CGIAR

RESEARCH PROGRAM ON Water, Land and Ecosystems

LED BY: IWMI International Water Management Institute

Photo: Mulugeta Ayene, Ethiopia / WLE

# 2018 ANNUAL REPORT

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

April 2019

# CGIAR Research Program on Water, Land and Ecosystem (WLE)

*Connected Thinking, Compelling Solutions*

WLE is a global research-for-development program connecting partners to deliver sustainable agricultural solutions that enhance our natural resources and the well-being of people. WLE brings together CGIAR centers, the UN Food and Agriculture Organization (FAO), the RUAF Foundation, and numerous national, regional and international partners to find integrated solutions.

WLE is led by the International Water Management Institute (IWMI) and partners, and supported by CGIAR, a global research partnership for a food-secure future.

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**WLE Flagship Programs**

Flagship 1, RDL - Restoring Degraded Landscapes
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Flagship 4, VCR - Managing Variability, Risks and Competing Uses for Increased Resilience
Flagship 5, ESA - Enhancing Sustainability Across Agricultural Systems

| | |
|---|---|
| A4NH | CGIAR Research Program on Agriculture for Nutrition and Health |
| AMR | Antimicrobial Resistance |
| CCAFS | CGIAR Research Program on Climate Change, Agriculture and Food Security |
| CIAT | Centro Internacional de Agricultura Tropical (International Center for Tropical Agriculture) |
| CRP | CGIAR Research Program |
| FAO | Food and Agriculture Organization |
| FINAGRO | Fondo para el financiamiento del sector agropecuario (Colombian Financing fund for the Agricultural Sector) |
| FTA | CGIAR Research Program on Forests, Trees and Agroforestry |
| GIZ | Gesellschaft für Internationale Zusammenarbeit GmbH |
| IBFI | Index-based Flood Insurance |
| ISC | Independent Steering Committee |
| ICRAF | World Agroforestry Centre |
| ICRISAT | International Crops Research Institute for the Semi-Arid Tropics |
| IFPRI | International Food Policy Research Institute |
| ILRI | International Livestock Research Institute |
| IWMI | International Water Management Institute |
| IPBES | Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services |
| KUSUM | Indian Solar Agriculture Pumps Subsidy program |
| MARIS | Migration, Agriculture and Resilience: Initiative for Sustainability Network |
| MARLO | Managing Agricultural Research for Learning and Outcomes |
| MELIA | Monitoring, Evaluation, Impact Assessment and Learning |
| NRM | Natural Resource Management |
| OICR | Outcome Impact Case Report |
| PIM | CGIAR Research Program on Policies, Institutions and Markets |
| POWB | CGIAR CRP Plan of Work and Budget |
| RRR | Resource recovery and reuse (WLE Flagship 3 Research Theme) |
| SADMS | South Asia Drought Monitoring System |
| SAFI | Studying Farmer Led Irrigation Network |
| SAI | Sustainable Agricultural Intensification |
| SDC | Swiss Agency for Development and Cooperation |

| | |
|---|---|
| SDG | Sustainable Development Goal |
| SLO | System Level Outcome |
| SOC | Soil Organic Carbon |
| SRF | Strategic Results Framework |
| TEEB | The Economics of Ecosystems and Biodiversity |
| ToC | Theory of Change |
| UN | United Nations |
| USAID | United States Agency for International Development |
| USD | United States Dollar |
| WHO | World Health Organization |
| WLE | CGIAR Research Program on Water Land and Ecosystems |
| WUA | Water Users' Association |

# EXECUTIVE SUMMARY

**2018 results from the CGIAR Research Program on Water Land and Ecosystems (WLE)** identify new ways of managing natural resources that work not only in the field, but also at landscape and system levels. WLE ensures agricultural interventions are managed to consider impacts on land, water, ecosystems and the people who rely on them.

To achieve this, WLE operates through five inter-connected flagship programs[1] addressing CGIAR global challenges:

**Planetary boundaries:** At the core of WLE's work is finding solutions that turn food systems from a major driver of degradation to part of the solution. 2018 results include:

- **Massive new investments in solar irrigation:** USD 16.4 billion Indian investment includes a farmer co-op model tested by WLE/International Water Management Institute (IWMI)/CGIAR Research Program on Climate Change, Agriculture and Food Security (CCAFS) promoting efficient irrigation practices and income generation through sale of surplus clean energy. WLE builds on these and other results through business models for Ethiopian solar investment; gender equity tools, and conservation agriculture support. (OICR2791)
- **E-flows adopted into SDG indicator:** WLE integrated environmental flows into a Sustainable Development Goal (SDG) indicator on water scarcity. (OICR2795)
- **Building natural resource based resilience** through analyzing soil carbon sequestration potential in Ethiopia, India and Kenya; supporting Wetlands City designation for Colombo, Sri Lanka; and improving farmers' resilience during drought by providing satellite data to the Indian government and crop insurance stakeholders. (OICR2796)
- **Supporting decisions based on evidence** through uptake of WLE decision analysis tools, soil data, water-energy-food nexus tools, and a platform used in Honduras to identify irrigation and drinking water sources.(OICR2793)
- **Influencing discourse through international assessments:** WLE scientists played leading roles in Africa and Asia reports of the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES), sections of the UN World Water Development Report 2018 and The Economics of Ecosystems and Biodiversity (TEEB).

**Equality of opportunity:** Sustainable success hinges on equitably meeting the needs of women, youth, and smallholders. Key results include influencing investment decisions to include women farmers in a Tajik irrigation training program; engaging youth through university curricula partnerships to include waste recovery business models, and tailoring bio-energy models to women; and WLE tools for equitable irrigation planning. (OICR2773)

[1] Flagship 1: Restoring Degraded Lands; Flagship 2: Land and Water Solutions; Flagship 3: Rural Urban Linkages; Flagship 4: Variability, Risks and Competing Uses; Flagship 5: Enhancing Sustainability Across Agricultural Systems.

**Other CGIAR challenges** are also tackled through WLE's cross-cutting solutions:

- **Food availability** is being increased through rural-urban food system solutions, satellite data monitoring, flood management, and small scale water investment planning.
- **Public health** through safe wastewater reuse, sanitation policy, and understanding water-nutrition linkages.
- **Jobs and growth** will potentially be strengthened through new smallholder agriculture solutions, and resource recovery and irrigation business models.

Working towards such outcomes, WLE has documented delivery of:

- Eight innovations and eight strategic outcomes.
- 338 publications, with four high-impact journal articles including on irrigation efficiency and ecosystem services.
- 4,427 policy-makers, smallholders, practitioners and others trained.
- 239 external partners supporting development, adoption or scaling of solutions.

# Part A: Narrative

## 1. Key Results

### 1.1 Progress Towards SDGs and SLOs (sphere of interest, with research results frequently predating the CRP)

WLE contributes to Systems Level Outcome (SLO) 3 "improving natural resource systems and ecosystem services" and SLO 1 "reduced poverty". To a lesser extent, WLE also contributes to the health and nutrition benefits of SLO 2. Because impacts within the natural resource sector often take many years to mature before it is possible to measure these impacts (Table 1); and because impact measurement in this sector is still methodologically challenging, WLE prioritizes, and is in the process of commissioning, several outcome level assessments. Preliminary evidence suggests that, in 2018, WLE funded research is making some contribution to the *SLO target of 21 million farm households adopted improved (water and land) management practices*. In Colombia, for instance, the Ministry of Environment and the agricultural sector are scaling WLE research through the Financing Fund for the Agricultural Sector (FINAGRO), where small and medium-size landholders have been supported to conserve forests and restore deforested areas, leading to improved wellbeing. In the Ethiopian state of Afar, WLE-funded research has shown how to create new arable land for crop and forage production, whilst reducing flood risk, through flood-spreading weirs. The Ethiopian Government is set to scale out such approaches.

WLE is contributing to the crosscutting SLO, *capacity development*, through evaluative research in Tajikistan which led to the adoption by the United States Agency for International Development (USAID) of a new training module targeting women. By increasing their capacity in water management, we expect to find evidence that women, enabled to secure water for their farms and kitchen gardens, will also contribute to the WLE SLO target of *assisting 5.74 million people (50% of which are women) to exit poverty*. In India, WLE and CCAFS research on solar-powered irrigation has been scaled up as part of a major farm energy program (KUSUM) in Gujarat (with pilots in Gujarat and six other states). Early results include a 50% increase in net farm income, whilst reducing withdrawal of groundwater (among other benefits).

In 2018, WLE also contributed to SLO target *restoring 7.7 Mha of degraded land.* For example, the Soil-Plant Spectral Diagnostics Laboratory assisted 14 government institutions and three private sector labs to adopt soil spectral technology that measure and map soil properties. Combined with capacity development in the new methods, this WLE funded technology is helping to reverse nutrient and organic matter depletion and soil erosion, particularly in Sub-Saharan African countries.

### 1.2 CRP Progress Towards Outputs and Outcomes (spheres of control and influence)

#### *1.2.1 Overall CRP progress*

WLE addresses CGIAR Global Challenges - particularly living within planetary boundaries - delivering more sustainable management of land, soils, water and biodiversity and managing related trade-offs.

##### Challenge: Planetary boundaries

**Massive new investment scales out solar irrigation business model.** The Government of India announced a USD 16.4 billion investment to promote solar irrigation (thirty percent capital subsidy from central

government), which includes a WLE/IWMI/CCAFS farmer co-op model that protects groundwater by selling excess power to the grid.[2] With Swiss Development Cooperation (SDC) support, WLE/IWMI initiated a long-term regional partnership to expand the model across South Asia, and is disseminating lessons to Sub-Saharan Africa and Latin America. (OICR2792).

**UN-endorsed global reporting system on water stress incorporates environmental flows.** WLE/IWMI research on environmental flows has been incorporated into the new FAO official country reporting guidelines for calculating the Water Stress Indicator 6.4.2 of SDG 6. The UN Environment Head of Ecosystems lauded this as the first time environmental flows have been included in a global policy. (OICR2795).

**UN agencies incorporate global water pollution assessment and wastewater guidance into training modules.** WLE/IWMI/FAO published a major global review of water pollution from agriculture. This study was accompanied by a handbook on safe use of wastewater in horticulture.

**Influencing global discourse on biodiversity and ecosystems.** The IPBES report was launched with WLE/CIAT/Bioversity as lead authors of the Africa assessment and WLE/IWMI scientists co-chairing the Asia-Pacific assessment. The reports help create an international consensus on a post-2020 global biodiversity framework under the Convention on Biological Diversity. WLE/IFPRI researchers led the agri-food systems chapter in the TEEB initiative. WLE/IWMI scientists contributed to the UN World Water Development Report 2018 chapters on nature-based solutions.

**Decision-makers navigating water-energy-food nexus.** A Philippines carbon tax proposal cited WLE/IFPRI's work on the potential of renewables. The Government then requested IFPRI to assess options to support national mitigation goals. Governments and other practitioners are using WLE/IFPRI tools (e.g. Niger River Basin, Ethiopia and Sudan), including a guide for Nexus Analysis.

**Identifying soil carbon capture potential.** WLE/CIAT found that adopting conservation agriculture has the potential to increase soil organic carbon (SOC) on 84% of croplands in Ethiopia, India and Kenya.

**Seventeen countries using new decision-support technology to restore land.** Three new African countries are using WLE/ICRAF soil–plant spectral technology to help make better fertilizer decisions, thus protecting and restoring soils and enhancing fertilizer use efficiency. (OICR2794).

### Challenge: Food availability

Degrading landscapes, declining soil fertility, and worsening droughts and floods mean effective resource management is increasingly critical for successful harvests. Highlights:

**Real-time drought monitoring enhances agricultural production and incomes.** The South Asia Drought Monitoring System (SADMS), developed by WLE/IWMI/CCAFS, provides real-time drought severity data enabling local authorities to better advise farmers on crop choices. In three central Indian districts, crop yields and incomes in targeted areas were significantly higher than in control areas. This triggered plans

[2] CCAFS reported this in 2017, but at that time it was a proposal. It was only in February 2018 that the Indian Finance Minister announced and launched the "KUSUM" initiative formally. See OICR2792 for details.

in Karnataka and other areas to scale out the program in 2019; and World Bank interest in scaling via new drought insurance projects in Asia and Africa. (OICR2796).

**Harnessing extreme floods for agro-pastoral system improvements.** WLE/ICRISAT demonstrated "water spreading weirs" to harness flash floods as part of integrated flood management in eastern Ethiopia. The study showed that combining this system with improved farming practices can enhance degraded landscape productivity. The World Bank and International Fund for Agricultural Development plan to integrate this model into a proposed USD 456 million investment. (OICR2791).

**Water investment planning tool adopted by Honduras for national conservation policy implementation.** WLE/CIAT, the Government of Honduras and partners developed an online science-based platform "Agua de Honduras" which generates hydrological information to assist water management and irrigation investment decisions. This tool was used about 150 times to identify rainwater harvesting sites and 25 times to identify river diversion points. (OICR2793).

**Improving rural-urban food systems**. To address urban challenges, WLE/RUAF Foundation analyzed four very diverse cities' food systems: Tamale and Ouagadougou in West Africa, Colombo, Sri Lanka and Quito, Ecuador. In Quito, WLE/RUAF helped develop a Citizen Charter to guide provision of sufficient nutritious food in equitable and sustainable ways.

### Challenge: Equality of opportunity

WLE addresses gender and marginalization to ensure solutions tackle food insecurity, conflict and inequality. Highlights:

**Evidence demonstrates importance of targeting women in irrigation management**. USAID reoriented its investment based on a WLE/IWMI evaluation of an irrigation training program in Tajikistan which found that only male farmers were targeted for training. This risked irrigation performance, as women are increasingly taking over irrigation infrastructure management due to male out-migration. USAID adopted the recommendation to train female farmers in order to sustain the irrigation systems and improve home garden productivity. The recommendations have informed USAID's Feed the Future's Global Learning Agenda. (OICR2773).

**Empowering farmer-led irrigation in Africa**. To support low-income smallholders' access to technology, WLE/IWMI developed business models for solar irrigation in Ethiopia and reviewed African micro-credit experiences. "Out-of-the-box" pilot projects identified included models where a business sells the service, not the equipment, as a type of "uber for irrigation". These models potentially enable women and youth to better access irrigation or start small businesses (Section 1.3.1 and 1.3.2).

### Challenge: Jobs and growth

**A business model approach to natural resource management (NRM).** WLE/IWMI are piloting business models to encourage investments in reusing urban waste in Ghana and Sri Lanka. These models have the potential to create new forms of business (Section 1.3.2). WLE is supporting 19 universities to integrate this approach into curricula.

### Challenge: Public Health

**Impact pathways to improve nutrition**. WLE/IFPRI analyzed water-nutrition linkages across SDGs 2 and 6 and found many knowledge gaps around how to link interventions across these two SDGs. WLE/IFPRI is supporting World Bank guidance on nutrition-sensitive irrigation investments. WLE/ICRAF applied new decision analysis methodologies to Uganda's agricultural development policy, honey value chains in Kenya, and proposed community-led natural resource management investments in Kenya's drylands.

**Cross-cutting work** on health includes ensuring safe waste reuse. New World Health Organization (WHO) Guidelines on Sanitation and Health acknowledge WLE/IWMI scientists. WLE/IWMI scientists participated in WHO-FAO expert groups updating the Codex Alimentarius on food safety related to irrigation water and antimicrobial resistance (AMR).

### *1.2.2 Progress by flagships (optional)*

Please see Milestones table. As instructed, WLE has selected to provide this information in 1.2.1

### *1.2.3 Variance from planned program for this year*

WLE is generally on target as per the 2018 Plan of Work and Budget, with some delays in finalizing outputs, often due to Project Leads setting overly ambitious deadlines.

Flagship 1 extended to next year the completion of ongoing activities for developing an investment-ready business portfolio for private sector investment on land restoration.

Flagship 2 had to modify some of its planned work in Ethiopia on irrigated fodder, and review of watershed management, since a major project led by the International Livestock Research Institute (ILRI) was closed earlier than expected. A research report on exclosure mapping was delayed to 2019.

Flagship 3 redirected some of the food safety research to better link with WHO/FAO's work on irrigation water and AMR and the new CGIAR AMR Hub, resulting in a joint postdoctoral fellow position, with ILRI.

Flagship 4 has strengthened its partnership with WorldFish and the FISH Consortium Research Program (CRP) through a joint initiative to better incorporate inland fisheries in the planning and management of water control infrastructure (Table 9). Focus on the role of nature-based solutions in urban and peri-urban environments in Sri Lanka and in Lao PDR also increased. Due to difficulties in securing bilateral funding on water storage and malaria, from 2019, VCR will instead re-orient W1/W2 funds into research to improve data and information exchange in transboundary waters (rivers and aquifers).

Flagship 5 was funded with a reduced W1/W2 budget starting in 2018. Work commenced in mid-2018 to develop a corresponding work plan, which focuses on (1) building a natural resource management decision support framework for multi-functional landscapes; and (2) piloting the framework in two landscapes. During 2018, scoping work was undertaken to review literature on existing approaches and frameworks, and to identify water, land and ecosystem management challenges in case study landscapes in Northern Ethiopia and Uganda.

### *1.2.4 Altmetric and publication highlights*

WLE research supported production of 338 publications in 2018 (Table 6 and spreadsheet), of which 228 were noted as peer reviewed.

WLE Altmetrics results are in Table 6. Since CGIAR adopted this as an indicator in 2017, WLE has implemented a range of steps to improve scores and tracking. But across the CGIAR, data are still incomplete, and systems are still being improved by Centers and CRPs to bolster results and ensure reliable measurement.

Journal articles and other publications can be found embedded as Evidence in the Milestones Table (5) and throughout the narrative and tables.

Highlights from 2018 include:

- Four high performing journal articles mapped to WLE, as measured by Altmetric scores:
  1. The Paradox of Irrigation Efficiency, in *Science*, finding that advanced technologies do not necessarily "save" water that can be reallocated to some other use, but enable increased production by farmers. Cited in news, blogs and shared via hundreds of social media posts. (Score of 428)
  2. Tragedy revisited, a major discourse piece in *Science*, on collective natural resource management (266)
  3. Distilling the role of ecosystem services in the Sustainable Development Goals ecosystem services (209), cited in two policy documents
  4. Crop pests and predators exhibit inconsistent responses to surrounding landscape compositions (186), covered in global media and shared widely on social media

- To promote integrated solutions and insights from WLE research, WLE launched three new online publications in the Towards Sustainable Intensification: Insights and Solutions series:
  - Gender-equitable pathways to achieving sustainable agricultural intensification
  - River deltas: Scaling up community-driven approaches to sustainable intensification
  - Upper river basin watersheds: Sustainable, equitable and profitable interventions

- High profile resource books WLE contributed to or published include:
  - Resource recovery from waste: business models for energy, nutrient and water reuse in low- and middle-income countries, with an engagement plan to secure adoption in curricula
  - Advances in groundwater governance, being provided to global practitioners and decision makers
  - More people, more food, worse water? a global review of water pollution from agriculture, in collaboration with the FAO as part of their Policy Support and Governance launched at the High-Level Conference on the International Decade for Action "Water for Sustainable Development," 2018-2028
  - How to support effective and inclusive irrigation water users' associations: a guide for practitioners

- Agricultural Development and Sustainable Intensification, bringing together a decade of research on community driven solutions in river deltas.

## 1.3 Cross-Cutting Dimensions (at CRP level)

### *1.3.1 Gender*

WLE's approach is built on the principle that sustainability goes hand-in-hand with equity. Key 2018 findings, methods, tools, capacity development, policy changes and outcomes include:

- Based on a WLE/IWMI study in Tajikistan, USAID re-oriented its irrigation management training program to target women, with promising results. (Section 1.2 and OICR2773).
- When the Gender in Irrigation Learning Tool (GILIT), published in 2017, was applied by ICRISAT in India, it was discovered that women are not being consulted during design of watershed interventions, to the detriment of women and the water schemes. Interventions targeting women often reinforced strict hierarchical and gendered social norms.[3]
- Under the REACH program, small-scale irrigation technology guidance has been developed. The tool has been used by projects in Cambodia and Bangladesh; and a narrated guide was used to train African irrigation engineers (2 women, 10 men) at the launch of the *Studying Farmer-Led Irrigation* (SAFI) network. SAFI plans continues to provide this training.
- A new book documented successful initiatives for women to recover bioenergy from waste. Eight cases demonstrate how to establish new waste-to-energy businesses for women.
- A systematic review of studies of differing gender perceptions of ecosystem services found, for example, that women prioritize water quality, erosion control and habitat and biodiversity conservation, while men have greater knowledge of fuel and timber and mitigation of extreme events.
- A WLE-bilateral study in Ethiopia examined the water-energy-food nexus using local level participatory methods. The study demonstrated that the understanding and perceptions of trade-offs between food production, use of land resources, and energy production from cattle dung and crop residues differ between men and women. The research underscores the importance of incorporating local level gender analyses for achieving better development outcomes.
- In Nepal, WLE-supported pilot interventions have identified the need for system-level change in ensuring that agricultural interventions are inclusive - especially in the context of agricultural collectives which must focus more on inclusion of women and marginalized groups.

#### Findings that have influenced the direction of WLE's work

WLE's research confirms that failure to pay attention to gender inequalities has potentially substantial social and economic impacts. This is particularly relevant in relation to sustainable agricultural intensification and natural resource management, given gender differences in perceptions, approaches and dependencies. Several deep-rooted challenges inhibit the delivery of a step-change in progress. To

[3] ICRISAT and WLE. 2018. Gender- and social- inclusion approach in watershed project: Insights on gender norms and gender relations in Parasai-Sindh watershed, India. Draft report, Gender Norms and Relations in Agricultural Watershed Projects in Jhansi, India.

date, WLE-supported gender work has not proactively addressed the prevailing low institutional capacity among partners to address gender, which is a key reason why gender equality interventions often result in reinforcing women's burdens, rather than resolving them. An important lesson is that research on gender will not translate into transformational change if key institutional actors and implementers are not motivated, or incentivized, to change. WLE is, therefore, transitioning from women-inclusive to gender transformational approaches - where the focus will increasingly be on enabling structural changes to unequal gender relations and addressing institutional and systemic barriers to change at scale. Work by the new Gender and Youth Inclusion Lead has begun to address this gap, by examining where gender intersects with poverty, age and other contextual disparities, with a focus on gender analysis of the political economy of agriculture, land management and irrigation.

### *1.3.2 Youth and other aspects of social inclusion / "Leaving No-one Behind"*

Several WLE studies focus on how to reach youth and others in danger of being left behind. An example is how to scale out farmer-led small-scale irrigation to create income-generating opportunities for young entrepreneurs and farmers, e.g. through vegetable farming; or how to strengthen value chains to make irrigation equipment affordable and accessible, creating new business opportunities. Similarly, WLE is exploring circular economy practices, such as converting urban waste into profitable products to provide new business opportunities for youth.

Highlights include:

- **Business model curricula aimed at students**. WLE is investing in integrating its resource recovery and reuse business models into university and technical school curricula: students will have opportunities to learn new marketable skills. WLE/IWMI's compendium of business models for recovering organic energy, nutrients and water from waste identifies 24 business models with potential for scaling out. WLE is engaging with 19 universities to adapt this work into their syllabus to train young professionals.
- **Young women and men take charge**. In West Africa, multiple demands on small reservoirs often lead to conflicts among community members. A small project supported by the UK Department for International Development has worked with 16 villages and used an innovation platform to enable people to work out how to share water from the reservoir equitably. Women and young men are now actively engaged in reservoir management and hold key leadership positions.
- **Integrating indigenous with scientific knowledge** is critical to the success of Forest Restoration Landscape programs, according to a recent WLE/Bioversity study. Local knowledge holders of different genders and ages must be engaged to generate culturally desirable and effective benefits for local women, men and youth and avoid the danger that outsiders extract resources.
- **Building livelihood resilience and food security**. WLE/IFPRI evaluated a multi-pronged intervention in northeast Nigeria, "Fadama III-Additional Financing", aimed at increasing food security, agricultural productivity, and entrepreneurship among youth in an area affected by conflict. Over 50% of youth who received support started businesses and those receiving management training increased their profits. Combining humanitarian support and livelihood restoration has led to significant improvements for people in the program area, especially for the poorest decile.

- **Building migration research and connections:** WLE/IWMI led two key information-sharing events: Migration and Social Transformation in Ghana, to build momentum around livelihood opportunities, employment and education; and Managing Sustainable Growth, Resilience and Migration: Towards Creative Policy and Practice Solutions for Rapidly Transforming Rural Systems in East Africa and the Nile Basin. Both were via CGIAR's migration-focused MARIS (Migration, Agriculture and Resilience: Initiative for Sustainability) Network led by WLE/IWMI. A new project will analyze the drivers and impacts of migration out of rural areas in seven countries.
- **Internships:** WLE supported more than 50 interns and postgraduate students in acquiring skills and making connections to lead future innovation and scaling out of research results.

Findings that have influenced the direction of WLE's work

Solutions developed for small farmers do not necessarily benefit the most marginalized. For example, a WLE/IWMI/CCAFS pilot test of an Index-based flood insurance (IBFI) product (See: WLE's 2017 Annual Report) explored the potential of this low-cost approach for risk transfer and enhancing the resilience of poor smallholder farmers. However, a still-unpublished *ex-post* evaluation found that 76% of beneficiaries were men, half aged over 60, had relatively large land holdings and were not from marginal castes. This study reinforces the importance of making sure we pay specific attention to gender and other local social contexts.

WLE's planned Commission on Sustainable Agricultural Intensification will aim to seek out evidence of how to bring sustainability and equity closer together in production systems to complement work on sustainable diets promoted by the EAT-Lancet Commission (see 2.5).

### *1.3.3 Capacity development: key achievements and learning points*

WLE builds capacity through training, advising, resource provision, long-term relationships and institutional strengthening. Through MARLO (Managing Agricultural Research for Learning and Outcome platform), WLE reports 4427 people trained. Highlights:

- **Training**. In India 179 trainees (30% women) learned how to develop solid and liquid waste "Action Plans" to improve sanitation in their village areas. They will draft sanitation plans for up to 900,000 rural dwellers. WLE/ICRAF provided training and advisory services on applying low-cost soil-plant health measurements for land restoration, training to 185 people and supported 13 MSc/PhD students.
- **Capacity tools**. WLE/CIAT/Bioversity and partners developed a manual providing guidelines for improving seed production, with supporting material and videos, benefitting over 200 farmers. WLE/IWMI published a guideline for practitioners on establishing sustainable and inclusive irrigation water users' associations (WUAs), which is being used to prepare a detailed manual for organizing WUAs in Myanmar. WLE/IFPRI/PIM's experiential groundwater governance game is being considered by the World Bank for incorporation into water investments in India.
- **Disseminating business models**. WLE/IWMI is working with universities to co-develop resource recovery and reuse business model curricula in sanitation, engineering and other courses. An intensive training program was held for 25 university teachers to deliver material to students in Asia, Africa and Europe. These 'training the trainer' programs help tailor material for engineering,

health, economics, or business courses; and support peer training. A free online curriculum will be uploaded to sswm.info.

- **Regional convening:** WLE's Greater Mekong program culminated with discourse-leading Greater Mekong Forum, and resources on hydropower resettlement, environmental impacts, and knowledge networks.
- **Increasing researchers' opportunities**. WLE's ThriveNet newly established research network nearly doubled to 400 Facebook members. ThriveNet piloted a travel grant program to support researchers' development and milestones, to expand in 2019. Grants included blog production / coaching. Collated opportunities are shared via social media and email.

### *1.3.4 Climate change*

All agricultural interventions must address climate challenges. WLE increases resilience through:

**Supporting landscape management practices that increase resilience to climate-related natural hazards:** WLE/IWMI supports integrating nature-based solutions for flood risk management and hence climate adaptation into city planning in the Mekong Region; and Colombo, Sri Lanka where WLE/IWMI supported its Wetlands Cities designation. WLE/CIAT is piloting a financial instrument in the Colombian Amazon to enable farmers to improve their wellbeing while adapting to climate change. WLE/ICRISAT developed a "flood-spreading weir" system that is helping pastoralists adapt to floods and droughts (Section 1.2 and OICR2791).

**Risk management through provision of information:** WLE/IWMI/CCAFS supports the South Asia Drought Monitoring System (SADMS) to provide drought severity data at local levels. (Section 1.2 and OICR2796). The WLE/IWMI/CCAFS' index-based flood insurance model for smallholders is set to expand to include drought coverage and seed provision in 2019.

**Energy-efficient ag-water supply**: Effective management of agricultural water enhances resilience during dry periods. Scaling out solar irrigation in India with a co-op model (See: 1.2 and OICR2792) will reduce greenhouse gas emissions. WLE/IWMI's business models and suitability mapping aim to sustainably expand solar irrigation in Ethiopia.

**Effective mitigation through sustainable management of natural resources:** WLE/CIAT research demonstrated how conservation agriculture can sequester significant amounts of soil organic carbon, building the case for good soil management as a climate mitigation measure (see more on new Ethiopia, India and Kenya research in section 1.2). WLE/IFPRI addresses climate challenges within the Water-Energy-Food nexus, including identifying potential for renewable energy technologies to support agricultural and economic growth and climate mitigation (e.g. Ethiopia, Philippines) as well as how to manage the tradeoffs that occasionally arise in progression to climate technologies.

# 2. Effectiveness and Efficiency

## 2.1 Management and Governance

After serving as Chair of WLE's Independent Steering Committee (ISC) since 2012, Johan Rockström, stepped down. Barbara Schreiner served as Interim Chair, and Ann Tutwiler was confirmed to take on the role from March 2019. Mihir Shah and Joan Kagwanja reached the end of their ISC terms and a process was set up for selecting two further members, from Africa and Asia. Peter White joined the ISC representing the World Business Council for Sustainable Development. The Terms of Reference for the ISC were updated to further clarify functions, and distinction from the IWMI Board, which carries legal and fiscal responsibility for WLE.

A survey was conducted with the WLE Management Committee (MC), which identified a number of future management priorities including a focus on: external partnerships and fundraising, strategy and post-2021 vision, and greater efforts to promote strategic results. Deepa Joshi joined the WLE Management Committee as Gender, Youth and Inclusion Coordinator, a shared position with IWMI. Rolf Sommer left CIAT and was replaced by Marcela Quintero as co-leader of Flagship 1.

WLE ran a very healthy gender balance in 2018 averaging 60% women across the WLE ISC, MC and PMU.

Improving processes for planning, reporting, assessment and data management were a significant component in 2018; which continues into 2019, to ensure decision-making processes are clear and documented, in conformity with the CGIAR Performance Based Management standards. Key activities included: improving MARLO data entry, supporting researchers to make better use of the system, and tightening the assessment of projects for inclusion in the portfolio. This is part of WLE's wider strategy to learn lessons from past experience to improve processes and reduce transaction times, at the same time practicing adaptive management to take into account evolving CGIAR policies and formats as well as the changing external environment.

## 2.2 Partnerships

### *2.2.1. Highlights of external partnerships*

Table 8 demonstrates that WLE works with a large number and variety of partners who often play multiple roles (e.g. research *and* capacity development *and* delivery).

**Research/ knowledge partners.** WLE taps into the specialized expertise of many universities. Examples include Addis Ababa University, University of Development Studies in Ghana, Texas A&M University, Swedish University of Agricultural Sciences, and Australian National University. Others like Rothamsted Research and Quantitative Engineering Design provide specialized expertise to the Africa Soil Information Service program.

**Scaling and delivery partners.** WLE has initiated partnerships with some private firms. Our collaboration with Jekora Ventures Ltd on recovery and reuse of urban solid waste is enabling scaling out of a public private partnership model in Ghanaian cities. EstudioOCA, an urban planning company, supports integrating nature-based solutions to climate adaptation into city planning with the Sri Lanka Urban Development Authority. WLE works with United Nations agencies – FAO, the United Nations Development Program, the United Nations Convention to Combat Desertification, WHO, and the United Nations

Standing Committee on Nutrition for example – to incorporate research results into guidelines, manuals and training programs.

**Policy engagement partners**. WLE has a close partnership with the Ethiopian Agricultural Transformation Agency, for example, in learning lessons from a program to scale out solar irrigation pumps. We work with multiple government agencies, such as the Ministries of Environment in Peru and Colombia on sustainable landscape management systems. We also collaborate with international finance institutions and bilateral donors on both policy and delivery; USAID through its Feed the Future program and the Ministry of Environment of Germany are especially important.

**Capacity development partners**. Most of our research and scaling partners also provide capacity development services. We work with 19 universities and technical institutions in Africa, Asia and Europe to integrate urban resource recovery and reuse business models into their curricula.

WLE Greater Mekong Program, the last of WLE's region-focused work, closed due to reduced funding. See: 1.3.3.

### *2.2.2. Cross-CGIAR partnerships*

**CCAFS** and WLE continued to collaborate on scaling up a solar irrigation business model (OICR2792), and on managed aquifer recharge for flood mitigation in India and Vietnam, index-based flood insurance trials in India, and a project providing real-time drought risk data at micro level (OICR2796).

**FISH** and WLE collaborated on flood based farming systems, reservoir fisheries and fisheries and water control infrastructure. We held a workshop on fisheries productivity and jointly published a brief on enhancing fisheries productivity through improved management of water control infrastructure.

With the CGIAR Research Program on Roots, Tubers and Bananas (**RTB)**, WLE provides advisory, analytical and capacity development services on soil-plant spectroscopy to the Soil Intelligence System for India, and the Africa Cassava Agronomy Initiative. We are establishing a landscape case study in Uganda.

**PIM**, the CGIAR Research Program on Forests, Trees and Agroforestry **(FTA**) and WLE are integrating complementary evidence on landscape restoration to deliver targeted policy and investment advice.

WLE engaged with **PIM** and **CCAFS** on integrated Water-Energy-Food nexus modelling to understand the impact of irrigation development on food import dependency in Sub-Saharan Africa.

**A4NH** and WLE organized a session at Stockholm World Water Week on water use, food security and disease – achieving healthy outcomes. WLE engaged with the new A4NH-linked CGIAR Antimicrobial resistance hub targeting a joint postdoctoral fellow position of IWMI and ILRI.

With **FTA,** WLE supports projects on forest restoration in Ethiopia and the Kenya drylands by applying decision analysis methods.

Through ICRISAT, WLE and the CGIAR Research Program on Grains, Legumes and Dryland Cereals (**GLDC)** are exploring the impacts of farm-level interventions on food security and incomes, landscape-level synergies and tradeoffs, and return on investments.

WLE is a partner with **ILRI** and the International Institute of Tropical Agriculture (**IITA**) on the Africa RISING initiative in Ethiopia and West Africa.

Refer to Table 9 for details.

## 2.3 Intellectual Assets

*(a) Have any intellectual assets been strategically managed by the CRP this year?* No

*(b) If relevant, indicate any published patents and/or plant variety right applications (or equivalent) associated with intellectual assets developed in the CRP and filed by Centers and/or partners involved in the CRP, giving a name or number or link to identify them.* N/A

*(c) List any critical issues or challenges encountered in the management of intellectual assets in the context of the CRP (or put N/A).]* CGIAR and its Centers have not yet developed a systematic meta-tagging system to identify datasets by CRP. Thus, CGIAR-supported datasets are managed and made open by Centers and cannot be easily be collated by CRPs.

## 2.4 Monitoring, Evaluation, Impact Assessment and Learning (MELIA)

In 2018 WLE developed a complexity-aware evaluation approach that sought to prioritize outcome level results. Over the coming years, WLE will conduct at least six evaluations that will feed into our evidence base and facilitate spending on interventions with a high potential for positive results. The first evaluation on our Resource, Recovery and Reuse (RRR) work in Ghana and Sri Lanka will be completed before mid-2019.

Other MELIA work has focused on building internal reporting systems, including a review of the CRP Results Framework, which has led to a more strategic, portfolio-driven planning process. The results of this internal review are evidenced by the 2019 Plan of Work and Budget, which provides an improved set of milestones that will guide WLE toward the achievement of planned outcomes.

WLE also revisited and reflected upon our current theory of change (ToC). The review underscored the continued relevance of the existing ToC but also identified new 'ways of working' in complex issue areas. A related internal review developed a set of criteria to assess the relevance of flagship-level projects. The new criteria will help ensure that WLE maintains a coherent and strategically driven project portfolio.

Refer to Table 10 for examples.

## 2.5 Efficiency

As a cross-cutting CRP, WLE collaborates with CGIAR Centers and CRPs to address specific natural resources management and sustainable agricultural intensification issues. The assumption is that collective effort delivers results more efficiently. 2018 examples include:

- The decision to establish a WLE Commission on Sustainable Agricultural Intensification (SAI) to bring together research from across the CGIAR, and outside, on SAI solutions. This will introduce

greater efficiency in analyzing, showcasing and promoting evidence to influence global discussions.

- WLE Flagship 3 partnering with RUAF Foundation and FAO to deliver outcome 3.1 through the CITYFOOD Network, complementing other CGIAR efforts to address nutrition issues in urban and peri-urban areas, with the work of these two external partners.
- Flagship 5's efforts to bring together researchers from four Centers, to work jointly to apply decision support tools in agricultural landscapes.
- Efforts to combine the strengths of FTA, PIM and WLE around what works for land restoration were initiated through a joint research meeting.

In management, WLE saw efficiency gains by sharing the Gender Youth and Inclusion Lead with IWMI, and by converting the Monitoring Evaluation and Learning position to a part-time consultant, freeing up funding for outcome evaluations. WLE also drafted internal guidance to ensure CRP management and operations are efficiently delivered. In the medium to long term, the heavy investment in MARLO will deliver efficiency since the data entered can be used for both planning and reporting, reducing data entry time, and serving as the main source for other incoming information requests.

## 2.6 Management of Risks to Your CRP

Following IWMI's Risk Management structure, WLE monitors risks based on four categories: 1) Research and Science Risks; 2) Financial Risks; 3) Infrastructure and Capability Risks; and 4) Reputational Risks. WLE's management reviews the register at least twice a year, identifying appropriate mitigation actions. Sixteen risks were identified in 2018, two were considered to be of inherently high-risk. One of these was financial, relating to a potential W1/W2 funding cut, with mitigation measures put in place including scenario planning for 2018 and establishing a process to avoid instability due to reductions late in the year. The second was research based, relating to the risk of lower than expected delivery on gender targets. To mitigate this, the Gender, Youth and Inclusion Lead has now been recruited and has begun to develop and implement a plan to meet these targets.

Of the residual risks, ten were minor and six were moderate. Of those classified as moderate, funding risks continue, with some partner Centers having difficulty maintaining agreed levels of bilateral funding. Measures have been discussed and instituted with these Centers, and WLE will further adjust its planning and budgeting process for 2019 onwards to improve on over/under budgeting on W1/W2 in the context of the uncertainty of allocations until the end of the year. The issuance of the CGIAR Financial Plan for 2019-2021 should help to reduce this risk from 2019 onwards.

## 2.7 Use of W1/W2 Funding

W1/W2 funding constituted 21% (USD 7.3 million) of WLE's total expenditure. It is channeled for research across flagships and to maximize programmatic integration and enhance portfolio-level uptake and impact. See Table 12. Examples include:

**International policy engagement to leverage results.** WLE engages in international policy arenas including: Intergovernmental Panel on Biodiversity and Ecosystem Services, UN Convention to Combat Desertification Science Policy Interface, and Ramsar Scientific and Technical Review Panel.

**Enhancing partnerships along impact pathways.** WLE/IWMI partners with RUAF, the International Council for Local Environmental Initiatives and FAO in the CITYFOOD Network aimed at strengthening resilience of rural-urban linked food systems.

**Developing and piloting innovations.** WLE/ICRAF demonstrated the value of infrared spectroscopy to measure soil health; and pilot-tested land use alternatives for land management in Colombia and Peru.

**Innovative interdisciplinary research.** Examples include solar irrigation business models in Ethiopia and the development and implementation of disaster risk management tools in South Asia.

**Gender integration** is a major investment focus. WLE showed the impacts of different land management practices on household welfare; and evaluated the impacts of a flood insurance program on the poor, landless and women.

**Capacity building.** WLE supported PhD and masters' students and internships; and development and dissemination of RRR curriculum.

**Synthesis, communication and dissemination.** WLE enhanced impact potential through 49 targeted Op-Eds and blogs; events (e.g. promoting business models at the EAT Forum, supporting over 30 sessions at Stockholm World Water Week, convening the Greater Mekong Forum); and supporting publications including three synthesis briefs (Section 1.2.4).

## 3. Financial Summary

WLE's total expenditure in 2018 was USD 34.4 million, of which USD 7.3 million (21%) was W1/W2, and USD 27.1 million (79%) was funded by bilateral and W3 projects. W1/W2 expenditures were slightly below the POWB budget of USD 7.6 million, due mainly to the decision to allocate USD 200,000 to the Sustainable Agricultural Intensification Commission, to begin in 2019. The ultimate allocation in the CGIAR Financial Plan for WLE in 2018 was USD 8 million.

WLE again raised more additional bilateral funding than planned, with the additional USD 1.5 million resulting in WLE meeting its target of a proportion of 4:1 of bilateral/W3 to W1/W2 funds in 2018.

Further details can be found in the financial summary provided in Table 13. All details are preliminary, pending the final WLE audited report.

# Part B. Tables

## Table 1: Evidence on Progress towards SRF targets (Sphere of interest)

WLE will largely focus its limited MELIA resources on outcome-level assessments, to deliver evidence on WLE results that fall within our 'sphere of influence'. WLE is aiming to conduct up to 6 outcome studies up to 2021, in addition to the planned impact assessments listed in Table 1. Impact assessments present some challenges within the multi-sector, multi-scale initiatives that characterize WLE. Impacts from research targeting environmental public goods (i.e. natural resource management and ecosystem services), are often diffuse, or arise over longer time scales, and so evaluators working in these fields are often methodologically challenged. Impact assessments that utilize experimental or quasi-experimental designs are rarely suitable for evaluating such interventions, as they use a broad range of knowledge-intensive and site-specific management principles that are not conducive to measuring impacts from cross-sector, cross-scale complex interventions.

| **SLO Target (2022)** | **Brief summary of new evidence of CGIAR contribution** | **Expected additional contribution before end of 2021 (Optional)** |
|---|---|---|
| **1.1.** 100 million more farm households have adopted improved varieties, breeds, trees, and/or management practices | No new evidence in 2018 | Balasubramanya, Soumya. 2019. Effects of training duration and the role of gender on farm participation in water user associations in southern Tajikistan: implications for irrigation management. *Agricultural Water Management*, 216:1-11.*<br><br>Buisson M.C.; Balasubramanya, S. 2019. The effect of irrigation service delivery and training in agronomy on crop choice in Tajikistan. *Land use policy*. 81:175–184.* |
| **1.2.** 30 million people, of which 50% are women, assisted to exit poverty | No new evidence in 2018 | |
| **2.1.** Improve the rate of yield increase for major food staples from current <1% to 1.2-1.5% per year | N/A | |

| | | |
|---|---|---|
| **2.2.** 30 million more people, of which 50% are women, meeting minimum dietary energy requirements | N/A | |
| **2.3.** 150 million more people, of which 50% are women, without deficiencies in one or more essential micronutrients | N/A | |
| **3.1.** 5% increase in water and nutrient efficiency in agroecosystems | No new evidence in 2018 | |
| **3.2.** Reduction in 'agriculturally'-related greenhouse gas emissions by 5% | No new evidence in 2018 | |
| **3.3.** 55 M ha degraded land area restored | No new evidence in 2018 | |
| **3.4.** 2.5 M ha forest saved from deforestation | No new evidence in 2018 | |

*These impact assessments focus on a USAID funded initiative. They provide WLE with important data relevant to SLO targets.

## Table 2: Condensed list of policy contributions in this reporting year (Sphere of Influence)

Note: This table contains only policy contributions assessed as Stage 1 or higher by WLE's external assessor.

| Name and description of policy, legal instrument, investment or curriculum to which CGIAR contributed | Maturity Level | Link to sub-IDOs | CGIAR cross-cutting marker score | | | | Link to OICR or link to evidence |
|---|---|---|---|---|---|---|---|
| | | | Gender | Youth | CapDev | Climate Change | |
| Indian government rolling out national solar irrigation investment program based on results of WLE and CCAFS-supported pilot study. Farmers will be able to sell surplus power to electric utility. | 2 | -Reduced smallholder production risk | 0 | 0 | 0 | 2 | https://marlo.cgiar.org/projects/WLE/studySummary.do?studyID=2792&cycle=Reporting&year=2018 |
| Based on a WLE-supported evaluation of the effectiveness of an irrigation management training program in Tajikistan, the United States Agency for International Development re-designed the program to target women, who are increasingly taking responsibility for management of the irrigation systems. | 2 | -Reduced smallholder production risk<br>-Increased capacity for innovation in partner development organizations and in poor and vulnerable communities | 2 | 0 | 2 | 0 | https://marlo.cgiar.org/projects/WLE/studySummary.do?studyID=2773&cycle=Reporting&year=2018 |
| Based on the demonstrated proof of concept of water spreading to manage extreme flooding across pastures in eastern Ethiopia, supported by WLE, the approach is being integrated into a major World Bank/ International Fund for Agricultural Development project. | 2 | -Agricultural systems diversified and intensified in ways that protect soils and water | 0 | 0 | 0 | 2 | https://marlo.cgiar.org/projects/WLE/studySummary.do?studyID=2791&cycle=Reporting&year=2018 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| A WLE-supported methodology for monitoring environmental water flows for Sustainable Development Goal 6.4.2 has been adopted and disseminated by the United Nations for use in country reporting. | 2 | -Enhanced conservation of habitats and resources<br>-Land, water and forest degradation minimized and reversed | 0 | 0 | 1 | 2 | https://marlo.cgiar.org/projects/WLE/studySummary.do?studyID=2795&cycle=Reporting&year=2018 |
| Supported by WLE and CCAFS, the South Asia Drought Monitoring System demonstrated use of real time drought forecasting to make cropping recommendations to farmers, the World Bank plans to scale this out through a new crop insurance program in Asia and Africa. | 2 | -Enhanced capacity to deal with climatic risks and extremes | 0 | 0 | 2 | 2 | https://marlo.cgiar.org/projects/WLE/studySummary.do?studyID=2796&cycle=Reporting&year=2018 |
| In Amazonian Colombia, the Financing Fund for the Agriculture Sector (FINAGRO) is testing a methodology developed with WLE support to help smallholders implement forest conservation practices. | 1 | -Increased resilience of agro-ecosystems and communities, especially those including smallholders | 0 | 0 | 1 | 1 | Short case study: https://hdl.handle.net/10568/100226 |
| Soil-plant spectral technology guiding soil fertility investments in 17 African countries and several Asian countries. | 2 | -Land, water and forest degradation (Including deforestation) minimized and reversed | 1 | 0 | 2 | 2 | https://marlo.cgiar.org/projects/WLE/studySummary.do?studyID=2794&cycle=Reporting&year=2018 |

## Table 3: List of Outcome/ Impact Case Reports from this reporting year (Sphere of Influence)

| **Title of Outcome/ Impact Case Report (OICR) with link** | **Maturity level** | **Indicate whether OICR is**<br>• New<br>• Updated Case- same level of maturity<br>• Updated Case- new level of maturity |
|---|---|---|
| OICR2791: Harnessing Ethiopian floodwaters helps dryland pastoralists – and the approach is scaling up (ICRISAT) | 2 | New |
| OICR2773: Evaluation of water management training program in Tajikistan leads to redesign to target women farmers (IWMI) | 2 | New |
| OICR2792: A Revolution in solar-powered irrigation: Solar Power as Remunerative Crop (SPaRC) model is being scaled out nationwide in India | 2 | New |
| OICR2793: Water planning system "Agua de Honduras" used to improve Honduran investment decisions (CIAT) | 2 | New |
| OICR2794: Soil-plant spectral technology guiding soil fertility investments in Africa (ICRAF) | 2 | Updated, same level of maturity |
| OICR2795: Environmental water flows go global to support implementation of the Sustainable Development Goals (SDGs) (IWMI) | 2 | New |
| OICR2796: Making the Leap from Drought Monitoring to Managing Agricultural Drought Risks in India (IWMI) | 2 | New |
| Scaling out tested sustainable agricultural practice and conservation-restoration measures: Piloting of a financial instrument in the Colombian Amazon (CIAT) | 1 | New |

## Table 4: Condensed list of innovations by stage for this reporting year

| Title of innovation with link | Innovation Type | Stage of innovation | Geographic scope (with location) |
|---|---|---|---|
| An approach developed to convert torrential flood to productive use. (Project P477, Flagship 2). MARLO Link | Production systems and Management practices | Stage 3: available/ ready for uptake (AV) | Regional - Sub-Saharan Africa |
| WABEF, a toolkit to promote anaerobic digestion of bio-wastes in West Africa (Project P438, Flagships 3). MARLO Link | Production systems and Management practices | Stage 3: available/ ready for uptake (AV) | Regional - West Africa |
| A holistic probability modeling approach for Agricultural Policy for Nutrition (Bayesian Network models) (Project 516, Flagship 5). WLE/ICRAF has applied a new decision analysis methodology to Uganda's agricultural development policy, honey value chains in Kenya, and to proposed community-led natural resource management investments in Kenya's drylands. The new methodology is a holistic probability modeling approach to identify how to make agricultural policies and interventions better serve multiple-stakeholder goals and reduce risks. MARLO Link | Social Science/ Biophysical Research | Stage 2: successful piloting (PIL - end of piloting phase) | National - Kenya, Uganda |
| A River Health Monitoring Framework for Myanmar: Methods and Tools (Project 518, Flagship 5). MARLO Link | Methodologies and Tools | Stage 2: successful piloting (PIL - end of piloting phase) | National - Myanmar |
| Fecal Sludge Management Business Model tool developed (Project P442, Flagship 3). MARLO Link | Methodologies and Tools | Stage 1: discovery/proof of concept (PC - end of research phase) | Regional - Africa and Asia |
| Mobile Phone App (AgRISE - Agricultural Remote Sensing-based Insurance for Security and Equity) that will provide more than half of | Methodologies and Tools | Stage 1: discovery/proof of concept (PC - end of research | National - India |

| | | | |
|---|---|---|---|
| Indian farmers with crop insurance in the next 2-3 years. (Project 452, Flagship 4). MARLO Link | | phase) | |
| Farm characterization approaches to evaluate agro-biodiversity value (Project 719, Flagship 5). MARLO Link | Research and Communication Methodologies and Tools | Stage 2: successful piloting (PIL - end of piloting phase) | National - Cuba |

## Table 5: Summary of status of Planned Outcomes and Milestones (Sphere of Influence-Control)

| FP | FP 2022 Outcomes | Summary Narrative on progress against each FP outcome this year | Milestone | Milestone status 2018 | Evidence for completed milestones or explanation for extended, cancelled or changed. |
|---|---|---|---|---|---|
| F1 | 1.1 Better informed landscape restoration policies, approaches and interventions. | RDL focused efforts in 6 countries: Ethiopia, Ghana, Kenya, Tanzania, Colombia and Peru on: 1) recommendations for land restoration developed in collaboration with local stakeholders; 2) Mapping land degradation projects at national | 2018 - Synthesis report of factors affecting success and failure of restoration initiatives (enabling factors and incentive schemes) leading to recommendations for the design of new restoration initiatives. | Complete | Ethiopia: Synthesis results on restoration presented to various Ethiopian stakeholders. Ministries have received it favorably. Presentation and manuscript available.<br><br>Kenya: Working paper on farmers' decision-making on soil rehabilitation options and pathways to adoption completed (forthcoming). Blog. |

| FP | FP 2022 Outcomes | Summary Narrative on progress against each FP outcome this year | Milestone | Milestone status 2018 | Evidence for completed milestones or explanation for extended, cancelled or changed. |
|---|---|---|---|---|---|
| F1 | | level and developing rapid indicators for determining soil health in agricultural lands; 3) a synthesis of land restoration successes and failures, and identification of barriers and pathways to adoption; and 4) providing knowledge on land restoration options to policy makers and stakeholders interested in land restoration investments. | 2018 - Innovative investment packages and restoration pilots that implement incentives and enabling conditions for the adoption of sustainable and equitable restoration interventions in progress in 3 countries. | Extended<br>*Research/science - inherent risk in unknown cutting-edge research or science* | A document explaining WLE/RDL's value proposition for sustainable financing of landscape restoration will be presented to CPIC (Coalition for Private Investment in Conservation) in 2019. CPIC is a non-profit coalition of member organizations (potential investors and donors). CIAT has applied for CPIC membership (waiting for approval). |
| F1 | | | 2017 EXTENDED - Knowledge products used by national governments or regional stakeholder platforms supporting implementation of innovative restoration pilots as well as national conservation and restoration planning in Kenya, Ghana, Tanzania and Ethiopia. | Extended<br>*Research/science - inherent risk in unknown cutting-edge research or science* | Final reports in process for Ethiopia, Tanzania (blog), Ghana and Kenya (blog). Final delivery in 2019.<br><br>Land degradation maps corresponding restoration strategies and cost-benefit analysis in Kenya, Malawi and Uganda: submitted to World Bank; waiting for approval.<br><br>Manual for seed production, training materials published and videos. |

| FP | FP 2022 Outcomes | Summary Narrative on progress against each FP outcome this year | Milestone | Milestone status 2018 | Evidence for completed milestones or explanation for extended, cancelled or changed. |
|---|---|---|---|---|---|
| F1 | | | 2017 EXTENDED - Private sector companies or foundations active in land restoration request WLE support for developing an investment-ready business portfolio. | Complete | Technically complete but we still plan to evaluate and disseminate results. Colombian farmers implementing sustainable intensification and landscape restoration participated in a pilot simulating the application of an agri-environmental financial incentive by Financing Fund for the Agricultural Sector in Colombia (FINAGRO).<br><br>Twitter Link 1; Twitter Link 2. |
| F1 | 1.2 Policies, strategies, and interventions investing in practices that rehabilitate or protect soil fertility and soil carbon. | WLE supported co-design and pilot-testing land use practices to enable farmers to improve their capacity to mitigate and adapt to climate change in Amazonian degraded lands (Colombia and Peru).<br><br>Land degradation and soil carbon models and assessments were completed in two African countries; the results should benefit national and county level planning and decision making. | 2018 - Knowledge products (reviews, tools, methods, maps, statistics, and other noteworthy research outputs) on soil carbon sequestration in East Africa are presented/discussed with key stakeholders at two international conferences. | Complete | Global Landscapes Forum (GLF) gender event; facilitated sessions; gender brief.<br><br>GLF-Nairobi: improving land governance in Africa (video)<br><br>WLE-CCAFS/4-p1000-Southern African Confederation of Agricultural Unions side event at United Nations Framework Convention on Climate Change COP24; presented on re-carbonizing the Earth's soil.<br><br>African Forest Landscape Restoration Initiative meetings; presented soil carbon enhancement |

| FP | FP 2022 Outcomes | Summary Narrative on progress against each FP outcome this year | Milestone | Milestone status 2018 | Evidence for completed milestones or explanation for extended, cancelled or changed. |
|---|---|---|---|---|---|
| F1 | | WLE advanced understanding on gender in land restoration initiatives. | 2018 - Predictive models to quantify the potential for soil carbon sequestration under differing management in tropical soils and landscapes developed and submitted for open-access publication in an international peer-reviewed journal. | Complete | Kenya: empirical model soil carbon (re)sequestration completed, applied.<br><br>Paper on "The cost of carbon sequestration in different regions of the world" submitted to Nature CC; currently under review.<br><br>Working paper on soil carbon management in Kenya, Ethiopia and India here. |
| F1 | | | 2018 - At least two Kenyan county governments include methodological guide and farm-level decision support systems on estimating and measuring soil carbon and fertility at various scales into their soil and landscape restoration planning and monitoring. | Extended<br><br>*Research/science - inherent risk in unknown cutting-edge research or science* | Soil carbon and fertility assessments completed. Outreach activities with county governments will be held in 2019. |

| FP | FP 2022 Outcomes | Summary Narrative on progress against each FP outcome this year | Milestone | Milestone status 2018 | Evidence for completed milestones or explanation for extended, cancelled or changed. |
|---|---|---|---|---|---|
| F1 | | | 2018 - Understanding of gender, social and economic barriers to, and drivers of adoption of, soil conserving management practices gained in two countries, and insights shared with policymakers in these countries. | Extended<br>*Research/science - inherent risk in unknown cutting-edge research or science* | 5 papers in preparation for publication, 2019<br>3 workshops in Peru and Colombia. Twitter Links:<br>twitter.com/CIAT_/status/1068547312648114177<br>twitter.com/CIAT_/status/1068547641083080704<br>twitter.com/CIAT_/status/1067493840972587008<br>twitter.com/CIAT_/status/1068590050571636737<br>twitter.com/CIAT_/status/1068620195755945984<br>twitter.com/maromero_CIAT/status/1067522886418792448<br>Advances in data collection on how gender is addressed in restoration initiatives. Datasets available (access restricted).<br>Brief identifying entry points for gender integration in RDL projects being peer-reviewed. |
| F1 | | | 2017 EXTENDED - Kenyan county governments of Kakamega, Siaya and Bungoma consider including methodological guide on estimating and measuring soil carbon at various scales into their soil and landscape restoration planning and monitoring. | Complete | Land degradation hotspots and policy options assessed combining modeling, participatory stakeholder consultations and field validation - Policy brief.<br>This county policy brief is complemented by a detailed report. |

| FP | FP 2022 Outcomes | Summary Narrative on progress against each FP outcome this year | Milestone | Milestone status 2018 | Evidence for completed milestones or explanation for extended, cancelled or changed. |
|---|---|---|---|---|---|
| F1 | 1.3 Strengthen approaches to the monitoring and evaluation of land restoration and the assessment of land degradation risks. | WLE/ICRAF introduced a new decision analysis framework for *ex ante* evaluation to support improved planning and efficient monitoring of land restoration initiatives. WLE/ICRAF use this framework to illustrate how the 110+ countries signatories of the United Nations Convention to Combat Desertification (UNCCD)'s Land Degradation Neutrality Target Setting Programme could use it. Piloting of the framework in a restoration project in Ethiopia was also initiated.<br>Training and advisory services were provided to multiple stakeholders in applying low cost soil-plant health measurements in nine countries. WLE has trained over 1000 people from 17 countries. More African and Asian countries plan to adopt the technology. | 2018 - Decision Analysis Framework for Planning and Performance Measurement of Land Restoration Initiatives applied to UNCCD Land Degradation Neutrality case study and one land restoration project and improved based on feedback from stakeholders. | Complete | The Decision Analysis Framework for Planning and Performance Measurement of Land Restoration Initiative: article is in review (abstract here) includes recommendations for UNCCD's Land Degradation Neutrality framework and Target Setting Programme.<br>Workshop to develop a decision analysis case with WeForest, Ethiopia (report here). Further outputs available here. |
| F1 | | 2018 - 60 National scientists (20% women) trained and supported in applying low cost soil and plant health measurements using dry spectroscopy for targeting and monitoring land restoration in 8 countries (Ethiopia, Ghana, Kenya, India, Malawi, Nepal, Nigeria, and Tanzania). | Complete | Training and advisory services provided to multiple stakeholder in applying low cost soil-plant health measurements in nine countries (Cote d'Ivoire, Ghana, India, Kenya, Malawi, Mauritius, Nepal, Nigeria, Uganda). Further details are available here. The impact of this work is described in the updated soil-plant spectroscopy case study. [OICR2794] |
| F1 | | 2018 - Online tool set for management, analysis and application of soil-plant infrared spectroscopy data, including Africa soil property prediction, tested with 8 national labs, and improved based on feedback (Ethiopia, Ghana, Kenya, India, Malawi, Nepal, Nigeria, and Tanzania). | Extended *Research/science - inherent risk in unknown cutting-edge research or science* | Africa Soil Information Service soil spectral and reference library published on Amazon's Registry of Open Data (RODA), here.<br>WLE/ICRAF Soil-Plant Spectral Diagnostics Laboratory beta version of online software package, SpecWeb. Informally tested with 8 national institutions. |

| FP | FP 2022 Outcomes | Summary Narrative on progress against each FP outcome this year | Milestone | Milestone status 2018 | Evidence for completed milestones or explanation for extended, cancelled or changed. |
|---|---|---|---|---|---|
| F1 | | | 2017 EXTENDED - Framework paper presenting a new analytical approach for planning and performance management of land restoration initiatives integrating feedback from testing with development partners. | Extended<br>*Research/science - inherent risk in unknown cutting-edge research or science* | Malawi land use changes report, 2019 Design of independent evaluation of interventions in Malawi.<br>Decision analysis framework (abstract here). Outputs here, and here.<br>Land health work here.<br>Technical report on soil carbon management practices is due in 2019. |
| F1 | | | 2017 EXTENDED - Partnership with government and development agencies in Kenya and Tanzania produce data sets from multi-location agronomic trials demonstrating a soil-plant ionomics approach using dry spectral technology for predicting crop nutrient constraints. | Extended<br>*Financial - funding delayed and/or cut* | Calibrations for total elemental analysis using portable x-ray fluorescence for soils, plants, manures, and fertilizers were used by multiple agencies for multi-element plant analysis. A low cost, handheld, near infrared spectrometer for soil testing was tested in partnership with Global Good. |
| F2 | 2.1 Policy and practice informed by more effective agricultural land and water management solutions and | Gender in Irrigation Learning and Improvement Tool (GILIT, 2017) piloted for watershed interventions in India; now demanded by users in Mozambique, Central America and West Africa. Additionally, a tool promoting small scale irrigation technologies was developed and | 2018 - Phase 1 and 2 gender tools refined to enable application by policy and investment actors in 2 countries, and the implications of Phase 1 and Phase 2 gender analyses communicated through presentations to policymakers and investors at 3 events. | Complete | GILIT applied to understand gender norms and relations in large scale watershed projects in central-north India (Link).<br>Insights on how to deliver more equitable farmer led irrigation published in high impact paper.<br>Gender guidance tool when promoting small scale irrigation technologies. |

| FP | FP 2022 Outcomes | Summary Narrative on progress against each FP outcome this year | Milestone | Milestone status 2018 | Evidence for completed milestones or explanation for extended, cancelled or changed. |
|---|---|---|---|---|---|
| F2 | investment options | applied by the Innovation Lab for Small-Scale Irrigation, working with private sector partners to roll out promising irrigation technologies.<br><br>Revised business models: Business models for solar irrigation development in Ethiopia generated interest by private and social enterprises.<br><br>In Gujarat India, an IWMI-TATA pilot of a business model informed state-national level solar irrigation development. This was shared globally. | 2018 - At least 3 LWS (Flagship 2 Land and Water Solutions for Sustainable Intensification) investment options/ business models refined and shared with public and private sector institutions in 2 countries. | Complete | Business model for solar irrigation development in Ethiopia published.<br><br>Suitability mapping framework for solar photovoltaic pumps, sub-Saharan Africa.<br><br>Policy dialogues: 2018 Africa Green Revolution Forum.<br><br>International Forum on Solar Technologies for Small-scale Agriculture and Water Management.<br><br>Published Microfinance for rural smallholder irrigation.<br><br>Policy influence: Ethiopian delegation hosted by ICRISAT India. |
| F2 | | | 2017 EXTENDED - Phase 1 business models reviewed (and as appropriate adapted/ adopted) public/private sector agencies in 6 countries. | Completed | Three business models published in 2017-2018: Ethiopia: A catalog of management options for ecosystem restoration (Mekuria et al. 2017)<br><br>Ethiopia and Ghana: solar pump based irrigation (Otoo et al. 2018). Shared business models at several events including:<br><br>http://www.fao.org/land-water/events/solartech/en/<br><br>http://www.fao.org/in-action/water-for-poverty-in-africa/finalprojectworkshop/en/ |

| FP | FP 2022 Outcomes | Summary Narrative on progress against each FP outcome this year | Milestone | Milestone status 2018 | Evidence for completed milestones or explanation for extended, cancelled or changed. |
|---|---|---|---|---|---|
| F2 | | | 2017 EXTENDED - Phase 1 recommendations on ALWM (Agricultural Land and Water Management) interventions evident in policy, investment and/or development programs in 3 countries: Ethiopia, Ghana and India. | Completed | Recommendations incorporated into policy and development programs e.g. irrigation equipment tax exemption, soil fertility maps (Ethiopia).<br><br>Government of Uttar Pradesh (India) requested scaling up integrated agricultural water management pilots.<br><br>Ghana requests further support on conservation agriculture. Danish pump company considering market expansion. Reported at workshop: https://www.icirisat.org/moving-away-from-silos-working-towards-synthesis-of-learnings/ |
| F2 | 2.2. Improved management of new and revitalized medium to large scale irrigation schemes | Across four countries and dozens of irrigation schemes, the use of simple tools (soil moisture, soil nutrient concentration) supports water and labor savings, yield increases and economic benefit to farmers, whilst contributing towards water productivity gains. These pilots are being scaled with partners in Zimbabwe and Uzbekistan.<br><br>Tools such as the Online Irrigation Benchmarking System OIBS and System Asset Management have been developed, with data sets; to be released in 2019. Knowledge | 2018 - Two African medium or large-sized irrigation schemes monitoring irrigation performance and showing increases in farmer incomes, gender equity and ecosystem services delivery. | Completed | Paper assessing adoption of water saving technologies (Link); Tunisia study-sustainable water management techniques (Link). |
| F2 | | | 2018 - Synthesized knowledge around technical, management and policy ''levers of change'' used in triggering new opportunities for scaling of at least 5 farm/field level innovations in irrigated systems in 2 countries. | Completed | India, Sri Lanka, Myanmar: the online irrigation benchmarking tools and System asset management tool (SAMS) and data sets developed; release expected in 2019.<br><br>Impact assessments of training water user associations in Tajikistan show improved performance and equity of irrigation services between large and small farms, Agrilinks. |

| FP | FP 2022 Outcomes | Summary Narrative on progress against each FP outcome this year | Milestone | Milestone status 2018 | Evidence for completed milestones or explanation for extended, cancelled or changed. |
|---|---|---|---|---|---|
| F2 | | products on training and capacity development with gender conscious approaches in water user associations in Tajikistan led to recommendations to USAID for targeting training of female farmers. | 2017 EXTENDED - Farmers, scheme managers, investors and policy makers in medium and large-scale irrigation systems, request LWS-influenced new technologies and management approaches to improve productivity and income generation (targeting Zimbabwe and Myanmar). | Completed | Myanmar: Pywar Ywar Pump Irrigation Project, developed new pump energy model, Best Management Practices for high value crops (BMPs), developed capacity in National Agricultural Research Systems , assessed market opportunities; learning site for 300 similar schemes.<br><br>Zimbabwe: Leveraged support to extend from pilots in six irrigation schemes 2013-2017, to scale to 30+ schemes. |
| F2 | | | 2017 EXTENDED - Identify how problematic large and medium scale irrigation schemes (LSIS) in 3 countries (India, Ethiopia, Egypt) can be improved by benchmarking tools, PPP (public-private partnership) arrangements and supporting capacity building needs in private and public irrigation sector. | Extended<br><br>*Partnership - partners were not able to deliver a key piece on time* | Partners and projects were not in place for delivery. The Flagship portfolio now holds several projects suitable for this analysis. Additional input for 2019 delivery may include ICARDA Egypt and IFPRI Ethiopia assessment of national irrigation schemes. |
| F3 | 3.1. Increased capacity and evidence for male and female stakeholders and policy makers to | WLE/FAO/RUAF Foundation developed a toolkit outlining the City-Region Food Systems (CRFS) approach for cross-sector and cross-boundary analysis. Seven cities conducted a CRFS assessment. | 2018 - 2 additional cities adopt a monitoring system for UPA/City Region Food Systems (CRFS) related innovations. | Completed | Participating cities for North-South learning:<br><br>Toolkit with WLE acknowledgement<br><br>RUAF, FAO and WLE discussed as direct follow-up a new phase focusing on climate change and city region food systems, led by FAO. A new project co-funded by Germany and WLE will support this effort in 5+ cities from 2019. |

| FP | FP 2022 Outcomes | Summary Narrative on progress against each FP outcome this year | Milestone | Milestone status 2018 | Evidence for completed milestones or explanation for extended, cancelled or changed. |
|---|---|---|---|---|---|
| F3 | implement urban and peri-urban agriculture (UPA) related policies and farming system innovations | WLE, RUAF with CIAT, FAO, IWMI and the CITYFOOD network co-led by Local Governments for Sustainability engaged local and regional governments on training, policy guidance and technical exchange to build capacity to implement the Milan Urban Food Policy Pact (MUFPP). 16 new cities joined CITYFOOD network to adopt MUFPP. In Quito, RUAF support resulted in a municipal urban food charter. FAO and RUAF presented the Urban Food Monitoring Framework at the 4th MUFPP Mayors Summit. | 2018 - 5 cities implement Milan Urban Food Policy Pact with WLE facilitation. | Completed | Mayor summit WLE/FAO-RUAF session (1 of 17 videos): https://www.youtube.com/watch?v=rTmbXaWiq0c and presentation.<br><br>14 cities are engaged in MUFPP indicator work: https://www.ruaf.org/sites/default/files/FAO-MUFPP%20Indicator%20framework%20Tel%20Aviv.pdf<br><br>Quito, urban food charter: http://www.conquito.org.ec/wp-content/uploads/2018/09/carta-1.pdf |
| F3 | | | 2018 - Reports providing in-depth and focused food and farming system analysis in a minimum of 7 cities. | Completed | Reports completed on Tamale, Ouagadougou, Colombo, Kitwe, Utrecht, Toronto, Medellin, Quito and more. For FAO- led city reports, see here and for Ghana and Burkina Faso see here. See also article here. |
| F3 | 3.2 Increased business capacities in nutrient, water and energy recovery from domestic and agro-industrial waste for | Waste-based soil rehabilitation field trials continued with public private partnerships (PPP) on waste-based fish production established in Ghana.<br><br>The RRR business model catalogue on gender and energy recovery from waste was published. And the Fecal Sludge Management | 2018 - Private Sector Facilitates field trials for waste-based soil rehabilitation established in Sri Lanka, informing 18,000 ha under coconut, tea and rubber. | Extended<br><br>*Research/ science - inherent risk in unknown cutting-edge research or science* | WLE/IWMI research with Horana Plantations PLC in Sri Lanka. Publication forthcoming.<br><br>WLE/IWMI collaborating with Coconut Research Institute of Sri Lanka on fertilization advisory services for about 400,000 ha (approx. 100,000 ha smallholder production). |

| FP | FP 2022 Outcomes | Summary Narrative on progress against each FP outcome this year | Milestone | Milestone status 2018 | Evidence for completed milestones or explanation for extended, cancelled or changed. |
|---|---|---|---|---|---|
| F3 | intensified food crop production | MOOC (Massive Open Online Courses) milestone adjusted to providing free online curriculum. Worked with 19 universities for curriculum adaptation and implementation.<br><br>Supported the sanitation improvement program, Sri Lanka. And became a member of two task forces: the South Asia Hub Consortium for City-wide Inclusive Sanitation (CWIS) and Fecal Sludge Management (FSM); Indian National Fecal Sludge and Septage Management Alliance.<br><br>Continued to advise Sri Lanka on organic compost production.<br><br>FAO handbook wastewater irrigation management was published. | 2018 - 16 Business models for resource recovery from fecal sludge promoted through ongoing free Massive Open Online Courses (MOOC). | Changed<br><br>*Partnership - partners were not able to deliver a key piece on time* | A change was required as the host MOOC did not adopt the WLE provided modules. Therefore, the free online curriculum of RRR Business Models will soon be at www.sswm.info.<br><br>Sri Lanka: started to work with National Institute of Business Management. |
| F3 | | | 2018 - FAO adopts revised handbook on wastewater management for irrigation. | Completed | https://wle.cgiar.org/farm-practices-safe-use-wastewater-urban-and-peri-urban-horticulture<br><br>FAO "On-farm practices for the safe use of wastewater in urban and peri-urban horticulture: A training handbook for Farmer Field Schools in Sub-Saharan Africa". |
| F3 | | | 2018 - Gender and Resource Recovery case studies referenced by stakeholders. | Completed | RRR catalogue with streamlined gender analysis: already being cited according to Google scholar and reading material in 5+ universities.<br><br>RRR report special volume on gender and energy recovery: >200 reads on ResearchGate; being used for training at Penn State University, USA.<br><br>See here and here. |

| FP | FP 2022 Outcomes | Summary Narrative on progress against each FP outcome this year | Milestone | Milestone status 2018 | Evidence for completed milestones or explanation for extended, cancelled or changed. |
|---|---|---|---|---|---|
| F3 | | | 2018 - Advisory services for adoption and replication of resource oriented solid and liquid waste management in small towns (up to 8000) established for World Bank and Government of India. | Extended<br><br>*Internal resources - key staff, infrastructure or equipment was not available at the time needed.* | India: 179 trainees (60 women) as village sanitation experts to develop waste and fecal sludge "Action Plans". Outreach to 900,000 people possible.<br><br>Partnerships in Sri Lanka, India (Column 3) are promising developments. |
| F4 | 4.1. Risks associated with water variability mitigated | Analysis of business case options for Index-based flood insurance (IBFI) has been completed, providing insights on approaches for funding IBFI schemes. The report will be published in 2019.<br><br>Drought and flood early warning tools developed and disseminated | 2018 - Index Based Flood Insurance business model published. | Extended<br>*Research/ Science Inherent risk in unknown cutting-edge research or science* | Report on a business model for index- based flood insurance under review (forthcoming 2019). |

| FP | FP 2022 Outcomes | Summary Narrative on progress against each FP outcome this year | Milestone | Milestone status 2018 | Evidence for completed milestones or explanation for extended, cancelled or changed. |
|---|---|---|---|---|---|
| F4 | | for use in India and Sri Lanka. Uptake of drought tools has been particularly successful.<br><br>Analysis of equity issues associated with Index Based Flood Insurance (IBFI) trials conducted in India and Bangladesh is completed. Forthcoming reports make recommendations on how to better include vulnerable groups in the schemes. Both Indian government and insurance companies are indicating interest to further scale-up. | 2018 - Regional flood and drought forecast and early warning tool developed for India/Sri Lanka with associated protocols distributed to relevant government agencies. | Complete | Regional flood and drought forecast models completed; drought model integrated in weekly South Asia drought bulletin.<br><br>Central Research Institute for Dryland Agriculture in India and Sri Lanka's Disaster Management Agency have used the information for real-time contingency planning and drought assessment respectively.<br><br>AgRice smartphone app developed and deployed in India. |
| F4 | | | 2017 EXTENDED - Flood insurance theoretical and institutional framework and tools (with insights for more equitable risk sharing for women) delivered to government partners and insurance companies (co-developed with CCAFS). | Complete | Two trials on Index Based Flood Insurance (IBFI) completed in India. Report and two technical briefs for India and Bangladesh forthcoming 2019.<br><br>Both governments and insurance companies interested in scaling up, including use of WLE-developed technology in the Bihar Crop Assistance Scheme for rapid payout. |

| FP | FP 2022 Outcomes | Summary Narrative on progress against each FP outcome this year | Milestone | Milestone status 2018 | Evidence for completed milestones or explanation for extended, cancelled or changed. |
|---|---|---|---|---|---|
| F4 | 4.2. Uptake of solutions and investment options better able to address tradeoffs across competing water-energy-food needs | Work on conjunctive water management in the Ramotswa and Tuli Karoo transboundary aquifer systems in the Limpopo Basin, is incorporated into the activities of a new trans-national Groundwater committee through progress reporting at committee meetings, provision of project data into the Limpopo Watercourse Commission and Southern African Development Community frameworks, and project concept formulation.<br><br>Flagship 4 made a significant contribution to the ongoing global dialogue on nature based solutions and the role of natural infrastructure in sustainable development, through involvement in various processes and forums.<br><br>Increased awareness of opportunities for groundwater use and Managed Aquifer Recharge in selected countries. | 2018 - Groundwater information for Africa is used by 2 governments in their planning processes. | Complete | Ramotswa Information Management System producing important insights on transboundary aquifer shared by Botswana and South Africa; roadmap developed in 2016 has been transformed into a Joint Strategic Action Plan awaiting ratification. Both governments are proposing a large-scale program on aquifer remediation and have provided letters endorsing the project. |
| F4 | | | 2018 - 2 or more tools for addressing tradeoffs across the water-energy-food nexus published. | Complete | Workshop reports; nexus tools to address water-energy-food nexus tradeoffs for Niger River Basin, Vietnam; and a practical application in the Niger River Basin.<br><br>Toolkit on nexus approaches for Eastern Nile Region.<br><br>Integrated framework of models for social, economic and institutional developments in Omo and Zambezi basins complete, pending publication. |

| FP | FP 2022 Outcomes | Summary Narrative on progress against each FP outcome this year | Milestone | Milestone status 2018 | Evidence for completed milestones or explanation for extended, cancelled or changed. |
|---|---|---|---|---|---|
| F4 | | | 2018 - Capitalizing on the international focus on "nature-based solutions for water" in 2018, contribute to international dialogue through participation at 3 or more awareness raising events (e.g. World Water Forum, World Water Week, IPBES Conference of the Parties (COP) and Ramsar COP) and at least 5 communications pieces/products that highlight nature-based solutions that contribute to reduced trade-offs and sustainability. | Complete | Webpage on natural infrastructure<br><br>Participated in World Water Week; Ramsar and Intergovernmental science-policy Platform on Biodiversity and Ecosystem Services COPs; contributed to global communication. Multiple communications pieces here, here and here. |
| F4 | | | 2017 EXTENDED - Information on risks and opportunities associated with groundwater use applied and taken up with key Government partners in India and elsewhere. | Complete | Hydro-geological map and dataset provided to Department of Water Resources, Lao PDR.<br><br>Vietnam Managed Aquifer Recharge (MAR) video presented on morning news in April 2018.<br><br>MAR in UN World Water Development Report 2018 ; UN Chronicle story mentions MAR.<br><br>India: capacity building handover of trial site to government and commitment to scaling out in Uttar Pradesh. |

| FP | FP 2022 Outcomes | Summary Narrative on progress against each FP outcome this year | Milestone | Milestone status 2018 | Evidence for completed milestones or explanation for extended, cancelled or changed. |
|---|---|---|---|---|---|
| F5 | 5.1: Decision makers are better able to access relevant evidence, tools and expertise to design and manage natural resource management (NRM) and agriculture programs that deliver more effectively against multiple SDG targets across scales | Good progress developing approaches to support decision making in landscape management contexts, including literature review on knowledge brokering and ecosystem service assessments (forthcoming 2019). Knowledge brokering framework will be iteratively improved during the project.<br><br>Survey designed for government and NGO stakeholders at national and landscape scale to build a picture of their current use of evidence to inform decision making (will be rolled out in 2019).<br><br>IWMI has started to review tools and management approaches developed by previous WLE projects that can be applied to NRM Program and policy design, informed by interviews with decision makers in Ethiopia | 2018 - Publication of an approach and framework for supporting decision makers to manage better trade-offs arising at scale from field level farming activities. | Complete | Framework developed linking evidence products for decision support; to be iteratively improved.<br><br>Knowledge brokering literature in the context of natural resource management reviewed, summarized (forthcoming 2019) (WLE/Bioversity).<br><br>Review completed on opportunities to interact with ongoing NRM policies and programs in East Africa (WLE/IFPRI). |
| F5 | | | 2018 - Publication of refined decision analysis approaches for a better fit to NRM/sustainable agriculture decision making at the landscape scale. | Complete | Holistic probability modeling for nutritional impacts of agricultural development policy applied in Uganda.<br><br>Decision analysis methods guide for agricultural policy for nutrition.<br><br>Probabilistic causal modelling applied: honey value chains, impacts of community led interventions (Kenya).<br><br>Decision Analysis Framework for Performance Measurement of Land Restoration Initiatives applied; journal article in review. |

| FP | FP 2022 Outcomes | Summary Narrative on progress against each FP outcome this year | Milestone | Milestone status 2018 | Evidence for completed milestones or explanation for extended, cancelled or changed. |
|---|---|---|---|---|---|
| F5 | 5.2: NRM and agricultural development programs that apply WLE approaches and use tools are more cost-effective and avoid negative trade-offs between SDGs across scales | Workshop in Desa Forest, Northern Ethiopia, to initiate decision analysis process. Outputs will be used to calibrate Bayesian modelling and screen other suitable WLE decision support tools, and approaches.<br><br>Workshop with RTB colleagues to scope a second case study in Uganda. Target landscape identified (Isingiro District), proposal developed, and a list of stakeholders compiled.<br><br>Due to the tightness of funding in Flagship 5, we decided to reduce from three case studies to two. This will provide greater resources for proof of concept in Ethiopia and Uganda. | 2018 - Work plans finalized for 3 new partnerships in three different farming systems (RTB, RICE, FTA). | Changed<br><br>*Financial - funding delayed and/or cut* | **Ethiopia:** Workplan developed, workshop held with WEFOREST to populate decision models.<br><br>**Uganda:** Study site identified. Plans developed with CGIAR Research Program on Roots, Tubers and Bananas (RTB). Stakeholder workshop planned mid-2019.<br><br>**Rice:** Case study cancelled, resources redistributed to the Ethiopia and Uganda cases for 2019. |

## Table 6: Numbers of peer-reviewed publications from current reporting period (Sphere of control)

| | Number | Percent |
|---|---|---|
| **Peer-Reviewed publications** | 228 | 86% (of those identified yes/no by partners) |
| **Open Access** | 173 | 54% (of those identified yes/no by partners) |
| **ISI** | 90 | 83% (of those identified yes/no by partners) |

## Table 7: Participants in Capacity Development Activities

The following figures are based on data provided to WLE by project leaders, using MARLO. As MARLO was not designed to collect this specific data and given that these needs were not a requirement when 2018 activities were planned, it is likely these indicators are largely underreported.

The Capacity Development data collected in MARLO is only classified as short or long-term, for formal training. The total number of individuals, within WLE, who participated in formal training is 4,427. The total numbers of people trained both formally and informally, according to MARLO project data, was 12,201.

| **Number of trainees** | **Female** | **Male** |
|---|---|---|
| In short-term programs facilitated by CRP | 426 | 2293 |
| In long-term programs facilitated by CRP | 475 | 1233 |

## Table 8: Key external partnerships

| **Lead Flagship** | **Brief description of partnership aims** | **List of key partners in partnership** | **Main area of partnership** (Research/Delivery/Policy/Capacity Development/Other) |
|---|---|---|---|
| 1 | Rothamsted Research supports reference for calibration of WLE's dry spectral calibrations and partners on the Africa Soil Information Service project and development of new initiatives to take advances to scale. | Rothamsted Research, World Agroforestry Centre (ICRAF), International Institute of Tropical Agriculture (IITA). | Research, Delivery. |
| 1 | Africa Soil Information Service furthers the development of state-of-the-art national soil information systems based on soil-plant dry spectral analysis and digital soil property mapping. | Governments of Ethiopia, Ghana, Nigeria, and Tanzania, Rothamsted Research, World Soils Information (ISRIC), Columbia University, Quantitative Engineering Design (QED). | Research, Delivery, Capacity Development. |
| 1 | International/ national, scientific/academic partnership to assess sustainability at household and landscape levels to determine how land-based options contribute to building sustainable landscapes; and at country level to determine how far they are towards the achievement of SDGs, and the trade-offs and synergies among objectives. | Potsdam Institute for Climate Impact Research (PIK, Germany), University of Amazonia (Colombia), National Agrarian University - La Molina (UNALM, Peru), Research Center for the Peruvian Amazon (IIAP, Peru), Amazon Institute for Scientific Research (SINCHI, Colombia), Research center for sustainable agricultural systems (CIPAV, Colombia), Ministry of Environment of Peru (MINAM) and Ministry of Environment of Colombia (MADS). | Research, delivery, capacity development and scaling. |
| 1 | A partnership for developing decision support tools to provide solutions to water management challenges in Honduras. | United States Agency for International Development (USAID), Ministry of Environment of Honduras. | Research and delivery. |

| Lead Flagship | Brief description of partnership aims | List of key partners in partnership | Main area of partnership (Research/Delivery/Policy/Capacity Development/Other) |
|---|---|---|---|
| 1 | Promotes dialogue between scientists and policy makers on desertification, land degradation and drought (DLDD). | United Nations Convention to Combat Desertification Science-Policy Interface (SPI). | Policy. |
| 2 | Flagship 2 activities are linked with other CGIAR and external partner joint initiatives, including the Innovation Lab for Small-Scale Irrigation which includes Texas A&M University, International Water Management Institute (IWMI), and International Livestock Research Institute (ILRI). | Texas A&M University, United States Agency for International Development (USAID). | Research/Delivery/Policy/Capacity Development. |
| 2 | Influencing the key messages going to the High-Level Political Forum on the review of the nutrition targets under the SDGs. | United Nations Standing Committee on Nutrition. | Delivery. |
| 2 | A research collaboration between International Food Policy Research Institute (IFPRI) and University of Development Studies, Ghana (UDS) on the impacts of a motor pump experiment. | University for Development Studies, Ghana. | Research. |
| 2 | A tri-lateral research collaboration with International Food Policy Research Institute (IFPRI) on nutrition sensitive irrigation under the Feed the Future Innovation Lab on Small Scale Irrigation (ILSSI). | Tufts University and Addis Ababa University. | Research. |

| Lead Flagship | Brief description of partnership aims | List of key partners in partnership | Main area of partnership (Research/Delivery/Policy/Capacity Development/Other) |
|---|---|---|---|
| 2 | Agricultural Transformation Agency (ATA) is implementing solar pumps in 16 districts in Ethiopia. ATA asked IWMI to undertake impact assessment and support in planning given past experience in pilot schemes. | Agricultural Transformation Agency, Ethiopia. | Research/capacity development. |
| 3 | Uptake of WLE research on Resource, Recovery and Reuse (RRR) business models. | Discussions with 19 universities so far (list available). | Capacity Development. |
| 3 | Support of United Nations publications. | FAO, World Health Organization (WHO), UN Environment (UNEP). | Delivery (IPG). |
| 3 | Public Private Partnerships on Fortifer production. | Municipality of Yilo Krobo and Jekora Ventures Limited. | Implementation. |
| 3 | Advisor on food and the circular economy. | Ellen MacArthur Foundation. | Capacity. |
| 4 | WLE continues to liaise with the Food, Energy-Environment and Water Network (FE2W network) which supports co-development and implementation of Nexus tools and approaches. | Australian National University, and several other universities and partners as reflected on the network website. | Research, Capacity, Delivery. |
| 4 | Integration of innovative nature-based solutions to climate adaptation into city planning. | EstudioOCA (Bangkok based urban planning and architecture company), Sri Lanka Urban Development Authority and other national partners. | Private sector – research/delivery. |

| Lead Flagship | Brief description of partnership aims | List of key partners in partnership | Main area of partnership (Research/Delivery/Policy/Capacity Development/Other) |
|---|---|---|---|
| 4 | The Sustainable Water Future Programme (Water Future) of Future Earth is a global platform facilitating international scientific collaboration to drive solutions to water problems. WLE is part of this, through the International Water Management Institute (IWMI). | Griffith University and other partners of the Water Program under Future Earth. | Research. |
| 4 | Ramsar Science and Technical Review Panel (STRP): WLE continues to participate in the Scientific and Technical Review Panel, which provides scientific and technical guidance to the Conference of the Parties, the Standing Committee, and the Ramsar Secretariat. | Ramsar Convention. Key Organizational partners include Wetlands International, World Wildlife Fund (WWF), Birdlife International, International Union for Conservation of Nature (IUCN), and Wildfowl & Wetlands Trust. | Delivery. |
| 5 | University of Bonn is a partner in Flagship 5's decision analysis work, providing scientific and technical support and student co-supervision. | Department of Horticulture of the University of Bonn, World Agroforestry Centre (ICRAF). | Research, Delivery, Capacity Development. |
| 5 | Working with World Agroforestry Centre (ICRAF) in Disa Forest, Tigray. | WeForest, Ethiopia. | NGO. |

## Table 9: Internal Cross-CGIAR Collaborations

| **Brief description of the collaboration** | **Name(s) of collaborating CRP(s), Platform(s) or Center(s)** | **Optional: Value added, in a few words, e.g. scientific or efficiency benefits** |
|---|---|---|
| The collaboration between WLE Flagship (ESA) and Flagship 1 (RDL) and PIM and FTA aims to bring together complementary research and evidence on landscape restoration from across the three CRPs, and channel this in a user-friendly format, that delivers targeted advice to policy and investment processes on land restoration.<br><br>In August 2018, WLE participated in the Global Landscape Forum Nairobi at the panel of the discussion: Improving land governance and land use planning for Landscape restoration in Africa. WLE presented perspectives of land property rights in the context of land restoration initiatives in Africa and Latin America. https://events.globallandscapesforum.org/agenda/nairobi-2018/day-2-thursday-30-august-2018/parallel-sessions-3/3-parallel-discussion-forums-3/improving-land-governance-and-land-use-planning-for-landscape-restoration-in-africa/ | CGIAR Research Program on *Policies, Institutions and Markets* (PIM) and CGIAR Research Program on *Forest, Trees and Agroforestry* (FTA). | Brings CG-wide collective evidence together to:<br><br>● Stimulate debate on how to more effectively address key constraints to scaling up of land restoration practices.<br>● Identify ways of collating complementary research and evidence on landscape restoration for greater policy influence and impact.<br>● Build a better understanding of the "demand"/''clients''. |
| As part of a collaboration between WLE and CGIAR Research Program on *Climate Change, Agriculture and Food Security* (CCAFS), Centro Internacional de Agricultura Tropical (CIAT) and the International Institute for Tropical Agriculture (IITA) worked with stakeholders part of the "Lushoto District Climate Change Learning Alliance" in identifying priorities, practices and the enabling environment required to achieve land restoration. | WLE and CGIAR Research Program on *Climate Change, Agriculture and Food Security* (CCAFS)/Centro Internacional de Agricultura Tropical (CIAT) and the International Institute for Tropical Agriculture (IITA). | This builds on the effort of the CGIAR to create climate change district learning alliances, to discuss land restoration priorities, and identify actions for moving forward restoration efforts at the district level. Actions identified for land restoration will be shared to inform future investments in the district. |

| Brief description of the collaboration | Name(s) of collaborating CRP(s), Platform(s) or Center(s) | Optional: Value added, in a few words, e.g. scientific or efficiency benefits |
|---|---|---|
| WLE seeks to leverage evidence-based policy advocacy geared towards sustainable intensification at the landscape scale. Support was initiated for a CGIAR Research Program on *Forest, Trees and Agroforestry* (FTA) project on forest restoration in Ethiopia in partnership with weForest to analyze and improve proposed restoration interventions. WLE also supported FTA in the Kenya drylands by applying decision analysis methods. | CGIAR Research Program on *Forest, Trees and Agroforestry* (FTA). | Quantitative decision analysis support for improving the design of land restoration intervention options to better meet the entire set of stakeholder goals and minimize implementation risks. |
| WLE and the CGIAR Research Program on *Livestock,* Environmental Flagship, work together in the study: Rangeland Degradation: Causes, Consequences, Monitoring Techniques and Remedies; with a focus on soil-based solutions in Africa. | CGIAR Research Program on *Livestock*. | Rangelands occupy 25% of the total land surface globally. In Africa, rangelands are estimated to cover 66% of the land surface although there are variations from country to country. Many of these lands are under degradation processes. By working together, WLE and Livestock scientists were able to addressed rangeland degradation and potential for controlling this with a strong focus on soil aspects. |
| Flagship 1 provided advisory, analytical and capacity development services on soil-plant spectroscopy, including to the Soil Intelligence System for India, and the Africa Cassava Agronomy Initiative (ACAI). | CGIAR Research Program on MAIZE and CGIAR Research Program on *Roots, Tubers and Bananas* (RTB). | Included training course on soil-plant spectroscopy for India and Nepal scientists; soil and plant tissue analysis for ACAI cassava trials. |
| Flagship 2 activities are linked to Phase 2 of the Gender and Assets in Agriculture Program, led by the International Food Policy Research Institute (IFPRI) and funded by Bill and Melinda Gates Foundation, and CGIAR Research Program on *Agriculture for Nutrition and Health* (A4NH). WLE contributes to research under this program. | CGIAR Research Program on *Agriculture for Nutrition and Health* (A4NH). | |

| Brief description of the collaboration | Name(s) of collaborating CRP(s), Platform(s) or Center(s) | Optional: Value added, in a few words, e.g. scientific or efficiency benefits |
|---|---|---|
| Flagship 2 maintains close collaboration with CGIAR Research Program on *Climate Change, Agriculture and Food Security* (CCAFS) on solar irrigation work in India (see OI), which has resulted in major expanded investment by the Indian Government.<br><br>Flagship 4 continued collaboration with CCAFS on managed aquifer recharge for flood mitigation with a focus on capacity building and engagement, leading to handover of the Indian trial site to government and ratification of the concept and a commitment to scaling it out in Uttar Pradesh state. In Vietnam, the trials, comprising an assessment of volumes of water recharged, water quality and cost effectiveness of Managed Aquifer Recharge (MAR) interventions, continued throughout 2018. The joint WLE - CCAFS trials on index based flood insurance were scaled-up (400 farmers in 11 villages). Consideration is now being given for 2019 for a greater focus on post-flood recovery – including "bundling" Index Based Flood Insurance with the dissemination of stress-tolerant crop varieties and broadening the CGIAR collaboration to encompass other centers and CRPs.<br><br>Flagship 1 together with CCAFS, 4p1000, and Southern African Confederation of Agricultural Unions organized the side event on "Agriculture Advantage 2.0" at the United Nations Framework Convention on Climate Change COP24, in December 2018. | CGIAR Research Program on *Climate Change, Agriculture and Food Security* (CCAFS). | |
| Flagship 2 Natural Resource Management are part of the Africa RISING initiative in Ethiopia, which includes partners from WLE (CIAT, ILRI, ICRISAT) and outside of WLE (ILRI, IITA). Watershed research is also part of Africa RISING in West Africa. | International Livestock Research Institute (ILRI), International Institute of Tropical Agriculture (IITA). | |

| Brief description of the collaboration | Name(s) of collaborating CRP(s), Platform(s) or Center(s) | Optional: Value added, in a few words, e.g. scientific or efficiency benefits |
|---|---|---|
| Flagship 2 partners (ICARDA-ICRISAT-IFPRI-IWMI) contributed to the research agenda of the DryArc draft concept note 2019-2021: Proof of Concept of a New Interface of the CGIAR for the Drylands. | DryArc is a cross Center initiative which involves ICARDA (lead), ICRISAT, IWMI and IFPRI. | DryArc is aiming to target and scale existing CGIAR work in certain dryland regions and 'spillover' into new geographies where the CGIAR is not active and new donors are interested in supporting such work. |
| CGIAR Research Program on *Grains, Legumes and Dryland Cereals* (GLDC) Flagship 3 explores how farm level interventions impact household food security and incomes, while WLE Flagship 2 works at scales above the farm (watershed and landscape) to understand the tradeoffs, synergies and environmental impacts of interventions on many farms in a community and to evaluate the impacts of sustainable intensification at scale. | CGIAR Research Program on *Grains, Legumes and Dryland Cereals* (GLDC). | Evaluating the return on investment of a government scheme promoting landscape management, e.g. the example of Wollo in Ethiopia and the impacts of farmer managed contour bunding on water availability to a community. |
| WorldFish reviewed the Flagship 3 report on wastewater & aquaculture in Kumasi, Ghana. | WorldFish. | |
| Flagship 4 has collaborated extensively with the FISH CRP in 2018 with work in The Ayeyarwady Delta Myanmar on flood based farming systems and on reservoir fisheries and fisheries and water control infrastructure.<br><br>In 2018, Flagship 4 strengthened its collaboration with CGIAR Research Program on *Fish Agri-food Systems* (FISH) through collaborative work on water control infrastructure and fisheries. This included a jointly funded workshop on fisheries productivity in relation to human-made infrastructure and the publication of a joint brief on *Enhancing fisheries productivity through improved Management of reservoirs, dams and other water control structures.* In 2019 it is planned to further broaden the collaboration through a joint WLE-FISH-RICE focusing on research to create new knowledge and innovations on the sustainable intensification of rice-fish production systems. | CGIAR Research Program on *Fish Agri-food Systems* (FISH).<br><br>CGIAR Research Program on *Rice* (RICE). | |

| Brief description of the collaboration | Name(s) of collaborating CRP(s), Platform(s) or Center(s) | Optional: Value added, in a few words, e.g. scientific or efficiency benefits |
|---|---|---|
| Flagships 3 and 4 collaborated with CGIAR Research Program on *Agriculture for Nutrition and Health* (A4NH) on a joint session at Stockholm World Water Week on Water use, food security and disease – achieving healthy outcomes, which focused on how climate change and other drivers affect mosquito habitats and how to manage water accordingly, including infrastructure such as dams for irrigation. WLE also engaged with the new CGIAR Antimicrobial Resistance Hub to deliver a joint postdoctoral fellow position between the International Water Management Institute (IWMI) and the International Livestock Research Institute (ILRI). | International Livestock Research Institute (ILRI). | |
| FP4 continued to engage with PIM on integrated assessment modelling to understand the impact of irrigation development on food import dependency of Sub-Saharan Africa and with PIM and CCAFS on joint assessment of the mitigation space through integrated water-energy-food nexus modelling. | CGIAR Research Program on *Policies, Institutions and Markets* (PIM), CGIAR Research Program on *Climate Change, Agriculture and Food Security* (CCAFS). | |
| WLE seeks to leverage evidence-based policy advocacy geared towards sustainable intensification at the landscape scale. Support was initiated for an FTA project on forest restoration in Ethiopia in partnership we weForest to analyze and improve proposed restoration interventions. | CGIAR Research Program on *Roots, Tubers and Bananas* (RTB). | |
| Flagship 5 is working in partnership with the CGIAR Research Program on *Roots, Tubers and Bananas* (RTB) (CIAT, IITA and Wageningen) to establish a landscape case study in Uganda (Isingiro District). Work will get underway in 2019. Flagship 5 is also in discussion with partners in PIM about collaborating in India on the management on common land. Work will start in 2019. | CGIAR Research Program on *Roots, Tubers and Bananas* (RTB); CGIAR Research Program on *Policies, Institutions and Markets* (PIM). | |
| WLE co-hosted webinar on how to improve women's participation and benefits in irrigation schemes and the CRP Director participated in a key session at the Gender Platform event in Addis Abeba in September 2018. | CGIAR Gender Platform. | |

## Table 10: Monitoring, Evaluation, Learning and Impact Assessment (MELIA)

| Studies/ learning exercises planned for this year (from POWB) | Status | Type of study or activity | Comments/ links |
|---|---|---|---|
| Outcome Evaluation Of Research For Development Work Conducted In Ghana And Sri Lanka Under The Resource, Recovery And Reuse (RRR) Subprogram Of The CGIAR Research Program On Water, Land And Ecosystems (WLE). | Extended. | Program evaluation. | This evaluation was started in 2018 and will be completed by second quarter of 2019. |
| Results Framework Review. | Completed. | internal review. | WLE-wide review of outcomes and milestones reviewed and updated to better reflect project portfolio. |
| Review and implementation of results-based management system | Completed. | internal review. | WLE developed a set of criteria to assess proposed activities and to develop the portfolio of work per Flagship in 2019. These criteria were designed to be harmonized with the incoming CGIAR Performance Based Management standards. |
| Monitoring Evaluation and Learning support to projects | Completed. | internal review. | This review occurs annually to ensure that outcomes and impacts are captured and reported through MARLO. |
| Joint i-CRP integrative Tool Assessment | Changed. | learning workshop. | In partnership with the other integrated CRPs, WLE will co-facilitate a learning workshop, now planned for 2020. |

| | | | |
|---|---|---|---|
| Indicator Reference Sheets | Completed. | internal review. | CRP has now harmonized indicators with CGIAR reporting indicators. |
| Evaluation, outcome story and impact assessment planning | Completed. | internal review. | CRP completed prioritized evaluation review. |
| CRP Thematic Evaluation: TBA after consultation | Cancelled. | Program evaluation. | The CRP prioritized outcome evaluations. |
| Flagship Theory of Change Workshops | Extended. | Internal review. | The CRP will complete this task in 2019. |
| Outcome story planning and development | Completed. | Internal review. | Outcome stories were prioritized and appropriate evidence collected. |
| Gender, youth and inclusion outcome review | Extended. | Internal review. | The CRP hired a gender specialist in late 2018 and will extend this task into 2019. |
| Performance Evaluation of GFDRR-UK Aid Challenge Fund Open-Source, DIY Remote Weather Stations in Sri Lanka (not from POWB | Completed. | Program evaluation. | http://documents.worldbank.org/curated/en/767281548757537292/pdf/Performance-Evaluation-of-GFDRR-UK-Aid-Challenge-Fund-Open-Source-Remote-Weather-Stations.pdf |
| Scoping study of GMCC utilization in soil rehabilitation in Kenya and in Benin. It integrates 3 approaches: 1) scoping study involving visits to key institutions and understanding their perspectives, barriers to adoptions and efforts to revert, 2) focus group discussions with farmers to understand integration of GMCCs into farming systems and challenges faced and 3) literature review to understand soil-related benefits of GMCC integrations. | Completed. | Ex-post adoption study. | https://marlo.cgiar.org/projects/WLE/studySummary.do?studyID=1541&cycle=Reporting&year=2018 |

## Table 11: Update on Actions Taken in Response to Relevant Evaluations

While WLE has a slate of ongoing and planned evaluations in 2019 and beyond, there were no formal management responses to evaluations in 2018.

| Name of evaluation | Recommendation number | Text of recommendation | Status of response to this recommendation | Concrete actions taken for this recommendation. | By whom | When | Comments |
|---|---|---|---|---|---|---|---|
| N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A |

## Table 12: Examples of W1/2 Use in this reporting period (2018)

The following are a few examples from each Flagship of key activities and deliverables funded through W1/W2 in 2018

| FP | Description | Category of use: |
|---|---|---|
| 1 | Land degradation assessments using multiscale approaches for agroecosystem restoration and improved food security, for Kenya and Burkina Faso. | Research. |
| 1 | Data sets collected for understanding how gender is approached in land restoration initiatives and what should be the most appropriate entry points of WLE regarding gender considerations. | Research. |
| 1 | Pilot-testing of land use alternatives for restoration and climate change adaptation in Colombia and Peru, and farmer pilot on financial incentives for Sustainable Productive Transformation, created by public second-level bank. | Research and delivery. |
| 1 | WLE/CIAT has served the Intergovernmental Panel on Biodiversity and Ecosystem Services (IPBES), as Coordinating Lead Author, of a regional assessment about the state of Africa's ecosystems. | Policy. |

| FP | Description | Category of use: |
|---|---|---|
| 1 | Soil fertility management in Babati (Tanzania): A practical guide on good agricultural management practices in smallholder farming systems. | Capacity development. |
| 1 | Soil carbon-yield relationships analyzed in conservation agriculture long-term trials, in Kenya. | Research. |
| 1 | Training on how to use biodiversity, including specific varieties of Tarwi and potato, for land restoration in the highlands of Bolivia. | Capacity development. |
| 1 | Tanzanian Climate Change Learning Alliances completed a list of priority interventions for combating land degradation and targeted required support from the Tanzanian Government (Financing) as well as scientific expert support for fine-tuning interventions. | Policy and partnerships. |
| 1 | Infrared spectroscopy proved to develop empirical models to determine soil degradation. Showed to be a valuable, fast and comparably cheap way of predicting suitable soil chemical variables and soil health indicators, providing basis for rapid soil health indicators. | Research. |
| 1 | Assessment of options for enhancing the adoption of green manure cover crops in Africa. | Research. |
| 1 | Maps of land degradation, restoration strategies and cost-benefit conducted for Kenya, Malawi and Uganda (commissioned by the World Bank). | Research. |
| 1 | Evaluation of land restoration initiatives in Ethiopia and action points discussed with the Ministry of Forest, Environment and Climate change (MOFECC). | Research and partnerships. |
| 1 | Digital soil mapping techniques to determine current and soil organic carbon (SOC) sequestration potential under different management practices in the Murugusi watershed (Kenya). | Research. |
| 1 | WLE/IFPRI with other authors studied "The cost of carbon sequestration in different regions of the world". | Research. |
| 1 | Report analyzing gender-disaggregated panel data showing how land management practices differed across gender and its impact on household welfare. | Gender. |

| FP | Description | Category of use: |
|---|---|---|
| 1 | Study on changes in the socio-economic status of women exposed to restoration interventions in two study sites; and data collection for at least three countries as the basis to study how gender is addressed in restoration initiatives. | Gender. |
| 2 | Qualitative surveys to understand the effect of irrigation on women's empowerment. | Gender. |
| 2 | Research involving academics from University for Development Studies in Tamale, Ghana. | Research. |
| 2 | Suitability mapping framework for solar photovoltaic pumps for smallholder farmers in sub-Saharan Africa, and accompanying brief. | Research, Partnerships. |
| 2 | Agricultural Water Management solar business model for Ethiopia. | Research. |
| 2 | Stockholm World Water Week: Small Scale Irrigation and ecosystem health. | Outreach. |
| 2 | Enhancing the regional policies and regulatory framework for Irrigation Water Users Associations (IWUAs) in the Southern Nations, Nationalities and Peoples' Regional (SNNPR) State: lessons from Tigray/Amhara regions within Ethiopia and some global experiences. | Research. |
| 2 | Gender Dimensions of Community-based Groundwater Governance in Ethiopia: Using Citizen Science as an Entry Point. | Research. |
| 2 | Business model scenarios and suitability for exclosures in Ethiopia. | Research. |
| 2 | Water User's Associations synthesis paper. | Research. |
| 2 | Gender in Irrigation Learning and Improvement Tool (GILIT). | Capdev/Gender. |
| 2 | How to Support Effective and Inclusive Irrigation. Water Users' Associations: A Guide for Practitioners (Research for Development Learning Series). | Capdev. |
| 2 | Assessment of scope for resilient crop yields through rainwater management under rainfall variability in sub-Saharan Africa | Research. |

| FP | Description | Category of use: |
|---|---|---|
| 2 | Review on the evidence of transformed landscape of Ethiopia, including water implications related to extent of watershed management and small reservoirs. | Research. |
| 2 | Irrigated area mapping for Ethiopia. | Research/partnership. |
| 2 | Costs of Investing in Ecosystem Rehabilitation versus Humanitarian Aid: A Case Study of the Bale Eco-Region. | Research. |
| 2 | Cost-Effectiveness of Natural Resource Management with and without Family Planning Interventions as a Means of Achieving Sustainable Resource Use in the Bale Eco-Region in Oromia. | Research. |
| 2 | Investigation of the modalities for an innovative financing mechanism for participatory natural resource management, in the Bale eco-region, Ethiopia. | Research. |
| 2 | Solar Irrigation Baseline Survey and on-going investment from Agricultural Transformation Agency, Ethiopia, in solar irrigation. | Research. |
| 2 | Small Scale Irrigation and Rural livelihoods study to analyze and map meteorological drought in Awash Basin and to collect socio-economic data for vulnerability to drought in the basin. | Research/youth/capacity development. |
| 2 | Gender dimensions of India watershed implementation programs. This research examines gender norms and gender relations in an agricultural watershed project in the Parasai-Sindh watershed, Bundelkhand Region, Central India. | Gender. |
| 3 | Resource Recovery and Reuse reports and Business Model book. | CapDev. |
| 3 | Resource Recovery and Reuse curriculum development with universities and of online courses (co-funded by BMZ). | CapDev. |
| 3 | Partnership development for R4D uptake in South Asia and globally (long list available). | Partnerships. |
| 3 | Facilitation of a Citizen Charter on Food Policy by the municipality of Quito. | Policy. |
| 3 | Internship program at IWMI for students working on Rural Urban Linkages / Resource Recovery and Reuse. | Capdev. |

| FP | Description | Category of use: |
|---|---|---|
| 4 | Supplementing bilateral funds: i) the development and implementation of disaster risk management tools in South Asia; ii) Flood and inundation mapping in the Ayeyarwady Delta; iii) Support to national level roll out of SDGs. | Research. |
| 4 | Evaluation of Index Based Flood Insurance impacts for the poor, landless and women; writing and publishing synthesis pieces relating to important gender issues. | Gender. |
| 4 | Engagement in Stockholm World Water Week, campaign on nature-based solutions as well as activities of the Groundwater Solutions Initiative for Policy and Practice and a series of Water-Energy-Food Nexus events. | Delivery. |
| 4 | Contributions to Ramsar Scientific and Technical Review Panel (STRP) as well as Intergovernmental Platform for Biodiversity and Ecosystem Services (IPBES) and the Scientific Advisory Panel of the Japanese Space Agency (JAXA) ALOS Kyoto and Carbon Initiative. | Policy. |
| 4 | Participation in a series of Nexus related conferences and engagements, including at the United Nations. | Delivery. |
| 4 | Workshop and exchange visit for urban planners from the provinces of Lao PDR to Thailand and development of an unsolicited proposal submitted to USAID for funding*: Livable Laos Cities: Green Infrastructure for Flood and Drought Mitigation, plus development*. | Pre-start-up. |
| 5 | Literature review and working paper on decision support for natural resource management. Initial version of a Natural Resources Management evidence framework (Bioversity led). | Pre-start up. |
| 5 | Review of Natural Resources Management policies and programs in East Africa (IFPRI-led). | Pre-start up. |
| 5 | Stakeholder workshop in Desa Forest, Tigray, Ethiopia to scope decision analysis (ICRAF). | Partnerships. |
| 5 | Development of stakeholder survey questionnaire. | Pre-start up. |
| All | To Support Management and Synthesis Functions of all Flagships. Extensive program support including Strategic Management and Partnerships; Coordination and Administration; Communications, Knowledge Management; Monitoring, Evaluation and Learning; and Gender Youth and Inclusivity. | Delivery. |

## Table 13: CRP Financial Report*

All Figures are in USD 000's.

| Category | Planned budget 2018 | | | | Actual expenditure 2018* | | | Difference | | | Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | W1/2 2017 Carry Over | W1/2 2018 | W3/ bilateral | Total | W1/2 | W3/ bilateral | Total | W1/2 | W3/ bilateral | Total | |
| FP1 | -23 | 1,762 | 6,840 | 8,579 | 1,674 | 9,050 | 10,724 | 65 | -2,210 | -2,145 | |
| FP2 | 102 | 1,580 | 10,661 | 12,343 | 1,688 | 9,557 | 11,245 | -6 | 1,104 | 1,098 | |
| FP3 | 111 | 950 | 1,995 | 3,056 | 992 | 1,827 | 2,819 | 69 | 168 | 237 | |
| FP4 | 50 | 1,394 | 3,847 | 5,291 | 1,398 | 4,257 | 5,655 | 46 | -410 | -364 | |
| FP5 | | 550 | 2,189 | 2,739 | 349 | 2,422 | 2,771 | 201 | -233 | -32 | |
| Strategic Competitive Research Grant | | 200 | 0 | 200 | | | 0 | 200 | 0 | 200 | Funds allocated to SAI Commission, starting 2019. |
| CRP Management & Support | -43 | 1,129 | 0 | 1,086 | 1,179 | 0 | 1,179 | -93 | 0 | -93 | Management & Governance; Monitoring and Evaluation; Communications, Engagement and Knowledge Management. |
| **SubTotal** | **197** | **7,565** | **25,532** | **33,294** | **7,280** | **27,113** | **34,393** | **482** | **-1,581** | **-1,099** | |
| Research Grants in case of Stretch Funding | | 458 | 0 | 458 | 0 | 0 | 0 | 458 | 0 | 458 | WLE budgeted on the basis of $7.6m, based on 2018 Financial Plan guidance. |
| **Total** | **197** | **8,023** | **25,532** | **33,752** | **7,280** | **27,113** | **34,393** | **940** | **-1,581** | **-641** | |

*Source: Lead and participating Center financial reports. Audit pending.