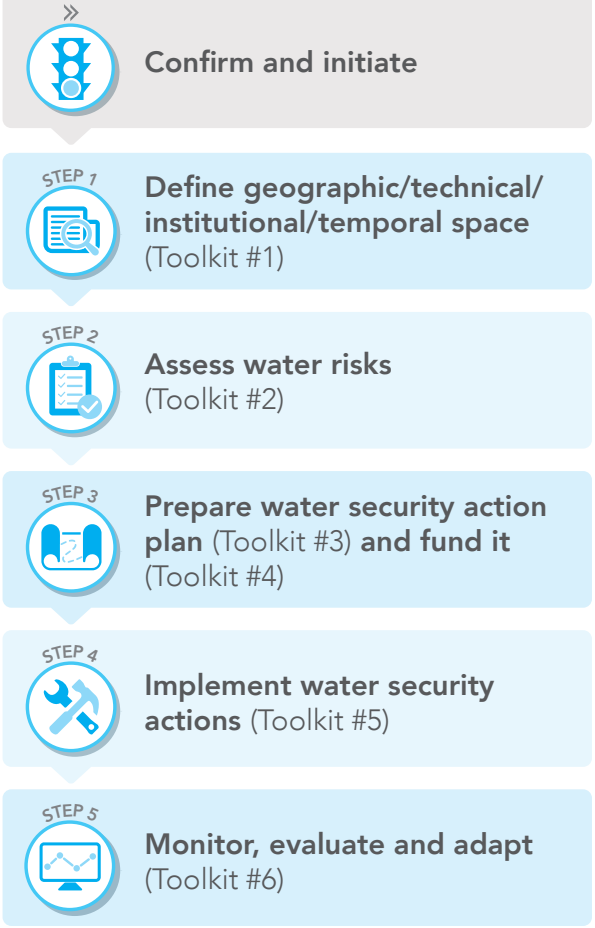
Population growth, urbanization, industrialization, rising living standards and Westernized diets are likely to further increase the over-extraction and pollution of water resources. This will raise insecurity and uncertainty over water access and the vulnerability of communities and infrastructure to natural disasters.

This **series of toolkits** presents an effective and efficient process to address water risks, including long-term water stresses that constrain social and economic development and sudden shocks that can quickly jeopardize the health and livelihoods of vulnerable populations.

Improving water security is about focusing actors and resources on key water risks. It is also about collaboratively planning and implementing specific activities to mitigate risks and provide tangible benefits to water users. Activities may include gray and green infrastructure (including improved operation and maintenance of existing infrastructure), awareness raising and behavior change campaigns, management as well as policy and institutional improvements (such as better data and better informed decision-making).

Improving water security must be a cross-sectoral theme. Development strategies and investments that ignore water security usually fall short of their objectives when water issues and conflicts undermine political and social cohesion, supply and value chains, public and environmental health, and service delivery and infrastructure operation.

The Water Security Improvement (WSI) Process



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Water security is the adaptive capacity to safeguard the sustainable availability of, access to, and safe use of an adequate, reliable, and resilient quantity and quality of water for health, livelihoods, ecosystems, and productive economies.

EXECUTIVE SUMMARY

As populations continue to grow, and as climate variability affects water availability and the frequency and severity of extreme events, **achieving and maintaining water security is a fundamental development challenge**. Total protection from water risks or definitive resolution of water problems is rarely, if ever, possible. Improving water security is about building the capacity of all actors—water managers and users, businesses, and communities—to regularly assess and address water risks by mitigating their negative impacts through negotiated activities. The Water Security Improvement (WSI) process relies heavily on changing behaviors away from polluting, wasteful practices, and conventional engineering approaches that often prevail in many countries.

The WSI Process Builds on Eight Essential Practices

- **Focus on priority water risks** in a defined geographic, technical, and temporal space
- **Engage and mobilize water users** as the actors that affect water resources
- Employ a **"systems thinking" approach** to address causes, not just symptoms
- Address **uncertainties** about information, science, climate variability, and human behaviors to ensure robust decision-making and adaptive management
- **Negotiate integrated actions** that distribute tangible benefits to water users, including especially women and marginalized groups
- Design **science- and fact-based** solutions through a combination of infrastructure development, watershed management, behavior change, and institutional improvements
- Build **adaptive management** capacities of institutions and communities to improve resilience to stresses and shocks
- Ensure **sustainability** through economic efficiency, environmental soundness, and social equity

Unaware and self-interested water uses can lead to pollution and wastage. Involving water users is often the most efficient solution to water insecurity.

The WSI Process Has an Inception Phase and Five Steps:

» Confirm the demand and need for a WSI process, ensure governmental and financial support, and formally start the process

1 Focus the process by identifying which actors to engage and defining the scope (geographic area, timescale, and priority water risks)

2 Assess the situation by conducting technical, institutional/management, and risk studies to provide an understanding of current and likely future water security

3 Plan by defining, analyzing, comparing, and selecting relevant water security activities while identifying and securing financing

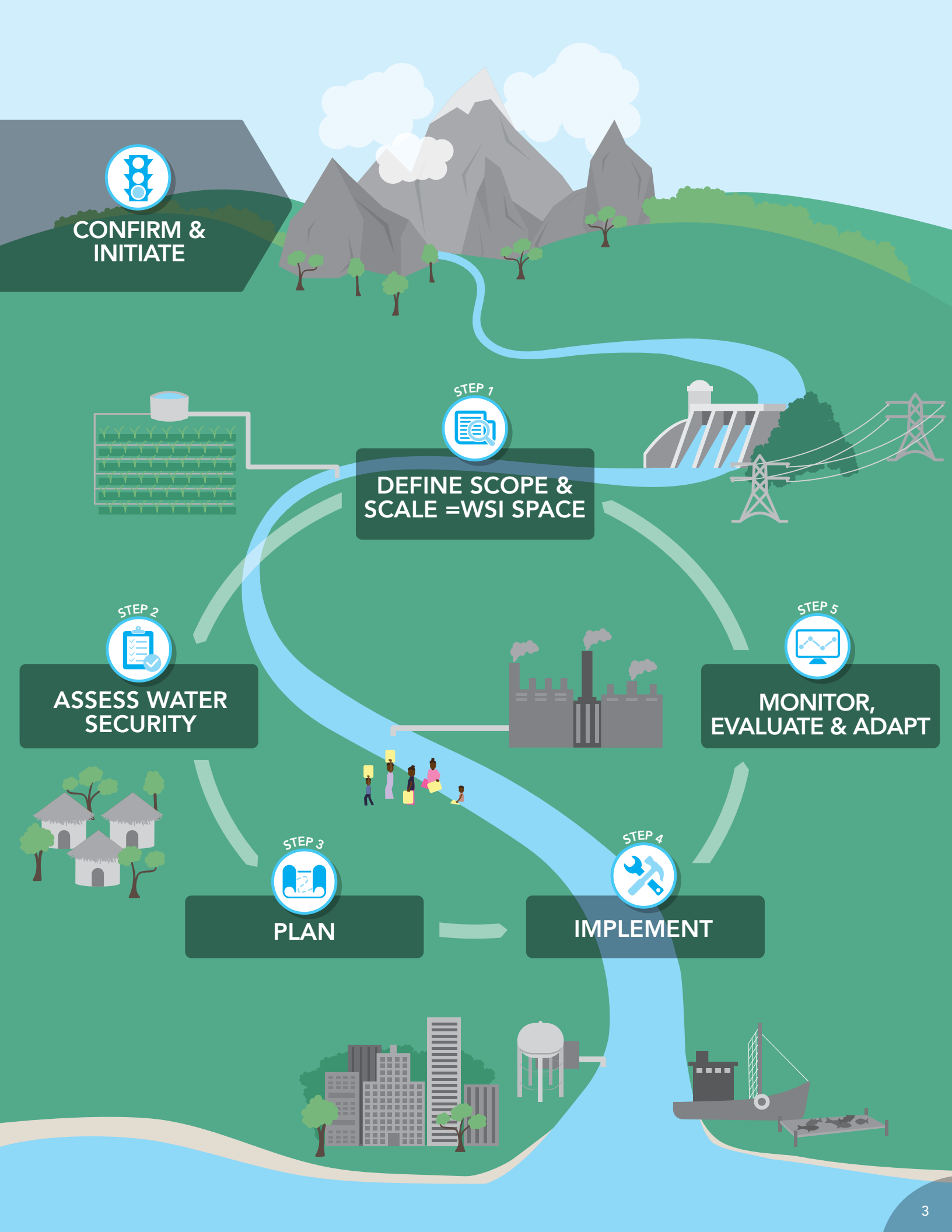
4 Implement water security activities that target priority water risks and provide tangible benefits to stakeholders

5 Monitor the progress and performance of implementation, building the adaptive capacity of all actors and guiding activity adjustments as needed

The WSI process is meant to be iterative: although getting to implementation and producing tangible benefits is essential, so is the participatory and collaborative effort that may require assessment and planning iterations to build trust, get buy-in, and ensure **sustainability**. While implementation and monitoring should be continuous, the WSI process is to be **repeated every few years, disseminated and scaled up**, using past experiences to become easier, more ambitious and more successful.

"During the next 10 years, many countries ... will experience water problems — shortages, poor water quality, or floods — that will risk instability and state failure [and] increase regional tensions ... Between now and 2040, fresh water availability will not keep up with demand [without] more effective management of water resources. Water problems will hinder the ability of key countries to produce food and generate energy, posing a risk to global food markets and hobbling economic growth."

Global Water Security Paper, 2012
U.S. Office of Director of National Intelligence


CONFIRM & INITIATE
STEP 1
DEFINE SCOPE & SCALE =WSI SPACE
STEP 2
ASSESS WATER SECURITY
STEP 3
PLAN
STEP 4
IMPLEMENT
STEP 5
MONITOR, EVALUATE & ADAPT

INTRODUCTION

Water Insecurity

In many places around the world, water resources are under great pressure and are being degraded at unprecedented rates. Population growth, rising living standards, increasing demands and rising costs of food and energy, urbanization, and land use changes affect the availability of, access to, and safe use of water resources. Climate variability also multiplies water risks. It can affect temperatures, alter the frequency and timing and intensity of precipitation, make extreme events more frequent and severe, and increase the uncertainty of weather variability.

Many countries also suffer from deficient water governance, due to under-resourced or inadequate water organizations at all levels, weak institutional coordination, absence or lack of enforcement of sound water management policies and plans, limited availability and quality of information to support evidence-based decisions, and conflicting water user interests.

Awareness Raising

An essential prerequisite to improving water security is for government, civil society and private sector to be aware of the water risks, and to be willing to proactively mitigate them. This requires the production and dissemination of proper information highlighting the water-related trends and hazards, their location and magnitude, the vulnerable areas and the potential consequences or damage, at present and in the near future.

Aqueduct's global water risk-mapping tool gives investors, governments, and other users a visual understanding of worldwide water risks.

Under the three themes of water resources, water management, and water risks, interactive maps show risk indicators such as: baseline water stress, inter-annual and seasonal variability, flood occurrence, and drought severity.

www.wri.org/our-work/project/aqueduct

Water security is even more difficult to improve in conflict areas, which suffer from degraded water infrastructure, limited human and financial capacities, and weak institutions. Fragility prevents the provision of basic water services, the preservation of water resources, and the protection of populations and assets from water-related disasters.

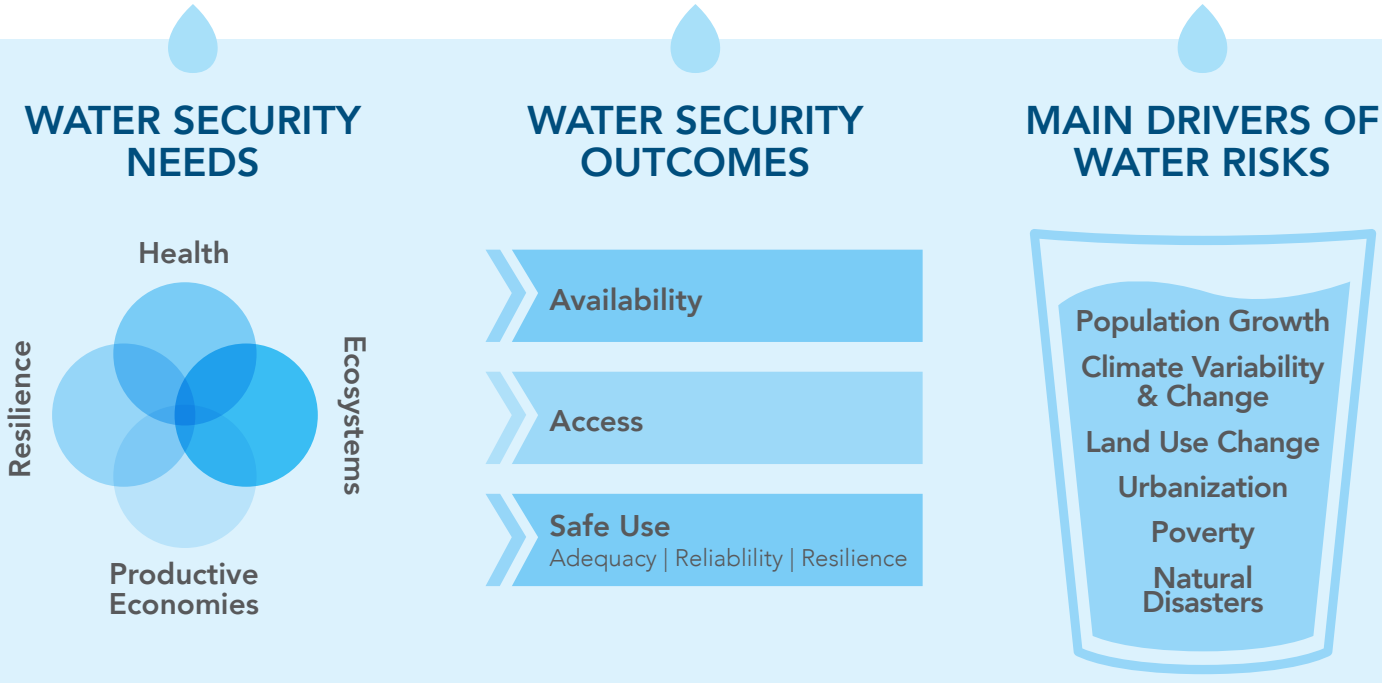
Water Security Outcomes

Water security addresses a variety of needs:

- Satisfying drinking water, sanitation, and hygiene requirements
- Supporting productive economies in agriculture, industry, and energy
- Ensuring healthy rivers and ecosystems
- Preventing or mitigating water-related disasters
- Building resilient communities that can adapt to change

Improving water security is essentially about satisfying these needs while coping with risks (both long-term trends or stressors and sudden events or shocks) through activities that support and enhance water availability, access, and safe use.

- **Availability** refers to sufficient quantities of water from surface and/or ground resources now and in the future, within the context of climate variability and change.
- **Access** includes consideration of natural and man-made means to mobilize, store, convey, supply, regulate, and conserve water. It also involves issues ranging from water allocation, quality, rights, and pricing to infrastructure management and service delivery.
- **Safe use** has three interrelated elements: adequacy (for the quality needs of all users, including ecosystems); reliability (predictability/consistency over time); and resilience (ability of human and natural systems to withstand, recover from, and/or adapt to water risks, foreseeable stressors, and unpredictable shocks).



A water security approach acknowledges the critical services provided by ecosystems and water resources.

- **Economic services** to produce food, fiber, and fuel, as well as for non-consumptive uses such as transport/navigation, tourism, and aquatic organisms that supply food and medicines
- **Environmental services** such as preserving water quality (natural filtration and purification), flood and weather regulation, erosion control, biodiversity, and groundwater recharge
- **Cultural services** such as water's contributions to recreation and religious or social activities

Why Is Water Security Important?

According to the World Economic Forum's Global Risks 2015 report, "Global water crises—from drought in the world's most productive farmlands to the hundreds of millions of people without access to safe drinking water—are the biggest threat facing the planet over the next decade. Other global risks are inextricably tied to water management, access, extreme weather events, failure of national governance, state collapse or crisis; rapid and massive epidemics; and failure to adapt to climate change."

To accommodate population growth, global food production will need to increase by 50% by 2050. Considering that agriculture accounts for 70% of global water consumption, there will be dire consequences for water demand..This comes at a time when the world's most productive farm regions—California's Central Valley, the North China Plain, northern India, and America's Great Plains—are already overdrawing their water resources.

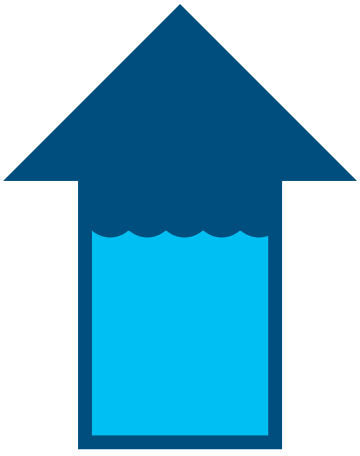
Beyond water for food and drinking, manufacturing and consumer markets are escalating the demand for water in producing electricity, mining minerals, making products, and processing fuel. Within the next 20 years, water consumption for generating energy will need to increase by 85%.

Improving water security must be a cross-sectoral theme. Development strategies and investments that ignore water security usually fall short of their aims when water issues and conflicts weaken political and social cohesion, supply and value chains, public and environmental health, and actual service delivery and infrastructure operation.

Water consumption for food production will need to increase by

50%

– BY 2050 –



Water consumption for generating energy will need to increase by

85%

– BY 2050 –

Water security is not a water sector issue—it is a broad socioeconomic, environmental, and political concern. Encouraging and educating all sectors to consider water in their policies and strategies is essential to sustainably manage the nexus of water, food, energy and climate variability, to support sustainable socioeconomic growth and political stability.

LIMITATIONS OF TRADITIONAL WATER MANAGEMENT

The Engineering Approach to Water Risks

Many countries respond to water risks by engineering infrastructure solutions to supply more water and protect against risks such as floods. Water decision-makers and managers are usually civil engineers trained to design and build, and political decision-makers tend to favor large infrastructure projects for their symbolic value to constituents.

This techno-centric approach gives little, if any, consideration to negative externalities to water user groups beyond the intended beneficiary communities. Consequently, it often fails to deliver long-term benefits across water users.

Examples of Negative Externalities

- A dam is a straightforward (but expensive) solution to store water for dry spells, protect against flooding, and generate energy, but reservoirs inundate fertile valleys, trap sediments that no longer fertilize downstream fields, and reduce fishing opportunities. Some communities benefit from the increased water supply, but do they use it efficiently? What about communities that lose their livelihoods?
- An embankment protects from floods. But what if floodwaters overtop the embankment? Where do flood volumes go when the embankment prevents them from expanding?
- A sewer collects and evacuates wastewater. But what happens downstream of the discharge point?
- A desalination plant provides freshwater. But what about the saline effluent?
- Lining an irrigation canal reduces leaks. But what happens to farmers irrigating from the aquifer fed by the seepage?

Ignoring the Many Dimensions of Water Issues

- **Social:** Common water use behaviors can be polluting and wasteful, they create excessive demands on water and associated resources. Focusing on the symptoms (too little, too dirty) and not the causes (wasting and polluting) results in expensive and short-lived solutions.
- **Environmental:** Infrastructure solutions tend to disrupt ecosystems and the services these provide, notably to the livelihoods of riparian communities.
- **Economic:** Water infrastructure is usually expensive and often has budget overruns. Its benefits, on the other hand, are often less than projected, and revenues rarely cover operations and maintenance (O&M) costs.
- **Institutional weaknesses** often undermine expected infrastructure benefits. Such weaknesses include:
    - Unenforced laws and standards that allow abusive/damaging water practices such as polluting and wastage.
    - Absent or ineffective water policies that lead to poor water data, weak staff capacity, and poor risk prevention and mitigation.
    - Unclear roles & responsibilities and lack of accountability & transparency that cause poor resource allocation, weak O&M, defective water services, and rapidly degrading infrastructure and equipment.
    - Centralization and lack of delegation which produce delayed/inadequate decision-making that does not reflect on-the-ground realities.
    - Gender and social inequities (i.e., ignoring the real needs/priorities of disadvantaged groups, starting with women) which result in poorly defined water activities, with most benefits accruing to already better-off water user groups.

Failure to Understand that

- Built, natural, and social systems are interdependent.
- Water problems can be complex, and sometimes "wicked" problems that are difficult to evaluate and solve.
- Past solutions may not replicate well in other contexts and past conditions may not be good predictions of the future.

Water Problems Are Complex, "Wicked" Problems

1. **Difficult to evaluate**
    a. Incomplete or contradictory information
    b. Many stakeholders with different concerns/perspectives/priorities/expectations
    c. Interconnections with other socioeconomic, environmental, and political problems
    d. Difficult to assess and measure issues and impacts

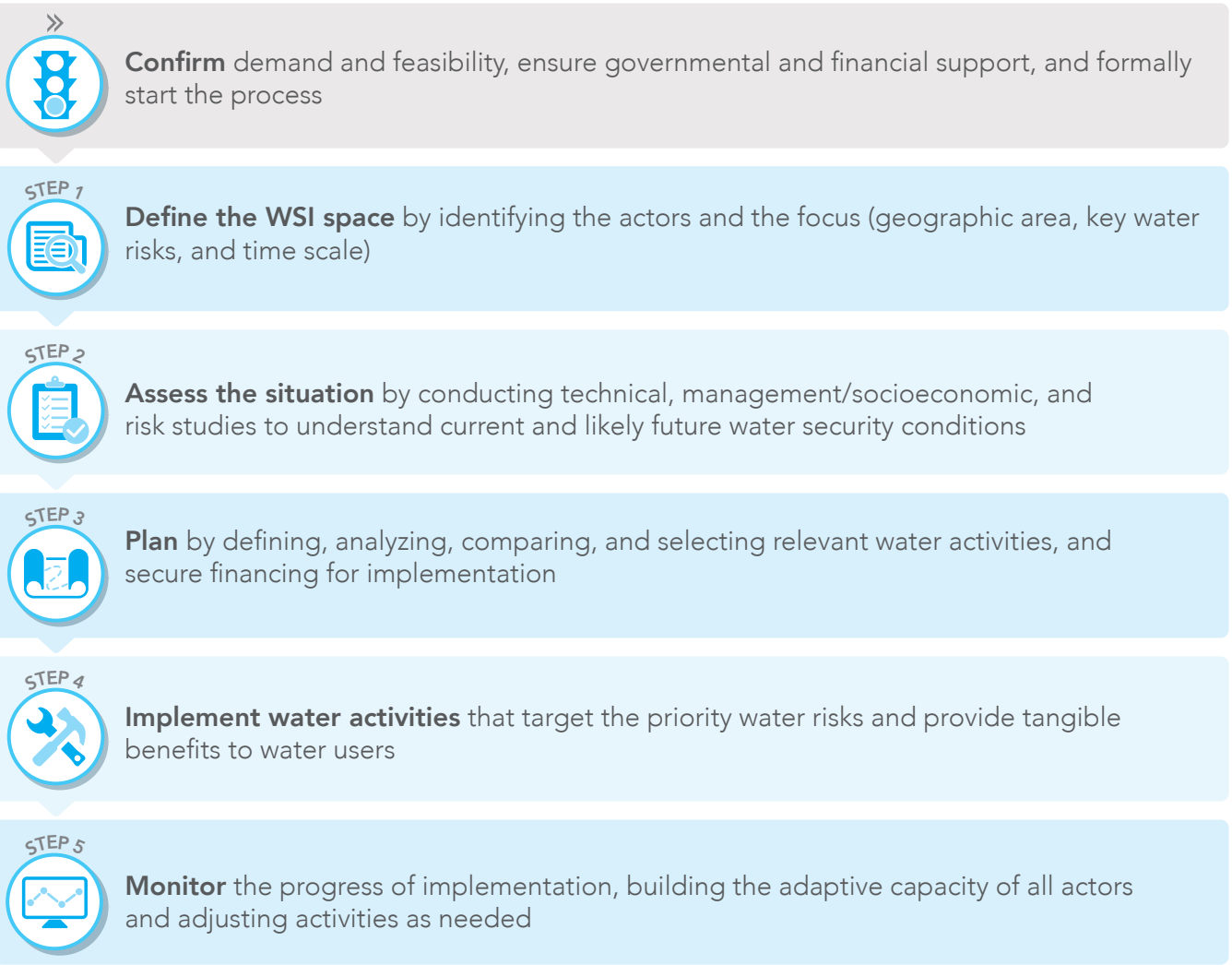
2. **Difficult to solve**
    a. Impacts can only be mitigated, stressors cannot be removed
    b. Parallel connected issues (e.g., land tenure) must also be addressed
    c. Need for local/specific solutions that improve over time ("learning by doing")
    d. Difficult to measure progress

THE WATER SECURITY IMPROVEMENT (WSI) PROCESS

Total protection from water risks is rarely possible. As population growth reduces water availability and climate variability makes extreme events more common, ensuring water security is increasingly difficult. Improving water security is about building the capacity of all actors—water managers and users, businesses, and communities—to regularly assess and address risks through robust planning and action. It relies on reducing polluting and wasteful practices and moving away from the conventional engineering approach that prevails in many countries. While water infrastructure is essential, it cannot deliver its expected benefits without a solid complement of watershed management, social behavior change, and policy/institutional/management fixes.

The WSI process is a series of steps that helps build the capacity of stakeholders to address water-related risks in a specific geographic area, such as a basin, sub-basin, or catchment. It is meant to be regularly repeated, as stakeholders become more comfortable working together and, over time, expand its scope.

The WSI Process: Inception and Five Main Steps



WSI Validation Points

As in any negotiated process, validation points are critical to:

- Record and formalize progress and agreements
- Commit all involved parties to the intended outputs
- Inform outside authorities, sponsors, communities, businesses, and the public

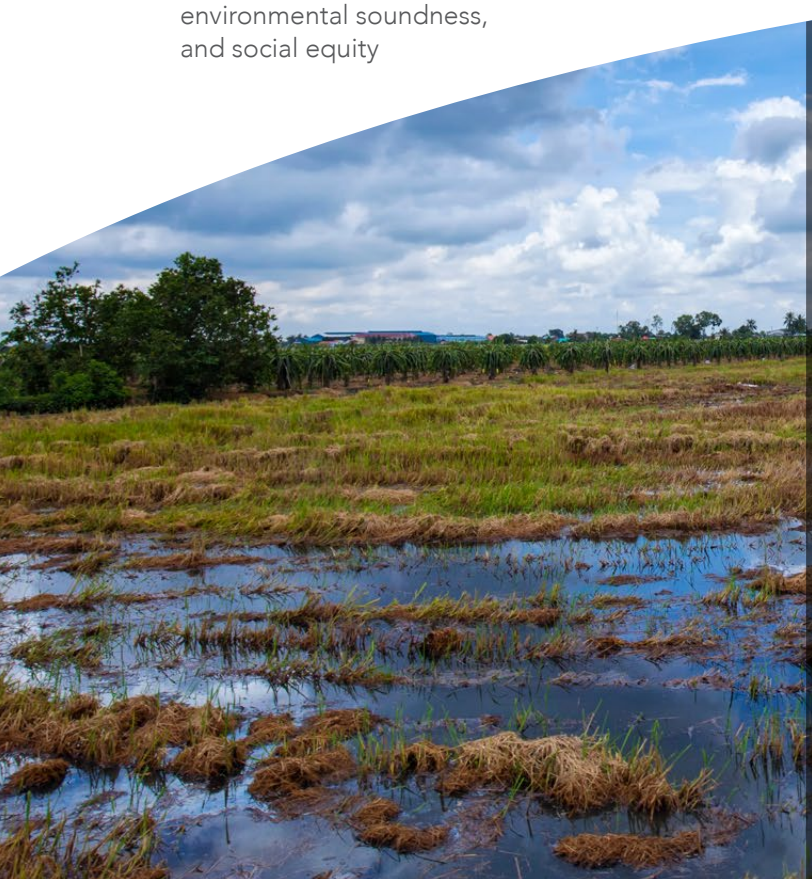
The five WSI validation points:

1. An initial declaration of intent, memorandum of understanding, concept paper, project definition, or similar document detailing the process, government endorsement, expected funding, parties to be involved, operating (communication and decision-making) rules, and the expected timeframe
2. At the end of Step 1, a vision/mandate paper to define the WSI space—the focus area, key water risks, socio-institutional setting (i.e., stakeholders to be involved)
3. At the end of Step 2, an assessment report to detail the findings of all studies about the current and future water security situation
4. An action plan resulting from Step 3 that presents the selected water security activities with their expected outcomes and benefits, targets, and resource and funding needs
5. Progress reports and monitoring data to ensure accessibility and transparency

WATER SECURITY GUIDING PRACTICES

The WSI Process Relies on Eight Key Practices

- Pragmatic **focus on priority water risks** within a defined institutional and geographic space and timescale
- **Engagement and mobilization of water users**: they impact water resources and often generate the water issues (including marginalized groups and women, who can significantly mitigate water risks when they become stewards of their environment)
- **"Systems thinking" approach** to:
    - Address causes and drivers, not symptoms ("Too little" can be solved by increasing water supply, but more sustainably by improving water use efficiency through demand management—optimizing needs and decreasing leaks, losses, and wastages during conveyance and use)
    - Consider negative externalities (impacts to outside parties)
    - Integrate related issues, such as environmental degradation (which affects water quality and usability); land tenure and agricultural subsidies (which affect farming practices); energy subsidies (which affect water use and wastage); education gaps (which affect use behaviors and staff capacity); and institutional weaknesses (which affect performance and enforcement)
- **Acknowledgement of uncertainties** in science and technology as well as socioeconomic and political factors to ensure robust solutions that provide direct and indirect benefits across the range of possible futures
- **Negotiated actions** that are endorsed by a majority of stakeholders, and equitably distribute benefits to different water user groups
- **Science-based solutions** that are grounded in solid evidence and knowledge and combine infrastructure development with watershed management, behavior change, and institutional improvements
- **Adaptive management and learning** that improve over time and build capacities
- **Sustainability** through economic efficiency, environmental soundness, and social equity



Uncertainties

- **Information:** Knowledge is always partial and evolving; data is neither spatially nor temporally comprehensive.
- **Science:** How will ecosystems respond to planned water activities? Do technical models/ assumptions accurately represent the real processes of natural and human systems?
- **Technology:** What better technologies will be available in the near future?
- **Climate variability:** Past and current conditions may not accurately predict the future.
- **Human behaviors:** Will farmers plant these crops or use these technologies? Where will urbanization expand?
- **Economic factors:** Will equipment or techniques remain affordable and relevant?
- **Political background:** Will the government change priorities/policies?

Climate change adaptation as a critical, underlying part of water security improvement

Improving water security requires understanding and managing for a changing and unforeseeable climate. The weather—rainfall and temperature—directly influences how much water is available for use by communities, businesses, and ecosystems. The largest impact of climate variability will be on the water cycle in most places around the world.

In the past, water infrastructure and management practices were developed based on assumptions of predictable weather conditions which are now less valid. Water managers need to proactively prepare for and respond to a changing operating environment. Successful responses must include using reliable and up-to-date weather and climate information, updating policies and management processes to anticipate and adjust to various futures, implementing activities to address changing conditions, and monitoring and learning from experience.

Final Guiding Practice is to Ensure Solid Communications:

1. Among government agencies, and between them and the water user entities engaged in the WSI process. Communications must rely on regular meetings to build dialogue and trust. Formal minutes and other regular documents (e.g., validation points throughout the WSI process) should record agreements and commitments.

2. Between WSI implementers and sponsors, supporting donors, and higher-level authorities to ensure continuing endorsement through regular reporting of progress and performance.

3. Between WSI implementers and the water users, residents and public at large. This must be two-way communication that captures the latter's needs and concerns through public meetings, consultations, and possibly surveys. Communications must also disseminate relevant information to advertise achievements, reduce resistance to change, and legitimize the WSI process.

"Water Security" vs. "IWRM" — What's the Difference?

Integrated water resources management (IWRM) has been the dominant framework in the water sector since the late 1990s. It is characterized by integrated, multi-sectoral approaches to water at the basin scale, attention to ecosystems and human uses of water, and emphasis on participatory governance to achieve long-term water sustainability. In practice, IWRM has proven to be too ambitious and principled, and thus difficult to implement.

In contrast, the water security approach focuses on concrete outcomes and tangible benefits for water users. This "narrower" approach does not, however, ignore:

- The need for a comprehensive vision that considers multi-sectoral dimensions of water risks and externalities from water solutions
- The river basin approach as a sound geographic scale to convene stakeholders
- A focus on the "triple bottom line" of environmental, social, and economic sustainability

Water Security	IWRM
Goal	Approach
Pragmatic	Principled
Focused	Exhaustive
Results-oriented	Ambitious

The water security approach attempts to understand the uncertainties facing water resources. While IWRM emphasizes a process that should lead to water sustainability, water security focuses on mitigating risks to water resources and uses. Framing water management around water security can make it easier to turn the principles of IWRM into practical interventions, customized and locally endorsed solutions, and more tangible benefits.

Water Security in the Context of Water, Sanitation, and Hygiene Activities

Water, sanitation, and hygiene (WASH) projects aim to improve public health as the first step toward poverty alleviation and economic development. To do this, they focus on the construction/rehabilitation of water and wastewater systems—from simple rural schemes to large urban networks—and promoting healthier sanitation and hygiene practices. Although WASH programs save lives, to be sustainable they must:

- Consider risks such as the pollution or depletion of water resources: by design, WASH interventions often do not address the cumulative effects of multiple water withdrawals and externalities from upstream on downstream communities
- Mitigate the impacts of:
    - Human and livestock populations flocking to new water points, straining local resources (e.g., water resources, croplands, and grazing lands)
    - Concentrated waste and/or wastewater on public and environmental health
- Anticipate that providing drinking water is only the first step in human development and immediately leads to larger water demands for livelihood and economic activities such as agriculture or livestock farming
- Raise beneficiaries' awareness of the health and economic benefits of clean water, and build ownership and demand for it by encouraging users to pay for operations and maintenance (and possibly depreciation) costs
- Address policy/institutional/capacity weaknesses and notably:
    - Establish and enforce water service and quality standards
    - Detect and repair infrastructure failures in a timely manner
    - Promote stakeholder participation and community empowerment
    - Facilitate the procurement of water equipment

WASH activities should adopt water security tenets:

- Participation of communities and their elevation from beneficiaries to empowered actors
- A "systems thinking" approach where causes (not just symptoms) and externalities are identified and addressed
- Integration of different water uses (from hygiene to agriculture and other livelihood and productive activities)
- Proper evaluation and safety planning (quantity and quality) of water sources, now and in the near future
- Complementing infrastructure activities with watershed management, awareness-raising, and institutional improvements

Multiple Use Water Services

Multiple Use Water Services is the approach whereby water, sanitation and livelihood needs should be simultaneously considered. The intent is to acknowledge that even small drinking water systems are often used for other purposes such as gardening or watering livestock. Considering such uses in the design and operation of drinking water systems is essential to improve their safe use, sustainability and robustness. A specific example is the construction of separate cattle troughs to prevent contamination of domestic water sources.

In the example of an irrigation canal, livestock may cause damage when accessing the water, and people needing water for domestic uses will not find it outside of irrigation times. These problems can be overcome when designing irrigation systems for multiple uses. Bathing or washing stations as well as livestock access points can be built. Minimum flows can also be ensured outside of irrigation times to provide for domestic needs.

Water User Participation for Improved Water Security

Why? Informing, engaging, and empowering water users leads to:

- Comprehensive field information to assess the water situation and risks: ignoring the knowledge and perspectives of water users prevents understanding of causes and links among water issues.
- Enhanced decision-making to select and plan activities: disregarding the priorities and needs of water users leads to poorly focused activities with few actual benefits and significant negative externalities.
- Improved implementation with support and contribution from water users: dismissing water users from activity implementation turns them into passive, even hostile, parties.
- Increased capacities: with more efficient and less polluting users, who are also more resilient to water risks.

How? The engagement of water users rests on:

- Identifying the main user groups (among communities and businesses) with their main characteristics (e.g., location, activities, water use behaviors and impacts, and exposure to water risks)
- Engaging local leaders (e.g., community officials such as mayors, farmer leaders, business managers, village chiefs and tribal elders, and NGO principals) to understand their water needs and priorities
- Consulting with local leaders during the entire process, possibly involving them in decision-making implementation and monitoring; eventually empowering them to be decision-makers and key implementers/monitors
- Informing the public (e.g., residents and water users) to raise awareness and progressively improve water use practices
- Allocating time and resources to support participation throughout the WSI process (the benefits from water user participation vastly recoup the investment)

Social and Gender Equity

Women and other marginalized groups (e.g., due to religion, ethnicity, social status or caste, wealth, age, or culture) are the majority of water users. Their water use and livelihood activities have a large impact on water resources. Inherently, they are the most vulnerable to water insecurity. These groups often rely on agrarian livelihoods, for which water is the critical input.

Consulting them provides unique insights to better understand their perspectives and expectations, the potential social implications of water activities, and to better tailor these to achieve more beneficial outcomes. Involving them to become stewards of their water resources mobilizes large amounts of knowledge, labor, and energy, increases their capacity to address the causes of pollution and overuse, and supports the implementation of successful activities.

The most direct way to engage these pivotal water users is by following a gender and social equity framework, including steps such as:

- Holding separate meetings: convene women and other marginalized groups seperately during the water security assessment to ensure their voices are heard and identify their water needs, concerns, priorities, and the conditions that frame their water uses, as well as barriers that prevent their access to water resources

- Asking for each water risk: How does this risk affect them? In what way and to what extent? How do women and other marginalized groups contribute to the creation and amplification of that water risk?

- Evaluating for each potential activity: What are the benefits and impacts? What contributions or inputs can these water users provide?

Private Sector Engagement

Factories and businesses are often significant water users in terms of quantity and impacts. Like other users, they have expectations and concerns about water security. They also recognize that water risks are business risks that can occur across their entire supply and value chains. They often identify three types of risks:

1. Physical risks: current or predicted changes in water quantity (over-allocation, droughts, or floods) or quality (pollution) that may affect direct operations

2. Regulatory risks: changes in water-related regulations or policies that may constrain operations and impact the cost of compliance or result in a loss of the company's license to operate

3. Reputational risks: water conflicts, incidents, or issues that may damage brand image

Water risks can also result from a company's actions (e.g., wastewater management) rather than river basin conditions.

Engaging businesses and other water users operating in or sourcing from the targeted area is vital for a water security process. Three approaches should be considered when working with these groups:

- Characterize water security improvement as a way to address water-related business risks, and/or a business opportunity

- Involve multinational firms, especially those in water-intensive industries (e.g., food and beverage), which are often sensitive to and engaged in water stewardship activities

- Approach small and medium businesses through industry/business associations or the multinational corporations they supply

Business benefits include cost reductions, more secure water allocations and/or rights, and improved branding/image.

INCEPTION PHASE: CONFIRM AND INITIATE

For Successful Implementation, the WSI Process First Requires Meeting Certain Enabling Conditions

These criteria include:

1. **Relevance and potential:** Confirmation that priority water risks are important to a range of water users and stakeholders, and there is potential to achieve tangible outcomes through a WSI process.
2. **Safe environment:** Water users can best be engaged in a collaborative process in a stable setting. Insecurity and/or armed conflict often prevents participatory dialogue around water security issues.
3. **Governmental endorsement:** Without endorsement, the legitimacy, of the WSI process—and perhaps its legality—will be in jeopardy and the resulting action plan will be unsupported, non-binding, and short-lived.
4. **Strategic compatibility:** The WSI process is compatible with the existing institutional framework and other relevant national/regional documents (e.g., water strategies/master plans).
5. **Financial support:** Funding (from government and/or donors) is essential to bring the process to fruition and ensure tangible outcomes. Developing a time-consuming action plan and not translating it into on-the-ground activities can discredit the entire WSI process.

The WSI process is intended to be:

- **Iterative:** Although getting to implementation and producing tangible outcomes is essential, iterations might be necessary throughout the five steps. This is especially true for first-time efforts to ensure that stakeholders learn the water security context, practice the participatory and collaborative approach, and remain engaged.
- **Reiterated, disseminated, and scaled up:** The WSI process should be repeated every few years to address more and evolving water risks. Based on lessons learned, it should be disseminated and scaled up to promote trusting collaboration and continuous teamwork among larger groups of stakeholders.

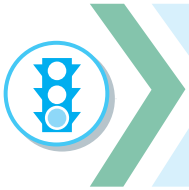
Government support

Endorsement of the WSI process—and participation of water users—can be difficult to obtain. Many developing countries lack the necessary culture of dialogue and collaboration between government, civil society, and private sector. Conversely, local leaders engaged in a WSI process may not understand their roles as representatives (negotiating for their constituents, not a small elite or simply themselves) and as actors (not passive beneficiaries and supplicants).

It takes time to develop new attitudes, to educate water managers about interacting with the public and local leaders about true representation. Starting at a local level is often easier, as field staff tend to have more accepting attitudes and experience engaging communities.

Taking the interaction to a higher level requires three enabling factors: policy and behavior change among officials; managers understanding that the status-quo is not sustainable; and leaders who are accountable to their constituencies. Champions from both sides should be identified and nurtured.

"Thanks to [Water User Associations], I now interact with local leaders who help me decide and implement and solve local water disputes. I know better what goes on in the field, I have fewer headaches deciding, and am no longer the one blamed by hundreds of farmers when we have water issues." - Gov. irrigation engineer in Egypt



OUTPUT OF INCEPTION PHASE

A declaration of intent, agreement, or similar memorandum of understanding to engage in an endorsed, comprehensive, and participatory WSI process

STEP 1

STEP 1: FOCUS—DEFINE THE WSI SPACE

(SOCIO-INSTITUTIONAL, TECHNICAL, GEOGRAPHIC AND TEMPORAL SCOPE)

Engaging and mobilizing a group of water user representatives and decision makers in a WSI process can lead to rich discussions, sound decisions and endorsed solutions, smoother implementation, increased capacities, and tangible benefits. For this to happen, however, the process must be driven and owned by local stakeholders, facilitated by a "convening institution," and focused on specific water risks in a defined geographic area.

Step 1 defines the socio-institutional, technical, geographic, and temporal frame in which the WSI process will operate.

Defining these four dimensions will require judgment calls. The main criterion is to be pragmatic and choose the scale that provides the best chance of successful implementation and risk mitigation.

Convening Platform or Institution

A lead entity or group must act as secretariat for the WSI process and be responsible for:

- Organizing meetings, drafting and disseminating minutes and, notably, validation documents
- Supervising consultants and other technical advisors, disseminating produced documents
- Liaising with higher authorities, sponsors, and donors
- Informing the public (water users)

Establishing an independent secretariat provides a more transparent and equitable platform. However, it requires more support and is less sustainable than using an existing government agency, which is more capable of navigating administrative procedures.

I. Defining the Socio-institutional Engagement Space: Which Stakeholders to Involve?

Stakeholders are those who influence and are affected by water decision-making. Influencers are usually government policy-makers and managers. **Affected** are water-user groups (communities and businesses), whose health and livelihoods directly rely on water resources and services. A **stakeholder inventory** is useful to identify these actors and to assess the relevance, desirability, and feasibility of their involvement.

Special attention is necessary to engage marginalized groups. Though they are a large constituency of water users, these groups often have a limited say, if any, in water decision-making. Not involving them perpetuates harmful water use practices and could create obstacles to implementation due to inertia or even resistance.

Representatives must be appointed from each group that will be involved in the WSI process. These can be readily available leaders (e.g., a mayor or a traditional village chief) or be selected through an ad-hoc or formal (election) process. These leaders must have legitimacy to represent their constituents. Their leadership capacities will be strengthened as they acquire communications, negotiation, collaborative decision-making, facilitation, and conflict resolution skills.

Other groups will be associated with the WSI process because they fund it (donors and investors) **or advise** with information or knowledge (research entities, universities, consultants). These groups are not real stakeholders, so their decision-making authority should be limited, but they are often essential to support and guide the WSI process.

The overarching objective is to build a network of empowered stakeholders committed to a collaborative WSI process of assessment, planning, decision-making, implementation, and monitoring. Communication and decision-making rules must be established and agreed-upon for sustained and meaningful interactions. These rules must consider local legal, administrative, and customary practices, and seek to ensure equity, accountability, and transparency.

II. Defining the Technical Scope: What is the Problem?

The WSI process should address specific water risks or concerns prioritized by stakeholders from the "too little, too much, too dirty, too erratic" issues. Narrowing the focus will ensure tangible benefits that will legitimize the process. A "systems thinking" approach should still be applied to consider connected water risks and potential externalities.

Initially, not all water risks will be addressed due to limitations in time, resources, and funding. The assessment phase will focus on the most significant risks; planning and implementation will eventually zero in on the manageable risks. As the process gains legitimacy, the technical (and possibly socio-institutional, geographic, and temporal) space can be expanded in future iterations of the WSI process.

This problem formulation and identification is a risk-based approach:

- Defining the key water risks or concerns of the main stakeholders/water user groups (possibly through a public opinion survey), notably within the context of broader community development goals
- Compiling existing information on these risks, and identifying the information gaps and necessary additional studies
- Understanding that not all water risks are relevant to all stakeholders, but if they are important to some stakeholders then they need to be recorded and eventually addressed ("This is not an issue for me, but I understand it is an issue for others and I agree to help them solve it if they help me solve my issues.")

Water Stakeholders

A stakeholder is a person or entity with an interest or concern in something. A series of questions is necessary to identify and inventory water stakeholders, then assess the relevance, desirability, and feasibility of involving them.

1. **Inventory: Water stakeholders affect or are affected by water resources. Identify them by asking two sets of questions:**

    a. Who currently uses water? Who affects water availability and quality? Whose livelihood depends on water?
    b. Who manages water resources (i.e., who designs, builds, and operates water infrastructure, who decides on water allocations, who monitors water resources, who regulates water uses and services?)

2. **Involvement: Focus on stakeholders (entities and groups) that can make meaningful contributions to the WSI process or whose absence could undermine it:**

    - Those with a sizeable population of water users or people residing in areas vulnerable to water hazards
    - Those who significantly affect or are affected by the priority water risks
    - Those whose area of influence/activity/jurisdiction corresponds to the geographic focus (or a sizeable part of it)
    - Those with significant influence over the water decision-making process (key decision-makers)
    - Those with leaders or representatives who can be identified, engaged, and trained to constructively participate in the WSI process and adequately represent their constituencies

Stakeholders typically include:

- Water users such as farmers in cooperatives and water-user associations
- Private-sector users such as factories, mines and quarries, hotels, power plants, and tourism businesses; some may be represented by chambers of commerce or industry or equivalent business associations
- Residents who use water for domestic needs and/or can be affected by water-related disasters
- Decision-makers such as officials and managers from ministries of water/irrigation, agriculture, energy, planning, finance, environment, etc. (at national, regional, and possibly local levels)
- Regional/provincial administrations such as governors, river basin authorities, irrigation agencies, and agricultural/health extension services
- Local entities such as water utilities and municipalities with mayors and councilors

It is also about identifying the participants' expectations and sensitizing them to the facts that:

- The WSI process does not eliminate water risks—it only mitigates their impacts while building the capacities of all parties to identify and address the underlying causes, now and in the future.
- All parties will be invited to commit to the action plan and contribute to the implementation and monitoring of water activities. They are no longer beneficiaries or recipients; they are becoming accountable actors.
- Only priority water risks will be initially addressed. Other water risks might be assessed, and either marginally addressed based on available resources or kept for future iterations of the WSI process.

III. Defining the Geographic Focus: Where Will We Work?

Defining the geographic area is another judgment call that should optimize the likelihood of success in terms of participation, network and relationships, effective assessment and planning, successful funding and implementation, and, most importantly, benefits to participants.

Defining the geographic space ends up being a trade-off between:

- Optimal geography, with a self-contained river/aquifer basin or watershed/catchment area being the most appropriate area to direct stakeholders' attentions and to clearly define water flow exchanges and linkages with outside neighboring areas
- An administrative area to simplify the number of entities and parties to be involved, and ensure that these have the legitimate authority to act and implement
- "Problemshed" (risk geography) to enclose the areas where the water issue is generated and experienced, and engage relevant stakeholders

BASED ON:	ADVANTAGES	DISADVANTAGES
Specific river/aquifer basin/ sub-basin (or even canal and its command area)	Ensures clear visualization of a common resource (and simplifies assessment of water volumes coming in and out)	May cut across administrative boundaries, multiplying the number of parties to be involved and without a clear overarching platform/institution whose jurisdiction matches the area
Existing political/administrative boundaries	Simplifies the identification of institutional actors to be involved; supports better process (notably implementation)	May cut across water flows and complicates the visualization, quantification, and assessment of "What water are we talking about?"
"Problemshed"	Encompasses both generating and impacted areas, focusing the WSI process where it matters	May ignore other related water risks and cause negative externalities during implementation

IV. Defining the Time Horizon: When?

The WSI process is meant to influence future conditions, so one or several time horizons have to be set. This is essential during the assessment step to define the business as usual scenarios predicting future conditions, during the planning step to predict the performance and guide the review of options and solutions, and during the implementation step to set targets and manage expectations. Usual time horizons include:

- Short-term (1-2 years) for addressing critical and imminent water risks
- Mid-term (4-6 years) for typical planning and implementation of water security actions
- Long-term (10-20 years) for assessing trends and defining strategic long-term objectives

OUTPUT OF STEP 1

A vision/mandate paper that defines the agreed-upon scope in terms of water issues, geographic and temporal focus, main stakeholders to be involved, convening platform/lead entity, and operating (communication and decision-making) rules. This document provides a mandate or social contract within which the WSI process will be carried out.


STEP 2

STEP 2: ASSESS THE SITUATION

(See Toolkit #2 for further details)

What Is the Water Security Assessment?

The water security assessment is performed within the spatial, temporal, socio-institutional scope of the WSI space. The assessment examines the array of key risks (both actual and potential) that can affect the availability, access, and safe use of water from the perspectives of different stakeholders.

The assessment is conducted from a **risk perspective** that identifies potential hazards, their likelihood and severity, and the vulnerable populations or areas. Such water hazards include known and predictable trends or stressors (e.g., population, economic and trade growth, changes to land cover, urbanization, availability of technology, poverty, and investment. Hazards also include unpredictable natural shocks (e.g., natural disasters such as floods, droughts, tsunamis, and landslides) and those resulting from human activity (e.g., harmful algal blooms, economic and political events, and conflicts).

Water Security Assessment Themes

Assessment activities follow long-standing disciplinary approaches such as hydrology, engineering, modeling, biology, chemistry, economics, sociology, and environmental and institutional analyses. Three themes can help frame the various dimensions of a water security assessment: the physical status of water (surface and ground) and related resources, the management setting, and risks. These themes help to systematically organize assessments and specific findings related to the goal of water security.

Physical water security is first about the availability, mobilization, and supply of sufficient volumes of water to address all water needs. This is essentially a "water balance", which is a spatial and temporal inventory and comparison of water availabilities, supplies, and usages. Second, water quality assessments examine the physical, biological, and chemical characteristics of water resources, both as naturally available and when used by human and natural systems. Last, environmental and ecosystem assessments are meant to examine other natural resources (e.g., land and biodiversity) and their interactions with water resources.

Assessments of the water **management setting** examine infrastructure, institutions, and social dynamics that directly frame water management and significantly influence water security.

- **Institutions** cover the wide range of organizations—as well as policies and legal instruments that guide, govern, and possibly constrain everyday water management decisions. Beyond the performance of water entities, it is often useful to analyze the entire water sector and how it is organized and operates. Issues of accountability and transparency in service provision are also a critical topic for assessing management capacities.
- **Social assessments** examine water use practices and behaviors, and help understand how water management decisions and activities can influence water security. Stakeholder analysis is at the center of social assessment because it can define the characteristics of the main water user groups, and their sensitivity to and interactions with water resources and water management decisions.

Water Balance

A water balance is an accounting exercise where freshwater availabilities (average untapped stream flows along with groundwater recharge, and storage in reservoirs and snowpacks) are inventoried along with actual water supplies, and compared to water consumptions (for all types of usages).

A water balance is preferably performed on a specific river basin so that the boundaries are clear and there are limited, if any, or well defined water flow exchanges with other neighboring areas.

A water balance is usually performed using average yearly volumes, with monthly balances being assessed to inform seasonal surpluses and deficits.

When uses exceed availabilities, there is a deficit and the situation is unsustainable (e.g., rivers dry up and aquifer levels drop). The objective of a water balance assessment is to appraise the current status and trend of water use and then guide water management decision-making.

Definition/Implementation of Small-Scale Demonstration Activities

If the WSI process is the first time water user representatives have assembled, their expectations should be met to legitimize their participation, for them and their constituents.

While a reasonably thorough process is necessary to define and implement an agreed-upon, consistent, and coherent set of water activities, consider some small-scale demonstration activities for rapid definition and implementation to overcome initial skepticism and entice participation. These must be carefully selected, designed, and implemented to achieve tangible benefits without generating negative externalities.

Assessment from a **risk perspective** identifies the potential for undesirable outcomes. This is achieved through a classical vulnerability and risk study process that considers and defines changes or threats, identifies vulnerabilities, among populations, assets, and ecosystems, and combines impacts with threat likelihoods to assess the magnitude of the risks.

A water security assessment involves six tasks:

1. Confirm WSI space (in terms of socio-institutional, technical, geographic, and temporal scope)
2. Review and synthesize existing information
3. Identify, plan, and conduct additional assessment studies
4. Share findings, seek feedback
5. Possibly adjust the WSI space
6. Finalize and share the assessment

OUTPUT OF STEP 2

An assessment document detailing the current and future status of water resources and uses, water management and institutional capacities, and main water risks in terms of actors (who, where, when), impacts (areas, populations, ecosystems, magnitude, current and future), causes, links among these issues, and linkages with non-water issues.


TALAWONA COMMUNITY MAP
25/04/2017
Bumiye
Tambiligile
N
Pilinkpari
BH (community borehole) (Tindime pampi)
Hill
Dogbanjpari
HIPPO LODGE
BH (white man borehole) (Nasari pampi)
To Dogbanjpari
Hill
Stream
To stream
Hill
Core Zone
KEY
Borehole
Hill
Stream (dug out)
pond
forest
Road
HIPPO LODGE
Farm lands
clinic

STEP 3

STEP 3: PLAN AND FUND

(See Toolkits #3 and #4 for further details)

Water Security Planning

After stakeholders have assessed and understand priority water risks, potential water-security activities must be explored and evaluated in terms of:

- Mitigation of targeted priority water risks
- Direct and indirect benefits, positive and negative impacts, and externalities
- Combined/cumulative benefits and externalities with other activities
- Socioeconomic and environmental impacts
- Direct and indirect costs, capacity and resource needs
- Robustness in view of uncertainties about future trends (i.e., capacity to provide benefits across the range of possible futures)
- Ability to adjust to changing conditions

Adopting stakeholder participation is vital for successful water security planning. For years, water managers and engineers have used predictive methods to identify solutions and make top-down water management decisions. These technical methods are based on experience and scientific knowledge to predict outcomes based on existing and future conditions. But 'Predict Then Act" methods often fail to deliver the expected results. Only water user participation can: handle water problems as the complex problems they are; consider multiple objectives; ensure positive outcomes despite uncertainties; adjust to changing circumstances; coordinate disparate views and expectations from stakeholders; and anticipate the combined impacts of actions.

A water security planning effort involves six tasks:

1. Translate priority water risks into specific goals
2. Explore possible water security activities
3. Review, analyze and compare solutions
4. Negotiate, decide and select preferred options
5. Perform funding "reality check"
6. Finalize and validate the action plan

Participatory Planning vs. "Predict Then Act"

Participatory methods are most appropriate when facing:

- Complex issues
- Multiple objectives
- Various uncertainties
- Need for flexibility
- Diverse stakeholder groups
- Combinations of solutions

Decision Support Systems (DSS) are most useful to define and visualize the potential consequences of combined actions over many plausible scenarios.

Decision-making

The method and timing for decision-making must be based on local practices and circumstances, such as the need for rapid action, and the magnitude of the decision and its impacts.

Different decision-making methods are available, but the outcome should always be the broad acceptance of solutions that:

- Target the priority water risks in a sustainable, efficient, and effective manner
- Are justified on solid information and current expert knowledge
- Are robust (i.e., provide satisfactory outcomes across a range of uncertain futures)
- Are acceptable to most stakeholders

Decision-Making Methods

Method	When?	Pros	Cons
Unanimity	Simple issues and solutions	Fast, easy, uniting	Too fast, possibly superficial
Consensus	Important issues and decisions	Collaborative effort, builds commitment	Time-consuming, needs small group of informed and involved parties
Compromise	Strong, polarized positions	Discussions toward middle option that all can live with	Negotiations can be time-consuming.
Majority voting	Clear, few options	Fast and effective if voters are informed	Result can be divisive
Multi-Criteria Analysis	Many different goals and options	Participatory, feels consensual	Subjective weighting or ranking, possibly unsatisfactory outcome
Autocratic (with/without consultations)	Simple issue, clear expertise or leadership	Fast, clear accountability	Possibly unsatisfactory and not endorsed by other stakeholders

These solutions should be communicated to stakeholders and relevant authorities to garner feedback, ensure proper vetting, and publicize the process. The final set of solutions is then translated into a list of activities or a water security action plan that defines, for each activity:

- Expected outcomes and targets
- Roles and responsibilities
- Resources and capacity needs
- Financing
- Timeline

The parties driving the implementation of the action plan should have the relevant legal powers, authorities, and resources. Successful implementation also requires that relevant information be shared with implementers, reported to higher authorities, and disseminated to stakeholders and the public on a timely basis. A communication plan should be part of the action plan.

Decision Support Systems (DSS)

A DSS is a computer-based tool that can model the analytical framework of linkages between possible solutions, desired outcomes, and key uncertainties by:

- Compiling available and relevant data (database)
- Running multiple simulations with varying parameters, creating an array of scenarios (model)
- Visualizing and comparing these scenarios with informative displays (user interface)

Although a DSS is a powerful tool that can greatly enhance the understanding and exploration of solutions and their performance across potential scenarios, it *cannot* replace the stakeholder-led negotiation and decision-making process.

For example, WEAP ("Water Evaluation and Planning") from the Stockholm Environment Institute is a DSS that structures, supports, and accompanies a participatory planning effort through:

- An integrated water planning system with built-in models for rainfall runoff and infiltration, evapotranspiration, crop water requirements and yields, surface water/groundwater interaction, instream water quality, with user-adjustable supporting assumptions and equations
- An embedded allocation optimization program
- A linked GIS-based interface, reporting through graphs, tables, and maps

www.weap21.org

Government Vetting

Ideally, the action plan will be vetted by a supervising governmental authority to verify that:

- Proper procedure (an agreed-upon process) was followed and guiding practices were applied.
- The plan is the legitimate outcome from a representative group of stakeholder/user delegates.
- The plan is properly funded.
- The plan is compatible with national and subnational strategic documents.
- The proposed water actions are based on data, scientific evidence, and technical studies.

Other government agencies not directly involved in the process should have a defined and reasonable amount of time to review and provide feedback.

Funding

Funding must be identified and secured early to cover the costs of the assessment and planning steps. It will also be the "reality check" for action planning, (i.e., what activities can actually be financed). Engaging potential financers early on is also essential because:

- Many financers articulate the types of actions they are willing to support (infrastructure, watershed management, social or institutional improvements).
- Most financers require specific analyses and justifications to provide funding. These elements must be part of the design of solutions (or you must make it clear that some activities will be carried out later).

Also, as water stakeholders realize the benefits of activities, they may be able to define, attract, or secure additional financing sources.

Financing for water security activities can come from government taxes, user tariffs, international aid transfers, and/or private-sector investments.

Funding Type	Description	Advantages	Disadvantages
Government spending (mostly from taxes) From citizens and companies (e.g., income, value-added tax, customs) paid to government	• Mostly fund construction/rehab. of water/irrigation networks/ structures (capital investments for utilities and other government agencies) • Also fund O&M costs (staff, maintenance, spare parts) as subsidies to public utilities/agencies • Used for some management activities (water monitoring), rarely for other activities (watershed management, awareness raising)	• Main funding, enables availability of basic water/irrigation services and water management activities • Used as a form of social welfare	• Depends on fiscal health of country (can vary and be unreliable) • Subject to poor or corrupt water sector governance • May distort market value of water services
Tariffs/User Fees Paid to water/ irrigation utility by customers	• Covers part of all O&M costs of water utilities and irrigation agencies • Rarely contribute to capital investments or other activities	• Provides for a more straight-forward, economical valuation of water services • Reduces reliance on govt subsidies	• Depending on tariff and fee amounts and structures, can incentivize or disincentive better water use behaviors
Transfers—International Funds Loans, grants, donations from multilateral and bilateral donors and foundations	• Usually complements government spending, notably to fund capital investment projects • Often used for construction/rehabilitation of water and irrigation structures and networks	• Available to countries with limited finances • Often integrated projects that cover activities other than infrastructure	• May create a culture of dependency and room for official corruption • Cannot cover recurrent O&M costs
Private Sector Investments (private infrastructure, concessions, water bonds) Often large investments, usually focused on water infrastructure	• Build-operate-transfer, concessions, service contracts, and other private sector outsourcing for construction/rehabilitation and O&M of water networks and structures	• Large source of water sector investment; decreases the tax-burden on traditional funding sources	• Expect returns on investment • May ignore poor areas/ neighborhoods • Requires solid regulation and credit-worthiness
Philanthropy or Corporate Social Responsibility Non-service funds, primarily expecting a non-monetary benefit	• Sometimes used to fund construction/ rehabilitation of small water infrastructure • Can improve water utilities' O&M through twinning and technology transfer solutions	• Makes new funds available for the water sector, can develop long-term partnerships	• Usually limited amounts • Expects returns on branding/image

Funding for water activities often combines competing perspectives and depends on priorities and policies: considering water as a **public resource** to be managed, developed, and subsidized for the benefit of all users, or as a **private service** to be provided to and paid by specific users/customers.

Traditionally, public agencies fund public services while private goods and services are financed by user charges. The boundary between the two can vary, depending on if the water is considered as a resource or a service, a right or a commodity.

User Tariffs

Charging for water services, even water management services such as water monitoring, allocates water costs to water users. It also changes perceptions (e.g., "Water is or should be free.") and the behaviors that lead to polluting and wastage.

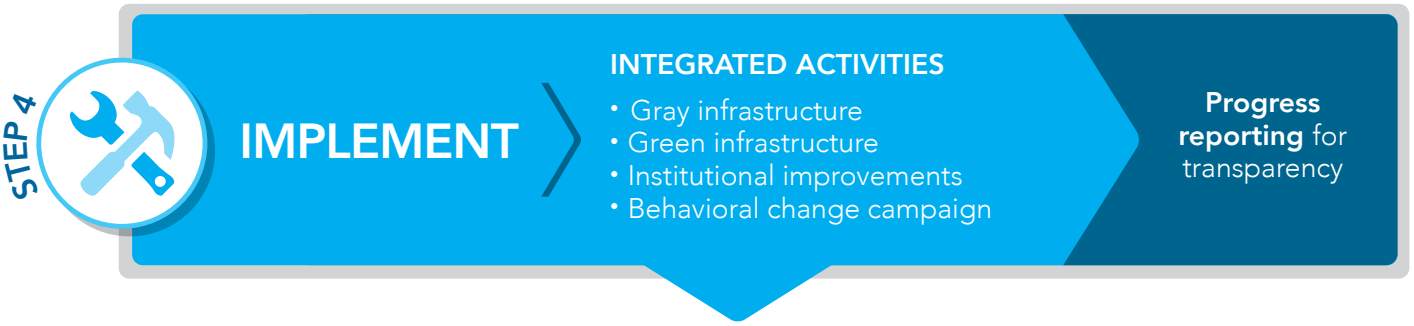
Charging for water services include principles such as:

- "User pays": The water user pays the full cost of the received water service (O&M costs and possibly capital investments)
- "Polluter pays": The water polluter pays the full cost of treating its wastewater effluent. This can achieve longer-term, sustainable water security by emphasizing cost recovery (and better appreciation of water supply and management costs) and ensuring accountability for externalities. Increased cost recovery can also attract private-sector investments.

OUTPUT OF STEP 3

An endorsed and funded water action plan designed to address/mitigate priority water issues/risks with defined activities (who, what, when, where). The plan must also have specific outputs and outcomes; clear targets and indicators; a well defined timeframe; clear roles and responsibilities; and identify the resources and capacities to be mobilized.


STEP 4



STEP 4: IMPLEMENT

(See Toolkit #5 for further details)

What Is Implementation?

The success of a WSI process ultimately depends on the actual implementation of stakeholder-defined water security activities or measures to mitigate water risks and if they increase the resilience of communities, assets, institutions, and ecosystems over the short and long terms.

The WSI process is legitimized by the delivery of tangible results that build confidence, trust, and experience among stakeholders by anchoring water security planning and decision-making in knowledge and evidence of what works.

Planning and developing a water security action plan is socially, institutionally, and technically complex. However, implementation is often a bigger challenge. Implementation can achieve tangible results—but commitments in resources and funding must be fulfilled, shortcomings in assessment and planning must be corrected, and initial stakeholder collaboration must be consolidated. Implementation is what turns a new exercise into a sustainable platform for improving water security over the long run.

Water security activities can range from construction, including gray and green infrastructure, to policy, legal, and institutional improvements and social behavior change campaigns.

Gray Infrastructure	Green Infrastructure	Policy and Institutional	Social and Behavioral
• Construction and O&M of diversion (weirs, barrages), storage (dams) ,conveyance (canals, pipes) and distribution (gates, valves) structures, water and wastewater treatment plants, desalination units, etc. • Improved O&M of water structures and systems (e.g., asset management, leak detection, metering) • Climate-proofing of infrastructure	• Agroforestry • Afforestation and forest conservation • Restoration and conservation of wetlands and/or coastal ecosystems • Vegetation/bio-structural engineering for river bank or slope stabilization, erosion control, fisheries and biodiversity, and stormwater management (e.g., reduction of runoff and sedimentation) • River and floodplain management (e.g. riparian buffers, controlled flooding, levee set-back/removal)	• Enforcement of water and related laws, decrees, by-laws, policies, etc. (*) • Preparation and implementation of water security strategies, action plans, etc. • Water monitoring (e.g. data collection, storage, analysis, dissemination) • Collection of water taxes, tariffs, and fees (*) • Enforcement of water and land rights, water permits (*) • Allocation planning and enforcement • Establishment of and support to basin committees/ boards/ agencies and water user associations • Regulation of water services	• Awareness-raising and social marketing campaigns (regarding water security risks, improved water use behaviors and practices, etc.) • Capacity-building of water users (e.g., soil and water management for farmers) • Livelihoods diversification • Collective action, community mobilization (river bank or pond cleanups, waste and wastewater recycling and reuse, etc.) • Education and curriculum development • Organizational change management

(*) Drafting of water and related laws, decrees, bylaws, policies, and definition of water taxes, tariffs, permits, water and land rights, water regulation standards, etc., is usually done at higher levels (e.g., the country level)

How to Implement?

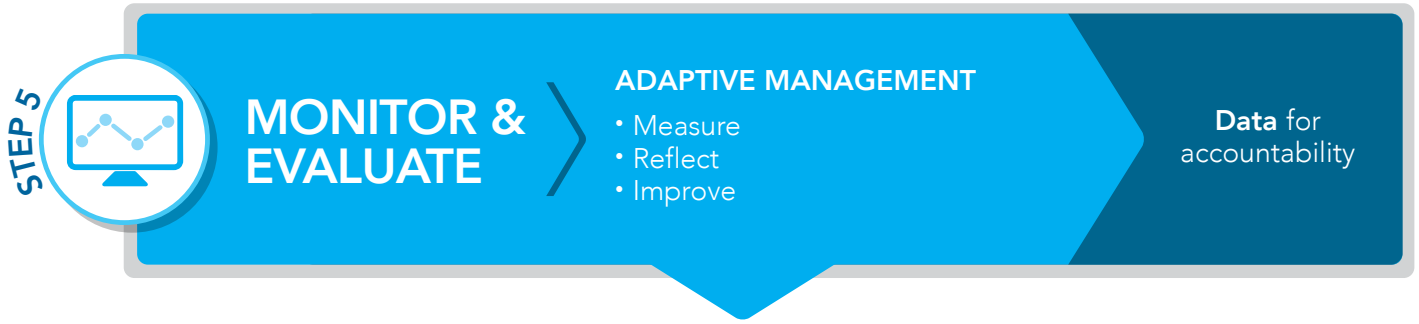
Key considerations for water security implementation embrace and reinforce the guiding practices of the WSI process:

- **"Quick wins" and early results:** Local leaders and stakeholders, especially when it is their first experience with a WSI process, may desire early actions that are visible, have an immediate benefit, and can be quickly delivered. Demonstration projects that produce early results incentivize stakeholders and improve collective learning, trust, and future iterations or expansions of the process.
- **Communication and adaptive management:** Successful implementation and the legitimacy of the WSI process require that information be shared among implementers. Information must also be reported to higher authorities and disseminated among stakeholders and the public on a timely basis.
    - Coordination mechanisms must be defined and used among implementers, with regular meetings to reflect on progress and possibly make decisions about adjusting actions to respond to changing conditions.
    - Reporting mechanisms must ensure that higher authorities continue to trust and support the agreed-upon WSI process (technical aspects, administrative structures, and/or financing arrangements).
    - Performance information must be disseminated to raise awareness among water users and the public. This will help ensure support and promote the necessary water-use behavior changes.
- **Accountability:** The WSI process must mobilize promised resources (e.g., finances, equipment, staff, and facilities) and fulfill the responsibilities described in the action plan. All parties are required to follow through on and be held accountable for their commitments and actions. Successes must be recognized and advertised, and failures must be corrected.
- **Compliance:** All activities should be implemented in compliance with existing standards and regulations.
    - Gray and green infrastructure activities: engineering design codes and guidelines, quality control and safety regulations, environmental regulations
    - Legal, institutional, and policy improvements: consultations and enforcement by relevant authorities
    - Social behavior change campaigns: proper analysis of current practices and social and customary/traditional norms

OUTPUT OF STEP 4

- Completed water security actions with tangible benefits that convincingly reduce the "too little, too much, too dirty, too erratic" experienced by water users and residents
- Improved capacity of all implementing parties to identify and allocate staff, equipment, and funding to define and implement water activities, address water issues and risks, and improve water security


STEP 5



STEP 5: MONITOR, EVALUATE AND ADAPT

(See Toolkit #6 for further details)

Monitoring and Evaluation

Monitoring and evaluation is a process of continuous assessment; it is a cornerstone of all development work. Monitoring is about collecting data on the current situation and changes brought about by voluntary policies and actions or socioeconomic and natural trends and events. Evaluation is about reflecting on monitoring data, comparing it to goals and targets, and using the information to learn and adjust implementation.

Collecting data can be a time and resource-intensive effort, while less attention is often devoted to actual data verification, analysis, and use. Defining what data to collect should be based on actual information needs. What information is needed for decision-making? Monitoring must be focused and practical; data should be useful, affordable, and collected regularly to be actually used.

Monitoring and Evaluation is meant to improve the definition, selection, design, and implementation of water security activities by:

- Providing information on the status of water and associated resources
- Building the capacity of stakeholders and decision-makers to understand and address water risks
- Supporting the review and comparison of alternative approaches/solutions
- Detecting implementation delays and issues early on
- Learning from experience, with successes and failures being duly documented

The overall goal of monitoring and evauation is to improve water decision-making and performance over time to achieve concrete results. It also builds the capacity of all actors through transparency and accountability.

Water security indicators attempt to monitor progress toward these goals, but tend to require large sets of data and rely heavily on expert evaluation. Moreover, water security is often a question of perspective, as different water users have different priorities and expectations.

The most reasonable approach is to focus on measuring:

1. The **status of water resources**, as a snapshot of the water situation
2. The progress and achievements of **water projects and activities**, as the tools trying to improve the situation
3. The performance of water agencies, as the **actors** managing resources and activities

Water risks get more complex over time—so our capacity to respond to them must also evolve. Evaluation aids this by comparing outcomes with expected targets and international standards and benchmarks.

Adaptive management is about learning from experience and making adjustments when necessary. This is the systematic process of continuously improving management policies and practices by collaboratively evaluating their outcomes. It is about building stakeholder capacities over time and developing the ability to collaboratively manage resources and deal with uncertainties.

Data on indicators that reflect the status of water resources must be continually collected. They must also be reviewed regularly to acknowledge successes and shortcomings, adjust implementation as necessary, and learn for the next assessment, planning, or design of water activities.

OUTPUT OF STEP 5

Regular monitoring showing the status of water resources, activities, and services, with regular reviews to acknowledge successes and shortcomings, adjust implementation as necessary, and learn for the next assessment, planning, or design of water activities.

VALIDATION POINTS & OUTPUTS

PRELIMINARY

CONFIRM & INITIATE

ENABLING FACTORS

- Financial support
- Relevance and potential
- Strategic compatibility
- Safe environment
- Government endorsement

Declaration of intent/ agreement to engage in participatory process

BEGIN WSI PROCESS

STEP 1

FOCUS

WSI SPACE

- Socio-institutional engagement space
- Geographic area
- Priority water risks
- Time horizon

Vision paper to improve water security within defined space

STEP 2

ASSESS

WATER SECURITY

- Physical status
- Management/institutional settings
- Risk studies

Assessment report with business-as-usual scenarios

STEP 3

PLAN & FUND

NEGOTIATION

- Exploration and analysis of solutions
- Robust decision making
- Funding identification

Action Plan (activities with targets, expected benefits, resource and capacity needs, costs, roles, and timelines)

STEP 4

IMPLEMENT

INTEGRATED ACTIVITIES

- Gray infrastructure
- Green infrastructure
- Institutional improvements
- Behavioral change campaign

Progress reporting for transparency

STEP 5

MONITOR & EVALUATE

ADAPTIVE MANAGEMENT

- Measure
- Reflect
- Improve

Data for accountability

– REPEAT, DISSEMINATE, SCALE UP –

GLOSSARY

Adaptation: learning under changing circumstances and using new information to adjust current actions.

Adaptive Management: a systematic approach for improving management by learning from management outcomes.

Climate Change: variations as well as persistent change in climate over decades or longer

Externalities: a side effect or consequence of an industrial or commercial activity that affects other parties without this being reflected in the cost of the goods or services involved, such as the pollination of surrounding crops by bees kept for honey.

Hydrological cycle (or water cycle): the cycle in which water evaporates from the oceans and the land surface, is carried over the Earth in atmospheric circulation as water vapor, condenses to form clouds, precipitates again as rain or snow, is intercepted by trees and vegetation, provides runoff on the land surface, infiltrates soils, recharges groundwater, and/or discharges into streams and flows out into the oceans, and ultimately evaporates again from the oceans or land surface. The various systems involved in the hydrological cycle are usually referred to as *hydrological systems*.

Resilience: the ability of human and natural systems to anticipate, withstand, respond to, mitigate, adapt to, and recover from shocks and stressors in a timely and efficient manner, including through ensuring the preservation, restoration, or improvement of essential basic structures and functions.

River basin (or watershed): the area of land that drains to a body of water, such as a lake, stream, river, estuary, sea, or ocean.

Robust actions: actions that provide satisfactory outcomes across a range of uncertain futures (unlike "optimal" actions, which can be sensitive to uncertainties). "No regret" measures are a type of robust measure, producing net benefits in the absence as well as in the event of climate change.

Runoff: precipitation that does not evaporate and is not transpired, but flows through the ground or over the ground and returns to bodies of water.

Systems thinking: an approach to problem-solving that attempts to balance holistic "big picture" thinking and reductionist thinking (focus on individual parts) by considering the overall system and its functioning, as well as examining the linkages and interactions between the components. Systems thinking is meant to avoid contributing to the development of unintended consequences and externalities.

Shock: an unexpected or unpredictable socioeconomic or environmental event that places sudden stress on water systems and their users; examples include:

- Floods, tsunamis, droughts, oil/chemical spills and similar events that can cause loss of life and damage to assets (e.g., housing, livestock, transportation and energy networks, factories) and have durable socioeconomic and environmental impacts
- Market or currency collapses and political/civil unrest, which can cause significant disruption to water supply services

Social learning: a process of learning from experience in which a group of stakeholders collaboratively assesses, plans, and makes decisions.

Stressor: a socioeconomic or environmental condition or trend that stresses water and related systems (human and natural); examples include:

- Population growth and rising living standards that increase water demands for hygiene, food, energy, etc.
- Decaying water infrastructure that degrades water supply services (timing, quantity, quality)
- Natural resource depletion
- Urbanization and industrial development that increase wastewater effluents and pollution
- Climate change that alters rainfall patterns, affecting water availability (timing, quantity)

Stakeholders: individuals or groups involved in making decisions about water and related resource management; or, more important, those who will be affected by such decisions.

Uncertainty: an expression of the degree to which a value or relationship is unknown. Uncertainty can result from lack of information or disagreement about what is known or even knowable. Uncertainty may originate from many sources, such as quantifiable errors in the data, poorly defined concepts or terminology, or uncertain projections of human behavior.

Vulnerability: susceptibility (exposure and sensitivity) of a system or population to incur damage due to natural and human-caused hazards (i.e., shocks and stressors).

Water risk: the potential for loss, damage, or destruction of a vulnerable entity (community or asset) as a result of a harmful water-related event (i.e., a stressor or shock).

Water stress: the inability to meet human and ecological water needs.

Water resources: all water volumes, including rainwater, surface water (e.g., rivers, streams, lakes, dams), and groundwater.

WATER SECURITY REFERENCES

Global Water Security, Office of Director of National Intelligence (2012)

A short, stern list of key judgements regarding how water problems will combine with poverty, social tensions, environmental degradation, ineffectual leadership, and weak political institutions to contribute to social disruptions that can result in state failure in countries important to US national security.

https://www.dni.gov/files/documents/Special%20Report_ICA%20Global%20Water%20Security.pdf

Water Security and the Global Water Agenda, UN-Water Analytical Brief (2013)

This brief provides a working definition of water security, establishes the link between water and human security issues, and highlights how water insecurity can lead to fragile and vulnerable societies. It also explores the relevance of water security to policy formulation on a number of key dimensions – from human rights, to development, to the protection of ecosystems. It finally highlights the key supporting elements needed to achieve water security – policies, capacities, governance mechanisms and structures – and options for addressing water security challenges.

http://www.unwater.org/publications/water-security-global-water-agenda

OECD Studies on water – Stakeholder Engagement for Inclusive Water Governance (2015)

An extensive review of obstacles, drivers, mechanism and tools for stakeholder engagement in the water sector. Also provides profiles of typical stakeholders.

http://www.oecd-ilibrary.org/governance/stakeholder-engagement-for-inclusive-water-governance_9789264231122-en

GWP – A handbook for Integrated Water Resources Management in Basins (2009)

A practical review of river basin management. Provides basics for establishing and sustaining river basin organizations, involving stakeholders, conducting strategic planning, ensuring communications, and supports these through numerous concrete examples.

http://www.inbo-news.org/IMG/pdf/GWP-INBOHandbookForIWRMinBasins.pdf

River Basin Management: A Negotiated Approach (2005)

A solid and convincing advocacy for participation and negotiation in river basin management, with practical advice and several case studies.

http://www.bothends.org/en/Publications/document/33/River-Basin-Management-A-Negotiated-Approach

Local Water Security Action Planning Manual (2016)

Presents a detailed and thorough process which tends to be focused on urban water planning. Suggested process is quite detailed and involves 20 steps.

http://documents.rec.org/publications/LWSAP_Manual_April2016.pdf

The EMPOWERS approach to Water Governance (2007)

These guidelines provide a practical framework for the development and implementation of integrated water development plans at community-level. They advocate collaboration and dialogue between water managers and users.

https://www.ircwash.org/resources/empowers-approach-water-governance-guidelines-methods-and-tools

Negotiate – Reaching agreements over water - IUCN-WANI (2010)

This manual emphasizes constructive engagement and consensus building. It provides the 4R framework (Rewards, Risks, Rights and Responsibilities) to facilitate negotiations, discusses the characteristics of Multi-Stakeholder Platforms and of final agreements as intended products of water negotiations.

https://www.iucn.org/content/negotiate-reaching-agreements-over-water-0

Water & Conflict – USAID (2014)

This toolkit explores the relationship between water, conflict, and cooperation; highlights lessons learned from water-related development and peacebuilding programs; discusses real-world examples of relevant development interventions, and provides guidance to identify and evaluate the conflict risk and peacebuilding potential of water programs.

https://www.usaid.gov/sites/default/files/documents/1866/WaterConflictToolkit.pdf

SUSTAINABLE WATER PARTNERSHIP