IWMI

International Water Management Institute

Innovative water solutions for sustainable development

IWMI Strategy 2019-2023

Food · Climate · Growth

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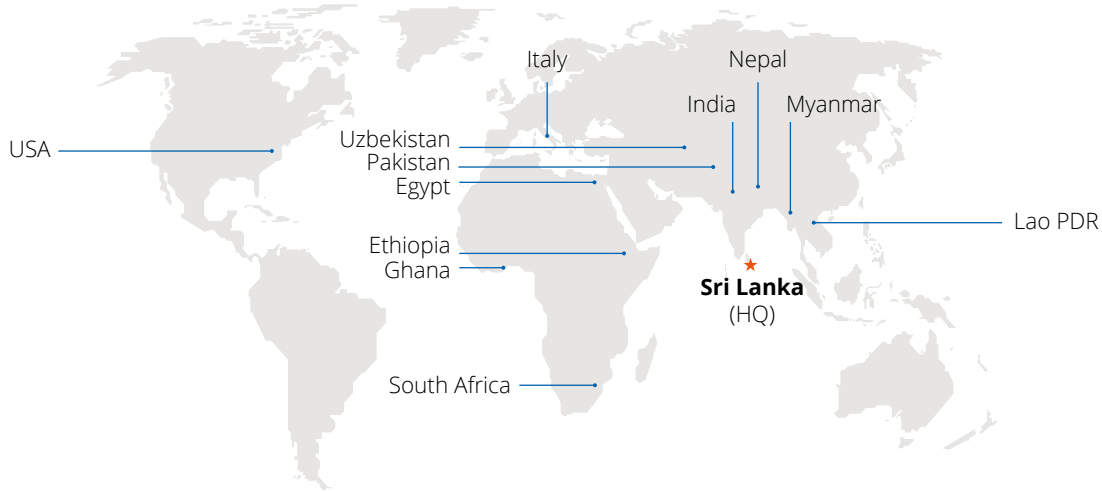
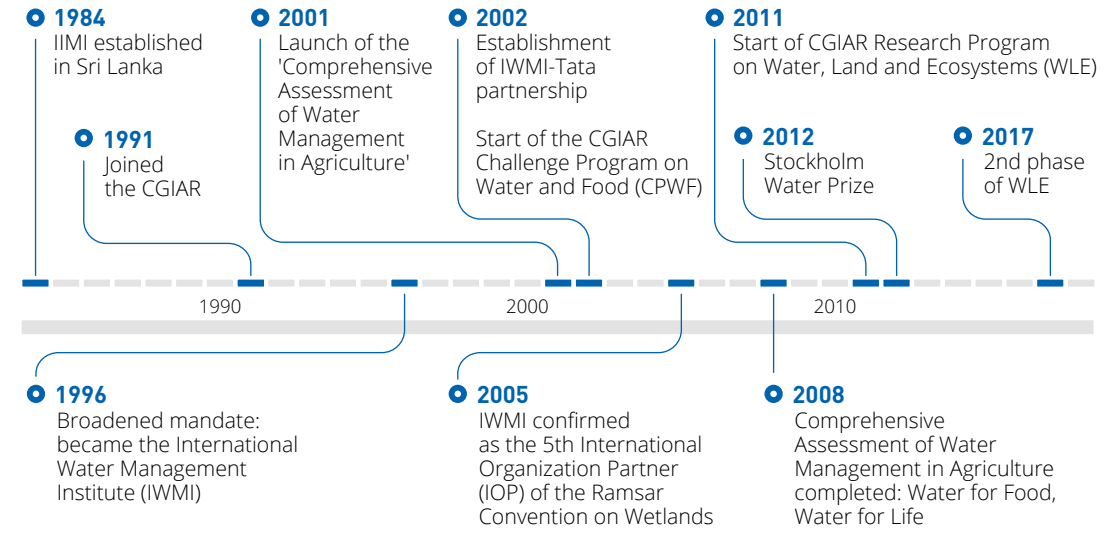
IWMI STRATEGY 2019-2023

Innovative Water Solutions for Sustainable Development

IWMI Offices



A Short History of IWMI



Message from the Board Chair and Director General

Today's IWMI has emerged from a relatively small international institute established 35 years ago to conduct research on how to improve the performance of irrigation systems. From an initial focus on irrigation management, our mandate broadened to include larger aspects of water management for agriculture and its essential contribution to food security and poverty eradication. Through research, dissemination, field-level application, and strategic alliances with national and international partners, IWMI has become the world's foremost international knowledge center for water, food and the environment.

Building on this very strong foundation, IWMI is now poised to take its agenda to the next level. Our work on the use and management of water for agriculture will continue unabated, but will be embedded within a broader framework aimed at addressing in a comprehensive way the world's most pressing water-related challenges: How will food security be achieved for the world's expanding population while lowering the environmental footprint of food systems and conserving ecosystems? How will the world adapt to and mitigate climate change and build resilience to disasters and disruption? How will growth become sustainable and inclusive, with benefits shared to overcome inequalities? To that end, we will shape our research around three strategic programs, each supported by excellent science and digital innovation: Water, Food and Ecosystems; Water, Climate Change and Resilience; and Water, Growth and Inclusion.

Going forward, our work will be guided by our new mission: to provide water solutions for sustainable, climate-resilient development. IWMI will expand and intensify its efforts to deliver water solutions and to bring about broad, systemic change. Indeed, the key thread running through the strategy is one of enabling transformational change in water management. Our broader focus will enhance IWMI's long-standing concentration on agricultural water management, and will continue to involve an extensive web of strategic alliances with fellow CGIAR centers and other national and international partners across the world.

Importantly, our new strategy seeks to hold a clear line of sight to impact. It calls for IWMI to expand and deepen its impact by combining research with data to build and enhance knowledge, information services and products; to strengthen capacity and convene dialogue; and to deliver actionable policy analysis for better water management. It recognizes that impact at scale cannot simply involve replicating the application of solutions, but rather must encompass complex processes of systemic change that reflect interdependencies among water, land and ecosystems and across water-using sectors.

Our strategic planning process has been informed and inspired by extensive consultations over the last year with IWMI's staff and its Board and management, and incorporates feedback from key stakeholders and external partners. Spearheaded by the work of two IWMI staff working groups on Emerging Challenges and Impact, these consultations have encouraged spirited debate and captured an emerging consensus on IWMI's unique, exciting and essential role over the next several years. We are grateful to all the IWMI staff who contributed to the development of this strategy and in particular to Mark Smith, IWMI's Deputy Director General for Research for Development, who led the overall effort.

We believe this strategy provides a truly exciting opportunity to combine IWMI's strong foundations and capabilities with an emerging global agenda based on new systemic thinking. On behalf of the Board of Governors of IWMI, we are proud to present this strategy to the global community.

Roberto Lenton
Chair, IWMI Board of Governors

Claudia Sadoff
Director General

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A Transformative Agenda for Water

As global economic output continues to expand, the consumption of water and other natural resources grows relentlessly. The results are increasingly visible as water over-abstraction, land and water degradation, climate change and looming extinction crises. These environmental impacts are accelerating and converging in ways that directly affect people and economies, creating interconnected risks that are unprecedented in human history.

x4

Global demand for freshwater has grown fourfold in 60 years

Water runs through these interconnected challenges. Where in the past they could have been mitigated one at a time, solutions that work across interacting chains of cause and effect are needed now. How societies safeguard and manage water resources must change as a result, and soon. 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. Water scarcity is becoming a binding constraint on development, sharpening trade-offs across the many uses and users of the resource.

It is not only the productive uses of water that are fundamental to well-being, but also the management of water-related risks. Water scarcity, increasing frequency of floods and droughts, and water pollution hold back productivity and development, aggravate poverty and inequality, and exacerbate food scarcity, conflict, vulnerability and fragility. These extreme weather events and water crises, along with the failure of climate change mitigation and impending threats of biodiversity collapse, were all ranked as top global risks for 2019, threatening the integrity of vital systems linking the well-being of people and the planet.

Our future well-being hinges on transformation: from convergence of stresses and risks to a future of sustainable, climate-resilient and inclusive development. Water is a connector and often a currency of exchange in the trade-offs that are inherent in these alternative transformative pathways.

How societies safeguard and manage water must change, and soon.

A Transformative Agenda for Water

The 2030 Agenda for Sustainable Development is the world's agreed roadmap for transformation.

The United Nations Sustainable Development Goals (SDGs) represent an unprecedented aspirational shift toward sustainability, and socially inclusive and equitable development. The indispensable role of water management in building this future is recognized in a variety of ambitious international policy statements and initiatives:

SDG 6
Ensure availability and sustainable management of water and sanitation for all

The **High Level Panel** on Water report "Making Every Drop Count", launched in 2018

The **New Urban Agenda**, adopted by the United Nations General Assembly in 2016

Paris Agreement of the United Nations Framework Convention on Climate Change (UNFCCC)

Global Commission on Adaptation, 2018-2019

International Decade for Action: Water for Sustainable Development, 2018-2028

Sendai Framework for Disaster Risk Reduction 2015-2030

Water makes essential contributions across the SDGs.

Water makes essential contributions across the SDGs. Solutions for water management underpin the SDGs for ending poverty (SDG 1), and ensuring food security (SDG 2) and good health (SDG 3). They are needed for securing access to energy (SDG 7), inclusive industrialization (SDG 9), and making cities safe and resilient (SDG 11). Managing water effectively demands empowering women and girls (SDG 5), and helps build peace and security for communities and countries (SDG 16). It is vital for conserving terrestrial ecosystems (SDG 15) and coasts and oceans (SDG 14), and adapting to the impacts of climate change (SDG 13).

Sustainable development that fulfils the transformative ambitions of the SDGs is unimaginable without strengthened water management. Water solutions are needed at all levels, from homes and farms to industries and cities, to nations and international river basins. 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. ■

Photo: Apollo Habtamu / IWMI

International Water Management Institute

VISION

A water secure world

MISSION

To provide water solutions for sustainable, climate-resilient development

RESEARCH

Science for a transformative agenda

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.

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. Together with our 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 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. ■

Vision and Mission

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

A water secure world is one where the immense productive and destructive potential of water is managed for the benefit of all. To IWMI, water security means the availability of an acceptable quantity and quality of water for production, livelihoods, health and ecosystems, achieved with an acceptable level of water-related risks to people, environments and economies. IWMI's mission is **to provide water solutions for sustainable, climate-resilient development**. We research, demonstrate and catalyze the delivery of

Agriculture is by far the largest user of water globally. Efficient use of water in agriculture is essential.

effective, innovative and inclusive water solutions. Our solutions build on our commitment and capacity to deliver cutting-edge scientific, technical, institutional and policy innovations to navigate key trade-offs in decision making, explore new business models, and to identify and support essential reforms. ■

IWMI in the CGIAR System

IWMI is a CGIAR Research Center. CGIAR, a global research partnership for a food-secure future, aims to use new knowledge and innovation to spearhead and accelerate a 'food systems revolution' to meet the SDGs.

> 30 years

track record of water management research

The water and food challenges are closely entwined and inseparable. Agriculture is by far the largest user of water globally. Thus, efficient water use in agriculture is essential, if the global water challenge is to be met. At the same time, ensuring the availability, reliability and quality of water is essential for efficient agriculture and for food security. IWMI's work on robust solutions for water management underpins CGIAR's agriculture-focused vision of a world free of poverty, hunger and environmental degradation.

The CGIAR System 3-Year Business Plan (2019-2021) calls for innovation to transform the global food system to address the world's urgent challenges identified as critical to a sustainable and resilient future. It calls for a sustainability transformation, a nutrition transformation, a genetics revolution, a social and economic transformation, and an information revolution. IWMI's leadership and participation in the CGIAR Research Programs directly support these goals.

IWMI leads the CGIAR Research Program on Water, Land and Ecosystems (WLE), which – in collaboration with other CGIAR centers and partners – develops, disseminates and catalyzes solutions for sustainable and resilient land and water management. IWMI is also a partner in the CGIAR Research Programs on Climate Change, Agriculture and Food Security (CCAFS); Policies, Institutions, and Markets (PIM); and Fish Agri-Food Systems (FISH). Through these CGIAR Research Programs, and collaboration in the CGIAR Platform for Big Data in Agriculture and CGIAR Collaborative Platform for Gender Research, IWMI researches complex, water-related challenges in food systems and their solutions. The Institute's role in the CGIAR Research Programs delivers knowledge and innovation that is vital for ensuring effective food systems, integrating more water-efficient and cleaner, less-polluting production, climate-smart and resilient agriculture, restoration of degraded landscapes, and providing support for governance reforms, women's empowerment and inclusion of youth. ■

IWMI

IWMI's Values

We focus on research for development that generates benefits for people living with poverty, and for members of vulnerable communities and disadvantaged groups in developing countries.

IWMI is committed to ensuring:

Integrity
Trust and accountability, respecting privacy and data protection in our research, partnerships and workplace

Equality
Gender equality, diversity and social inclusion

Dignity
Zero tolerance for harassment, intimidation or discrimination

Excellence
Relevant, high-quality, independent and objective research

Collaboration
Partnerships for delivering sustainable, efficient and equitable solutions

Photo: Hamish John Appelby / IWMI

Tackling Global Water Challenges

Three of the world's most pressing challenges set the stage for this IWMI Strategy:

FOOD

How will **food security** be achieved for the world's expanding population while lowering the environmental footprint of food systems and conserving ecosystems?

CLIMATE

How will the world adapt to and mitigate **climate change**, and build resilience to disasters and disruption?

GROWTH

How will **growth become sustainable and inclusive**, with benefits shared to overcome inequalities?

We will not resolve these challenges successfully without achieving and sustaining water security. Solutions for water security must therefore address complex and often competing demands. Water scarcity poses threats felt across sectors and water users, as there is an increase in competition for water to supply agriculture, industry, energy and ecosystems, as well as for water supply and sanitation in human settlements, particularly in rapidly growing towns and cities. Climate variability and change greatly compound these threats by creating uncertainty and disruptions in water availability. Water pollution, which is growing rapidly in both volume and virulence, adds yet another layer of complexity to the challenge of securing adequate, safe water resources. Since agriculture accounts for approximately 70% of global water withdrawals (a figure rising to 80% in Africa and Asia), irrigated and rain-fed farming systems, in particular, will come under increasing pressure to increase productivity and reduce their impacts on water supplies.

In response, IWMI will expand and intensify its efforts to deliver water solutions, building on its long-established expertise in agricultural water management to bring about broad, systemic change.

Why are solutions for water security essential for each of these challenges?

● Food and ecosystems

By 2050, global food production will need to increase by 60 to 100%, compared to levels in 2005, to keep pace with expected demand. During this same period, water consumption in other sectors, such as energy, industry and domestic use, is set to rise by 55% globally. Rising competition for water will increase the pressure on farmers to reduce water withdrawals, even as the demand to produce more

Global Water Challenges

60 to 100%

increase in global food production will be needed by 2050

~1 billion people

derive their livelihoods from rain-fed and irrigated farming in developing countries

food accelerates. In response, farmers must boost water productivity in both irrigated and rain-fed agriculture. Solutions, however, must not restrict access to safe water for smallholders, women and poor people. On the contrary, water solutions for agriculture must empower women, and reduce risks and inequality, while raising farm incomes.

Water management beyond the farm also affects the sustainability and resilience of food systems. The availability of water for food depends on its allocation among diverse uses across basins and landscapes, on measures to prevent pollution of surface water and groundwater, and on infrastructure for managing water risks. Overexploitation of water reduces river flows, depletes aquifers, causes soil salinization – already affecting 20% of the global irrigated land area – and degrades ecosystems, all of these undermining food security. An estimated 20% of the world's aquifers are over-abstracted, and 35% of wetlands worldwide have been destroyed since 1970. As ecosystems decline, so do the vital services they provide, such as water storage and filtration as well as regulation of floods and droughts. Despite their enormous contribution to food and water security, ecosystems are often undervalued in decisions about water use and quality. Solutions are needed that reverse the loss of ecosystems and biodiversity, and curb the degradation of soils, landscapes, aquifers and basins, while meeting the rapidly rising demand for water and natural resources at the same time.

Climate and disruption

Climate change impacts are felt principally through water. Climate change is, in effect, water change. Floods, droughts and damaging storms are becoming more frequent, and the retreat of glaciers and sea-level rise are accelerating. Agricultural communities are particularly vulnerable; more variable rainfall and more frequent extreme weather events are already a reality for the nearly 1 billion people who derive their livelihoods from rain-fed and irrigated farming in developing countries. The risks will increase for jobs that depend heavily on water, of which 95% are in agriculture. How societies choose to mitigate and adapt to climate change, whether through shifts in farming systems, land use or energy generation, will also affect water demand and allocation. Farms and rural communities, as well as cities and industries, must urgently prepare to meet these challenges. Water management is critical for enabling them to adapt to climate change, and is therefore an essential priority in climate-related investment.

Disruptions caused by natural disasters, conflict and political shocks, often related to climate change, undermine development. Water can play a central role in these disruptions through droughts and floods, and because water affects the speed and effectiveness of recovery efforts. Over 90% of disaster victims are affected by water-related hazards. By 2050, droughts, floods and hurricanes will have permanently displaced an estimated 150-200 million people. Water, disasters and the loss of agricultural livelihoods form a potent mix, which, together with social unrest and conflict, make communities more fragile and lead to political destabilization. Water stress is increasingly associated with migration and, as a result, improving water supplies, access and governance is increasingly a priority within strategies seeking to mitigate social unrest, improve livelihoods and boost resilience. Water solutions are critical for building resilience in the face of growing disaster risks.

Growth and inclusion

The absence of water security undermines growth, affecting the poor and vulnerable people the most. The structure of economies, and those who lose and benefit as economic development impacts water

Global Water Challenges

150 million

people will be displaced by 2050 due to droughts and floods

2/3

of the global population is expected to live in cities by 2050

availability and access, depends on how water is allocated across sectors. With the energy sector, a key driver of growth, responsible for 15% of water withdrawals globally (and rising), choices about energy development – among thermal, hydropower and renewable sources, for example – affect agricultural productivity and livelihoods, as well as the availability of water to cities and ecosystems. To secure water for growth, societies must skillfully manage trade-offs in the water-energy-food-ecosystems nexus, including at the international scale within the more than 280 transboundary river and lake basins, and 600 transboundary aquifers worldwide. Institutions need new scope, scale and capacity to handle these trade-offs, and build on potential synergies while advancing inclusion and equality at the same time.

By 2050, two-thirds of the global population will live in cities. While serving as centers of innovation and growth, expanding cities also intensify and concentrate demands for food, water and energy, and cause water pollution. Climate change and competition for water from the energy and agriculture sectors could, however, reduce urban water supplies by as much as two-thirds. If cities are to be sustainable and resilient, they need solutions to mitigate upstream and downstream water risks, manage wastewater and its impacts on human health, and recover resources from waste. Innovations in the recycling of water (within cities, and between rural and urban uses), and the recovery of nutrients and energy from wastewater will, furthermore, spur the emergence of an effective 'circular' economy. ■

Sustainable cities need solutions for managing upstream and downstream water risks.

Photo: Neil Palmer / IWMI

Global Water Challenges

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

Photo: Sharni Jayawardena/IWMI

IWMI's Strategy

***IWMI's Strategy 2019-2023* responds directly to the identified need and 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:**

FOOD

To improve food security while sustainably managing water resources and ecosystems

CLIMATE

To adapt to and mitigate climate change while building resilience to water-related disasters and disruption

GROWTH

To reduce poverty, and advance inclusion and equality as agriculture transforms, energy transitions and urbanization intensifies

IWMI's strategic response to global water challenges is:

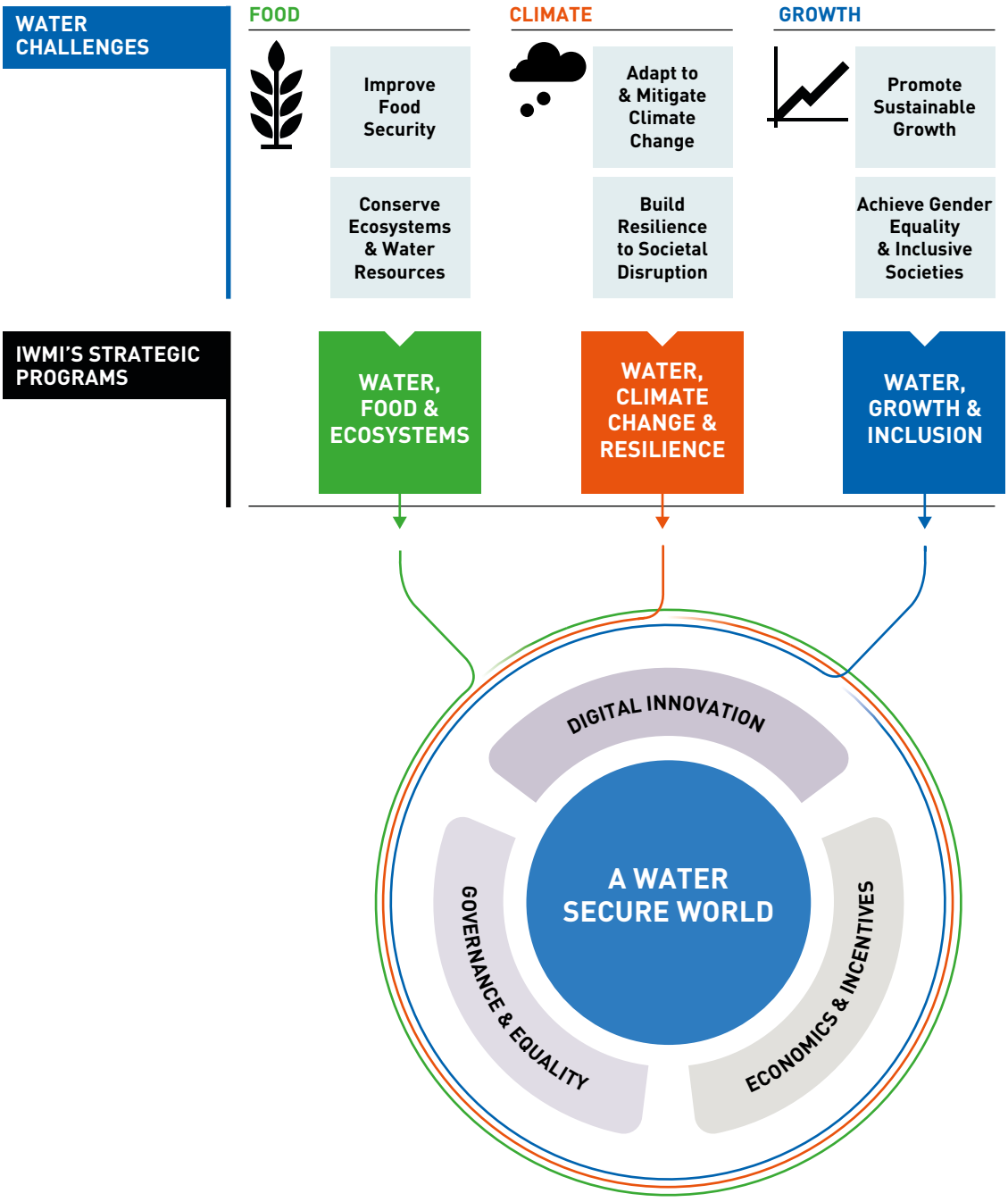
FOOD	CLIMATE	GROWTH
Water, Food & Ecosystems	**Water, Climate Change & Resilience**	**Water, Growth & Inclusion**

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 – through a series of Research-for-Development 'Missions' – where rigorous scientific research on water security underpins and influences the scaling up of change. Our research will focus on solutions in water management that, coupled with better policies, innovations and changes in practice, accelerate impact. ■

IWMI's Strategy



Keystones for Change

Science for a transformative agenda links research with technological, institutional and policy change. Success demands new knowledge generated through research that connects across scales, revisits the assumptions that have guided water management in the past and lowers barriers to change.

To deliver water solutions for the 2030 Agenda, IWMI's science must confront competing demands for water resources as well as coexisting water scarcity and excess, compounded by uncertainty and pollution. In the face of these new realities, IWMI will:

WATER MANAGEMENT

Expand water planning and management research: against a backdrop of rapid change and growing complexity, the world needs more modern and integrated information platforms, multi-purpose water planning, and adaptive management institutions, which together enable and deliver technical and policy solutions that work across a wide range of possible futures.

WATER ENGINEERING

Update water engineering research: in a world of finite resources, single-use and 'once-through' water engineering is no longer appropriate; this needs to be replaced by circular water systems that recover and reuse resources, and by systems that incorporate more non-conventional water resources and nature-based water solutions, adapted to the scale and capacity of user communities.

WATER ECONOMICS

Advance water economics research: at a time when water resources are becoming a binding constraint to growth and well-being, greater focus is needed on the trade-offs, opportunity costs and externalities of alternative water management options, as well as the policies and incentives that drive water-use efficiency, sustainability, degradation and allocation.

To advance the 2030 Agenda, research must help overcome barriers to change, while encouraging institutions and individuals to act in new ways. Poor governance and inadequate data are major obstacles to water security. Social exclusion, a lack of opportunities for women and youth, and absent or misaligned incentives also cause resistance to change. Until ways are found to overcome these impediments, progress will remain incremental, fragmented and slow. IWMI will respond across all of its programs by integrating better governance, greater equality and empowerment for women, more effective incentives, and enhanced efforts to transform data into easily accessible and actionable information. ■

Science for a transformative agenda links research with technological, institutional and policy change.

IWMI's Strategic Programs

IWMI will organize its research around three Strategic Programs :

Water, Food and Ecosystems

Water, Climate Change and Resilience

Water, Growth and Inclusion

DATA SCIENCE AND DIGITAL INNOVATION WILL SUPPORT ALL STRATEGIC PROGRAMS

WATER, FOOD AND ECOSYSTEMS

OUTCOME	Key questions:			
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	**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?**

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 will provide evidence and data analytics needed by governments, financing institutions, farmers and other partners making choices about agricultural water management technologies, development of inclusive business models for smallholder irrigation or reforms in large-scale, public-sector irrigation. Research will address water solutions for sustainable intensification in agriculture, including management of groundwater, agricultural water pollution, and integration of inland fisheries in water management for agri-food systems. We will expand the application of water accounting to support improvements in water productivity, and in basin planning, national policy development and water-related investments. Research will assess the impacts of equality and women's empowerment on agricultural water management and food systems.

Ecosystems: IWMI will integrate ecosystem values, services and sustainability into water resource allocation and management practices, as well as water infrastructure design and operations. Projects will support the assessment of trade-offs and synergies in planning portfolios of built and natural water infrastructure, application of environmental flows and conservation of biodiversity. We will develop knowledge on the hydrological impacts of restoration and applications to the design of large-scale programs for strengthening water security through wetland

and watershed restoration. IWMI research on the social and economic impacts of ecosystem degradation will be applied to ensuring that governance and incentives for protection and restoration of water-related ecosystems strengthen equality and inclusion. ■

WATER, CLIMATE CHANGE AND RESILIENCE

OUTCOME	Key questions:			
Improved climate change adaptation and mitigation with greater resilience to natural disasters and societal disruption through increased use of water-smart solutions	**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?**

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, for example, 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.

Photo: Pieter van Eijk, Wetlands International

Climate: IWMI will integrate its capabilities for modeling, monitoring and scenario planning for surface water and groundwater resources to equip governments and partners to plan and operationalize adaptation to floods, droughts and other water-related impacts of climate change. Basin modeling tools will be used to assess the hydrological impacts of plans for climate change mitigation through land-use change or changes in energy technologies. Research will build knowledge on what works where, and support effective water governance for climate change adaptation and mitigation. At farm level, IWMI's research on irrigation and soil water management will be applied to strengthen gender responsiveness and for the implementation of climate-smart agriculture.

Disruption: IWMI will further develop and support the deployment of flood and drought monitoring and forecasting technologies for improving disaster preparedness, and applications for improving and scaling up risk transfer products for smallholder and estate farming. IWMI will 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. Research will 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 AND INCLUSION

OUTCOME	**Key questions:**			
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	**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?**

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. Water management should occupy a central place in development plans and strategies, helping to achieve equitable and inclusive growth. Research is needed to explain how water affects the dynamics of growth, the implications of water resource allocation and water policies for economic development, the roles of institutions and incentives in water management, its impacts on gender and inclusion, and the real or perceived trade-offs between growth and sustainability.

Sustainable growth: IWMI will support the transformation to sustainable growth through innovation for the circular economy. Research will address the use of non-conventional water resources and the development of alternatives to

conventional, centralized infrastructure to recover nutrients for agriculture and reduce public health risks from pollution.

IWMI will further develop and scale up technologies and business models for resource recovery and reuse from wastewater and sanitation. We will assess the trade-offs and management of risks in the water-energy-food-ecosystems nexus, and between urban and agricultural water use, for better planning of water allocation. At farm level, IWMI research will support business models tailored to local contexts. At the national and basin levels, the Institute will assess how energy choices and technologies affect competition for water and trajectories for growth. IWMI will apply its capabilities for basin and groundwater management to help cities reduce upstream and downstream water risks.

Governance and equality: IWMI will address governance across all of its research areas to identify opportunities to increase the effectiveness and speed of change in water management, and to make the scaling up of water solutions more successful. Research will analyze the dynamics of power, interests and incentives and their impacts on decision making on water. We will apply science to support cooperation in transboundary water management. IWMI will integrate gender equality and social inclusion throughout its portfolio of research for development. Research will address gender dimensions of technologies and water governance,

Photo: Cristina Gottardi on Unsplash

and build an 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 to identify the impacts of, and effective incentives for, adoption and scaling up of water-related technologies, changes in governance and reallocation of water resources. Research will assess the costs and benefits of water risk management and application of ecosystem service valuations in decision making on water allocation and infrastructure investments. Cost-benefit and impact evaluation methodologies will be more systematically applied to strengthen policy analysis in IWMI's research. The Institute will make available enhanced capabilities in hydro-economic modeling to governments and other partners to support decision making. ■

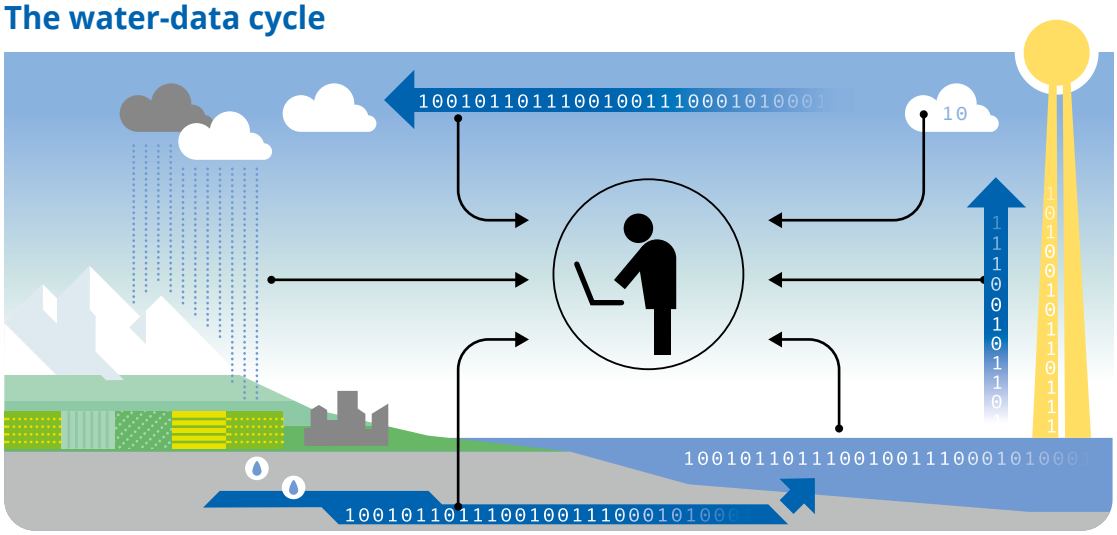
WATER DATA SCIENCE AND DIGITAL INNOVATION

Lack of, and poor or unequal access to, water data hold 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, businesses, water managers and millions of farmers around the world to reap the benefits of this deluge of water information.

IWMI recognizes that, because of both the complexity of the 2030 Agenda and the speed of current advances in technology, now is the time to seize the potential of the increased availability of water data and big data tools to catalyze change. The Institute 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 data collection, management and analysis, as well as to innovate new approaches for developing and delivering actionable information to users.

IWMI will develop new partnerships with leaders in digital innovation and developers of cutting-edge "Fourth Industrial Revolution" technologies to ensure these meet the needs and are accessible in the countries where it conducts research. The Institute will develop an open-access, web-based data platform with the goal of making 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 businesses. IWMI will work with partners to identify the most pressing data and knowledge needs for different contexts and challenges. Likely areas of focus will include digital extension services for agricultural water management, basin management and monitoring, and reporting and verification for large-scale programs and investments. IWMI will use these capabilities to undertake regional water security assessments, starting in Africa, assisting governments to prioritize, implement and monitor water resource policies and investments. ■

The water-data cycle

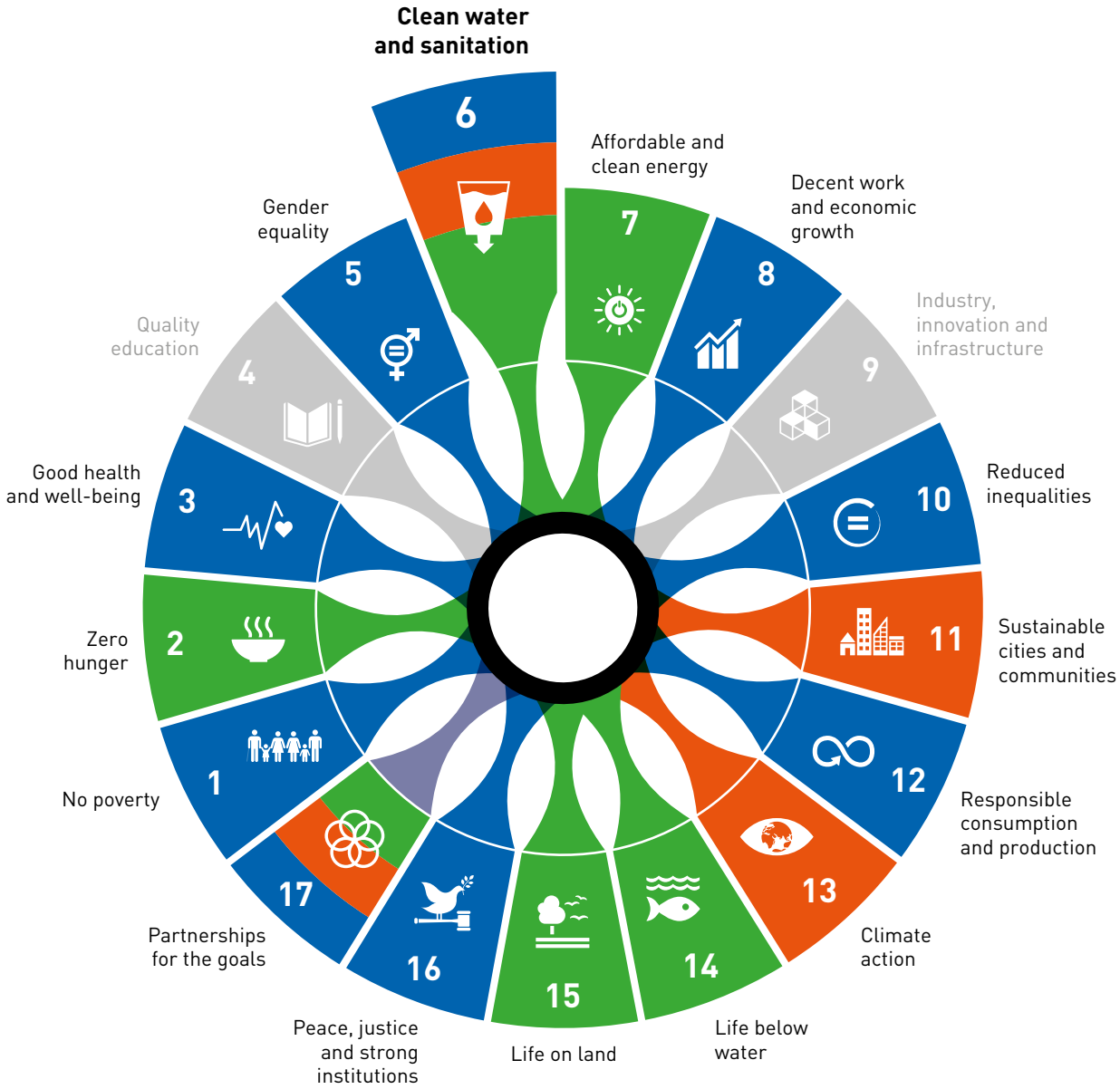


IWMI's Contributions to the Sustainable Development Goals

Water, Food & Ecosystems

Water, Climate Change & Resilience

Water, Growth & Inclusion



IWMI's Strategy

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

Water, Food & Ecosystems

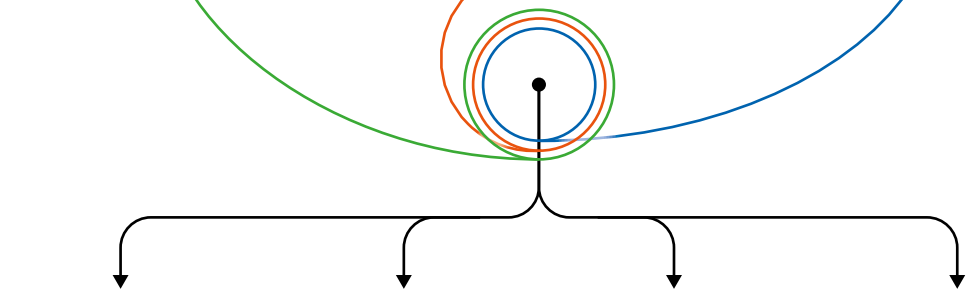
- Water-use efficiency & productivity
- Protect ecosystems
- Sustainable water for food
- Demand management
- Integrated Water Resources Management (IWRM)
- Improve agricultural livelihoods
- Water storage & groundwater
- Prevent water depletion
- Protect & clean up rivers

Water, Climate Change & Resilience

- Water scarcity
- Water risk management
- Adaptation
- Disaster preparedness & resilience

Water, Growth & Inclusion

- Water planning & accounting
- Wastewater & reuse
- Water pollution
- Nexus trade-offs
- Water information systems
- Transboundary cooperation
- Water for cities
- Research partnerships & interstate cooperation
- Institutional development
- Equity & inclusion in allocations
- Harmonizing cross-sectoral policies
- Stakeholder involvement
- Women & youth in agriculture



IWMI's Strategy Supports

AFRICA

The **African Water Resources Management 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 Water Council

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)

Moving to Action and Impact

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. Without it, IWMI will fall short of fulfilling its mandate of research for development, its vision of a **water secure world** and its mission **to provide water solutions for sustainable, climate-resilient development**.

Impact at scale demands more than replicating the use of technologies and solutions. With the many interdependencies among water, land and ecosystems, and across sectors, impacts emerge through complex systemic change. Therefore, IWMI designs programs for impact that integrate technology, policy and practice to shape wider plans and investments, and to catalyze change.

Impact at scale, based on both theory documented by CGIAR and on IWMI's own and others' lessons from research and practice, requires working at both local level and higher levels. At local level, our research programs collaborate with local problem-solving platforms and institutions to design and test water solutions. Through engagement 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. Programs articulating local to higher levels make links between local research and change at scale stronger.

IWMI applies knowledge from innovation systems to design programs for impact, building on its past successes in facilitating linkages along impact pathways. We work alongside people and institutions involved in change to mobilize, combine, adapt and put innovation and knowledge from research into use. During the period 2019-2023, IWMI will continue to reinforce and expand impact-driven planning throughout the organization. We will design and implement our research through partnerships and cooperation with coalitions that come together to solve problems.

Even more is demanded today, however, than impact at scale. There is also urgency. The pace of change is quickening, resource constraints are tightening and there are costs to inaction. Therefore, IWMI aims to learn, as we create programs for impact, how to accelerate implementation of solutions for water security.

Moving to Action and Impact

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.

Photo: Michelle Ng / IWMI

DIGITAL TECHNOLOGY EMPOWERING TRANSFORMATION

Water data, knowledge and information are a vital foundation for building water security, and for scaling up and accelerating change. With data, governments can monitor water resources, identify risks and assess options or innovations for policy, regulation and change. Businesses can make informed decisions on water management, investments and new technologies. Information empowers farmers to make choices that increase production, raise incomes and reduce environmental impacts. It empowers citizens to take part in planning how water is managed and builds accountability for all water users. With rapid advances in data technology, however, there is a need to transform data into useable, targeted and accessible information.

Opening access to water data and usable information for integrated water management can give countries transformative capabilities for using evidence in policy making, building consensus and making the decisions needed to intensify and accelerate investment and action on water security. 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.

Moving to Action and Impact

DELIVERING IMPACT THROUGH CGIAR RESEARCH PROGRAMS

Through its leadership of the CGIAR Research Program on Water, Land and Ecosystems (WLE), IWMI builds cooperation among CGIAR centers and networks of 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

Photo: Hamish John Appleby / IWMI

IWMI integrates research on hydroinformatics, application of digital technologies, and development and delivery of new data-driven products.

inclusive, and to synthesize and apply knowledge to support decision making at increased scale. We will cooperate through WLE on key priorities in IWMI's *Strategy 2019-2023* to build evidence for, and promote action on, solutions for water security.

CGIAR Research Programs provide a cornerstone for applying research to policy and practice change. Our role in WLE and other CGIAR Research Programs in which IWMI is a partner is essential to ensure 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 resilient development. ■

Moving to Action and Impact

Reaching Out: Expanded Partnership Models

Over decades of experience in research for development, IWMI has learned that 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 collaborations among scientists to embrace implementers in governments, civil society, businesses and development agencies. Through partnerships, there is then continuous collaboration to bring together technology and practice change to solve problems, and to support policies and institutional change to address large-scale development challenges. Such partnerships simplify engagement of researchers and knowledge providers in processes of solving complex problems. They put the collective capabilities of coalitions to work in applying research to demonstrating solutions and shaping impacts at scale.

IWMI uses its unique and extensive field-based presence of water scientists, its long-term partnerships with governments, researchers, nongovernmental organizations (NGOs), the private sector and development practitioners, as well as its membership in CGIAR, to identify other key partners and prioritize cooperation with coalitions at local, basin and national levels. Our priority is to deliver research and knowledge services to, and through, all these partnerships. ■

Photo: Jeffery M Walcott / IWMI

Moving to Action and Impact

Mission-Oriented Research for Development

R4D MISSIONS

Science for a transformative agenda must be actionable. IWMI's *Strategy 2019-2023* will adapt mission-oriented research models to link research to impact in practice. Research-for-Development (R4D) Missions will focus on resolving specific water security challenges under IWMI's Strategic Programs. R4D Missions will ensure IWMI's programs have clear targets and are broad enough to engage partners and attract investment for impacts at scale.

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 the CGIAR Research Programs and across IWMI programs. Portfolios may include capacity enhancement and dialogue, new data products, knowledge and information services or the promotion of social inclusion and governance reforms.

IWMI will deploy or develop an integrated package of knowledge, services and digital innovation to support each R4D Mission. Through these Missions, the Institute will bring consistent and repeatable tools and services to support governments and other partners in developing and implementing solutions to their water-related problems.

Photo: Samurdhi Ranasinghe / IWMI

Moving to Action and Impact

RESEARCH ON IMPACT

R4D Missions will enable IWMI, within its *Strategy 2019-2023*, to conduct research on change processes themselves. The Institute will increase investment in impact assessment and use research on systems change to identify key lessons on how to make its strategies for impact at scale more effective.

IWMI will build an evidence base of what works, where and how, when implementing solutions for water security. We will compile and disseminate what we learn to support continuous improvement of research for development and partnership practice under the R4D Missions. We will integrate associated know-how and products in knowledge and advisory services to help our partner governments, donors, researchers and NGOs to meet the demand to scale up and accelerate transformations for sustainable and climate-resilient development. ■

Partnerships put the collective capabilities of coalitions to work in shaping impacts at scale.

Photo: Hamish John Appleby / IWMI

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 and knowledge products. Through briefs, opinion articles and the news media, we will promote the uptake of published results in policy and practice, using our social media channels to draw increasing attention to our research outputs, 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 make more visible, evidence-driven contributions to national and international dialogue on water, using knowledge from our country programs and field research. We will show strong leadership in convening and co-convening events and dialogues that promote the uptake of science-based evidence in policy development and decision making. Finally, we will showcase how IWMI uses science for a transformative agenda to support and catalyze the changes needed for sustainable and climate-resilient development. ■

IWMI will convene and co-convene dialogues that promote uptake of evidence in policy development and decision making.

Photo: Hamish John Appleby / IWMI

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The International Water Management Institute (IWMI) is a non-profit, research-for-development organization that works with governments, civil society and the private sector to solve water problems in developing countries and scale up solutions. Through partnership, IWMI combines research on the sustainable use of water and land resources, knowledge services and products with capacity strengthening, dialogue and policy analysis to support implementation of water management solutions for agriculture, ecosystems, climate change and inclusive economic growth. Headquartered in Colombo, Sri Lanka, IWMI is a CGIAR Research Center and leads the CGIAR Research Program on Water, Land and Ecosystems (WLE).

www.iwmi.org

www.iwmi.org/about/contacts/

CGIAR is a global research partnership for a food-secure future. CGIAR science is dedicated to reducing poverty, enhancing food and nutrition security, and improving natural resources and ecosystem services. Its research is carried out by 15 CGIAR Centers in close collaboration with hundreds of partners, including national and regional research institutes, civil society organizations, academia, development organizations and the private sector. **www.cgiar.org**

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