

# Innovative water solutions for sustainable development

## SUMMARY

IWMI Strategy 2019-2023

Food · Climate · Growth



## ●●● A Transformative Agenda for Water

AS GLOBAL ECONOMIC OUTPUT CONTINUES to expand, consumption of water and natural resources grows relentlessly. The results are visible as water over-abstraction, land and water degradation, climate change and looming extinction crises. These are creating interconnected risks for people, economies and ecosystems that are unprecedented in human history.

Water is essential for food security, human health and biodiversity, and also for energy supply, industrial growth and urban development. Global demand for freshwater has grown fourfold in

60 years, a trend that cannot be sustained. How societies safeguard and manage water resources must change, and soon.


Productive uses of water are fundamental to well-being, but so too is management of water-related risks. Water scarcity, increasing frequency of floods and droughts, and water pollution hold back development, aggravate poverty and inequality, and exacerbate food scarcity, conflict, vulnerability and fragility.

Our future well-being therefore hinges on transformation: from convergence of

stresses and risks to a future of sustainable, climate-resilient and inclusive development. The 2030 Agenda is the world's agreed roadmap for this transformation.

Water is essential to the transformative ambitions of the 2030 Agenda. Water solutions are needed at all levels. This will take the combined effort of governments, civil society, the private sector, the inter-governmental system and the research community, of which the International Water Management Institute (IWMI) forms an important part. ■

**The indispensable role of water management is recognized in the 2030 Agenda and ambitious international policies:**

 <b>SDG 6</b> Ensure availability and sustainable management of water and sanitation for all	<b>The High Level Panel on Water</b> report "Making Every Drop Count", launched in 2018	<b>The New Urban Agenda</b> , adopted by the United Nations General Assembly in 2016	<b>Paris Agreement</b> of the United Nations Framework Convention on Climate Change (UNFCCC)	<b>Sendai Framework</b> for Disaster Risk Reduction 2015-2030	<b>Global Commission on Adaptation</b> , 2018-2019	<b>International Decade for Action: Water for Sustainable Development</b> 2018-2028
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## ●●● International Water Management Institute



**VISION**  
A water secure world

IWMI IS A RESEARCH-FOR-DEVELOPMENT (R4D) organization, with offices in 13 countries and a global network of scientists operating in more than 30 countries. For over three decades, our research results have led to changes in water management that have contributed to social and economic development.

IWMI's vision is a **water secure world**.

Based on evidence and knowledge drawn from our science, innovative technologies and testing of business models, IWMI works with governments, farmers, water managers, development partners and businesses to solve water problems and scale up solutions.



**MISSION**  
To provide water solutions for sustainable, climate-resilient development

IWMI's mission is **to provide water solutions for sustainable, climate-resilient development**.

We research, demonstrate and catalyze innovative and inclusive water solutions. Working with partners, we combine research with data to build and enhance knowledge, information services and products, strengthen capacity, convene dialogue and deliver actionable policy analysis to support the implementation of solutions for water management.

IWMI's value proposition is unique. It rests on our track record of more than 30 years of rigorous, solutions-oriented water management research, built on long-term



**RESEARCH**  
Science for a transformative agenda

partnerships at local, country and regional levels, a sustained field presence across Africa and Asia, and recognized through the award of the prestigious Stockholm Water Prize in 2012.

IWMI is a Research Center of CGIAR, the global research partnership for a food-secure future. The 2019-2021 CGIAR System Business Plan calls for innovation to transform the global food system to address the world's urgent challenges. In its commitment to this shared ambition, IWMI leads the CGIAR Research Program on Water, Land and Ecosystems (WLE), which – with other CGIAR Centers and partners – develops, disseminates and catalyzes solutions for sustainable and resilient land and water management. ■

## ● ● ● IWMI's Strategy

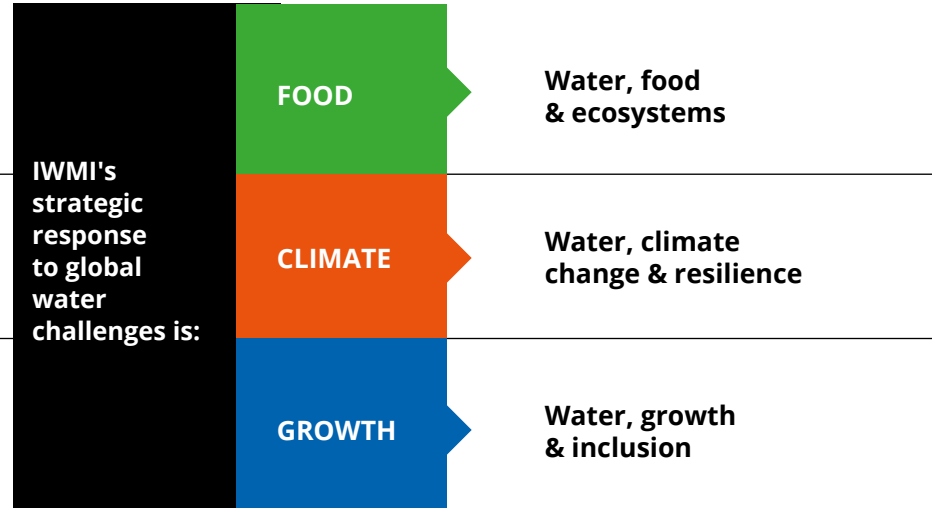
IWMI'S STRATEGY 2019-2023 RESPONDS directly to demand for innovative, scientifically-

tested water management solutions for sustainable development. Our research, at

field to basin and regional scales, will address three high-priority water challenges:

### GLOBAL WATER CHALLENGES

<b>FOOD</b>	To improve food security while sustainably managing water resources and ecosystems
<b>CLIMATE</b>	To adapt to and mitigate climate change while building resilience to water-related disasters and disruption
<b>GROWTH</b>	To reduce poverty, and advance inclusion and equality as agriculture transforms, energy transitions and urbanization intensifies



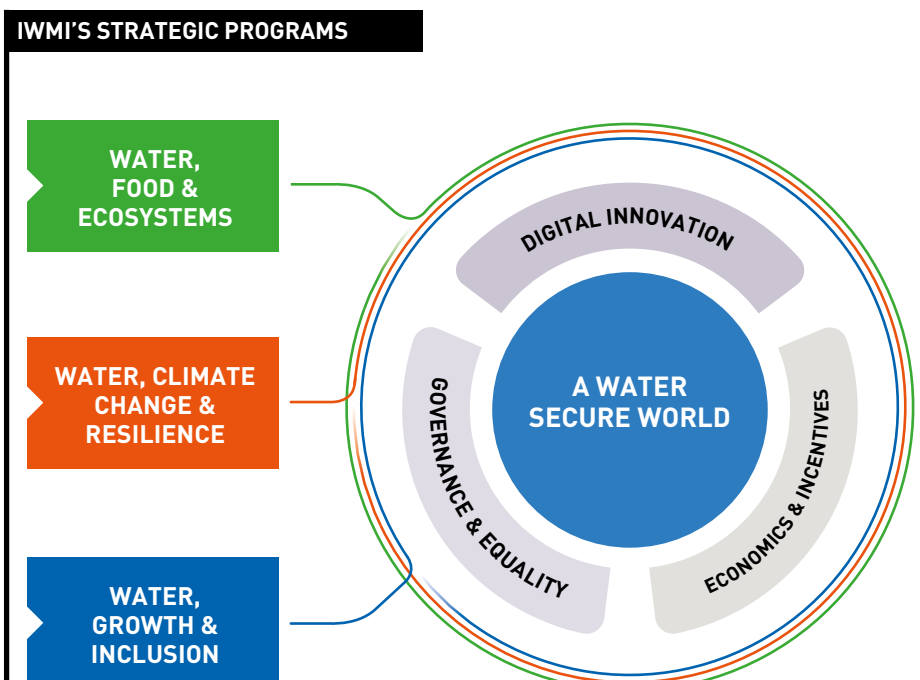
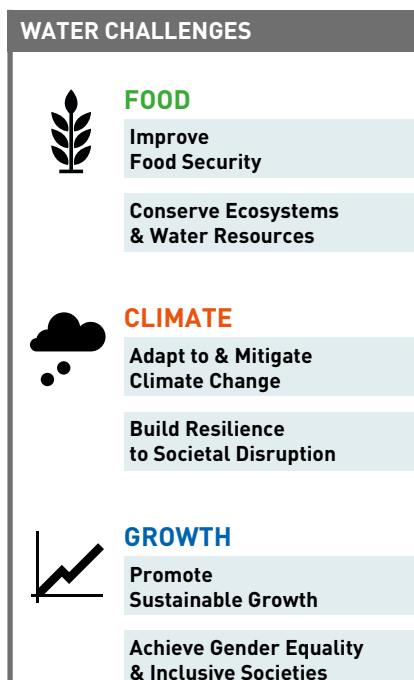
TO SUPPORT THE 2030 AGENDA FOR Sustainable Development, IWMI's research will focus on **science for a transformative agenda**.

We will embed water management research that connects across the SDGs in strategies for the scaling up of solutions. IWMI's science will

more closely align with national and regional priorities for water security in the countries and regions where the Institute works, and make stronger contributions to global dialogues on policy and financing. It will be designed to connect research to impact. IWMI's teams will co-design and co-implement, in strategic partnerships with policy and practitioner


communities, programs to demonstrate and catalyze systemic change with impacts at scale.


IWMI will expand and further develop coordinated research portfolios focused on solutions in water management that, coupled with better policies, innovations and changes in practice, accelerate impact. ■




## ● ● ● IWMI's Strategic Programs

IWMI WILL ORGANIZE ITS RESEARCH AROUND THREE STRATEGIC PROGRAMS :

 **Water, Food & Ecosystems**

 **Water, Climate Change & Resilience**

 **Water, Growth & Inclusion**

**DATA SCIENCE AND DIGITAL INNOVATION WILL SUPPORT ALL STRATEGIC PROGRAMS**

### WATER, FOOD & ECOSYSTEMS

AGRICULTURE IS THE ENGINE OF FOOD security, the largest global user of water and, in developing countries, an important source of employment for poor people. As competition for water intensifies, food systems must become more sustainable and resilient, and better able to meet the nutritional needs of growing populations without undermining the landscapes and ecosystems on which they depend. Research is needed to enhance agricultural productivity, develop technologies and policies that promote sustainable agricultural intensification, and identify ways to integrate nature-based infrastructure into the management of rural landscapes.

**Food** – IWMI research will:

- provide evidence and data analytics for making choices about agricultural water management, business models for smallholder irrigation or reforms in large-scale irrigation
- develop water solutions for sustainable intensification in agriculture, including management of groundwater, water pollution, and integration of inland fisheries
- expand the application of water accounting to support improvements in

#### OUTCOME

More sustainable and equitable food systems as a result of water solutions that boost productivity and efficiency, reduce poverty, and conserve ecosystems and the services they provide

#### Key questions:

How can farmers grow more food using less water?

How, and by how much, can the productivity and incomes of smallholder farmers be raised through agricultural water management?

What role do, and could, ecosystems play in helping to achieve and maintain water security?

How can competing goals for food production and ecosystem conservation be balanced and achieved?

water productivity, basin planning, policy development and water-related investments

- assess the impacts of equality and women's empowerment on agricultural water management.

**Ecosystems** – IWMI research will:

- assess trade-offs and synergies in planning portfolios of built and natural water infrastructure
- integrate ecosystem values, services and sustainability into water resource allocation

and management practices, and water infrastructure design and operations

- support application of environmental flows and conservation of biodiversity
- develop knowledge on the hydrological impacts of restoration and applications to strengthening water security through wetland and watershed restoration
- ensure that governance and incentives for protection and restoration of water-related ecosystems strengthen equality and inclusion. ■

### WATER, CLIMATE CHANGE & RESILIENCE

ENHANCED WATER RESOURCES MANAGEMENT and more resilient water services are essential for adaptation to the adverse impacts of climate change, and for strengthening the resilience of communities, ecosystems and economies. Research is needed on scenarios for water management and allocation in agriculture and across sectors under future climates, policies and technologies for disaster preparedness and response, climate-smart strategies for water storage and the development of financial remediation schemes such as insurance.

#### OUTCOME

Improved climate change adaptation and mitigation with greater resilience to natural disasters and societal disruption through increased use of water-smart solutions

#### Key questions:

How can farmers adapt to climate change?

How can water management help make development more resilient?

What are the best ways to increase preparedness for water-related disasters and reduce risks for vulnerable communities?

How can the dangers of water as a risk multiplier for conflict and migration in fragile communities be reduced?



**Climate** – IWMI research will:

- integrate modeling, monitoring and scenario planning for surface and groundwater to help governments and partners to plan and operationalize climate change adaptation
- use basin modeling tools to assess the hydrological impacts of plans for climate change mitigation through land-use change or changes in energy technologies
- support effective water governance for

climate change adaptation and mitigation

- strengthen gender responsiveness implementation of climate-smart agriculture.

**Disruption** – IWMI research will:

- further develop and deploy flood and drought monitoring and forecasting technologies for improving disaster preparedness
- improve and scale up application of risk

transfer products for smallholder and estate farming

- integrate data and analytical tools, research and knowledge on institutions, equality and inclusion, and facilitate capacity development and dialogue in programs for building river basin resilience
- enhance knowledge of how water relates to social, economic and environmental drivers of migration, and promote the use of this evidence in policies on migration. ■

## WATER, GROWTH & INCLUSION

WATER SECURITY IS KEY FOR SUSTAINABLE and inclusive growth, underpinning almost all types of economic activity – from farming to manufacturing, energy and transport. Water scarcity, floods, pollution and conflict over water all pose threats to people and economies. How water is allocated between agriculture and cities or among competing sectors affects growth and the sharing of its benefits across societies. Research is needed to explain how water affects the dynamics of growth, the implications of water policies for economic development, roles of institutions and incentives in water management, impacts of water management on gender and inclusion, and real or perceived trade-offs between growth and sustainability.

**OUTCOME**

Enhanced growth resulting from more inclusive water governance together with institutions and incentives that diminish pollution and promote more integrated, sustainable and productive water management in all uses

**Key questions:**

What threat does water scarcity pose to sustainable growth in developing economies?

How does water allocation in the water-energy-food nexus affect economic growth?

How can waste and wastewater be used as a resource for sustainable growth?

How can water governance arrangements support transformative agendas, and ensure that women and men benefit equally?

**Sustainable growth** – IWMI will support:

- innovation for the circular economy, including through technologies and business models for resource recovery and reuse from wastewater and sanitation
- development of non-conventional water resources and alternatives to conventional, centralized infrastructure to recover nutrients for agriculture and reduce public health risks from pollution
- better planning of water allocation through assessment of the trade-offs and management of risks in the water-energy-food-ecosystems nexus, and between urban and agricultural water use
- management of upstream and downstream water risks by cities, and assessment of effects of energy choices and technologies on competition for water and trajectories for growth.

its research areas and integrate gender equality and social inclusion throughout its portfolio of research for development. IWMI's research will:

- analyze the dynamics of power, interests and incentives and their impacts on decision making
- support cooperation in transboundary water management
- address gender dimensions of technologies and water governance, and build understanding of how to strengthen the inclusion of women, youth and marginalized people in growth.

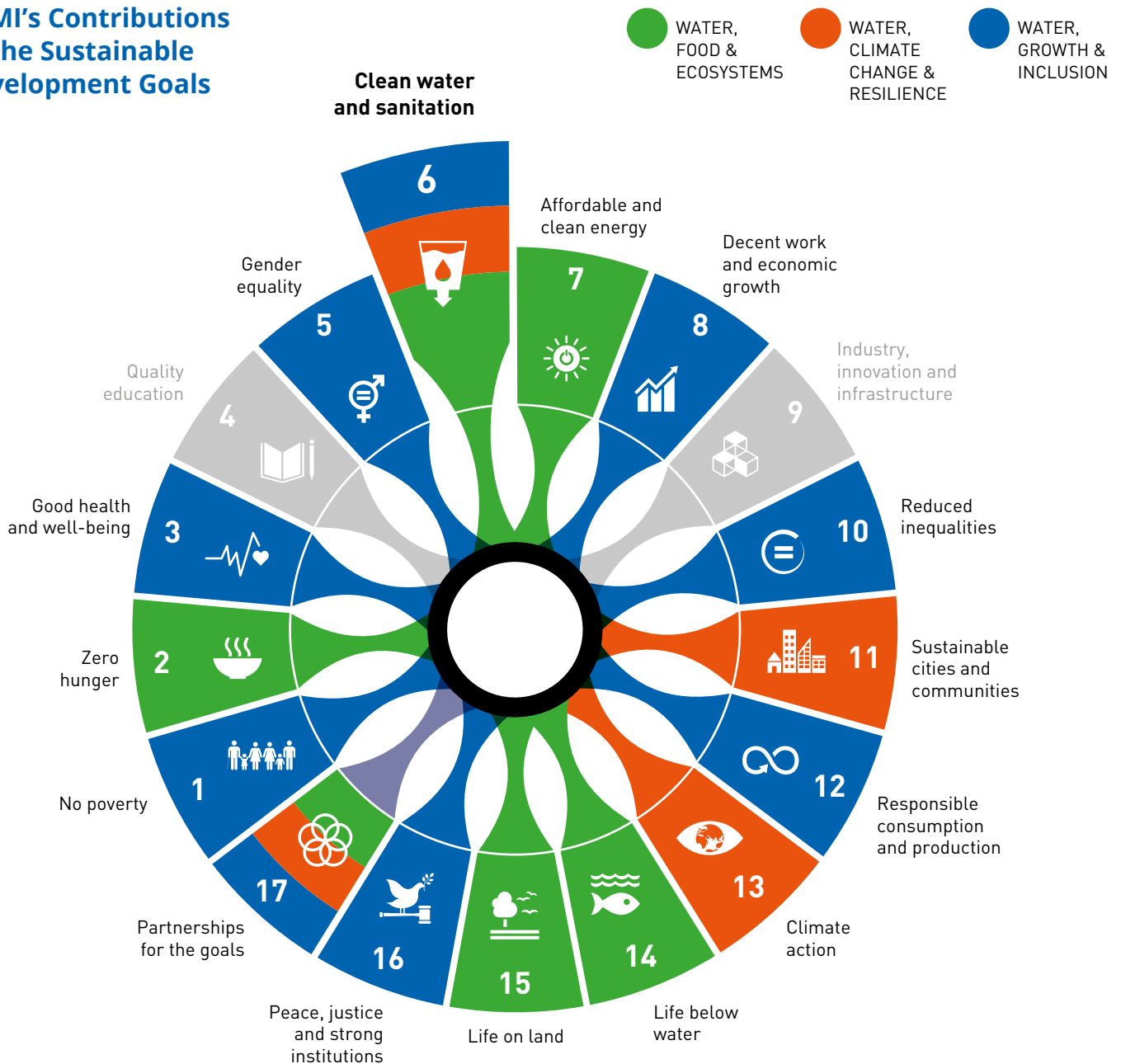
Through its projects, IWMI will increase women's access to decision making while developing knowledge of barriers and effective ways to overcome them. Projects will integrate mentoring of women and youth leaders so that they can contribute fully to developing and implementing water solutions.

**Economics and incentives** - IWMI will expand the development and application of economics research across its programs. Research will:

- identify the impacts of, and effective incentives for, adoption and scaling up of water-related technologies, changes in governance and reallocation of water resources
- assess the costs and benefits of water risk management
- support application of ecosystem service valuations in decisions on water allocation and infrastructure investments
- apply cost-benefit and impact evaluation to strengthen policy analysis in IWMI's research
- make available enhanced capabilities in hydro-economic modeling to support decision making. ■

**Governance and equality** – IWMI will address water governance across all of

## IWMI's Contributions to the Sustainable Development Goals



## WATER DATA SCIENCE AND DIGITAL INNOVATION

UNEQUAL ACCESS TO WATER DATA HOLDS back the world's ability to respond to growing water challenges and to meet the SDGs. Water data are often insufficient, are of uncertain quality, are not being shared or simply do not exist in many developing countries. Yet, technologies for data collection—such as satellites, virtual sensors and mobile phone applications—are generating vast quantities of information on the world's river systems,

aquifers, watersheds and freshwater ecosystems at unprecedented rates. Research and new data-driven products and services are needed for governments, business, water managers and millions of farmers around the world to reap the benefits of this deluge of water information.

Now is the time to seize the potential of the increased availability of water data and

big data tools to catalyze change. IWMI intends to strengthen the role it plays in putting emerging technologies and the big data revolution to work for water security. There is a need to identify how to channel multiple streams and sources of data into products that create or enhance knowledge needed by decision makers and investors. IWMI's Strategic Programs will seek to build on new technologies and services for

## Priorities in Regional Water Strategies Addressed in IWMI's Strategic Programs

<div>Water, Food &amp; Ecosystems</div> <div>Water, Climate Change &amp; Resilience</div> <div>Water, Growth &amp; Inclusion</div>	<ul style="list-style-type: none"> <li>Water-use efficiency &amp; productivity</li> <li>Protect ecosystems</li> <li>Sustainable water for food</li> </ul>	<ul style="list-style-type: none"> <li>Integrated Water Resource Management (IWRM)</li> <li>Improve agricultural livelihoods</li> <li>Water storage &amp; groundwater</li> </ul>	<ul style="list-style-type: none"> <li>Prevent water depletion</li> <li>Protect &amp; clean up rivers</li> <li>Demand management</li> </ul>
	<ul style="list-style-type: none"> <li>Water scarcity</li> <li>Water risk management</li> </ul>	<ul style="list-style-type: none"> <li>Disaster preparedness &amp; resilience</li> <li>Adaptation</li> </ul>	
	<ul style="list-style-type: none"> <li>Water planning &amp; accounting</li> <li>Wastewater &amp; reuse</li> <li>Water pollution</li> <li>Nexus trade-offs</li> </ul>	<ul style="list-style-type: none"> <li>Water information systems</li> <li>Transboundary cooperation</li> <li>Research partnerships &amp; interstate cooperation</li> </ul>	<ul style="list-style-type: none"> <li>Water for cities</li> <li>Institutional development</li> <li>Equity &amp; inclusion in allocations</li> <li>Stakeholder involvement</li> <li>Women &amp; youth in agriculture</li> <li>Harmonizing cross-sectoral policies</li> </ul>

## IWMI's Strategy Supports Regional Priorities

### AFRICA

The **African Water Resources Priority Action Programme 2016-2025**, the **Malabo Declaration on Accelerated Agricultural Growth and Transformation** and the aspirations of **Agenda 2063 of the African Union**

### MIDDLE EAST & NORTH AFRICA

The **Strategy for Water Security in the Arab Region to Meet the Challenges and Future Needs for Sustainable Development 2010-2030** of the Arab Ministerial Council on Water

### ASIA

Response to the **2017 Yangon Declaration of the 3rd Asia-Pacific Water Summit**, the **2016 Asia Water Development Outlook** and national and basin-level plans of action

### LATIN AMERICA

Action on water resources called for in the **Initiatives of the VII Summit of the Americas 2015**, and the priorities of the **Comité Regional de Recursos Hidráulicos (CRRH)** of the Central American Integration System (SICA)

data collection, management and analysis, as well as to innovate new approaches for developing and delivering actionable information to users. IWMI will:

- build on its open-access, web-based data platform to make integration of data from Earth observation, geo-spatial analysis, hydrometeorological monitoring and hydrological modeling faster, easier

and directly available to farmers, water managers, planners and business

- support and catalyze development of digital extension services for agricultural water management and management of basins and aquifers
- develop and apply digital tools for monitoring, reporting and verification for large-scale programs and investments
- use new data and digital technologies

to undertake regional water security assessments, starting in Africa, to assist governments to prioritize, implement and monitor water policies and investments

- develop new partnerships with leaders in digital innovation and developers of cutting-edge "Fourth Industrial Revolution" technologies to ensure these are accessible in and meet the needs of the countries where we work. ■

## ● ● ● Designing Programs for Impact



**Accelerated  
impact at scale**



**Problem-solving  
partnerships**



**Mission-oriented  
research**



**Evidence-driven  
communications**

SCIENCE FOR A TRANSFORMATIVE AGENDA sets a high bar for IWMI's *Strategy 2019-2023*. Our research must engage system-wide innovation involving interlinked technological, institutional and policy change across scales. This level of ambition is essential for IWMI to support transformation in the 2030 Agenda.

IWMI designs programs for impact that integrate technology, policy and practice to shape wider plans and investments, and to catalyze change. At local level, our research programs collaborate with local problem-solving platforms and institutions to design and test water solutions. At basin, national and higher levels, they cooperate with governments and others to address overarching policy, institutional and investment constraints, and to implement the solutions needed to reach national, regional or global development goals.

By strengthening focus on accelerated, impact-driven programs and projects, IWMI

increasingly operates not only as a research institute, but also – reflecting our title and research-for-development mandate – as a management institute, coordinating research and information services with capacity building, learning, dialogue and policy analysis, and providing advice to help governments, water management agencies, farmers and businesses find and implement effective ways of overcoming their water challenges.

### **DIGITAL TECHNOLOGY EMPOWERING TRANSFORMATION**

IWMI integrates research on hydroinformatics, application of digital technologies, and development and delivery of new data-driven products and services in designing and implementing its programs for impact. By lowering the current barriers to data and information, we will help harness the global expansion in data access and availability for scaling up transformations in water security.

### **DELIVERING IMPACT THROUGH CGIAR RESEARCH PROGRAMS**

Through leadership of the CGIAR Research Program on Water, Land and Ecosystems (WLE), IWMI builds cooperation among CGIAR Centers and partners to develop, test and apply knowledge and innovation in processes of scaling up change. Partnership through WLE helps IWMI to ensure that its solutions are socially inclusive, and to synthesize and apply knowledge to support decision making at increased scale.

Our role in WLE and other CGIAR Research Programs is essential to ensuring that our research – relating water resources to food systems, climate change, natural resource governance and equality – contributes to CGIAR's impacts on transformation of food systems for sustainable, inclusive and climate-resilient development. ■

### **Reaching Out: Expanded Partnership Models**

No one achieves impact at scale by acting alone. Research contributions to innovation systems are only possible through partnerships. IWMI prioritizes partnerships that put in place the relationships needed to link research to local change and innovation, and to policy and institutional change at national, regional and global levels.

IWMI's partnerships build on research collaboration with national research systems and CGIAR Centers to embrace implementers in governments, civil society, business and development agencies. Our priority is partnerships that put the collective capabilities of coalitions to work in applying research to demonstrating solutions and shaping impacts at scale. ■

### **Mission-oriented Research for Development**

Science for a transformative agenda must be actionable. IWMI's *Strategy 2019-2023* will adapt mission-oriented research models to link research to impact. Research-for Development (R4D) Missions will focus on resolving specific water security challenges under IWMI's Strategic Programs.

IWMI will carry out R4D Missions by building programmatic portfolios of activities that combine research and collaboration with partner-led processes of policy and practice change, and investments in water security. Portfolios will integrate cooperation in CGIAR Research Programs and across IWMI programs. IWMI will deploy or develop an integrated package of knowledge, services and digital innovation to support each R4D Mission. ■

### **Communication - Stepping Up in the Global Dialogue**

IWMI will invest in communicating our research and its impacts, and in knowledge exchange with those who use our outputs. Through briefs, opinion articles and the news media, we will promote the uptake of our results, using our social media channels to draw increasing attention to our research, products and services.

IWMI will proactively champion the global water agenda through thought leadership and advocacy of results, innovation and change achieved through our R4D Missions. We will showcase how IWMI uses science for a transformative agenda to support and catalyze the changes needed for sustainable and climate-resilient development. ■



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