

Farmer-led Irrigation Development: Implementation Across Africa, and Vision Beyond

Water in Agriculture Global Solutions Group Fiscal Year 2023





Farmer-led Irrigation Development for Water and Food Security

From Saroj Kumar Jha, Global Director for Water

Farmer-led Irrigation Development (FLID) is impactful because it works around our ultimate clients: farmers. The FLID concept puts "people" in the center of development, as does the operational work spreading across Africa. Years ago, when I began my work in civil service in India, I was particularly interested in helping farmers sustainably develop their lands, operate irrigation schemes, and organize marketing for their produce. Those memories are close to my heart, especially because those efforts and impacts centered around people. Similarly, FLID is about putting farmers in control, turning governments into facilitators, and mobilizing private contributions to serve farmers' needs.

FLID has tremendous potential to address the gap in the water needed for food security and to boost farmers' resilience to climate change.

It supports farmers in developing their own affordable, reliable, and sustainable irrigation, helping to secure production through drought caused by climate change, translating into improved livelihoods and resilience. As mentioned by President Ajay Banga during a recent Town Hall, in the time of climate change, the development story centers around farmers. A good example is from the Democratic Republic of the Congo where, this year, the FLID diagnostic fed into the Country Climate and Development Report (CCDR), and served as the basis for determining the impacts of climate change on farmers, tailoring the irrigation strategies for climate resilience. FLID offers standardized, problem-driven, impactful interventions for sustainable and inclusive irrigation development. With more than ten countries advancing in the FLID operational pipeline, we continue to realize the benefits that FLID brings in terms of shorter investment pipelines with faster results, increased ownership, and inclusivity. Our clients appreciate the bottom-up approach of developing irrigation where farmers are the drivers of the investments while leveraging the expertise and funding of the private sector. Governments are playing a key role as facilitators, helping their constituent farmers access resources in knowledge, financing, and value chains. This ecosystem—with dynamic interaction between farmers, government officials, equipment suppliers, service providers, financial institutions, market actors and development partners—would not have been organically mobilized without FLID.

We have earmarked more than 450 million USD for FLID interventions across Africa, which are expected to leverage 77 million USD of farmers' money. This is expected to translate into **more than 83,000 farmers accessing irrigation over more than 50,000 ha**.

As FLID continues to grow across and beyond Africa, so does the team within the World Bank Group. We count on the FLID community, spanning the Water Global Practice, the Agriculture and Food Global Practice, the Environment and Natural Resources Global Practice, the Water Resources Group 2030, and IFC. It is our enthusiastic staff who keep the momentum and vibrancy of this initiative, and support clients to empower farmers to build climate resilience and food security.



As knowledge distills, interventions evolve, and results incubated on the ground, let us dive into each country's profile to harvest the progress and plan forward.





UGANDA

Best-fit affordable technology rollout at scale

Operation: Intergovernmental Fiscal Transfer, UgIFT (P160250 & P172868) **Instrument:** P4R **Period:** 2020-2024

IDA amount: 500 million USD, of which 50 million USD earmarked for FLID, leveraging up to 36 million USD of farmers' money **FLID target:** 6,000 to 14,000 farmers for the development of 10,000 ha of newly irrigated land

Irrigation as a recent priority

Rainfall in Uganda has been historically sufficient to sustain rainfed agriculture. In the last decade, unreliable precipitation, coupled with severe droughts, triggered increasing interest in irrigation. The National Irrigation Policy sets an **ambitious** target of 1,500,000 ha irrigated by 2040 – against the current 77,000 ha. However, public resources and implementation capacity strongly constrain the achievement of this goal, demonstrating the need to identify cheaper, faster, and more inclusive approaches to develop irrigation.

Many smallholder farmers in Uganda have easy access to water nearby, which allows for **micro-scale irrigation** – meaning irrigating a small plot with an individual pump, plus a hose or sprinklers. Micro-scale irrigation makes sense because of its **low cost per ha** (less than half compared to large-scale irrigation), **fast development** (only a few months from concept to installation), **less sensitivity to land tenure issues** (mobile systems), and **increased sustainability** (easier to operate and maintain).

Smallholder farmers in Uganda face challenges in developing micro-scale irrigation by themselves, as they are constrained by **weak knowledge** and **unaffordable equipment** (30 percent to 50 percent higher costs than in Kenya), exacerbated by a lack of financing options. In 2020, the Government launched the Micro-scale Irrigation Program, which supports farmers through partial subsidy, facilitated access to credit, awareness raising events, demonstration sites, and

Interventions P P P P P Farmers Field Schools.

FY23 achievements

45,000 smallholder farmers expressed interest in the Program from all across the country, doubling the number compared to FY22. Government staff concluded **13,000 farm visits**, where they confirmed technical eligibility, allowing the farmers to choose their preferred irrigation equipment, and reducing transaction costs for

irrigation equipment suppliers. A total of 3,300 tenders were advertised for procurement of irrigation equipment. The average cost of irrigation equipment was 6,700 USD/ha, of which 40 percent (2,800 USD/ha) was paid by the farmers. Indeed, 2.4 million USD was raised in farmers' contribution, which will top up public resources in the support of additional farmers. More than 1,000 farmers acquired irrigation equipment, a tenfold increase compared to FY22. A total of 112 irrigation demonstration sites were installed, with an additional 260 undergoing installation.







What to look forward to in FY24

Now that the processes are well established countrywide, the Micro-scale Irrigation Program may well produce impressive impacts at scale, depending on the availability of public funds. Should the expected 18 million USD being budgeted for FY24 materialize, it would enable the equipping of at least **an additional 3,500 farmers** with irrigation. This would raise **10 million USD in farmers' co-payment**, which would re-enter the Program and support the purchase of equipment for **an additional 2,000 farmers** – thus totaling **5,500 farmers in only one year.**

To receive more info, reach out to: **Harriet Nattabi** (Water GP) hnattabi@worldbank.org





Learn more:

- Read about Uganda: Adaptive re-planning in the Micro-scale Irrigation Program on page 26.
- Read about South-South Learning: From Madagascar to Uganda, and From Uganda to Ghana on pages 28-29.
- Watch the video on the latest achievements of Micro-scale Irrigation Program at https://www.youtube.com/ watch?v=wVhVdUR9Wvc.
- Watch the interview with farmers who benefitted from the Micro-scale Irrigation Program at https://www.youtube.com/ watch?v=zbV3w5nhpqE.
- Visit the Micro-scale Irrigation Development Program website at https:// www.agriculture.go.ug/micro-scaleirrigation-program/.
- Scan to download IrriTrack from the Google PlayStore:



NIGERIA

Private sector bridging the gap to affordable irrigation

Operation: Agro-Climatic Resilience in Semi-Arid Landscapes Project, ACReSAL (P175237)
Instrument: IPF with results-based financing
Period: 2021-2027
IDA Amount: 700 million USD, of which 54 million USD earmarked for FLID, leveraging 40 million USD of farmers' money
FLID target: 20,000 farmers for the development of 10,000 ha of newly irrigated land

Small-scale irrigation reaching deep rural areas

In Nigeria, the Government recognizes the potential of irrigation expansion – **over five million ha** of farmland could be profitably irrigated using groundwater. Specifically, in 2.6 million ha of these areas, **solar water pumps represent the least-cost solution**. To tap into this potential, the Government has made investments in **small-scale irrigation** as part of the 30-year long **FADAMA project**.

The expansion of irrigation will depend on catalyzing farmers' actions, which are constrained by limited access to irrigation technology. Solar irrigation equipment can hardly be found in deep rural areas – and, when it is available, the **upfront costs are usually much higher** than the farmers can afford.

The private sector can play a key role in bridging this gap. A new generation of good quality and more affordable **solar water pumps** is being sold using a "pay-as-you-go" business model. In this scenario, the suppliers provide not only irrigation equipment, but also **affordable financing** as well as **professional installation**, **warranties**, **after-sales service**, and **advisory support**. However, these experiences are still at pilot stage, and would need to be scaled up to achieve desirable impacts.

The Agro-Climatic Resilience in Semi-Arid Landscapes Project (ACReSAL) aims to enhance farmers' access to irrigation information, products and services, credit, and agricultural markets. The project started with a watershed planning exercise, including groundwater resources assessment, to identify micro-watersheds and local government areas with high FLID potential in



the north of Nigeria.





ACReSAL supported several **FLID training events** with the project management unit staff at federal and state levels. The objective of the training was to familiarize the implementation team with the innovative **results-based financing (RBF)** model. As a key feature of the project, RBF will support suppliers to establish the distribution network, and enable them to provide equipment at an affordable price.

What to look forward to in FY24

The project will roll out FLID awareness campaigns to stimulate demand for irrigation in the selected states. In parallel, it will establish the RBF facility to recruit and accredit irrigation suppliers and provide subsidies with tracked performance. A digital multi-stakeholder platform will be created to link farmers with technology, inputs, and credit, and in the meantime to track grant applications, verification, and the repayment for the irrigation suppliers. A multi-stakeholder workshop is scheduled for October 2023 to strengthen the partnership among farmers and irrigation suppliers as well as federal and state-level ministries and agencies.

The project team is planning a **study tour** to learn from the Uganda Micro-scale Irrigation Program. The study tour will be an opportunity for the clients and the World Bank task team to learn about design process and implementation options for FLID, and to understand the role of local government officers, irrigation equipment suppliers and financial institutions in facilitating irrigation development.

To receive more info on FLID activities under ACReSAL, reach out to:

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Learn more:

Read about Making Sense of FLID Financing: Nigeria's ACReSAL at the results-based knowledge frontline on page 25.



ANGOLA

Farmer field schools as the backbone of irrigation development

Operation: Smallholder Agricultural Transformation Project, MOSAP3 (P177305) Instrument: IPF Period: 2022-2029 IDA Amount: 300 million USD, of which 20 million USD earmarked for FLID FLID target: 15,600 farmers for the development of over 6,200 ha of irrigated land by 2029

Small-scale irrigation development for climate resilience

With its most severe drought in 40 years, Angola faces growing climate risks. National agricultural output is well below demand, and the country imports more than half of its food. Agriculture, though with low productivity, is the largest source of jobs and livelihoods. However, incomes in the sector remain low due to the predominance of low-skilled labor – three out of four farmers have less than primary education.

Smallholder farmers account for 80 percent of production and 90 percent of agricultural land. However, they have poor access to water resources. Irrigation plays a modest role: **340,000 ha** were equipped for irrigation in 2005, but only 80,000 ha are currently in operation.

The Smallholder Agricultural Transformation Project (MOSAP3) supports smallholder producers to increase agricultural productivity and adopt climate resilient technologies and practices. The project uses Farmer Field Schools (FFS) to drive climate-smart technology uptake. The FFS model aims to strengthen smallholders' knowledge and skills in areas such as productivity, climate-responsive agricultural practices and technologies, small community water stocks for irrigation, marketing, business plan development, and postharvest management and valueaddition. Farmers graduating from the FFS will become eligible for a partial subsidy to purchase selected technologies. Specifically when it comes to water, the project promotes individual and small group irrigation development, adopting a farmer-led approach, which addresses barriers including types of farming systems, water resource availability, farmers' financial



capacity, and their access to technologies, knowledge, and value chains.



FY23 achievements

MOSAP3 became effective in January 2023. The client started the preparation of FLID implementation guidelines, including the definition of the eligibility criteria for producers, as well as the maximum initial investment caps and the co-financing share from the beneficiaries.

What to look forward to in FY24

In FY24, the FLID implementation guidelines will be completed and adopted. Farmers having graduated from FFS under MOSAP3 will be thus in the position to apply for the partial subsidy for irrigation development. FFS curriculum specific for irrigated agriculture will be developed.

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MAURITANIA

Partial subsidy to catalyze private irrigation

Operation: Sahel Irrigation Initiative Support Project, SIIP (P154482) Instrument: IPF

Period: 2018-2024

IDA Amount: 170 million USD across 6 countries – 25 million USD for Mauritania, of which 2 million USD earmarked for FLID to be leveraged by 0.7 million USD from farmers money

FLID target: 150 farmers for the development of 220 ha of newly irrigated land

Government's first attempt to catalyze small-scale private irrigation

In Mauritania, community irrigation development is the go-to model in Government's support. Although there is no established implementation modality yet, the **Government recognized the potential of small-scale individual irrigation**. Once exposed to the FLID concept, the Government decided to take a leap to catalyze individual irrigation development. This is because such modality leads to further opportunity for smallholder entrepreneurial farmers, including women, due to its easier land tenure requirements and the possibility of producing high value vegetable crops, which translates into high profitability.

Recognizing access to finance as the main constraint to individual farmer's action in irrigation development, the Government set up a **partial subsidy scheme**. Two windows were designed – one for smallholder farmers (*Promoteurs Familiaux*) farming two ha or less, and another for medium farmers (*Promoteurs Privés Moyens*) farming five to eight ha. The requirement of **a sound business plan as a key criteria** is crucial to ensure that the project helps overcome market constraints. Although currently at pilot scale, this project should demonstrate the potential of private irrigation development in Mauritania and across



the Sahel region.



FY23 achievements

Following a major radio advertisement campaign, 500 farmers came forward in just a few weeks. A total of 82 farmers were retained to benefit from financing support, of which 69 smallholder farmers (totaling 65 ha) and 13 medium farmers (totaling 81 ha). To date, 60 ha have already been equipped. The unit costs averaged 4,600 USD/ha for the smallholder farmers (of which 33% paid by the farmer), and 20,000 USD/ha for the medium farmers (of which 10% paid by the farmer).

What to look forward to in FY24

The project will complete installation of the remaining 86 ha. Already ongoing irrigation is expected to promote higher crop diversification, the further introduction of high value horticultural crops such as onions, tomatoes and carrots, and an overall increase in farmers' livelihood.

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SOMALIA

Innovative water infrastructure solutions for climate resilience

Operation: Somalia Water for Agro-pastoral Productivity and Resilience Project, Biyoole (P167826) **Instrument:** IPF **Period:** 2019-2023 **IDA Amount:** 32 million USD Operation: Somalia Water for Rural Resilience Project, Barwaaqo (P177627) Instrument: IPF Period: 2022-2028 IDA Amount: 70 million USD **Operation:** Food Systems Resilience Program for Eastern and Southern Africa, FSRP (P178566) **Instrument:** IPF **Period:** 2022-2029 **Trust Fund Amount:** 788 million USD

Sand dams as a climate resilient pathway for Somalia's agriculture

Somalia has been experiencing more extreme climate shocks in recent decades, leading to a growing crisis in food security. Roughly half of the Somali population lives in rural areas, earning their living from animal herding and crop cultivation. Their livelihoods depend on an increasingly narrow and fragile natural resource base in an arid and semi-arid climate.

Agriculture and livestock are significant to Somalia's GDP, with respective contributions of 20 percent and 57 percent. They are the largest rural employers and the largest sources of export earnings, but have low productivity rates due to heavy reliance on rainfall, lack of value chain development, and land and soil degradation. Somalia's National Development Plan has prioritized pathways to revive the livestock and agriculture sectors through investments in water harvesting and storage infrastructure, access to credit and extension services, and promotion of climate-smart agriculture. In 2015, the Water for Agropastoral Livelihoods project (WALP) was piloted to test the possibilities of **storing water in sand rivers known as "wadis"** and proved that building sand and subsurface dams in a dryland environment was feasible and can significantly improve human health and well-being. To carry the baton forward, a follow-up project – the **Water for Agro-pastoral Productivity and Resilience Project (Biyoole)** – was rolled out to improve access to multiple-use water resources, including small-scale irrigation.





Sand dam wadi in Somalia



In FY23, the Biyoole project was able to demonstrate the viability of expanding access to multiuse water infrastructure in rural drylands of Somalia. Close to 1,000 farms were reached and farmers were trained on various agronomic, water harvesting, and irrigated agriculture practices.

What to look forward to in FY24

In this fragility, conflict, and violence affected country, a new generation project – the Somalia Water for Rural Resilience Project (Barwaaqo) – is expected to sustain and further develop water harvesting and irrigated agriculture. It aims to continuously scale up water, agriculture, and environmental services for rural communities in Somalia's drylands. The Food Systems Resilience Program (FSRP) is a further opportunity for Somalia, supporting the country in enhancing water availability for crop and livestock production. The program works with common interest groups to identify and prioritize needed hardware investments. It will develop multipurpose water harvesting and water catchment structures, including solar pumps, irrigation networks extending from reservoirs to farmers' fields, and conservation agriculture technologies such as drip irrigation. Knowledge exchange and field learning are planned to help the clients learn from neighboring countries where small-scale irrigation is practiced using similar water sources. Building on the success of Biyoole, the projects will establish demonstration sites and farmer field schools to raise awareness of the benefits of irrigation.

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Learn more:

Check out the project dashboard for the latest results at: https://app.powerbi.com/view?r=eyJrljoiYzhlNWFkMmEt ZmUz Ny00 N2M1LWJhODMtMWUwMGQ3YTdlYTg1liwid Cl6ImI5NTFIMDMwLW FmMzgtNDBkNy1iZDBiLWZiZWQz Yzg3NjUzYSIsImMiOjZ9&pageName =ReportSection93c0 ef934198c97908b0

ETHIOPIA

Building a solid foundation for micro-scale irrigation roll-out

Operation: Food Systems Resilience Program for Eastern and Southern Africa, FSRP (P178566) **Instrument:** IPF

Period: 2022-2029

IDA amount: Ethiopia total: 750 million USD, out of which the Resilient Small-Scale Irrigation Development and Management part is 236.4 million USD

FLID target: Total 40,000 ha irrigated, subdivided into: 15,000 ha under rehabilitation; 10,000 ha to be developed; and 15,000 ha under Micro-scale Irrigation

Advancing micro-scale irrigation in Ethiopia

Agriculture is the dominant sector in the Ethiopian economy, comprising 36 percent of GDP, 70 percent of employment, and 80 percent of exports. **Smallholder farmers supply over 90 percent of the country's crop production from rainfed farms.** These farmers are exposed to impacts of climate variability (such as delayed onset of rains) and extreme events (such as floods and, particularly, droughts). Irrigated agriculture is given prominence to contribute to climate resilience, food security, and employment generation. Previous multistakeholder dialogues led by the Ministry of Agriculture and the Agricultural Transformation Agency (ATA) convened stakeholders to identify barriers to micro-scale irrigation technologies and practices in Ethiopia, and explored opportunities of expanding micro- and small-scale irrigation.

Recent studies show that seven million ha are available as irrigable land, of which two million ha can be irrigated using shallow ground water. The studies also show that, due to an increasing demand for irrigated crops, farmers have taken initiatives to divert stream flows or acquire diesel operated pumps to tap ground water from shallow wells and boreholes. On the other hand, the high cost of fuel is driving farmers to seek alternative solutions such as solar powered pumps and piped distribution systems. However, farmers will need financial and technical support to cover the initial high cost of solar pumps and sustainably operate the technology. Support in market linkages for inputs (including irrigation equipment)



and outputs is also needed.



The Food Systems Resilience Program (FSRP) aims to tap into this opportunity by supporting micro-scale farmers – who farm from 0.2 ha (Individual) up to 20 ha (for groups) – to procure simple micro-irrigation technologies and utilize easily available water sources for irrigation. The program intends to provide a **government partial subsidy** and facilitate **access to credit from financing institutions** for farmers to access such technologies.





The World Bank and 2030WRG participated in **multistakeholder dialogues** organized by IWMI, USAID, and the Ministry of Agriculture to discuss opportunities for FLID in Ethiopia, sharing regional experiences in the implementation of FLID, and to identify key barriers to scaling FLID.

The Ministry of Agriculture's Federal Project Coordination Unit developed **Implementation and Technical Guidelines** for micro-scale irrigation. The guidelines describe the implementation process, the stakeholders and their responsibilities, and define the activity timelines.

What to look forward to in FY24

The FSRP aims to establish a solid foundation for the roll-out of FLID by streamlining activities such as:

- (i) updating the existing implementation guidelines to reflect recent discussions;
- (ii) jointly identifying regions and respective woredas with better resource potential for micro-scale irrigation for implementation of FLID;
- (iii) training project staff at the woreda level;
- (iv) designing procurement modalities for contracting service providers to supply, install, and maintain the micro-scale irrigation;
- (v) organizing and training local youth groups interested in establishing agribusiness enterprises; and
- (vi) mapping out the financial arrangements for co-financing from financial institutions and matching grants.

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MADAGASCAR

FLID as an agile complement to irrigation schemes

Operation: Rural Livelihood Productivity and Resilience Project (P175269) Instrument: IPF Period: 2023-2027 IDA Amount: 200 million USD FLID target: 1,000 ha across the two high-potential regions: Alaotra-Mangoro and Sofia





Farmer-led irrigation development to complement scheme development

Madagascar is facing significant challenges in combating poverty and nutrition insecurity. The country's water resources have been heavily impacted by environmental degradation and climate change. Poverty is severe in the semi-arid southern region, and is compounded by extreme droughts and famine, and more recently, debilitating floods. Nationwide, low agricultural productivity prevails, and farmers are highly vulnerable to situations such as cyclones, droughts, and market instability.

The Government has identified **irrigation intensification** and **diversification** as strategies to address the above problems. This involves investing in research and extension services, improving irrigation infrastructure, and identifying suitable alternative crops. However, most of the irrigation areas have suffered from degraded infrastructure, unreliable water supply and weak irrigation governance.

Micro-irrigation barely features in the current planning and investment profile of the Government and was studied for the first time in six regions in 2022. The results showed that it presents not only widespread activity, but real potential as a complementary solution to scheme rehabilitation and agricultural intensification.

In FY23, following the earlier **FLID diagnostic** in six diverse provinces across Madagascar, there were two valuable outcomes.

First, tailored options for west and south Madagascar to support microirrigation expansion were included in the Rural Livelihood Productivity and Resilience Project (RLPRP). The project has included support for FLID through a matching grant arrangement that increases irrigation equipment affordability. Under this project, micro-irrigation uptake is expected to help achieve crop diversification by **enabling the production of shortseason horticultural cash crops in the counter season, when canal irrigation supplies are typically low**. FLID expansion will also contribute to increased food diversity, with better nutrition outcomes.

Secondly, **a forward-looking policy note was developed**, and articulated why and how further investments supporting FLID could help the Government achieve its agricultural and climate-resilience goals.



Learn more:

Read about South-South Learning: From Madagascar to Uganda: E-voucher and Matching Grant study tour on page 28.



What to look forward to in FY24

The initial FLID diagnostic inferred strong growth potential at the national level but only covered six regions, with two of the target regions – Alaotra Mangoro and Sofia - identified with high potential for FLID expansion. During the rollout of the RLPRP, additional scoping studies will be mobilized to identify more areas with high potential. These studies will particularly target factors of shallow groundwater, surface water availability in the counter season, along with favorable road and market access. These studies and experiences will inform more precise targeting of future FLID support interventions.

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KENYA FLID goes mainstream

Operation: National Agricultural Value Chain Development Project (NAVCDP) (P176758) Instrument: IPF Period: 2022-2027 IDA Amount: 250 million USD, of which 20 million USD earmarked for FLID FLID target: 4,000 farmers for the development of 4,000 ha of newly irrigated land

Ambitious targets and new directions

The agriculture sector in Kenya contributes 60 percent of the national GDP and employs more than 40 percent of the population. An impressive **threequarters of crop production takes place on farms of less than three ha**. Irrigated agriculture is at the top of Kenya Vision 2030, with the 2022 National Irrigation Sector Strategy targeting expansion from 216,000 ha to 600,000 ha of irrigated land by 2030. Increased productivity, and technical and financial sustainability are top priorities alongside expansion.

To achieve this, the whole irrigation sector

 including all forms of irrigation expansion and intensification – will need to escalate sharply, from just 6,000 ha per year in 2010–2020 to 40,000 ha per year in 2020–2030. Addressing such a challenge involves navigating a path of unconventional business strategies, and FLID plays a crucial role in



this endeavor.



National equipped area and target irrigation growth to 2030





The National Agricultural Value-Chain Project (NAVCDP) that commenced in 2022 follows on from two value-chain and agricultural livelihoods support projects that are currently being completed in Kenya – the National Agricultural and Rural Inclusive Growth Project (P153349) and the Kenya Climate Smart Agriculture Project (P154784). These projects included the rehabilitation or construction of approximately 500 small water storage structures that will enable micro-irrigation. They also linked potential irrigation farmers to suppliers, with pay-as-you-go systems in demand. The progress is impressive: **79 micro-irrigation demonstration farms were established**, and **246 groups and 5,149 farmers purchased their irrigation equipment from private-sector entities**.



The **multi-stakeholder diagnostic**, undertaken last year by the Ministry of Water Sanitation and Irrigation and the World Bank, showed that scaling up the FLID approach presents a huge potential to accelerate access to irrigation for smallholders in Kenya. The diagnostic identified financing, the knowledge system, and access to markets as the major obstacles for smallholder farmers to take the initiative in irrigation. In the NAVCDP, FLID is enabled through a series of interventions, with 20 million USD funding support, including: institutional building of the **County Irrigation Development Units; access to individual loans** through Savings and Credit Cooperative Organizations (SACCOs); **networking with suppliers and financial institutions** through FLID innovation forums; and **farm pond excavation subsidies** via county construction contracts.

What to look forward to in FY24

Under NAVCDP and the Food Security Resilience Program (FRSP), a survey has commenced on the current extent of irrigation developed through FLID processes, along with basic farmer characteristics. Data will be collected across the whole of Kenya. Complemented by a separate remote sensing study on water accounting in Kenya, this survey will, for the first time, obtain data on how much irrigation is actually established by farmers themselves.

FLID has been mainstreamed into the strategic investment planning in Kenya. The 2022 FLID diagnostic, along with subsequent lessons-learned exercises by the Water GP, raised real high-level Government interest in new and better ways of achieving the national agricultural water goals. The relatively low unit cost, the reality of mobilizing private capital from farmers, and the short implementation timelines are the motivating factors. These projects have provided a platform of evidence and practice such that FLID is now included as one of the main pathways in irrigation sector investment planning. This will be further driven by the National Irrigation Authority in FY24.

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COMOROS

Boosting FLID with water security using runoff harvesting 'impluviums'

Operation: Food Systems Resilience Program for Eastern and Southern Africa (FSRP) – Phase 3 (P177816) Instrument: IPF Period: 2023-2029 IDA Commitment: 603 million USD, with 15 million USD earmarked for FLID FLID target: 600 ha of annual cropped irrigation area

High food trade deficit in the island economy

There is high demand for agricultural water to support market-crops. The agricultural sector is essential for the Comorian economy but has fallen in the share of production to an estimated 30 percent of GDP. Comoros falls low in regional food sufficiency, with the share of the population with insufficient food being 21 percent, lower than Malawi and Kenya. Total arable area is 84,000 ha which is less than half of the total islands area, but only 300 ha of land, mostly vegetables, is thought to be irrigated. Profitable cash crops like vanilla increasingly need supplementary irrigation to achieve reasonable yields. However, irrigation water sources are largely absent, requiring water harvesting.

The majority of agricultural production is rainfed. This is because developing irrigation is challenging given the natural resources realities: slopes are steep; groundwater is deep; the young volcanic soils have extremely low water holding capacity and high infiltration rates, requiring frequent water application intervals; suitable dam sites are absent. On the larger Anjouan and Mohéli islands, communities rely on seasonal streams for micro-irrigation using hand watering, and occasionally on gravity-piped multiple-use water supply systems. There are only four perennial streams, with just one old scheme of 20 ha in size.

Average dry days by calendar month indicating high drought risk



Despite the dearth of irrigation schemes, there is a strong history of constructing **small water harvesting ponds** (10 cubic meter to 500 cubic meter in size). In the lower rainfall areas, water has to be collected in January–March, when it is too wet to farm, to later support the production into the dry season. Late in the main planting season, in August, supplementary irrigation with stored water is critical for sustained production.





Storage is essential for expansion of vegetable production and increasing water security for flowering crops. In FY23, provisions for **storage tanks using rainwater harvesting collection methods** were included in the Food Systems Resilience Program for Eastern and Southern Africa (FSRP) – Phase 3. The program provides technical training to government teams and uses low-cost high-density polyethylene (HDPE) lining, excavated ponds, and vegetative silt traps at the intakes. The program will increase the annual cropped irrigation area from the existing 300 ha to a target of 600 ha. More importantly, technology cost-effectiveness in support of individual FLID activity will be demonstrated, and the supply chain for HDPE lining will be strengthened.



What to look forward to in FY24

The project rollout will commence in FY24, including capability development of 30 personnel from the government's Regional Directorates and Rural Development Centers; cross visits to similar systems in the Kenyan National Agricultural and Rural Inclusive Growth Project, NARIG (P153349); the setting up of 15 demonstration sites with private supplier involvement; and the establishment of a new Agricultural Water Development Planning Unit in the Ministry of Agriculture.

The training for proper siting of the runoff water harvesting ponds, or 'impluviums' as they are locally named, will be in place. A staged rollout will then lead to the first new ponds, supporting fresh vegetable production, coming into operation by the end of the year.

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Water harvesting pond, or 'impluvium', with runoff collection from HDPE sheeting (Anjouan Island)

ZAMBIA

A performance approach to strengthen institutional development for FLID

Operation: Zambia Growth Opportunities Program, ZAMGRO (P178372)
Instrument: P4R
Period: 2023-2026
IDA Amount: USD 300 million, of which USD 62 million earmarked for irrigation
FLID target: 12,500 farmers; 3,500 ha of newly irrigated land; 340 IWUAs trained

Tailored irrigation pathways for different resource situations

At the national level, there is a strong emphasis on prioritizing irrigation to achieve stable crop production and ensure food security for households. The water resources situations vary in different parts of Zambia. In the drier regions of the south and east, irrigation relies on major rivers, and thus requires large infrastructure. Most of the FLID potential lies in the north and west regions of the country, characterized by abundant water sources like shallow groundwater, hillside streams, and extensive wetlands. **"Dambo" shallow-groundwater use practices are common.** The predominant irrigation method, employed by 80 percent of smallholder farmers, is manual bucket irrigation.

The different characters of resource abundance across the country, and their associated technical considerations, have led to two pathways for irrigation development: one being government-led large-scale schemes, and the other irrigation development by farmers themselves, either as individual enterprises or in farmer groups. For the latter, there are currently around 300 small-scale irrigation schemes below 100 ha, which have been constructed by farmers groups, sometimes with support from development partners and the government. These community schemes are managed by Irrigation organizations, but are mostly informally organized and have great potential to improve reliability and equity of irrigation supply through institutional and capability



upgrading.







The Zambia Growth Opportunity Program (ZAMGRO) Program for Results included a new set of guidelines for Zambian **institutional development**. These cover arrangements to guide public-private and government operations, and an intensive training-of-trainers approach for the capability building of irrigation organizations in FLID communities. The irrigation organization (IO) training will be rolled out by **50 dedicated personnel** from across the country as part of a 2-year program, which is now commencing.

What to look forward to in FY24

The institutional effort on the FLID community schemes will emphasize a performance approach, including **priority indicators of adequacy, reliability, equity, productivity, affordability and sustainability** (covering both technical and financial angles). Innovative technologies, such as soil-moisture measurement for productivity monitoring, will be

included. Performance target setting will take place during training on schemes starting in FY24, with follow-up assessments. The institutional drive under ZAMGRO will also link the scheme-level organizations to the local catchment management planning and allocation processes to help manage water availability risks.

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ZIMBABWE

A new vision with micro-irrigation center-stage

Re-focusing irrigation development

Currently, Zimbabwe is estimated to have 220,000 ha of land equipped for irrigation, with only 175,000 ha functioning. The national Irrigation Master Plan under implementation aims for a big leap that will double the irrigated area to 350,000 ha by 2025.

Zimbabwe's land reform program, and the agricultural transformation that went with it, was pivotal in shaping the current characteristics of the country's irrigation

patterns. The eight million ha of farmland that was originally on 4,500 large scale commercial farms was redistributed among 162,000 farms. The high importance of **supporting many small-scale individual enterprises** has called for a rethink of irrigation development modalities. To do that,

Zimbabwe started with a FLID diagnostic in FY22. There is major potential to utilize existing storage dams and water bodies for irrigation with a micro-irrigation and FLID drive. The main farmer groupings who are facing challenges in starting or expanding

irrigation were identified by the Government planning team, shown in the table below.

| CATEGORY | OBJECTIVE | FARM SIZE | VALUE CHAIN | CROP MIX | LABOUR | SOPHISTICATION | ADDITIONAL DESCRIPTORS |
|--|---|-------------------------------------|--|---------------------------------------|--|--|---|
| A. Subsistence with surplus sale | Mainly food Sell less than one-third of produce | Less than 0.5 ha irrigated | Loose, local and informal | Mix of staples and horticulture | Family | Basic irrigation technology Low external input (fertilizer use limited) | Households Knowledge challenge Limited technology |
| B. Market gardeners (resource limited) | Cash income Sell most produce Consume surplus | 0.25 ha to 1 ha | Mostly loose (informal local) (loose) with some contract (tight) | Horticulture | Family and casual hired | Simple irrigation technology Intensive production with fertilizer use (organic niche!) | Full entrepreneurs Good knowledge |
| C. Small scale irri-enterprise (sophisticated) | Cash income Sell all produce | 1 ha to 10 ha | Mostly tight but exploit multiple channels opportunistically | Horticulture and field crops | Employed (skilled) and casual hired | Medium to high tech: invest in irrigation technology (pumps/drip) Intensive production | Cash injection from employment Mini partnerships Paid advisory services |



The assessments showed that farmers face the largest constraints in accessing financing and markets, followed closely by a weak knowledge base and limited affordable technology. Possible solutions include the establishment of revolving funds, matching grants, business linkages, and advisory platforms. Technical incubation hubs and private sector incentives were also suggested to drive innovation and quality. Knowledge gaps need to be addressed by mapping of water resources suitable for FLID, and studies on irrigation equipment and field methods. Securing land tenure for leasing was also identified as important.

FY23 achievements

In FY23, the Zimbabwean team achieved a milestone with the adoption of the **policy note** by the Minister. They also formulated a set of **priority responses** to address the range of challenges and held a **financing workshop** with financial institutions and NGOs. Synergies with ongoing international FLID research were identified, and initial proposals were outlined.

What to look forward to in FY24

The Ministry of Agriculture and the Ministry of Finance are encouraged to provide widespread support for both the **integration of the Zimbabwe FLID Policy Note recommendations into existing programs**, and **raising funds for FLID pilots**. Finally, a study is planned to fill the knowledge gap and evaluate the best-suited land and water resources – where water is close to land, or in shallow groundwater. This would guide where a future FLID operation would be best suited.

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DEMOCRATIC REPUBLIC OF THE CONGO

Rapid irrigation diagnostic under CCDR

Irrigation development to boost climate resilience

The Democratic Republic of the Congo (DRC) has **huge agricultural potential untapped**. Being a net food importer increases the country's vulnerabilities to markets and climatic shocks and leaves 26.4 million people food insecure. Although DRC is typically a water rich country with ample rainfall, it now faces **increasing climate variability** and **longer dry spells**. There is an urgent need to **boost climate resilience**. The country has a total estimate of eight million ha arable land, while only around 3.8 million ha is cropped. Areas under supplementary irrigation vary from 13,500 ha to 85,000 ha.

The Climate Change Development Report (CCDR) comes at a critical time for DRC. It informs policies contemplated by the Government to implement its updated Nationally Determined Contributions and contributes to the dialogue towards the preparation of the Country Partnership Framework FY23–27. As part of the CCDR, a number of **deep dives are ongoing, including irrigation**.

FY23 achievements

The Ministry of Agriculture, Department of Land and Water Management and the Ministry of Environment and Sustainable Development, Department of Water Resources joined forces with the World Bank to carry out **a rapid irrigation diagnostic to understand the current constraints to and potential of irrigation development**. The initial analysis focused on a **participatory**

assessment of a sample of existing small and medium schemes in four provinces. This was complemented by modeling

irrigation scenarios to

understand the potential impact of water scarcity and

crop production in the face of various irrigation

development scenarios by 2050. Additional modeling of yield shocks on rainfed crops complements the analysis.

The FLID diagnostic has been received with enthusiasm by government partners, who recognize the importance of farmer-led initiatives. The dialogue has uncovered opportunities for the public sector to stimulate the development of irrigation at scale, although further analysis is needed to help prioritize locations and interventions.

What to look forward to in FY24

A deep-dive summary note on irrigation for DRC will be produced, with recommendations for **improving the enabling policy, regulatory, institutional, and market environments**, and for public sector interventions to address constraints to small-scale, farmer-led and inclusive irrigation development. Opportunities under existing or new operations will be explored to support interventions that can accelerate farmer-led irrigation development.

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Newsflashes in FLID Operations

Making sense of FLID financing: Nigeria's ACReSAL at the results-based knowledge frontline

FLID support inevitably involves a mix of approaches that include Government direct subsidies or matching grants to farmers, along with initiatives that trigger an acceleration of private-sector services. **Results-based financing (RBF)** and **private capital mobilization (PCM)** are dominant working themes with a multitude of options and working cases to inform designs. One particularly useful way to map the mix of supply- and demand-side mechanisms is shown in Figure 1. The affordability gap for irrigation equipment narrows from high on the left, to low on the right. The supply-side market price can, for example, be reduced by innovations, production scale-up, competition, and a lower cost of doing business factor. Farmer demand on the other hand, can be elevated by greater awareness of options and benefits, changed perceptions on business farming, greater income, and thereby the ability to mobilize private capital from savings or family loans.

Figure 1: Closing the affordability gap: supply and demand side mechanisms (source: Schmitter, 2022)



The ACReSAL project financing for FLID leverages a number of these mechanisms to bridge the affordability gap and trigger private capital mobilization (Figure 2).

Figure 2: Three linked elements of the ACReSAL support intervention



On the **demand-side**, investments with direct Government funding include knowledge and awareness outreach about profitability and technology options through multi-media communications. Demonstration sites and watershed plans have been the key nodes of engagement.

On the **supply side**, technology innovation and supplier expansion into remoter areas is supported with the challenge funds under ACReSAL. Scaling up is also accelerated by a results-based financing facility, based on the number of verified installations. A supply-side subsidy (which is variable based on equipment type) further helps suppliers pass equipment savings onto more, and more-distant, farmers.

The ACReSAL solution is a holistic approach that combines more than one public funding mechanism with other interventions. This is almost always needed, but combinations vary:

If the objective is to support nascent markets, or expand them into underserved areas, a combination of upfront grants and results-based financing can work well.

If companies lack access to working capital financing but are otherwise close to being able to meet lender requirements, credit lines and risk mitigation can be considered.

In settings where risks are already very high, and companies are unwilling to take on additional risk, the provision of demand-side subsidies from the outset can work well.

 In situations where market-based solutions are not viable, a public procurement approach can be used.

Uganda: Adaptive re-planning in the Micro-scale Irrigation Program

Adaptive planning and problem-centered processes like **Problem Driven Iterative Adaptation (PDIA)** ideas feature in the World Bank's Governance scope of work. PDIA is included in the *Governance in Irrigation and Drainage Resource Book*, and the Governance GSG supported, GovEnable process (Figure 1).

Figure 1: Assessment cycle with planned review intervals enabling strategies to change



When you use problem-driven approaches (problem tree) and repeat the experiential learning in an ongoing project cycle, you have Problem-Driven Iterative Adaptation (PDIA) The Ugandan Micro-scale Irrigation Program has just run **a cycle of review and modification** to the rollout process. An internal 18-month review of the program led to a series of key changes, both in the subsidy arrangements, and in the way suppliers were engaged, reducing excessive bid-preparation costs. The assessment showed a range of positive outcomes and drivers:

- Solar technology solutions were preferred for pumping, mostly with simple hose application systems.
- Farmers are typically engaged in supplementary irrigation to get early planting and spread limited supply across high value cash crops, including vegetables, vanilla, ginger, and coffee.
- Drought protection and dry-spell risk mitigation was a key driver of investment.
- Highly tailored use, spread across crops, from nurseries to orchards.
- Multiple water use was a strong feature, beyond homestead use to include neighbors' needs.
- The capacity of machinery was used to its full extent, with land rarely being a major constraint.
- Equipment choices tended to be cheap, simple, and robust.

While program momentum has accelerated – and continues to accelerate – fast (see page 4 for the Uganda Micro-scale Irrigation Program brief), key opportunities to unlock the bottlenecks in the rollout process were identified in January 2023 and quickly enacted into the national rollout.

The pace of procurement was limited by the need to visit multiple sites at the Government's own cost, to prepare bids accurately. While IrriTrack is continuously updated by the Ministry of Agriculture, Animal Industry and Fisheries (MAAIF) team, field accuracy and data collection equipment needed improvement and simplification.

The two main changes implemented were:

- 1. To simplify and streamline the subsidy application and procurement process; and
- 2. To generate a tailored farmer information output from the Management Information System (MIS), to link more effectively with lending institutions and banks (Figure 2). IrriTrack data entry was key to this, and to updating of advisory cost estimations to help farmers decide.



A strategic change was also made to the timing of the co-payment, another bottleneck in the process. Co-payment had been made only after the suppliers bid was submitted, thus slow farmer payment risked delay to the final award. To ensure commitment, a farmer-payment of 50 percent at the time of application was recommended to the Districts, to exclude potential delays right from the start. Other quick changes that were made in time for the national rollout were:

- Lobby District leadership to ensure field staff have necessary (basic) equipment for field assessments.
- Revise manuals and retrain local government staff for better accuracy of design criteria, to avoid supplier field visits prior to tendering.
- Include tank-stands in the farmer's options.
- Develop standard designs and adjust the minimum specifications.
- Update IrriTrack and roll out IT support in MAAIF.



The ability of the Ugandan leadership team in MAAIF to frequently assess, replan and act quickly in response to rapid changes – amidst a host of country challenges in FY23 – is one key to the ongoing momentum of the Uganda program. They have shown that building in PDIA thinking and milestones to enable re-planning now allows quick changes of direction later.

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South-South Exchange

From Madagascar to Uganda: E-voucher and Matching Grant study tour

A team from Madagascar's Ministry of Agriculture and Livestock and the PIU of the Rural Livelihoods Productivity and Resilience Project (P175269) carried out a study tour in Uganda in November 2023. The officials learned about the E-voucher system set up under the Agriculture Cluster Development Project (P145037), geared at providing partial subsidies for facilitating farmers' access to agricultural inputs. The delegation explored how partial subsidy can also catalyze access to irrigation by visiting the Micro-scale Irrigation Program.

Mampionona:

"Farmer-led irrigation leverages available local resources, such as solar energy and water, to help improve farmers' livelihoods. FLID complements large-scale irrigation scheme development. In Uganda, I saw the irrigation engineer from the Ministry of Agriculture providing consistent support to local producers, which shows a **high level of commitment from the central government** as a 'facilitator' to develop irrigation with farmers. We have observed that **the community as whole benefits from FLID**, even including the schools."



From Angola to Tanzania: FLID diagnostic and the National Irrigation Development Fund

A knowledge exchange session – titled "Resilient, Inclusive Sustainable and Efficient (RISE) Irrigated Agriculture in Tanzania: An analysis of priority sector challenges and options for accelerated growth" – was held at the rollover of the fiscal year. The session was organized by the World Bank and the National Irrigation Commission and included 80 people from government planning and operational units, research academics, private-sector agricultural companies and service providers. The substantial expansion opportunities and possible micro-financing solutions to accelerate FLID were the main themes that overlapped with Angola's new agricultural and irrigation program.

Adri:

"I learned that an **agricultural census survey** as was done in Tanzania would be really helpful in Angola. Knowledge about irrigation beyond the large "formal" schemes is limited, yet **we observe a lot of FLID practices in the field**. The contrast in irrigation development approaches was striking, with new schemes costing more than double and taking a lot longer to complete. Supporting the uptake of innovative, simpler technology resonated with my lifetime of field experience – I've seen so many big schemes underperform. But for FLID success in Angola, the situation looks the same as in Tanzania – **access to affordable financing to enable farmers to buy equipment is a critical hurdle to jump!**"

From Uganda to Ghana: Knowledge exchange to scale-up FLID across Sub-Saharan Africa

The Sub-Saharan knowledge exchange conference "Investing in Farmer-led Irrigation Development in Sub-Sahara Africa: Business, development, and research practices" brought together participants from government, the private sector, development organizations, and research from 16 African countries. The interactive convening collected lessons on catalyzing FLID at scale, as well as strategies for addressing remaining barriers and gaps through new knowledge and investment actions in the next five years. Solutions identified include innovative financing instruments, such as pay-as-you-go, results-based financing, and agricultural digitalization, such as IrriTrack, which supports decision-making by farmers, the private sector, and government officials. Allan Ollando, Senior Engineer at the Ministry of Agriculture, Animal Industry and Fisheries in Uganda, shared their promising experience under the Uganda Micro-scale Irrigation Program. The Uganda program was discussed extensively and frequently referred to by participants as a good example of leveraging agricultural digitalization (IrriTrack) and the use of matching grants.

Ruyi:

"One topic that broadened my horizon is that **bundling existing services around FLID is a strategy to de-risk investment**. For example, I learned about innovative models such as pay-as-you-go. With IT being the backbone, it goes beyond a flexible payment structure and irrigation equipment supply, but also serves as a portfolio management and impact monitoring tool to track carbon reduction, which potentially generates carbon revenues, and harvests lessons which feed into this adaptive model."



FLID Monthly Meetings

The monthly meetings feature countries' reflections along the FLID pipeline and hot topics on FLID business models to overcome financing, technology, knowledge, and market bottlenecks. This knowledge sharing platform not only convenes and connects colleagues from the headquarter and country offices to exchange regional experience, but also presents the best practices or state-of-the-art under each thematic areas of FLID. In FY23, seven meetings were held under the two main themes below.

Theme 1: FLID along the Diagnostic and Operations Pipeline

Madagascar: A Rapid FLID Diagnostic

Simplify and target the questions and messages for each

stakeholder group. Field visits with semi-structured questionnaire and interviews is the way to test the temperature and appetite for FLID. Decentralized Department of Agriculture is the entry point of FLID at local level. Built on field visits and desk analysis, bring the identified constraints and interventions into the inperson workshops, to refine the scoring based on stakeholders' perspectives.

Angola: Strategizing the Period between Project Approval and Effectiveness

Forward thinking and proactively working with the PIU and the

client to (1) internalize the concepts of FLID; (2) refine the eligibility details of beneficiaries – answer the questions such as: what is the distance from water sources to targeted farmers? Should farmer groups also be considered as potential beneficiaries? What is the expected access to land that eligible farmers should have? What is the reliability of technologies and spare parts in the area? and (3) prepare an action plan.

Uganda: Team Reflections – Two Years into Program Implementation

A fit-for-purpose and adaptive design approach is needed for FLID technologies.

■ IrriTrack, or similar agriculture and financing digital tools, reduces transaction costs for the private sector and allows adaptive approaches for the design of the micro-scale irrigation system.

Theme 2: Financing Mechanisms

Guarantees: Financing Micro-scale Irrigation Development in Kenya and Tanzania

■ In Kenya, irrigation products in microfinance institutions (MFIs) and savings and credit cooperatives (SAACOs) are limited due to inadequate technical capacity and the large amount of risks associated with the investment. In this context, SACCOs, combined with revolving funds, are identified to be the best way to help smallholder farmers access finance for irrigation equipment. Additionally, a credit guarantee scheme is recommended to de-risk for the private sector. Interestingly, in neighboring Tanzania, a Smallholder Farmer Credit Guarantee Scheme (SCGS) (Figure 1) under the Tanzania Agriculture Development Bank (TADB) is a good example to underwrite lending and manage risk for irrigation.

Figure 1: Smallholder Farmer Credit Guarantee Scheme (SCGS) Illustration (source: Komakech, 2022)



Results-based Financing: Scale Up Solar Water Pumping Solutions for Smallholder Farmers in Senegal

■ For small-scale irrigation development, resultsbased financing is usually considered when the solution providers face challenges in reaching the remote areas, where the customer has limited ability to pay for the upfront costs of irrigation equipment. The results-based financing example discussed in this meeting is under the Scale up Renewable Energy program (SURE Senegal II), led by USAID and implemented by Tetra Tech. The program provides 300,000 USD RBF grants to support eligible forprofit companies with track record to expand solar pumping irrigation solutions in new markets. It offers an ecosystem approach that allows civil society and experts to add value.

Pay-as-you-go: Observations on pay-as-you-go (PAYGO) pumping

■ The main bottleneck of PAYGO is that companies struggle to raise equity. Very limited equity is going into the irrigation sector in West Africa. Additionally, pumps tend to require after sales intervention and technical capacity, which discourages many well-capitalized PAYGO potential entrants. The SURE Senegal program promotes PAYGO models but does not assume PAYGO is only model of scaling up farmer financing. The program works on strengthening the supply capacity through key articulations: (1) between pump installers and financial institutions on the crafting of financing offer; and (2) between pump installers and farmer support organizations for controlled sales.

FLID at the World Bank Water Week 2023







The role of the private sector for operationalizing FLID

by Joy Busolo

Catalyzing private sector investments for FLID in Nigeria under the ACReSAL Project

by Olamide O. Bisi-Amosun

How to make irrigation development truly farmer-led

by Gabriella Izzi

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FLID beyond Africa

Western Balkans

During the last three years, analytical studies on the Future of Water in Agriculture in Europe and Central Asia (with particular emphasis on the Western Balkans) has been initiated. The Western Balkan region observes vibrant Farmer-led Irrigation Development, which is often denominated as private or individual irrigation. In the Western Balkan context, private or individual irrigation refers to a situation where one farm is entirely responsible for abstracting, transporting, and applying its irrigation water. The main role of the public is licensing the abstraction. The irrigated area may range from a small plastic greenhouse to hundreds of hectares on a corporate farm, as shown in the images below.



Examples of private/individual irrigation: small plastic greenhouse (left), and micro-sprinkler system



The key feature is that farmers, whether big, medium, or small, are responsible for the entire process. The system tends to be institutionally simple and economically profitable, and is widely used to produce high-value crops that can easily cover the costs of irrigation. FLID is already the dominant system in the region. The data for four countries (Croatia, Kosovo, Montenegro, and Serbia) indicates that more than 150,000 farms are engaged in FLID, with the total for the region estimated to exceed a quarter of a million farms. Most of these farms operate without any formal permit. Across the Balkans, more than 60 percent of FLID operations use groundwater, and almost 40 percent use surface water. The specific sources of water for FLID include boreholes, rivers, dual-purpose water networks, and municipal water supply networks. Dual-purpose water networks refer to water infrastructure developed to serve both the domestic and agriculture water needs, which is commonly practiced throughout the Western Balkans.

Small and medium FLID practitioners often irrigate about 1 ha or less. This group may have limited financial capacity and need credit facilities and subsidies. An example from Serbia shows that the cost of developing a 3 ha groundwater-based FLID is about 10,190 USD (1,609 USD for the borehole,

5,363 USD for a drip system, and 3,218 USD for the electricity connection). Large FLID practitioners generally operate more than 5 ha. They have greater financial capacity to be in charge of the required investments, partially or totally.

Filter and fertigation system (left); and fruit tree and drip system





Public support to FLID

There is a dedicated public program, both at European Union and national level, which is designed to support the agriculture sector and the FLID aspect. **The EU Pre-accession Assistance for Rural Development (IPARD) is an example of public support to FLID.** Instrument for Pre-accession Assistance is how the EU has been supporting reforms in the enlargement region with financial and technical assistance since 2007. The current beneficiary countries are Albania, Iceland, Bosnia and Herzegovina, Kosovo, Montenegro, North Macedonia, Serbia, and Turkey. The program is in its third phase (2021–2027), with a total budget of 15.19 billion USD. IPARD has 11 measures, or Intervention Areas, of which two are relevant for the FLID program: Investment in Physical Assets of Agricultural Holdings and Investments in Physical Assets Concerning Processing and Marketing of Agricultural and Fishery Products.

The analysis of water resources indicates that groundwater resources are quite abundant in parts of the Pannonian plain and the isolated plains, while those along the Adriatic coast are more

> limited. The general policy tends to restrict the use of groundwater for irrigation in order to preserve this high-value water resource for other uses.

Transferable lessons for Africa

There is need to formulate a visible national FLID program towards which donors can make financial and technical contributions.

The adoption of the FLID approach in the existing public irrigation schemes could be used to modernize and valorize the systems in a relatively cheaper and faster way.

Sustainability measures should be made an integral part of the FLID process by encouraging green and environmentally sound farming and irrigation practices.

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Growing the Momentum with Farmer-led Irrigation Development

From **Amal Talbi**, Global Lead for Water in Agriculture Global Solutions Group (WiA GSG)

As the Global Lead of the WiA GSG, I continue to be inspired by FLID geographically, thematically and its potential in FY24. Throughout FY23, I witnessed the expanded partnerships, vibrant cross-regional learning, and tangible progress in improving farmers' livelihood on the ground. As we all follow on the global public good discussion, sustainable agricultural water management is critical for the water security and food security, two major global public good. Farmers' action in irrigation development will have a big role in this agenda.

Geographically, the FLID pipeline has witnessed new progress along its various stages in FY23, from diagnostics to operationalization. We have deepened our engagement in Africa, where FLID is crucial to "irrigate" and "nurture" the future of the continent, and contribute to food production for a growing population. We engaged in new countries such as Democratic Republic of the Congo and Comoros, not only with strong interest but also rapidly conducted diagnostics and rolled out interventions. In Fragile, Conflict and Violence (FCV) affected countries such as Somalia and Ethiopia, FLID is playing a crucial role in our portfolio by catalyzing innovative water infrastructure solutions for sustainable food production. Looking forward into FY24, more progress shall be seen in countries that have freshly started to explore the FLID approach, such as Burkina Faso. Additionally, with our FLID ambassador Gabriella Izzi moving to Middle East and North Africa, and Regassa Ensermu Namara deepening his engagement in Europe and Central Asia, FLID has the potential to expand and benefit other continents.

Thematically, multiple deep-dives in innovative financing mechanisms for FLID have triggered continuous discussion over this year. The FLID family explored financing modalities to strategize demand and supply side incentives for irrigation services in each unique regional context to reach more farmers. The Groundwater Flagship showed the potential to have more irrigation in Africa and that not using the groundwater is not the answer. We must support the farmers grow more food while finding approaches to safeguard groundwater with FLID emerging at scale. Looking forward into FY24, the WiA GSG is devoted to carrying out an Agricultural Water Management Flagship, where we look forward to featuring the lessons learned in these thematic focuses to inspire Africa and beyond.

I am committed to continually supporting the FLID workstream together with the leadership of Regassa Namara, with the operational and analytical support from Jonathan Denison, the coordination of Ruyi Li, and the graphics concept formulation and communication support from Dudu Coelho. With great enthusiasm, I look forward to carrying on the good work in FLID with colleagues across and beyond Africa, and making real impacts for better livelihoods of farmers'.









The Farmer-led Irrigation Development Guide

A what, why and how-to for intervention design

GWSP

The Farmer-led Irrigation Development Guide

is a resource pack to help governments, development practitioners and other key stakeholders design public interventions to catalyze farmerled irrigation development (FLID). Scan the QR code to access, download and share the electronic FLIDguide, or find it at www.worldbank.org/ farmerledirrigation



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