

CGIAR Research Program on Water, Land and Ecosystems

Uniting agriculture and nature for poverty reduction



RESEARCH
PROGRAM ON
Water, Land and
Ecosystems

Led
by:



Annual Report 2012

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Uniting agriculture and nature for poverty reduction



Annual Report 2012

CGIAR Research Program on Water, Land and Ecosystems

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WLE at a Glance

“Vision

A world in which agriculture thrives within vibrant ecosystems, and where communities have higher incomes, improved food security and the ability to continually improve their lives.”

Goals

- Food security and livelihoods of male and female farmers in sub-Saharan Africa are improved through the expansion of small-scale irrigation and strategic improvements in rainfed agricultural systems that do not compromise ecosystem functions but underpin sustained development.
- Livelihoods of rural poor, particularly women, in Asia, are strengthened through improved irrigation and agricultural water management.
- The development of water, land, energy and ecosystems is maintained and enhanced through the equitable sharing of benefits and risks amongst different uses and users across key river basins and landscapes.
- Improved investments in sustainable intensification are made at national, regional and global levels.

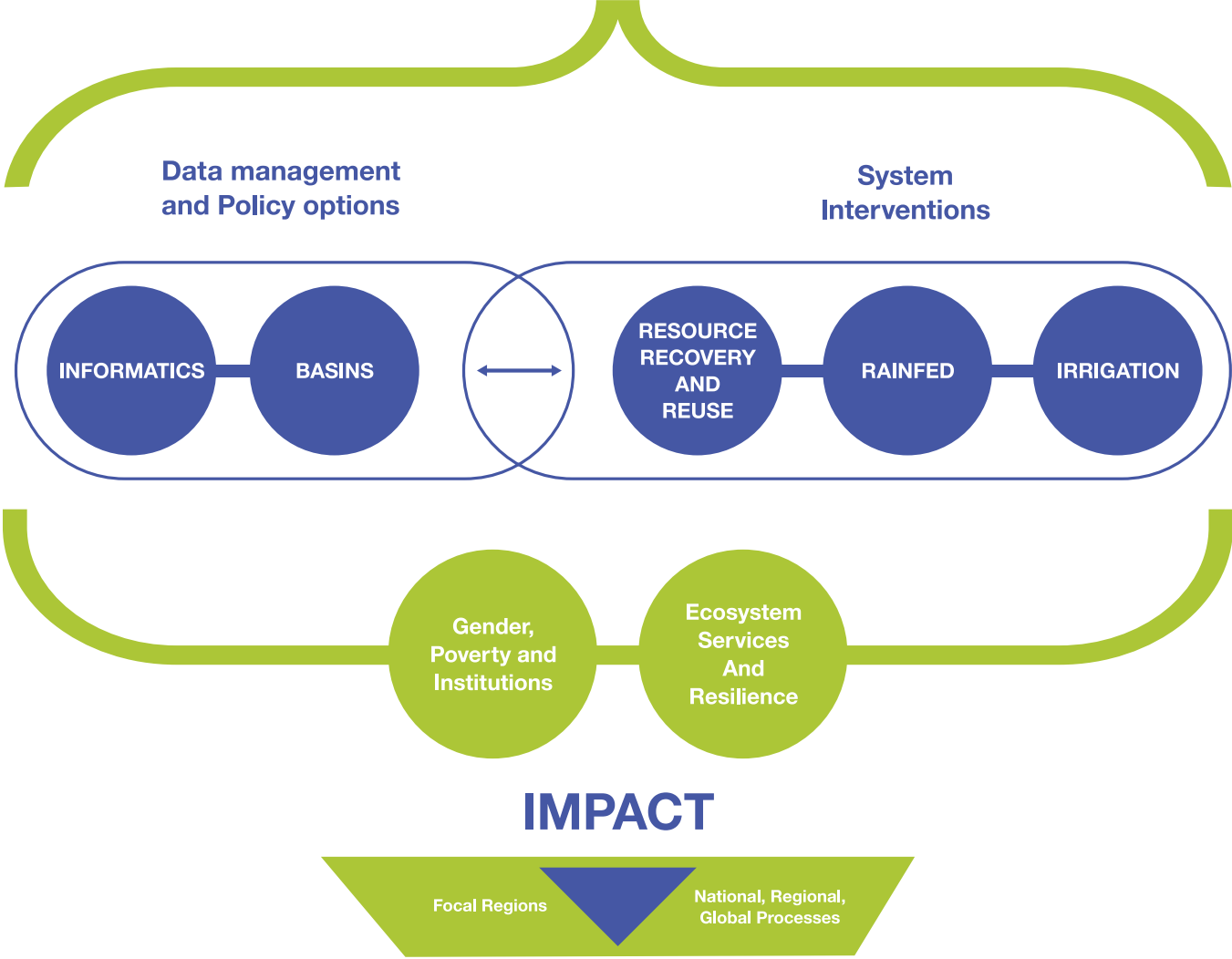
Outputs

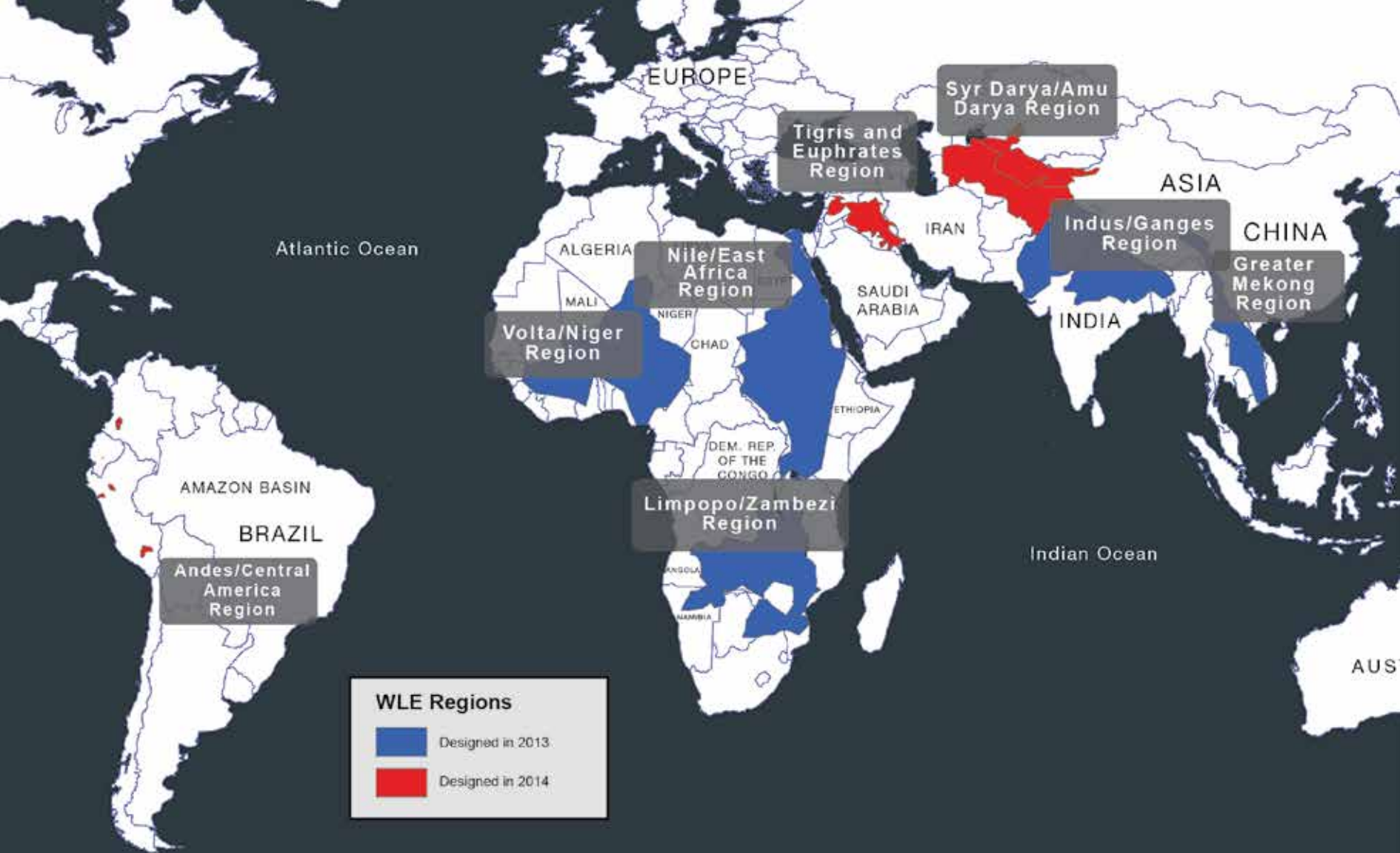
Tangible outputs can be formulated under these categories, for each activity:

- Assessments of the state of the system and scenarios.
- Models and decision support systems.
- Recommendations to improve investments and practices.
- Capacity building.
- Engagement in established platforms or working in partnership to establish new ones.

Program Approach

SRPs





Sources: Esri, DeLorme, NAVTEQ, TomTom, Intermap, increment P Copr., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, and the GIS User Community

Message from the Director General, International Water Management Institute



I arrived at the International Water Management Institute (IWMI) in October 2012 and have seen a rapid evolution of the CGIAR Research Program on Water, Land and Ecosystems (WLE). For IWMI, as lead Center of the program, WLE represents a major collaborative research initiative that will be a vehicle for change in how we address challenges related to water, land and agricultural productivity through a new paradigm of sustainable intensification - a paradigm that firmly places ecosystem considerations at the heart of efforts to generate growth and reverse current trends of resource degradation.

From a programmatic perspective, WLE brings together many of the CGIAR Centers, the Food and Agriculture Organization of

the United Nations (FAO) and hundreds of partners in the regions we work. It focuses on the very complex problem related to how we can meet global needs for food and feed while ensuring that natural resources are sustainably managed. It does this through emphasizing a new approach to sustainable intensification that works at the landscape level and recognizes the competing demands on land and water resources arising from urbanization, population growth, demographic changes (e.g., the feminization of agriculture and migration) and climate change.

For IWMI, we see WLE as an excellent vehicle to move to a more focused and programmatic way of working. WLE will help expand partnerships and provide us with new tools for ensuring IWMI and partners' research products are being appropriately used in development-related processes and responds to the variety of development challenges in different regions.

This first inception year of WLE in 2012 was an important stepping-stone in building partnerships and inclusive

management structures. We have a very engaged and diverse Steering Committee that is guiding us in understanding the complex, multi-scale and multi-institutional dimensions of the program, and I am pleased to report significant progress in articulating the program strategy and implementation procedures, particularly for our focal regions and business plans for key thematic research areas.

We look forward to further strengthening these partnerships to bring about WLE's vision of ensuring "sustainable agriculture and communities within vibrant ecosystems." I would like to thank all those involved in helping us bring WLE from a concept to a vehicle for delivering development-oriented research results.

Jeremy Bird
Director General
International Water Management Institute (IWMI)
May, 2013



Message from the Program Director, Water, Land and Ecosystems

Having joined the CGIAR Research Program on Water, Land and Ecosystems (WLE) at the end of 2012, it has been a steep learning curve but I have been struck by the tremendous amount of progress that was made in 2012. Credit for this has to go to my predecessor, Simon Cook, who was the first WLE Program Director appointed. He did an excellent job of bringing together the activities that were mapped to the program and embarked on a process of developing a coherent vision of where WLE should be going. With those foundations laid, we have been able to move the program forward.

WLE faced two challenges when it began in February 2012. First, to clearly articulate its vision and what it was going to deliver. This is because it is dealing with 'wicked problems'. Wicked Problems are difficult to solve because of incomplete, contradictory and changing requirements that are often difficult to reconcile and

whose solution requires people to change their mind-sets and behavior. Most often, technical solutions have proven ineffective because the solution requires a more integrated social approach that is often political in nature and requires flexible consultative processes that develop collective understanding and responses.

Thus, in WLE, we strive to achieve a wholesale change in how we perceive agricultural production and do this through an innovative form of sustainable intensification. Whilst sustainable intensification has a focus on the farming enterprise there is a need to go beyond this spatial scale to ensure that ecosystem services at the landscape level are explicitly incorporated into our thinking of future agricultural production systems that place ecosystems and people first. As shown in this report, WLE has progressed a great deal in articulating

its vision and developing the operational foundations to make the program run.

Second, WLE is a complex program with many parts. More than 160 projects were implemented in 2012. So, the challenge is bringing together these elements to ensure that the program is the sum of all of its parts and is effectively delivering on its potential. In 2012, we have been examining these different projects, how they fit together, and how we can build upon lessons learned and experiences to ensure that we have a coherent program of research for development.

An example of this is the CGIAR Challenge Program on Water and Food (CPWF) which has been integrated into WLE and is currently working in six major river basins using an innovative research for development program (see section on CPWF). We hope to build upon not only the science the program is carrying out

but also the innovative arrangements it has established to move research outputs to development outcomes through its partnerships, and uptake and engagement strategies in the places it works.

Likewise, WLE put in place a number of operational and management systems which will form the basis for the program to get off to a running start in 2013. A Management Committee has been established which consists of all major partners, and an operations team has been selected to steer the program.

Looking ahead it is clear that a programmatic vision is taking shape. WLE will work broadly in eight regions with a concentrated effort in six of these regions. These programs will be articulated and designed, in close collaboration with partners, in 2013. It is in these focal regions that the WLE

Strategic Research Portfolios (SRPs) and crosscutting themes will work together in an integrated fashion to achieve higher impact.

In order to realize this programmatic vision, we first have to initiate change ourselves. Individually, researchers will need to learn how to work within a multi-disciplinary program and engage in development processes. Organizationally, we will need to break down silos and work in an integrated fashion around complex problem sets. Institutionally, we will need to forge new partnerships and ways to engage with end users to ensure research is having impact and leading to the desired changes we all seek to achieve.

I would like to thank all our partners and staff for the incredible effort they have made in 2012 and look forward to working together in 2013 to change how we deliver our research.

[Andrew Noble](#)

Interim Director

CGIAR Research Program on Water, Land and Ecosystems (WLE)

May, 2013



Achievements in 2012: Organizing for Change

The first year of implementation of WLE has seen significant progress being made in moving the program from a concept to a research program that has the potential to make a real difference in sustainably managing water, land and ecosystems for the betterment of people and nature. WLE brings together the combined capacity and resources of 11 CGIAR Centers and FAO along with hundreds of other partners.

During this inception the focus has been on establishing the organizational elements that would drive the program, and putting in place the platform from which new initiatives will emerge that demonstrate the integrative aspects of the program.

Selected achievements include:

- Identification of a WLE Science Focal Point in each of the partner organizations and the mapping of more than 162 research activities to the program.
- Leaders for the Strategic Research Portfolios (SRPs) were appointed from a range of partner institutions (see chapter on partners and staff)
- The WLE Management Committee, responsible for program planning and strategic management, was established, and held its first face-to-face meeting in November, 2012. The WLE Steering Committee was established in 2012 with 11 members and held its first meetings in September and December, 2012.

- An Operations Team has been established including an Interim Program Director, Program Manager, Support Scientist, and Communication and Knowledge Management support.

The profile of engagement, communication and knowledge management has been raised and further resources have been budgeted for it. This is in recognition of the fact that if we want to move from research to outcomes, communication and uptake will play a central role.

The WLE website and blog that underpin WLE's strategy for engagement with CGIAR and external partners, has generated significant interest with over 9,000 unique page views from 42 posts in 2012 since going live in September. In addition, WLE held a joint Knowledge Management and Communication workshop in October with the CGIAR Research Program on Livestock and Fish. The workshop identified ways that communication can support research, achieve intended outcomes and build a decentralized network of communication staff from WLE's network of partners.

Program highlights

A major programmatic challenge has been to articulate how WLE operates as a whole, given the different elements that link it together. This is largely because legacy projects mapped to WLE have contractual obligations that restrict some programs from moving into new integrated areas of research for development.

That's key: research for development. WLE uses a matrix approach to its research where "thematic activity clusters" (see Box 1) have been identified for each Strategic Research Portfolio (irrigated systems, rainfed systems, resource recovery and reuse, river basins and information systems) to ensure that the research is focused on specific global problem sets. In addition, WLE has embraced a regional approach where specific problems are identified and the SRPs come together in an integrated fashion to solve these problems.

A Strategic Plan to embrace the paradigm shift reflected by WLE was drafted in September 2012 and is being fine-tuned. The plan will call for the research program to operate in three focal regions: Volta/Niger, Indus/Ganges and Nile/Eastern Africa. Additional focal regions will be designated in 2014. At the same time, WLE will continue to accommodate research in other regions and will extend its educational outreach globally.

The focal regions will examine three working hypotheses:

- Agricultural intensification based on the integration of rainfed and irrigated strategies and innovations in resource reuse, will result in improved, resilient and sustainable livelihoods.
- Gender and cultural diversity provides better stewardship for sustainable intensification of agriculture.
- Ecosystem services are key to poverty eradication.



Box 1. Activity Clusters.

In addition to focal regions, WLE's research is focused on "thematic activity clusters," to ensure research is for impact and development. These clusters are focused pathways for change within the strategic research portfolios. Each activity cluster outlines the specific problem the research is addressing, anticipated development outcome, research outcomes and outputs, timeframe and budget.

For example, one activity cluster is irrigation in sub-Saharan Africa. The problem is that an estimated 70% of the 400 million poor live in rural areas and depend on farming and livestock for their livelihoods. One intermediate development goal is to improve food security in drought-prone areas by extending irrigation technologies to smallholder farmers.



Strategic Research Portfolio Highlights

Each Strategic Research Portfolio (SRP) and crosscutting theme kicked off in 2012 with a variety of activities. All SRPs conducted initial stakeholder consultations.

Rainfed Systems aligned partners and global initiatives. Activities included hosting a partner workshop, developing a white paper, co-hosting a United Nations Environment Programme (UNEP) workshop on soil carbon, and engaging in high-level conferences and forums.

Resource Recovery and Reuse has been under way for some time and a number of outputs were produced. FAO has published its Farmer Field School manual based on WLE research on safe wastewater use, and the international chapter in the United States Environmental Protection Agency (USEPA) - United States Agency for International Development (USAID) Wastewater Use Guidelines builds strongly on IWMI's research conducted for the World Health Organization (WHO) and refers to the Resource Recovery and Reuse SRP.

River Basins kicked off with a workshop in May 2012 and has developed its activity clusters, which includes managing water resources variability. Meetings were held to discuss innovative groundwater recharge systems, such as underground water storage.

Information Systems organized a workshop on the Applied Information Economics (AIE) method, which took place in October and resulted in the design of a framework to analyze interventions across the WLE research portfolio. Information Systems is working in partnership with Hubbard Decision Research, who pioneered the AIE method.

A major achievement has been the establishment of the Ecosystem Services and Resilience (ESS&R) Working Group led by Bioversity International, which

has proven to be a dynamic forum for collaboration between partners within and outside WLE. Outputs of the group include the submission of two proposals to the Ecosystem Services for Poverty Alleviation (ESPA) research program and the publication of WLE papers, including one in *BioScience*¹ on the importance of matching ecological and governance scales in the management of ecosystem services.

Gender, Poverty and Institutions - the coordinator for this crosscutting theme was hired at the end of the year. Gender equality targets are being established by working within the SRPs to identify the most pertinent gender issues. Since a majority of the gender issues are context- and culturally specific, a more participatory approach will also be used within WLE's focal regions to develop targets and a monitoring program.

¹Fremier, A.K.; DeClerck, F.; Bosque-Perez, N.A.; Estrada Carmona, N.; Hill, R.; Joyal, T.; Keesecker, L.; Klos, P.Z.; Martinez-Salinas, P.; Niemeyer, R.; Sanfiorenzo, A.; Welsh, K.; Wulfforst, J.D. 2013. Understanding spatial-temporal lags in ecosystem services to improve incentive mechanisms and governance. Submitted to *Bioscience* In Press.



Irrigated Systems

Forty-percent of the world's food is produced on the 20% of farmland under irrigation. Irrigation has improved livelihoods and enhanced food security for millions of rural and urban households. However, irrigation has both positive and negative impacts on ecosystems.

Gaining a better understanding of those impacts will enable us to determine why the rates of increase in productivity on irrigated lands are stagnant or declining in several important regions, such as the Indo-Gangetic Plains. We will also aim to enhance the understanding of constraints and opportunities for extending irrigation across Africa, and will analyze issues related to surface water and groundwater.

In 2012, the Irrigated Systems SRP conducted a workshop with partners, which focused on African irrigation potential and peri-urban agriculture. The SRP also started work on its public canal irrigation systems activity cluster, with e-discussions and a workshop with the Food and Agriculture Organization of the United Nations (FAO).

Box 2. AgWater Solutions

The AgWater Solutions Project, led by IWMI and funded by the Bill & Melinda Gates Foundation, came to an end in 2012. The three-year research project found that investments in smallholder farmers could ensure food security and increase incomes for tens of millions of farmers in sub-Saharan Africa and South Asia. Researchers estimated that access to motorized pumps in sub-Saharan Africa alone could benefit 185 million farmers and generate net revenues of up to USD 22 billion.

The project recommended ways to support the market, such as through micro-credit financing, equipment rental programs and training. It developed a calculator that shows how agricultural yields increase when money is invested in various technologies.

The AgWater Solutions Project has resulted in a number of developments taking place in the countries where research was carried out. In West Bengal, India, government officials relaxed permit requirements for buying small pumps and provided low-cost electric connections. In Tanzania, a parliamentary committee recommended a USD 6 million funding increase for the Ministry of Agriculture. In Ghana, the Ghana Irrigation and Development Authority (GIDA) is formalizing links between the agriculture, rural energy and transportation sectors.



Rainfed Systems

This SRP targets the 80% of the world's farmland that is largely under rainfed cultivation. Though many farmers in rainfed areas capture and store water for use as supplemental irrigation, millions more depend entirely on rainfall. The inherent uncertainty and extensive poverty that characterize rainfed systems generate research questions that are quite different from those pertaining to irrigated agriculture. We need to better understand the risks that households face in rainfed settings. We also need to explore the reasons why many methods for enhancing soil and water management are not adopted, while learning more about livestock production in water-scarce environments.

In 2012, Rainfed Systems aligned partners and global initiatives. Activities included hosting a partner workshop, developing a white paper, co-hosting a United Nations Environment Program workshop on soil carbon, and engaging in high-level conferences and forums. New research collaborations were developed together with FAO and the United Nations Convention to Combat Desertification.

Box 3. N2Africa

One of the highlights is the work that the International Center for Tropical Agriculture (CIAT) and the International Institute of Tropical Agriculture (IITA) are doing to contribute to N2Africa, a major initiative to improve soil fertility and yields among smallholder farmers by introducing nitrogen fixation technologies. The initiative focuses on growing legumes such as soybeans, cowpeas and peanuts, as well as using the most advanced rhizobium, compost and chemical fertilizer practices. Some legumes are particularly effective at converting nitrogen in the air to the soil through their roots – the soil bacteria rhizobium aids in such nitrogen fixing.

N2Africa will reach more than 225,000 farmers, more than 50% of whom are women, in eight sub-Saharan African countries, with more countries soon to come on board. The project is changing behavioral patterns in farming techniques as well as training area mentors. It was designed as a development program, but at the same time data collected through field trials can be used to better understand crop production variability and target future interventions with the goal of improving livelihoods and sustaining resources.





Resource Recovery and Reuse

Land degradation and nutrient depletion characterize large areas of agricultural production, particularly in sub Saharan Africa. Many farmers in Africa can't afford fertilizer. Yet, both domestic and agro-industrial wastes contain substantial amounts of nutrients that can be used in agriculture. Such use could be compelling in regions where the price and availability of commercial fertilizers don't match demands.

This SRP will determine, through a business approach, how to maximize the untapped potential for recovering water, energy and essential nutrients. At the same time, it will promote safer and healthier practices when reusing waste materials on farms and when processing crops for consumption. It will also examine affordable measures for improving ecosystem health in areas where reuse occurs.

The Resource Recovery and Reuse SRP was already under way at IWMI, hence it has become operational quickly within WLE. The SRP works in nine peri-urban areas in Asia, Africa and Latin America. RRR research is mainly led by IWMI with ICRISAT implementing a North-South technology transfer project in India and ICARDA addressing greywater reuse in the Near East. In 2012, activity clusters were developed, partnerships were established and a business plan was drafted, which will serve as a model for the other SRPs.

Box 4. Safe use of wastewater

One notable success has been in the Near East, where ICARDA works with home farmers in arid and semi-arid areas of Jordan, Lebanon and Palestine to promote the safe use of greywater for irrigation. A total of 24 greywater treatment units were installed in target areas between 2010 and 2012. Project beneficiaries in Jordan formed their own Greywater Reuse Association, and the safe reuse of greywater was promoted through a public awareness campaign that included posters, radio discussions and a video. Training, particularly targeting women, was conducted on system operation and maintenance.

As an example of how behavior changed, a group of farmers and technical staff from the West Bank and Gaza Strip visited farms, research stations and water treatment plants in Jordan to learn how to safely use greywater and wastewater, and how to monitor water quality by carrying out simple tests. The Palestinians have since repaired a neglected wastewater treatment station in the City of Ateel in the northern West Bank.



River Basins

River Basins will be used as a unifying SRP to assess the impact of agricultural management on many ecosystem services, given that hydrological processes connect all water and land users. This connection greatly complicates decision making, as decisions made in one location can have substantial and often unrecognized impacts in others. Salinization in the lower Indus, for example, is partly the result of farmer choices further upstream.

Researchers will also examine issues pertaining to competition for water, benefit sharing mechanisms and other forms of cooperation in river basins, where the sum of competing water demands is greater than available supplies. This SRP is intricately linked to the CGIAR Challenge Program on Water and Food (CPWF).

The River Basins SRP kicked off its activities with a workshop in May 2012 and has developed its activity clusters, which include managing water resources variability. Meetings were held to discuss innovative groundwater recharge systems, such as underground water storage. The basin theme was introduced at various international forums, and two special sessions were prepared for the Global Water System Project 2013 conference on the water-energy-food nexus.



Box 5. Transboundary cooperation

As an example of the opportunities, in 2012, IWMI concluded a five-year project to foster transboundary cooperation on two small rivers in Central Asia – the Khojabakirgansai shared by Kyrgyzstan and Tajikistan, and the Shakhimardansa in Kyrgyzstan and Uzbekistan.

IWMI generally takes a basin-wide approach, and has been involved in a broader water resources management and agricultural productivity program in the Fergana Valley since 2001.

However, in this case, IWMI believes that potential conflicts in this volatile region can be eased through cooperation on small rivers, with the hope that such

efforts will spread. The two rivers feed into the Syr Darya River which, in turn, empties into the depleted Aral Sea.

IWMI organized workshops and helped provide a framework for joint river management action plans. Changed behavioral patterns have included better communication during extreme weather events, joint water measurements and data sharing, more reliable water distribution, and a process for resolving disputes.



Information Systems

The Information Systems SRP addresses a critical issue that can either constrain or enhance any research effort – the availability of accurate and reliable information. The SRP reflects on the pressing need for better data on hydrology, water management and agriculture. In many countries, data collection and reporting efforts are inadequate to support high quality analysis of important research questions. These activities must be enhanced, taking advantage of modern methods such as remote sensing, which allows one to monitor and measure trends, and risks and impacts on hydrology, soils and agriculture as never before.

The SRP will also establish data collection and reporting systems that are needed to improve national and international research programs.

Box 6. Applied Information Economics

To systematically identify high priority information needs, an Intervention Decision Model framework using the Applied Information Economics (AIE) method has been developed in partnership with Hubbard Decision Research. The AIE method was developed to analyze investment dilemmas which have extensive uncertainties and risks. It synthesizes quantitative methods from economics, actuarial science, decision and game theory, and statistics. Unlike traditional methods that produce arbitrary scores, the AIE method conducts a risk-return analysis with the same rigor that would be used by actuaries to estimate insurance loss rates.

The AIE method will be used to identify what information has the most impact on stakeholder decisions on water, land and ecosystems. Research has shown that most measurement efforts are spent on areas that have little value to the desired impact.

“The approach is currently being applied to a sample of six cases across the WLE portfolio, including irrigation, integrated rainfed agriculture, human waste reuse, managing water variability in river basins,

payments for environmental services schemes, and increasing the resilience of pastoralist systems,” said Keith Shepherd, Information Systems Program Leader and Principal Scientist at the World Agroforestry Centre (ICRAF). He said that plans are under way to apply the framework to other areas, such as the evaluation of investments in public irrigation in Ethiopia and farm-level decision making in Tanzania.

Shepherd said that it’s already becoming apparent that the process is encouraging researchers to think more specifically about interventions and impacts. “One of the areas that researchers have struggled with most is in identifying the specific development decisions that they are trying to influence,” he said.



Ecosystem Services and Resilience

Ecosystem Services and Resilience (ESS&R) a crosscutting theme within WLE.

In the context of poverty alleviation, ecosystem services research and management is about natural capital supporting the lives of the poor. It offers a holistic view that enables one to understand trade-offs and synergies, both short- and long-term, on how mixed-use landscapes can be managed for their multifunctionality. WLE recognizes the critical need to demonstrate how, under what conditions, and at what scale ecosystem service management contributes to improving the lives of the poor.

Ecosystem services go beyond solely impacting the poor however, and are central to a global strategy for sustainability. Global agricultural systems are met with the dual challenge of increasing food production to meet a growing global population, and to reduce the negative impact of agricultural systems on the environment. WLE recognizes that agriculture of the twenty-first century must move beyond yields and focus on the capacity of agricultural landscapes to provide multiple ecosystem services, including food production and hydrological services.

Ecosystem Services and Resilience, comprising members from each CGIAR Center and from each SRP, met for the first time in October 2012. The group has been working on the development of an Ecosystem Service and Resilience framework with partners of CGIAR Research Programs (e.g., Centre de coopération internationale en recherche agronomique pour le développement [CIRAD], Ecoagriculture Partners, Stockholm Resilience Centre and the Natural Capital Project). The Working Group leadership has presented WLE to partners in the United States and Europe. The group is currently engaged in integrating ecosystem service work across the strategic research portfolios.

Box 7. Integrated Pest Management

For the past eight years, Bioversity International and partners have studied pest- and disease-resistant crops in China, Uganda, Ecuador and Morocco.

Until recently, Integrated Pest Management (IPM) methods have concentrated on using agronomic techniques to reduce the need for pesticides. One of the few assets available to small-scale farmers in developing countries is to reduce pests and disease through the appropriate management of crop diversity. Through on-farm experiments, researchers identified traditional crop varieties that have higher resistance to pests and diseases. Researchers found that an increased diversity of crop varieties corresponded to a decline in the damage of crops from disease. The results support what might be expected of a strategy to reduce the damage caused by pests and diseases to crops.



Gender, Poverty and Institutions

WLE will ensure that all of its research and associated work benefits poor women and men. Researchers will seek to remove all gender-bias in research and, where appropriate, data will be disaggregated by gender and evaluated in terms of equity issues.

As an example, the research will examine the extent to which male and female farmers have different irrigation adoption rates and identify gender-specific barriers that may work against adoption. Gender-sensitive policies will be developed for land and water management, and the program will seek to improve women's involvement in managing resources.

Gender, Poverty and Institutions recruited a coordinator in late 2012, and Nicoline de Haan started in March 2013. Gender and poverty issues are being incorporated into the research designs of WLE's four focal regions, and equality targets are being established by working within the SRPs to identify the most pertinent issues. Since a majority of equality issues are context- and culturally specific, a more participatory approach will also be used within WLE's focal regions to develop targets and a monitoring program.

The program will also examine the relationship between poverty and government policies. "The bigger picture is how poverty and institutions are interlinked," said Nicoline de Haan, Coordinator, Gender, Poverty and Institutions.

Box 8. Improving livelihoods

For example, IWMI, ILRI and local partners have been examining those issues in the Fogera District in the "Blue Nile River Basin" of Ethiopia, as part of a livelihoods project.

Various groups, including focus groups divided by gender, were shown a video made by community members. The video, titled "A Rope to Tie a Lion," focuses on community attitudes toward unrestricted grazing, water stress, and government-led soil and water conservation work.

The participatory process is designed to encourage people to talk openly about power, gender and representation, with the goal of eventually changing attitudes and behaviors, including male-dominated behaviors. One member of the district (woreda) administration who watched the video said, "Today I have come to realize that farmers can play a role in solving their problems by participating actively."







CGIAR Challenge Program and Water and Food: Leaving a Legacy of Change

The CGIAR Challenge Program on Water and Food (CPWF) is one of the key partners of WLE. The program will end in 2013 and WLE is building upon ten years of CPWF experience in creating a partnership-based research for development program.

One of the CPWF mandates has been to foster partnerships. Currently, 14 of its 29 projects across six river basins (Andes system of river basins, and the Ganges, Limpopo, Mekong, Nile and Volta) are led by non-CGIAR institutions, among them regional and national research organizations, advanced research organizations, development organizations and the private sector. Bringing together a diverse base of partners into the design and implementation of CPWF activities ensures that different actors directly inform, and are informed by, CPWF research.

In 2012, CPWF and its partner projects in basins continued to carry out quality science while pursuing initiatives to ensure that the research contributes to development outcomes. The work in the Andes and Limpopo basins, described below, exemplify what strong partnerships can do to ensure research is relevant and being used by end users.

Investing in the future

A CPWF project in the Limpopo River Basin led by ICRISAT has been testing the efficacy of market-oriented approaches to boost technology adoption rates in mixed crop-livestock systems, and encourage strategic reinvestments that pay off in both the short- and long-terms and have shown clear positive results for rural women. Partners of this project include Agricultural Research Council, South Africa; Limpopo Department of Agriculture; Progress Milling; Agricultural Technical Extension Services, Zimbabwe; World Vision; Rural District Councils; and Zimbabwe Fertilizer Company.

Innovation platforms have been established to bring these actors together to discuss production and marketing challenges. In Gwanda, a diverse and active innovation platform has created a strong local auction system for goats, helping to raise the value of one goat from USD 10 to USD 60.

"Farmers who used to sell one or two animals at their farm gate now plan ahead and sell their animals at the auctions, because they trust this system," says Andre van Rooyen, a scientist at ICRISAT-Bulawayo.

In van Rooyen's opinion, it is the creation of this regular marketing channel with a reliable pricing structure that has inspired the recent increase in livestock-related technology adoption rates. "Farmers know what their animals are worth. So, they are now willing to invest in technologies that will protect their animals," says van Rooyen.

CIAT and CPWF have played key research and engagement roles since 2005 in the development of benefit-sharing mechanisms (BSM) to maintain watersheds in Peru. In close partnership with the Ministry of Environment of Peru, the projects have helped define priority areas and design a BSM for the Cañete River Basin. The Cañete River Basin will be used by the Ministry as a pilot project to guide the development of BSMs in more than 30 additional basins. Also, CIAT and CPWF recently served on an advisory group to draft national ecosystem services legislation. The work in Peru has advanced this year to the design of a trust fund to finance the Cañete River Basin



CGIAR Challenge Program and Water and Food: Leaving a Legacy of Change

BSM with the likely support of IFAD and the Global Environment Facility. The proposed scheme would use funds provided by downstream users, such as urban water consumers and river rafting tourism operators, and invest the money in improved water and land management practices, and conservation in the highlands. "The project demonstrates how research can produce information that is critical to the development of important legislation and policy reform to address recurring conflicts stemming from the uneven distribution of benefits within a basin," said Larry Harrington, Research Director, CPWF.

An unexpected highlight to carry over in 2013 has been the interest in cross-basin learning amongst partners. Three cross-basin learning exercises are scheduled for the first part of the year: Engagement Platforms, Ecosystems Services and Resilience, and Spatial Analysis and Modeling.

CPWF will end in 2013 but its work will continue through the activities of partners and WLE in its focal regions. Next year, CPWF will focus on lesson learning, returning results to end users and demonstrating the emerging outcomes of this phase of work (2010-2013).





WLE Partners and Staff

In 2013, WLE carried out more than 162 activities with hundreds of partners. The International Water Management Institute (IWMI) leads the program, working closely with 11 core partners and a range of others working at different levels on specific projects and activities. These WLE partners range from traditional partners in agriculture, such as National Agricultural Research and Extension Systems (NARES) and Agricultural Research Institutes (ARIs), to strong international and local environmental nongovernmental organizations (NGOs).

Core Partners

Bioversity International
CGIAR Challenge Program on Water and Food (CPWF)
Food and Agriculture Organization of the United Nations (FAO)
International Center for Agricultural Research in the Dry Areas (ICARDA)
International Center for Tropical Agriculture (CIAT)
International Crops Research Institute for the Semi-Arid Tropics (ICRISAT)
International Food Policy Research Institute (IFPRI)
International Institute of Tropical Agriculture (IITA)
International Livestock Research Institute (ILRI)
International Potato Center (CIP)
International Water Management Institute (IWMI)
World Agroforestry Centre (ICRAF)

(Africa Rice and International Rice Research Institute (IRRI) left WLE in 2012)

Management Committee

Andrew Noble (IWMI)	Interim Program Director (As of December 2012)
Prathapar Sanmugam (IWMI)	Co-Leader, Irrigation Systems SRP
Theib Oweis (ICARDA)	Co-Leader, Irrigation Systems SRP*
Deborah Bossio (CIAT)	Co-Leader, Rainfed Systems SRP
Peter Craufurd (ICRISAT)	Co-Leader, Rainfed Systems SRP*
Pay Drechsel (IWMI)	Leader, Resource Recovery and Reuse SRP
Vladimir Smakhtin (IWMI)	Co-Leader, River Basins SRP
Claudia Ringler (IFPRI)	Co-Leader, River Basins SRP
Keith Shepherd (ICRAF)	Co-Leader, Information Systems SRP
Lisa-Maria Rebelo (IWMI)	Co-Leader, Information Systems SRP*
Fabrice DeClerck (Bioversity International)	Leader, Ecosystem Services and Resilience Working Group
Nicoline de Haan (IWMI)	Coordinator, Gender, Poverty and Institutions**

*since February 2013

**since March 2013

Operations Team

Simon Cook	Program Director (February – December 2012)
Andrew Noble	Interim Program Director
Abby Waldorf	Communications and Engagement Fellow
Alain Vidal	WLE Support – Focal Region Design
Elizabeth Weight	WLE Support - Uptake and Monitoring and Evaluation
Emma Greatrix	Program Manager
Himani Elangasinghe	Program Assistant
Martin van Brakel	Program Support Scientist
Martina Mascarenhas	Communications Officer
Michael Victor	Communications and Engagement Coordinator
Nicoline de Haan**	Coordinator, Gender, Poverty and Institutions

Steering Committee

Johan Rockström (Chair)	Executive Director, Stockholm Resilience Centre, Sweden
Gretchen Daily	Bing Professor of Environmental Science, Department of Biology, Stanford University, California, USA
Charlotte de Fraiture	Professor of Water and Land Development, UNESCO-IHE Institute for Water Education, The Netherlands
Nuhu Hatibu	Chief Executive Officer, Kilimo Trust, Uganda
Mihir Shah	Member, Planning Commission, Government of India, India
Lindiwe Sibanda	Chief Executive Officer, Food, Agriculture and Natural Resources Policy Analysis Network (FANRPAN), South Africa
Jimmy Smith	Director General, International Livestock Research Institute (ILRI), Kenya
Pasquale Steduto	Deputy Director, Land and Water Division, Food and Agriculture Organization (FAO), Rome, Italy
John Williams	Director, John Williams Scientific Services Pty Ltd (Former Commissioner, Natural Resources Commission, New South Wales, Australia)
Jeremy Bird (ex officio)	Director General, International Water Management Institute (IWMI), Colombo, Sri Lanka
Andrew Noble (ex officio)	Interim Program Director, Water, Land and Ecosystems (WLE), International Water Management Institute (IWMI), Colombo, Sri Lanka

Science Focal points

Fabrice DeClerck	Biodiversity International	Keith Shepherd	ICRAF	Peter McCornick	IWMI
Fred Kizito	CIAT	Suhas Wani	ICRISAT	Yumiko Kura	WorldFish Center
Roberto Quiroz	CIP	Claudia Ringler	IFPRI		
Alain Vidal	CPWF	Alpha Kamara	IITA		
Theib Oweis	ICARDA	An Notenbaert	ILRI		

Finance highlights

2012 was a successful inception year for WLE, with a portfolio of 162 activities in progress and the program's governance structure established and operational by the end of the year.

The budget for 2012 was \$75m, consisting of \$29m CGIAR 'Windows 1&2' funds (W1&W2), and \$46m from 'Windows 3' and other bilateral sources.

The execution of W1 & W2 funds stood at 77%, with the variance mainly due to the later than anticipated start of the program moving recruitments, capacity building and program development activities under the essential costs budget into 2013. The rate of execution of bilaterally sourced funds was 72%, with a proportion of unspent funds to be carried over into 2013, also due to the late program start. The total expenditure for 2012 was \$55.5m.

Table 1: 2012 Expenditures by Partner (in USD 000's)

CENTER	BUDGET	EXECUTED	% EXECUTED
Biodiversity	2,854	2,500	88
CIAT	9,873	9,200	93
CIP	426	394	92
ICARDA	2,750	2,627	96
ICRISAT	2,576	1,986	77
IFPRI	1,863	941	51
IITA	2,911	3,234	111
ILRI	196	370	189
IWMI ¹	46,307	30,905	67
ICRAF	5,266	3,091	59
World Fish	222	226	102
TOTAL	75,243	55,474	74

Table 2: 2012 Expenditures by Strategic Research Portfolio (SRP) (in USD 000's)

SRP	BUDGET	EXECUTED	% EXECUTED
SRP 1: Irrigation	14,581	11,380	78
SRP 2: Rainfed	22,642	19,955	88
SRP 3: RRR	3,575	2,316	65
SRP 4: River Basins	19,443	12,000	62
SRP 5: Information	10,322	8,212	80
Essential Program Costs ²	4,680	1,609	34
Totals for CRP	75,243	55,473	74

¹ Includes CPWF & WLE Essential Program Costs

² Includes Management; Communications; Gender, Poverty & Institutions; and Research & Capacity Building

Table 3: 2012 Expenditures by natural classification (in USD 000's)

CATEGORY	BUDGET	EXECUTED	% EXECUTED
Personnel	26,286	16,545	63
Collaborator Costs - CGIAR Centers	3,911	3,460	88
Collaborator Costs - Partners	17,729	11,802	67
Supplies and Services	14,128	12,902	91
Operational Travel	4,570	3,283	72
Depreciation	1,299	695	53
Sub-total of Direct Costs	67,924	48,687	72
Indirect Costs	7,319	6,787	93
Total - all Costs	75,243	55,474	74

Donors

Over 80 donors supported the program through bilateral funds provided directly to partner activities and Window 1 funds channeled directly to Centers 2012.

Uniting agriculture and nature for poverty reduction

About the CGIAR Research Program on Water, Land and Ecosystems

The CGIAR Research Program on Water, Land and Ecosystems (WLE) is a ten-year initiative to find solutions to how we can intensify agriculture, while still protecting the environment and lifting millions of farm families out of poverty. It uses an integrated approach to agriculture and natural resource management which recognizes the impacts of, and relationship between, agriculture, other development activities and the environment.

The program combines the resources of 11 CGIAR Centers and numerous international, regional and national partners to provide an integrated approach to natural resource management research. This program is led by the International Water Management Institute (IWMI).

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