INDEPENDENT EVALUATION OF THE ADAPTATION PORTFOLIO AND APPROACH OF THE GREEN CLIMATE FUND

Project deep dives

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GREEN CLIMATE FUND
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Independent evaluation of the Adaptation portfolio and approach of the Green Climate Fund

PROJECT DEEP DIVES

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Chapter I. INTRODUCTION

A. SCOPE, METHODS AND LIMITATIONS

At the IEU, project deep dives explore the impacts of specific adaptation interventions by defining the pathways through which change is supported. The deep dive then tests these pathways against a specific project in GCF's adaptation portfolio. Each deep dive explores the issue these projects aim to address, the nature in which these projects examine these issues, the projects' background and the impacts to date. It concludes with a discussion about the GCF's role in the projects.

Three projects are the subject of deep dives:

1. FP078: Acumen Resilient Agriculture Fund
2. FP042: Irrigation development and adaptation of irrigated agriculture to climate change in semi-arid Morocco
3. FP034: Building Resilient Communities, Wetland Ecosystems and Associated Catchments in Uganda

B. APPROACH

Ideally, the adaptation evaluation would include estimates of the impact of the GCF's entire adaptation portfolio. However, this is not possible for several reasons. First, defining the impacts of adaptation projects is challenging conceptually, making it difficult to determine the portfolio's impacts in either reducing a country's vulnerability to climate change or increasing its readiness for it. Second, even if it was possible to define the potential impacts at a portfolio or country level, there is limited project-related data in the portfolio to use for modelling impacts. If data are available, they are primarily descriptive and based on the categorizations required in funding proposals. This makes translating project data into concrete inputs for impact modelling challenging. Third, turning to project-level impacts, data from the IEU's Learning Orientated Real-Time Impact Assessment (LORTA) programme, which embeds rigorous impact evaluations into approved projects, cannot offer precise estimates of impacts. Fourth even if definitional and data hurdles can be overcome, adaptation projects bare highly context-dependent by their very nature. Consequently, it may not be possible to extrapolate their impacts to other contexts or aggregate them at the portfolio level.

Given the challenges in modelling the impacts of adaptation projects and the portfolio as a whole, this evaluation has taken a case study approach, whereby the adaptation evaluation team selected individual projects according to specific characteristics. We have looked at three case studies that represent, in general terms, the types of adaptation interventions defined in the IEU's recent evaluation of the GCF's adaptation portfolio. The evaluation identified seven climate adaptation interventions based on 464 studies conducted between 2007 and 2018: nature-based solutions, structural; technological; informational; institutional; market-based; and behavioural.[1] Of these, we focus on three types of interventions that are illustrative of this particular approach to increasing resilience (see Table I-1).

[1] See Doswald, N., Sánchez Torrente, L., Reumann, A., Leppert, G., Moull, K., Rocío Pérez, J. J., Köngeter, A., Fernández de Velasco, G., Harten, S., and Puri, J. (2020). Evidence Gap and Intervention Heat Maps of Climate Change Adaptation in Low- and Middle-Income Countries, DEval Discussion Paper 2/2020, German Institute for Development Evaluation (DEval) and Green Climate Fund Independent Evaluation Unit, Bonn, Germany and Songdo, South Korea. Available at: *https://ieu.greenclimate.fund/evidence-review/adaptation*

Table I-1. Characteristics of selected projects

Intervention type	Intervention Sub-types	Project candidate (Primary)	Description
Nature-based solution	• Water management • Sustainable forestry • Resilient agriculture • Coastal zone management	FP034: Building Resilient Communities, Wetland Ecosystems and Associated Catchments in Uganda	• Uganda (Africa, LDC) • APR • Country mission
Structural	• Water and waste infrastructure • Resilient infrastructure • Irrigation systems • Desalination systems	FP042: Irrigation development and adaptation of irrigated agriculture to climate change in semi-arid Morocco	• Irrigation systems • Morocco (Africa) • APR
Market-based	• Access to (climate) finance • Risk pooling • Climate insurance • Credit system • Value chain strengthening • De-risking facility	FP078: Acumen Resilient Agriculture Fund	• Access to (climate) finance • Kenya • APR

The project's deep dives apply two different approaches to estimating project impacts. For Kenya and Morocco, we assessed the general impact pathway for the interventions. This made it possible to determine how interventions support adaptation in practice, given what would be expected to happen theoretically. As quantitative data is limited, the evaluation team collected qualitative data from individuals sufficiently familiar with the project to describe its perceived impacts. In Uganda, the adaptation evaluation team drilled down as far as possible towards beneficiaries to elicit qualitative data on how effectively the project enhanced household well-being. In practice, this has taken the form or conducting qualitative interviews with district level officials who are in close contact with project beneficiaries.

Chapter II. PROJECT DEEP DIVE - KENYA

A. CLIMATE CHANGE ADAPTATION ISSUE THE INTERVENTION IS ADDRESSING

In many developing countries, micro-, small- and medium-sized enterprises (MSMEs) employ 60 per cent of the people. The figure is even higher in sub-Saharan Africa and south Asia.[2] Meanwhile, slow-moving climate changes, such as increasingly unpredictable weather patterns, harsh climate conditions, threaten the many agricultural dependent livelihoods in developing countries.[3] Reducing climate change risks, either sudden or slow-moving, requires financing. To fill this financing gap, the private sector needs to play a more prominent role in addressing climate change adaptation. Yet, the private sector, comprising firms across various sectors, faces barriers in fulfilling its role. These barriers include perceptions of high risk, low returns on investment and/or extended time horizons. Within this private sector context, patient capital can be effective if it focuses on impact and financial returns.[4] To support private sector investments in climate change adaptation, the GCF is providing financing for market-based interventions. As discussed in further detail below, one example of these interventions is the GCF's equity investment and support for FP078. FP078 is managed by the Acumen Resilient Agriculture Fund (ARAF), a USD 56 million fund that finances private sector entrepreneurs. These entrepreneurs operate MSMEs with a focus on businesses that work with smallholder farmers in several sub-Saharan countries.

B. INTERVENTION TYPE AND IMPACT PATHWAYS

Market-based interventions, like ARAF, address the constraints or barriers that the private sector or beneficiaries face when conducting adaptation activities. These typically include costly financial transactions or are caused by thin and imperfect markets. Examples of market-based adaptation interventions include payments for critical services, such as insurance, cash transfers or microcredit.[5]

Market interventions are critical to helping MSMEs and the people who rely on medium to small enterprises for their livelihoods. Based on a series of case studies and a literature review, the United Nations Development Programme (UNDP) and the World Resources Institute report that MSMEs face six hurdles when investing in adaptation activities, including a lack of financial capacity.[6] [7] According to the International Finance Corporation, MSMEs worldwide face a financing gap of

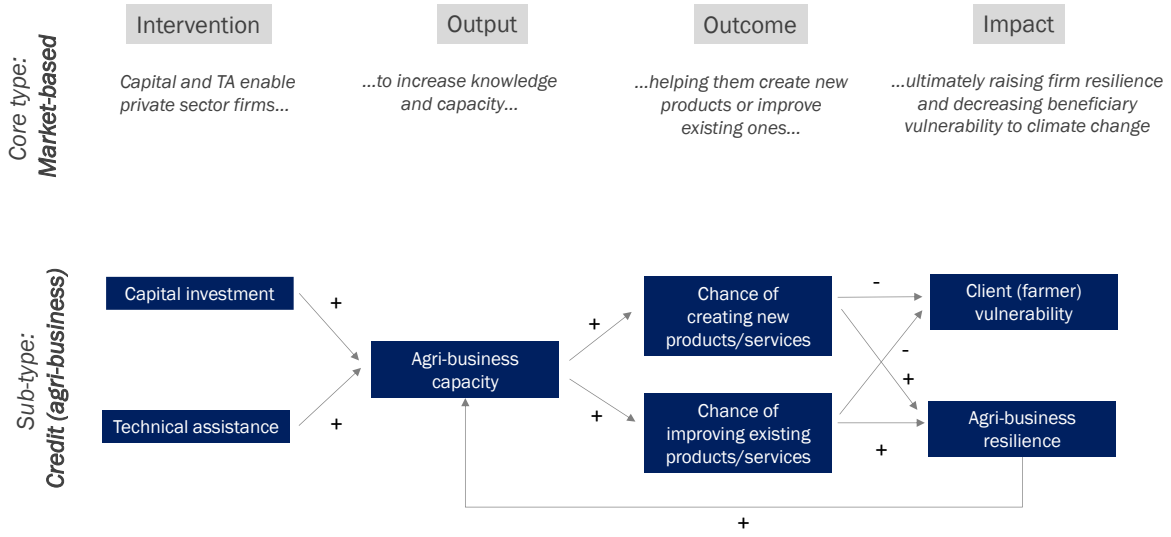
[2] Bacchetta, M., E. Ekkehard, and J. Bustamante. 2009. "Globalization and Informal Jobs in Developing Countries." Switzerland: World Trade Organization and International Labor Organization.
[3] Sadler, Marc Peter.2016. Making climate finance work in agriculture (English). Washington, D.C. : World Bank Group. http://documents.worldbank.org/curated/en/986961467721999165/Making-climate-finance-work-in-agriculture
[4] Patient capital refers to investments which seek long-term value in a broad sense (including environmental, social and governance returns) and not solely short-term profits
[5] Doswald, N., L. Sánchez Torrente, A. Reumann, G. Leppert, K. Moull, J.J. Rocío Pérez, A. Köngeter, G. Fernández de Velasco, S. Harten and J. Puri. (2020), Evidence Gap and Intervention Heat Maps of Climate Change Adaptation in Low- and Middle-Income Countries, DEval Discussion Paper 2/2020, German Institute for Development Evaluation (DEval) and Green Climate Fund Independent Evaluation Unit, Bonn, Germany and Songdo, South Korea.
[6] The six barriers are as follows: lack of awareness and knowledge of climate risks; limited availability or knowledge of adaptation options; lack of technical capacity to implement; lack of financial capacity to implement; policy and regulation that hinder adaptation; and, lastly, social attitudes toward adaptation.
[7] Dougherty-Chouz, Lisa, Pieter Terpstra, Srilata Kammila, and Pradeep Kurukulasuriya (2016) Adapting from the Ground Up: Enabling Small Businesses in Developing Countries to Adapt to Climate Change. World Resources Institute and United Nations Development Programme, Washington D.C., and New York, United States.

USD 2.1 - 2.6 trillion. Even during normal circumstances, these businesses need loans, insurance and credit but, for various reasons, cannot access such support.

Attracting financing for adaptation projects is difficult. Adaptation investments involve significant upfront costs, have long time horizons and are subject to climate change's uncertainties. Together, these characteristics of adaptation investments can sometimes leave banks and other financial intermediaries reluctant to invest in adaptation.[8] Compounding the problem is that, for specific sectors, the cost of financing is higher than usual due to the direct and indirect risks MSMEs face from climate change. This is particularly true for agribusinesses, according to UNDP. The direct risks to agribusinesses include damage to physical assets, disruption to production and degraded natural resources. The indirect risks to agribusinesses include, inter alia, lower availability of financing and disrupted supply chains.[9] Numerous actors are trying to address these barriers in agribusiness, including national, bilateral and multilateral financial institutions, development finance institutions and dedicated climate funds like the GCF. The World Bank finds that considering the private sector's high costs and risks in supporting MSMEs in agribusiness, financing should aim to catalyse private finance and reduce actual and perceived risks.[10]

Ideally, when MSMEs in agribusiness receive financing and support, these market-based interventions receive positive feedback that can lead to greater resilience for both the firms that receive financing and the farmers with whom they work. Financing and technical support for agribusinesses can raise their capacity. In turn, greater capacity in an agribusinesses' human and financial capital help it more readily introduce new products or services for farmers and/or improve the existing products and services. New products and services can reduce the farmer vulnerability that MSMEs work with while increasing the MSMEs' resilience. Improving existing products and services may do the same. Notably, greater resilience among firms may also increase capacity, creating a positive feedback loop that benefits both the agribusiness and the farmers it supports. Figure II-1 shows a stylized impact pathway for market-based interventions in agribusinesses.

Figure II-1. Idealized impact pathways through which market-based interventions for agribusinesses



Although figure 1 is a highly idealized representation, the increasing presence of these pathways is, at least in part, evidenced by the growing number of funds and financial institutions that appear to

[8] Ibid.
[9] Ibid.
[10] Sadler, M P (2016).

trust this model. For example, the Food and Agriculture Organization has advocated for agribusiness-led development that is inclusive of smallholder farmers and private and public sector investors.[11] The Netherlands-based non-governmental organization, IDH [the Sustainable Trade Initiative], established the Farmfit programme in 2019. The programme provides technical services and de-risking financing using its EUR 100 million funds for agribusinesses that work with smallholder farmers.[12] A report by the partnership Acumen and Bain & Company finds that using financing to enable agribusinesses to support smallholder farmers increases farmers' incomes and reduces their climate vulnerability. It also helps the agribusiness firms expand.[13] Acumen and Bain & Company maintain that capital and technical support are central to helping agribusinesses provide agriculture inputs, infrastructure and services to smallholder farmers and scaling up their business, thus helping more farmers improve their livelihoods. In part, this model was the inspiration for ARAF, which aims to provide the keys for unlocking the impacts agribusinesses can have and proving this model works in practice and encourages other funds to get involved.

C. GCF PROJECT DESCRIPTION AND BACKGROUND

FP078, the ARAF, is a private sector adaptation project managed by Acumen, a New York-based impact fund. ARAF aims to support pioneering and early-growth stage innovative agribusinesses that enhance the climate resilience of smallholder farmers. The Fund operates in several east and west African countries, including Nigeria, Ghana, Kenya, and Uganda, and plans to start operating in Ethiopia. The accredited entity for ARAF is the Acumen Fund, a GCF regional direct access entity. Implementation is by ARAF, which is a GCF executing entity for the purposes of this project.[14]

ARAF is one of several funds in the GCF portfolio that focus on private sector adaptation projects. Each of these funds uses market-based interventions to address private sector needs in climate change adaptation. Several of these funds are primarily focused on mitigation, with an emphasis on energy-related projects and companies. FP005, the KawiSafi Fund, was one of the first projects approved by the GCF and is also an Acumen project. FP025, the GCF-EBRD SEFF, focuses on MSMEs in the MENA region with a focus on energy. FP095, the Transforming Financial Systems for Climate project, focuses on helping Latin American and Caribbean countries develop more energy-efficient markets for renewable sources of power. However, other funds are working in agriculture for SMEs. FP048 operates in Guatemala and Mexico, helping share the risk between MSMEs in the agriculture sectors. FP097 provides credit to MSMEs in Central America working in agricultural production. FP114 is a fund that lends to local commercial banks in Ghana to help MSMEs and farmer-based associations led by women to implement climate-resilient agricultural practices.

ARAF will invest in three types of businesses, including aggregator platforms, digital platforms and financial services providers. Aggregator platforms will make up approximately 50-60 per cent of the investee portfolio. These agribusiness companies provide bundled solutions for farmers, such as

[11] Kelly, Siobhan (2012) Smallholder business model for agribusiness-led development. Food and Agriculture Organization of the United Nations. Rome, Italy. http://www.fao.org/3/md923e/md923e00.pdf
[12] https://www.idhsustainabletrade.com/farmfit/
[13] Acumen and Bain & Company 2014, "Growing Prosperity: Developing Repeatable Models to Scale the Adoption of Agricultural Innovations" [online], http://acumen.org/content/uploads/2014/11/GrowingProsperity-Agriculture-Report.pdf
[14] It's worth noting that approval of FP078 raised questions from civil society observers of the GCF. They were concerned about several issues pertaining to the lack of a gender-lens approach, insufficient consideration of risks posed by conflicts between herding communities, and the complex and opaque financial structure of the regional direct access entities and executing entities involved in FP078.

agricultural inputs, extension advice and knowledge, finance and connections with output markets. Essentially, these platforms aim to improve smallholder farmers' access to and integration with their respective local markets and, where feasible, linking them to international markets. Digital platforms will make up 20-30 per cent of the investee portfolio. Agribusinesses with strong information and communication capacities provide bundled digital solutions to meet the needs of farmers. The expectation is that such digital platforms will heighten supply chain visibility and deliver efficiency gains for farmers working in increasingly unpredictable conditions. Finally, financial services companies will oversee, at most, the remaining 20-30 per cent of the portfolio. These financial services firms will provide payment systems, (micro-) credit, and (micro-) insurance to farmers at scale.

ARAF aims to raise and invest USD 56 million over 12 years in approximately 18 – 20 investment deals. It also aims to set up a USD 6 million technical assistance facility. The GCF committed USD 23 million in equity financing and USD 3 million in grant financing to the facility. GCF's financing represents a catalytic first-loss capital that anchors the Fund and reduces other investors' risk incurring a loss. Therefore, if ARAF generates financial profits, these profits will be shared on a pro rata basis between financiers. Importantly, if losses occur, the GCF, as the provider of first-loss equity, will absorb these losses first. This allows the Fund to take on investments otherwise deemed too precarious for more risk averse private sector investors. The remaining funding, made up of senior equity, has been provided by Acumen, FMO [Netherlands Development Finance Company], and others. According to the project funding proposal and interviews with ARAF representatives, GCF's investment initial investment made it possible for ARAF to raise the remaining senior loans. GCF's de-risking role as a first-loss guarantor and its reputation as a financial institution of note gave ARAF the credibility to attract other investors.

The technical assistance facility (TAF), which receives grant funding, will provide capacity-building interventions for investees. The TAF's purpose is to support ARAF's investment strategy of building profitable, scalable, socially responsible climate adaptive businesses. These businesses will serve the bottom of the pyramid, support greater gender integration through targeted TAF interventions and provide a financial return to ARAF and its investors. The support services will include specific climate adaptation initiatives, such as training and extension services for smallholders working with investees, helping investees diversify income streams and working with investees to develop more gender inclusive proposals. The TAF also provide business development support for investees navigating the logistical and administrative hurdles encountered in scaling their businesses. The TAF will also provide opportunities for leadership development among entrepreneurs by learning from their peers.

D. GCF PROJECT IMPACT

ARAF has dual objectives. It aims to achieve social impacts and business returns. It has set itself a financial hurdle rate of return of 3 per cent per annum. The fund manager will receive a profit only if s/he achieves this hurdle rate. Investments are expected to last 5 – 7 years, providing patient capital for the early stage investees. ARAF has also set an impact hurdle rate of reaching five million beneficiaries. It expects to directly benefit 2.1 million people, mostly smallholder farmers, via the investees it supports. ARAF also expects to indirectly benefit 7.9 million people who are family members of the 2.1 million people directly reached. ARAF will use the survey data-collection methods employed by 60 Decibels (formerly Lean Data), an end-to-end impact measurement company Acumen developed to monitor and report on its impacts by investees.

ARAF expects to reduce farmers' vulnerability to climate change by improving their economic situation. Using data directly from farmers, ARAF expects to show how its investees help farmers improve farm productivity, increase net farm incomes, reduce the variability of net farm incomes and reduce farmers' financial stress. To help measure the fund's impacts and level of resilience overall climate change vulnerability, the Fund will use a pre-screening impact tool and develop an adaptation index. The pre-investment tool, Agriculture Resilience Investment Screen, was developed with Winrock International to evaluate, ex-ante, investment impacts ahead of approval in the investment committee. After investment, ARAF works with 60 Decibels to conduct poverty and resilience measurement and collect data directly from farmers on how they have benefited.

Although it is a new fund, it has significant investment deals in its pipeline, with some of them beginning to close. According to its annual report, ARAF's pipeline has approximately 23 contracts across the countries in which it operates. Of these, four investment are either closed or close to closing. An example of the former is a project in Kenya where ARAF has invested in a solar-powered irrigation pump company headquartered in the capital, Nairobi. The company is a growing Kenyan agribusiness start-up called SunCulture. It has featured in several media outlets[15] and is the subject of an impact analysis by the CDC Group, the UK Government's development bank. [16]

In Kenya, over 80 per cent of the land is unsuitable for rain-fed agriculture. Yet only 3 per cent of Kenyan farmers irrigate their fields. As a result, agricultural yields are significantly below global averages. SunCulture provides Kenyan farmers with a solar-powered irrigation pump that can lift 7,000 litres of water a day and pump up water from wells 100 metres deep. The pump is a productive asset that helps small farms improve agricultural output and maintain livestock. It is used primarily by horticulture farmers with a pay-as-you-grow and/or pay-via-instalment model. CDC Group's impact study used Lean Data survey methods to confirm that SunCulture's solar power water pumps enable farmers – many of whom eke a living out of plots smaller than three hectares – to increase their crop yields by as much as 300 per cent per year. Furthermore, farmers spend significantly less time and effort physically hauling water from wells, boreholes or communal rivers and lakes. SunCulture's pumps also replace costly diesel generator powered pumps, resulting in lower fuel costs for farmers.

SunCulture's example validates specific idealized impact pathways drawn in figure 1. By providing financing to SunCulture, ARAF helps the business improve its capacity to deliver solar-powered water pumps to smallholder farmers. This capacity improvement reduces farmer vulnerabilities by raising their yields and reducing generator costs, which increases farmers' net incomes. Simultaneously, the increased uptake of SunCulture's products can lead to long-term financial stability by attracting more customers and raising its operating capacity.

The CEO of SunCulture, Samir Ibrahim, was interviewed as part of this project deep dive. He noted that ARAF was an ideal partner for SunCulture because it is one of the few funds, if not the only fund, that understands the needs of smallholder farmers and the businesses trying to support them. According to Mr. Ibrahim, SunCulture uses ARAF's equity investment to continue to scale his business as it expands into new countries in Africa. He feels there are concrete steps the GCF and other climate funds can take to ensure companies like his scale faster. Mr. Ibrahim says funds should conduct due diligence rapidly, as start-ups evolve and change significantly in short periods. For instance, if a funding approval process takes 12 months, the start-up may experience significant changes before and after the approval process. He also feels alternative financing solutions should

[15] See Financial Times, July 26, 2016 article "Kenyan farmers use SunCulture solar power to help water dry land" (*link*) and Harvard Business Review, May 18, 2017 article "How Digital Technology is Changing Farming in Africa" (*link*)
[16] CDC Group (2019) "Portfolio Learning Insights" *https://assets.cdcgroup.com/wp-content/uploads/2019/08/27073116/2312_Insight_REPORT_Practical-solutions_v5_AW_HIGH.pdf*

be supported, such as subsidies for technology-based climate products that generate consumer demand and ensure financial growth for start-ups and government revenue.

E. DISCUSSION

There is a considerable gap in the available finance going to, and coming from, the private sector that focuses on climate adaptation. This gap is even more significant for MSMEs, which employ the majority of people in developing countries and are associated with some of the groups most affected by climate change. By supporting funds like ARAF, the GCF helps close that gap while simultaneously using its name and leverage to attract more private sector financing. Although the project is in an early stage, the first investments offer promising impact results. An investment in Kenya appears to be a clear application of the GCF's approach to using platform businesses to reach smallholder farmers and improve their resilience and lower their vulnerability.

The key question here should be: what would have happened without the GCF's support to the ARAF? The Board requested the GCF Secretariat to provide the first-loss capital for the GCF to de-risk the capital that others provide from the private sector. It was argued in the project's funding proposal that since there are significant risks to investing in early stage agribusinesses in developing countries that prevent private sector investors from supporting them. As an anchor investor, the GCF's capital attracted other development financing institutions, private equity investors and family funds. Without the GCF, it seems the fund would be significantly smaller or not exist at all. There also would have been less financial support for capacity-building among investees to help smallholder farmers. This is supported in interviews with individuals familiar with how the GCF's involvement in ARAF leveraged additional financing, enabling it to close its funding round. Furthermore, the GCF's reputation reassured these investors that their emphasis on climate emphasis would be taken seriously.

The GCF's equity investment positively impacts agribusinesses, such as those in Kenya, Nigeria and elsewhere. GCF's equity investment also has the potential to demonstrate replicable effects that could bolster the GCF's confidence in working with partners like Acumen – partners who are experienced, focused, and capable of making adaptation work in the private sector.

Chapter III. PROJECT DEEP DIVE – MOROCCO

A. CLIMATE CHANGE ADAPTATION ISSUE THE INTERVENTION IS ADDRESSING

The GCF supports many projects that are structural interventions aimed at improving infrastructure resilience and enhancing the livelihoods that depend on these projects. One type of structural/technological intervention the GCF supports in many countries is drip irrigation, which delivers a trickle of water to individual plants. Drip irrigation is the critical link between large infrastructures – such as dams – and small farm holdings, communities and households. Water is critically important in combating climate change, especially in semi-arid countries where water resources are historically scarce and climate change severely jeopardizes water availability for large and small farms and community households. Lower precipitation and less predictable rainfall threaten to reduce the rate at which groundwater is replenished. This creates uncertainty for vulnerable populations that depend on agriculture for their livelihood and food security. Drip irrigation is often used to decrease water consumption and increase the predictability of water supply. However, interventions such as drip irrigation can have shortcomings. For instance, by enabling greater areas to be farmed, net water consumption may increase and, ultimately, undermine adaptation efforts.

The IEU's deep dive into its evaluation of GCF's adaptation approach looks at irrigation projects in the GCF's adaptation portfolio. The deep dive describes the pathways that interventions use to contribute to both developmental and adaptation impacts. The deep dive then considers these pathways within the context of FP042, an irrigation project in Morocco, and evaluates the project's impact and the GCF's role in contributing to that impact.

B. INTERVENTION TYPE AND IMPACT PATHWAYS

Structural interventions, water and adaptation

That water related infrastructure and technology are inextricably linked to climate change and development should come as no surprise. The United Nations annually publishes a comprehensive report on the state of water resources in developing countries. Its 2020 report highlights how climate change affects the availability, quality and quantity of water for billions of people worldwide.[17] In the words of the World Bank (2016), "water is to [climate change] adaptation what energy is to mitigation".[18] Water, the World Bank (2016) explains, is critically linked to food security, cities, the environment and the economy. The cost of inaction on water stewardship is frighteningly high. To address this, the World Bank (2016) provides several suggestions. The first is to increase water use efficiency within sectors, particularly in agriculture, through smart climate practices that allow farms to maintain or increase yields while reducing their energy and water footprints. The second World Bank suggestion is to expand water supply and availability by investing, wherever sound and feasible, in storage infrastructure such as dams, water recycling and reuse systems, and desalination technology, to ensure water access for populations in dry regions. Last, the World Bank (2020)

[17] UNESCO, UN-Water, 2020: United Nations World Water Development Report 2020: Water and Climate Change, Paris, UNESCO.
[18] World Bank. 2016. "High and Dry: Climate Change, Water, and the Economy." World Bank, Washington, DC. License: Creative Commons Attribution CC BY 3.0 IGO

advises that policymakers reduce the impact of uncertainty and variability of water supply, particularly by investing in key infrastructure.

Not all water related infrastructure projects, though, are by default positive adaptation projects. A widely cited study on the economics of water, irrigation and development, shows how investment by international donor agencies in such projects creates incentives to build projects that are oversized or poorly managed. Because donors such as the World Bank and GCF subsidize project construction costs without fully considering the project's negative environmental impact, these projects' perceived cost is often lower than the actual costs they inflict on society.[19] Furthermore, while much has been written in general terms about why water is critical for climate change adaptation, the amount of evidence regarding the impact of these interventions is limited. According to a recent IEU evidence gap map report, the amount of research on the impact of water related interventions on climate change adaptation is limited compared to other sectors, such as agriculture, forestry and fishing.[20]

It seems quite benign and straightforward to suggest structural and technological interventions related to water use are critical for adaptation. However, these interventions need to be undertaken with caution to avoid maladaptation.[21]

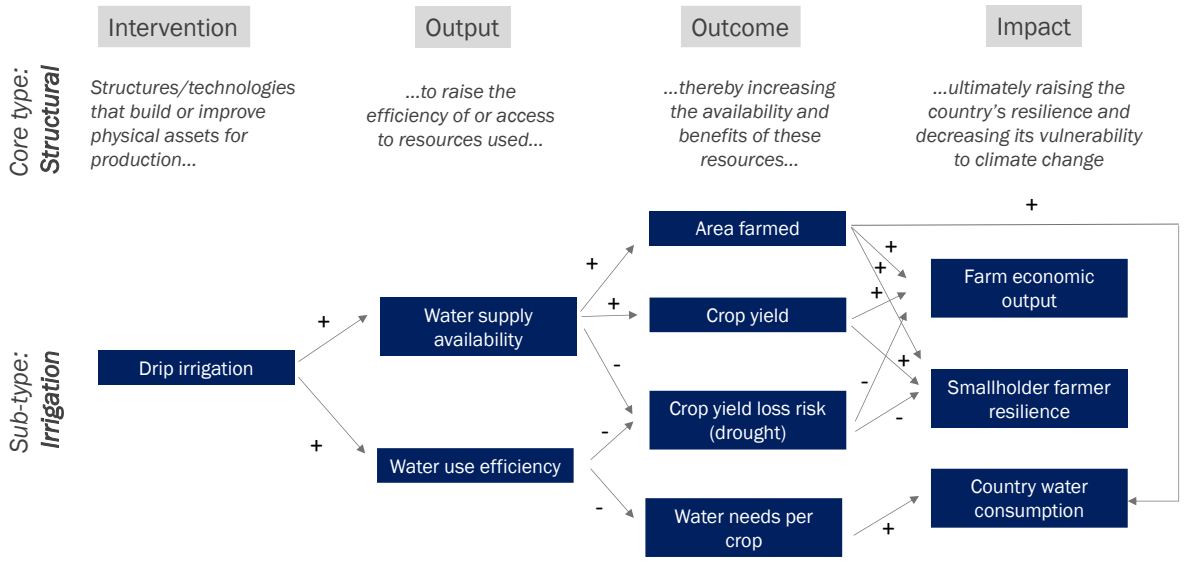
The impact of drip irrigation

Irrigation systems are a critical type of structural adaptation intervention as they address two high priority areas in developing countries: agriculture and water. Figure III-1 provides a logical illustration of the pathways through which drip irrigation could contribute to climate change adaptation.[22]

In general, structural interventions, such as drip irrigation, build or improve physical assets in a location or region. As a result, these projects aim to raise the efficiency of, or access to, resource use in that region. This increases the availability and benefits of these resources to the people and firms associated with them, with the ultimate intention of raising the country's resilience and decreasing its climate change vulnerabilities. Figure III-1 shows the impact pathways for drip irrigation.

[19] Schoengold, Karina and David Zilberman. (2007) "The Economics of Water, Irrigation, and Development". Handbook of Agricultural Economics. Vol 3. Pages 2933 – 2977.
[20] Doswald, N., L. Sánchez Torrente, A. Reumann, G. Leppert, K. Moull, J.J. Rocío Pérez, A. Köngeter, G. Fernández de Velasco, S. Harten and J. Puri. (2020), Evidence Gap and Intervention Heat Maps of Climate Change Adaptation in Low- and Middle-Income Countries, DEval Discussion Paper 2/2020, German Institute for Development Evaluation (DEval) and Green Climate Fund Independent Evaluation Unit, Bonn, Germany and Songdo, South Korea.
[21] Maladaptation refers to adaptation efforts that have unforeseen negative consequences, such as returning to earlier vulnerabilities or a decline in sustainable development. Juhola, Sirkku, Erik Glaas, Bjorn-Ola Linner, and Tina-Simone Neset. (2016) "Redifining maladaptation". Environmental Science & Policy, vol. 55, issue P1, 135-140.
[22] Plus symbols (+) indicate positive relationships, while minus symbols (-) represent negative relationships. This is not a normative indication of whether an outcome is "good" or "bad". Rather, it is a way to illustrate the directional nature of these relationships. They should be read as follows: "An increase in X raises Y, making a positive (+) relationship, while an increase in X decreases Z, making it a negative (-) relationship."

Figure III-1. Impact pathways of drip irrigation



Following this high-level theory of change, drip irrigation systems increase the supply of available water and improve water use efficiency (assuming it replaces previously less efficient techniques, such as water sprinklers or surface irrigation). Increased water supply from drip irrigation raises the amount of area available for farming, increases crop yields and reduces the risk of crop yield loss due to drought. Greater water use efficiency also reduces the risk of crop yield loss. It also reduces the amount of water needed per crop. Increases in the acreage of farming lands raise the amount of economic output from farms and may increase the country's total water consumption. Increased crop yields likewise raise the economic output of large farms and increase the resilience of smallhold farmers' livelihoods. A decrease in the risk of crop yield loss due to drought would also increase the economic output of large farms and the resilience of smallhold farming livelihoods. Finally, lower water needs per crop would reduce overall water consumption in the country.

A key outcome from examining the impact pathway is understanding how drip irrigation affects a country's water consumption. Drip irrigation would be expected to reduce a country's overall water consumption by increasing water use efficiency and reducing the amount of water required per crop. However, by increasing the available water supply and the acreage of land that can be farmed, drip irrigation may also increase a country's total water consumption. Thus, ex-ante, it is unclear what the net effect drip irrigation has on water consumption. According to the United Nations, the expansion and intensification of crop production on irrigated land is one of the most significant drivers of water demand for agriculture.[23] Furthermore, drip irrigation may increase the rate of water consumption overall.

Other pathways, however, are verified in the existing literature. But the strength of these linkages appears to depend heavily on the context, namely the location/region where the irrigation system is installed, the infrastructure it is replacing, and, potentially, the type of crop farmed. For instance, a study in India that examined irrigation's impact on wheat farmers verified that water supply from drip irrigation is associated with a reduced risk of crop yield loss.[24] In contrast, the link between irrigation and crop yield is less clear. A study in Thailand evaluating an investment by the Asian Development Bank and the Japan Bank for International Cooperation found the introduction of irrigation had little effect on rice harvests; however, the study authors say this may have been due to

[23] UNESCO, UN-Water, 2020
[24] Zaveri, E., Douglas H. Wrenn, an K. Fisher-Vanden. (2016) "Water in the Balance: The Impact of Water Infrastructure on Agricultural Adaptation to Rainfall Shocks in India".

poor study design.[25] In Morocco, some links appear validated mainly by several recent studies investigating how modern irrigation techniques, such as drip irrigation, contribute to lower water needs per crop, increased crop yield and an expansion in farming lands. These impacts from drip irrigation were shown in two studies looking at citrus fruit growers and berry farms.[26] In part, the success of these irrigation technologies may be commensurate with the skills of the individuals on farms who have studied engineering and are capable of maintaining water infrastructure.

C. GCF PROJECT DESCRIPTION AND BACKGROUND

Example project overview: FP042 - Drip irrigation in Morocco

FP042 in Morocco is emblematic of irrigation's role as a structural intervention that increases adaptation to drought or water scarcity. FP042 is a multi-faceted irrigation project. Firstly, it aims to use dam water to irrigate semi-arid agricultural land for growing and producing dates in a holistic, scalable and sustainable manner. Secondly, it aims to simultaneously reduce small- and large-scale farmers' dependence on depleted groundwater reserves. One of the project's significant aims is to help Morocco achieve the goals defined in its national climate change strategy, the Green Moroccan Plan, which includes goals for enhancing irrigation investment and increasing date production.

Morocco ranks sixty-fourth on the Notre Dame GAIN Index, making it relatively high in its readiness to address climate change adaptation, and moderately low in its climate change vulnerability. However, the country still faces significant climate change challenges, especially regarding water availability. Climate projections indicate that by 2050 precipitation will decline by 15-20 per cent as temperatures increase and raise the level of evapotranspiration (the rate at which water is removed from the soil as it evaporates into the atmosphere). According to the project's funding proposal, negative impacts from increased temperatures and higher evapotranspiration are likely to be reduced crop yields and increased climate change vulnerability among farmers.

FP042 operates in the Boudnib Valley, a semi-arid region of Tafilalet in the country's southeast. The local population relies on oasis-based agriculture for the bulk of their livelihoods (in addition to income from other sources, such as daily labouring in nearby cities). Livelihoods in the region are mostly small-scale, with households owning less than 0.5 ha of land to grow dates, mainly for their consumption. Also, because the area is a productive agricultural region, investors have been establishing large-scale farms for producing dates and olives for export with support from the Government of Morocco. These large-scale farms tend to be about 100 – 500 ha. Therefore, to meet the growing demand for water resources and maintain or increase farm yields for small- and large-scale farmers alike, FP042 will bring water from the nearby Kaddoussa dam. The dam is a multipurpose gravity dam measuring 62 metres high and 271 metres wide. Construction began in 2016 and is expected to be finished in 2020/2021. Located upstream on the Guir wadi (or river), the Kaddoussa dam is expected to provide 30 million cubic metres of surface water annually. A 63km adduction pipeline will link the dam to the last oasis on the Guir wadi, while distribution pipes will serve the 800-1,000 ha of small-scale oasis farming and 4,000 ha of medium- and large-scale farms.

[25] Palmer-Jones, R., Dilokkunanant, N., Phonyiam, B., Punyaratabandhu, S., Sutthiwongse, T. and Hanpongpandh, S., 2012, Impact Evaluation of Mae Lao Irrigation improvement project, Thailand 3ie Grantee Final Report
[26] See: Nassreddine Maatala, Aziz Fadlaoui, Philippe Lebailly. Evaluation of the Impact of Partnership Program on the Technical and Economic Efficiency of Irrigation Water Use for Moroccan Citrus Farms. International Journal of Agricultural Economics. Vol. 4, No. 2, 2019, pp. 70-79. doi: 10.11648/j.ijae.20190402.14. and Nassreddine Maatala, Younes Bekkar, Oumayma El Hassnaoui, Philippe Lebailly. Technical and Economic Efficiency of Irrigation Water Use for the Farms of Blueberry and Raspberry in the Loukkos Area in Morocco. International Journal of Agricultural Economics. Vol. 5, No. 1, 2020, pp. 1-8. doi: 10.11648/j.ijae.20200501.11

The project's cost is USD 89.3 million. GCF provides USD 23.5 million in grants. The *Agence Française de Développement* (AFD), the project's international accredited entity spearheading the project, will provide USD 47 million in loans and USD 1.1 million in grants. The Government of Morocco, represented by its national designated authority, the Ministry of Energy, Mining and Sustainable Development, will provide USD 17.6 million in grants. The project funding proposal was submitted in August 2015 and approved in April 2017. Implementation began at the end of 2018. So far, the GCF has disbursed USD 2.3 million for the project and implementation of its component is expected to commence at the end of 2023. There are several executing entities. At the national level, the Ministry of Agriculture's Directorate of Irrigation and the Development of Agricultural Areas is responsible for the project's coordination. It is AFD's main counterpart at the central level. At the local level, the project's implementation will be transferred to the Regional Office of Agricultural Development of Tafilalet.

The project has three main components. The first is connecting the dam with the drip irrigation infrastructure to the Boudnib Valley, the project's primary focus and costliest component. This component aims to build the drip irrigation scheme and define its management. A private sector company will manage project management under a public–private partnership framework. The framework will allow sustainable water delivery to communities and large-scale farmers and ensure quality water service throughout the year. The dam's surface water provides an opportunity to address two critical issues for the sustainability of the current economic transformation of the Boudnib Valley. Firstly, by preserving oasis-based agriculture and enhancing its resilience to climate change (i.e. secure its economic and social existence alongside more modern agriculture). Secondly, by substituting a scarce groundwater resource through surface water collected in the dam.

The second component focuses on building community resilience by improving the water infrastructure, connecting to other water resources and adapting agricultural and social practices in the oases. Specifically, the project aims to implement a holistic approach to enhancing resilience using several approaches. These include modernizing the oases' hydraulic infrastructure, implementing water resource mobilization, improving agroeconomic development by promoting oasis-based production or vocational training, and assisting environmental and social development activities using a participatory planning process. The intention is to revitalize the oases' communities in the Boudnib Valley by ensuring they benefit from new job opportunities.

The third component is focused on cross-cutting sustainability measures, such as technical assistance, groundwater management, environmental and social risk management and knowledge building. One of the main components aims to establish an aquifer contract in the area. Technical and economic advisory services will help farmers improve irrigation practices and promote climate-smart agriculture.

D. GCF PROJECT IMPACT

The expected and actual impacts of FP042 to date

In its funding proposal, the project defines how and what impacts it expects to achieve. For instance, the project's economic co-benefits are expected to affect 5,500 beneficiaries directly through improved access to water and a better irrigation network. The project operates across seven oases and will support some 1,300 farms (mostly smallholders <0.5 hectares per family farm). Also, by the time the project is completed, an additional 4,000 hectares of irrigated agricultural land is anticipated to produce up to 40,000 tons of dates/year, generating ~USD 400 million in sales. This positive economic outcome will Morocco towards achieving its goal of producing 160,000 tons of

dates by 2020.[27] As mentioned above, the project aims to facilitate several other holistic impacts. Local communities will benefit from the participatory nature of the project's community development plans, which will include a specific focus on empowering women and their role in decision-making processes. The project also aims to deliver positive environmental impacts by preserving 1,000 hectares of oases, the biodiversity they contain and groundwater conserved, which may be up to 20 million cubic metres.

Before turning to project impacts, it is important to consider the implicit assumptions in the drip irrigation intervention, particularly regarding the ability and willingness of beneficiaries to pay for the improved supply of water resources. When considering the willingness and ability of beneficiaries to contribute, it is important to note the relatively remote rural area they live in and, particularly, the community's poverty rate of 21 per cent. This is much higher than the national average of 14.2 per cent (poverty rates in communities tends to increase the further they are from cities). The project's funding proposal applied a tariff rate used in a similar project where water users are clustered into associations and pay for approximately 40 per cent of the irrigation system's investments costs and maintenance. The final figure is based on land size (fixed costs) and the volume of water used (variable costs). This tariff rate is broadly similar and possibly slightly higher than the cost of directly extracting groundwater via boreholes and pumps. However, an early feasibility study on the potential for a public–private partnership, as reported in the GCF's 2019 Annual Performance Report for this project, highlighted how, under this model, the tariff rate would not be similar to the current cost of extracting groundwater. Instead, it could be between two to four times more. Moreover, reducing the tariff would rebalance the risk profile between the government and the irrigation system's private operator, bringing the project's sustainability into question. A straightforward solution to this would have been if the funding proposal had conducted a willingness-to-pay contingent valuation exercise whereby beneficiaries revealed preferences might have offered a better basis for project revenue streams than applying a similar project's tariff structure.

Regarding impacts, some of the project's achievements align with what would be expected from the pathways defined in Figure III-1, while other impacts do not. At the output level, impacts are relatively straightforward. FP042 assumes the project will increase the available water supply for agriculture by 30 million cubic metres annually by connecting the Kaddoussa dam. This compares more than favourably with the baseline before the project's inception when the only river water available came from the Oued Guir river. When measured against traditional methods such as *khetttaras* (underground drainage systems connected to aquifers or wells), drip irrigation will increase water supply efficiency to plants.

At an outcome level, the links are less clear. FP042's funding proposal suggests agricultural land will expand by 500 ha per year by establishing large farms. For oasis agriculture, the growth in farm area is limited and unlikely to increase. And while FP042's funding proposal argues extensively that climate change threatens Morocco's crop yields due to aridity, there is no concrete figure regarding how the project will reduce such risks compared to a baseline scenario. Increased water efficiency use is also not expected to have any effect on crop yield loss risks. However, the project is expected to reduce the amount of water crops require by 15 per cent due to the rehabilitation and modernization of existing water infrastructure, such as replacing clay pipes in the oases.

The expected impacts of FP042 on farm output, smallholder farmer resilience and water consumption are also not obvious, ex-ante. Greater aridity due to climate change may depress yields and threaten the ability of oasis growers to continue production through greater and better access to

[27] According to the FAO, Morocco produced an estimated 111,701 tonnes of dates in 2018. Source: FAOSTAT

water. Regarding the ongoing expansion of farm area for dates and maintenance of crop yields, FP042 is most likely going to sustain not increase farm output and smallholder farmer resilience in the presence of climate change. However, it seems unlikely that the efficiency gains from either drip irrigation infrastructure, or the rehabilitation and modernization of existing water infrastructure, will be enough to offset the increasing demand for water by the large farms extending from the oasis. Large farms' demand for water is expected to increase in terms of need per hectare and need per crop. This is something the project recognizes but attributes mainly to the increased demands on water imposed by climate change rather than agricultural expansion.

Currently, project impacts are indeterminable. This is because the project is now in its inception phase. After implementation began in 2018, the focus of FP042 has been on preliminary project execution. According to the 2019 Annual Performance Report, the project accomplished several early deliverables during the reporting period. It finished preliminary studies and technical surveys and conducted multiple capacity-building workshops with oasis farmers and helped create seven agricultural water user associations, among other achievements. Several critical project components are ongoing, including the near completion of the first 22km of the adduction pipeline and accompanying infrastructure.

Further, a survey of water demand for establishing a public–private partnership to manage the water system is under way. However, many project components are yet to be started or completed. This is to be expected given the young nature of the project in its lifecycle.

E. DISCUSSION

Countries need to build and improve their structural and built environments to adapt to climate change stressors. This is particularly important for water supply and distribution. It is also clear that there are already projects and national plans under way in many places, such as Morocco, that address these stressors. Traditionally, water related infrastructure projects, like dams and irrigation facilitates, have been implemented by development finance institutions with an explicit focus on economic growth. Minimal attention is n given to the indirect, harmful environmental consequences of these projects, so long as minimal environmental and social safeguards are met. However, the stage at which such projects become adaptation projects and how and to what extent the GCF should be involved is unclear. Despite the risk of a false dichotomy and lack of definitional clarity between adaptation and development, the GCF is a climate fund whose role is to finance projects or project components in developing countries facing significant climate-related issues.

If the GCF was not involved in FP042, it is possible the project would be a different type of irrigation project, one more akin to the traditional development projects that AFD funds. AFD explicitly involves the GCF to make the project more holistic. AFD provided more than USD 40 million for component one of the project, which focused on building the adduction pipeline to irrigate agricultural areas. The GCF's financial contribution, together with the Government of Morocco's support, funds components two and three. These components will make the project more inclusive, based on the framework in Figure III-1, and help ensure the project delivers greater impact. These impacts include altering the hydraulic and water infrastructure, bringing water from intermediary basins to supplement irrigation, providing technical assistance to farmers, managing groundwater, meeting environmental and social safety safeguards appropriately, and addressing oasis-based agricultural and social systems. These are not the actions typically associated with strictly water infrastructure development projects.

Had the GCF not provided funding, it is possible financing for these project components would have come from other sources, either from another climate fund, the AFD itself or from elsewhere. Yet,

in this instance, the GCF's involvement appears to have made the project more climate adaptation focused, more sustainable in the long run, and dependent on the ability of both small and large farms to willingly pay for the provision of water supply through drip irrigation.

Chapter IV. PROJECT DEEP DIVE – UGANDA

A. CLIMATE CHANGE ADAPTATION ISSUE THE INTERVENTION IS ADDRESSING

Uganda's economy is highly vulnerable to climate change's negative impact on key sectors such as water resources, agriculture, forestry, health, infrastructure, energy and settlements. This situation demands a policy that builds climate change resilience while also promoting economic and social development.[28] Of particular importance in Uganda is the pivotal role of wetlands which have been prioritized by national adaptation planning, alongside the agricultural sector.

Wetlands cover around 11 per cent of Uganda's total land area and are critical for regulating ecosystem hydrology, carbon retention and support a diversity of economic activities. Current drivers of wetland degradation and loss are expected to reduce the extent of wetlands to 5.3 per cent by 2025 if nothing is done to reverse the trends.[29] The degraded wetland landscape affects the livelihoods of the four million citizens who live close by, 80 per cent of whom directly use wetland resources for their household food security. Crop farming is predominantly subsistence-based and rain-fed, with limited irrigation. While crop production has increased over the years, this has been due to an expansion in lands suitable for farming rather than productivity increases. Low crop yields greatly impede the sector's potential. Poor quality agro-inputs, diminishing soil fertility, poor land management, substandard agronomic practices, increased disease and pests, and high harvest and post-harvest losses have contributed to low crop yields and limited food production and availability. [30] Moreover, given that wetlands are highly vulnerable to changes in their water supply's quantity and quality, climate change is likely to substantially alter ecologically essential wetland attributes and exacerbate human activity's negative impacts.[31]

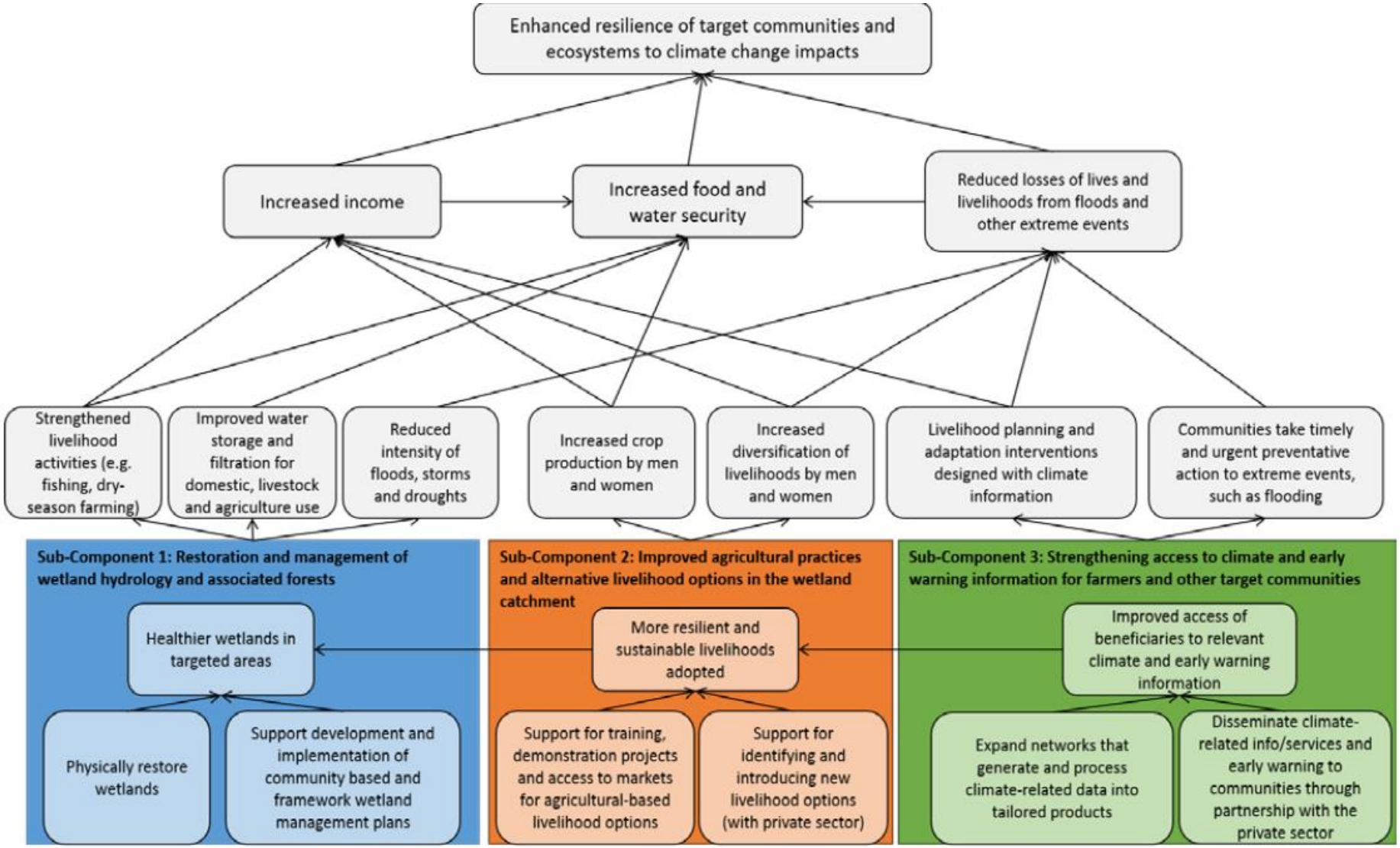
B. INTERVENTION TYPE AND IMPACT PATHWAYS

FP034 'Building Resilient Communities, Wetland Ecosystems and Associated Catchments in Uganda' targets highly vulnerable populations, more than half of whom are women living without sufficient food security in disaster prone districts dependent on climate sensitive, marginal livelihoods. [32] The project aims to achieve the following key interrelated results (see Figure IV-1):

- Restore critical wetlands to improve ecosystem services, such as groundwater recharge, flood control and enhance fishing and agriculture opportunities to improve livelihoods in the most vulnerable subsistence farming communities
- Diversify livelihoods and agriculture to make them more resilient to climate shocks by enhancing beneficiaries' skill set to improve their employability and improve adaptation
- Empower and train communities in sensitive wetland areas in risk reduction and preparedness for climate-related disasters through participatory and decentralized early warning systems and improving capacity to implement disaster risk reduction measures

[28] Uganda National Climate Policy (2015)
[29] Strategic Program for Climate Resilience: Uganda Pilot Program for Climate Resilience (PPCR, 2017)
[30] PPCR, 2017
[31] Erwin, 2009; Jin et al., 2009
[32] GCF/B.15/13/Add.07- Funding proposal package for FP034

Figure IV-1. Articulated theory of change for FP034 as shown in the funding proposal



C. GCF PROJECT DESCRIPTION AND BACKGROUND

FP034 targets communities that are reliant on climate sensitive ecosystems and who subsist using marginal livelihoods. It aims to empower communities that live close to wetlands and enhance their skills in managing wetlands sustainably, supporting resilient agricultural practices and providing alternative livelihoods. Also, FP034 aims to strengthen climate information and early warning systems. The project has targeted districts from two regions: south-western Uganda (six districts comprised of Kabale, Kisoro, Kanungu, Rukungiri, Greater Bushenyi and Ntungamo) and eastern Uganda (10 districts consisting of Pallisa, Kibuku, Bukedea, Namutumba, Butaleja, Budaka, Tororo, Kaliro Ngora and Mbale). These 16 districts have a total population of around four million people and a land area of 13,000km^2.

The project is supported by a USD 24,140,000 grant from the GCF, USD 18.2 in co-financing from the Government of Uganda and USD 2 million from UNDP. The funding proposal for FP034 stems from a collaboration between UNDP Uganda and the Ministry of Water and Environment. UNDP Uganda worked closely with the Director of Environmental Affairs to design the project's three components. During the design phase, the project received considerable support from the ministry and submitted almost 10 submissions to the GCF before the project was funded in March 2017. The project is now in its third year of implementation but is slightly behind schedule. Initial delays were caused by the slow recruitment of a UNDP project manager, which was mitigated somewhat by initial early contracts for NGOs to conduct some preparatory work. This is illustrated in the first project Annual Performance Report, which reflects the project's early emphasis on process issues.

A community member measures the high watermark in the Agu River at the chosen location for establishing the hydrological station. The team from District, MWE and NPC (RIP) study how the trained professional conducts measurement. (13 August 2020)

D. GCF PROJECT IMPACT

Quantitative impacts

During 2019, a total of 4,000 ha of degraded wetlands were restored against a planned target of 10,000 ha. 148.2 km of restored wetland boundaries were demarcated against a planned target of 80

km. Also, a water retention facility was set up in Nyaruzinga's wetlands in the district of Busheny. Work on another facility has commenced in the Ruhorobero- Kandekye wetlands, in the district of Sheema. Project team members carried out community socialization activities and marked the boundaries of the buffer zones in Namakole's inlet stream in the district of Mbale. The project conducted a rapid assessment to generate geo-referenced information on selected characteristics in targeted wetlands. The information generated is being used to design an impact evaluation. Furthermore, hands-on training was provided to project implementers at national and district levels. The training included spatial (GIS) data capture, data management, analysis, and presentation/dissemination (map processing). The training emphasized wetlands mapping/inventories. Two community-based, gender-responsive wetland management plans were developed for Lake Lemwa's wetland in the district of Pallisa and the Ntungwa-Nyabushoro wetlands in the district of Kanungu. Similarly, one community-based catchment action plan has been developed for the Nyakambu wetland.

In the district of Pallisa, a pilot small-scale irrigation scheme was established, with 300 community members utilizing the scheme to conduct all-year production of high-value vegetables and fruits. Increased incomes have enabled households to meet basic household needs and send children to school. In areas such as Limoto and Nyaruzinga, where restoration has already occurred, there is clear evidence that restoring wetlands enhances their regeneration significantly.

Qualitative impacts

A series of qualitative interviews were conducted with district level officials to gauge implementation and results. One key informant recounted his experience of participating in the three project components: wetland restoration, alternative livelihoods and early warning systems. He highlighted how wetlands regeneration has not only increased incomes and health in the community (e.g. through better nutrition from the consumption and sale of fish), but also how wetland restoration has been a good source of water and fodder for grazing cattle (which has been supported as part of the alternative livelihood options within communities). The informant described how smallholders have been able to sow and harvest twice a year, doubling yearly incomes due to wetland restoration and various project activities. In this respect, people in neighbouring districts where implementation has not started urgently await the project to reach their communities.

Interviews with other district officials highlighted that project activities in many districts are still at an initial phase and that it is still too early to speak of project impacts. However, a range of formative activities have taken place, such as undertaking training and awareness-raising, conducting feasibility studies, identifying project areas, establishing farmer groups and carrying-out community sensitization. Informants highlighted a series of pre-conditions that, in their view, would maximize the likelihood of successful impact in local communities. First, district level officials should be involved in the project workplan and budget from the start, as they are the project activity implementors. Interviewees also highlighted the need to define clear boundaries on project implementation processes and suggested harmonizing different stakeholders' different expectations. Moreover, accessing funds should be streamlined to enable better planning of project activities at the district level. Generally, the project is viewed positively, with respondents predicting that many benefits will accrue to their community upon full implementation. However, they also highlighted the challenges they currently face in their interactions with the project, which include:

- Insufficient consultations with communities regarding alternative livelihood options.
- Delays in implementing and accessing funds, leading to a loss of momentum and a lack of behavioural change within communities.
- Political resistance against restoration activities to gain popularity among communities.

- COVID19 related delays in the progress of project activities. For example, in some areas, community leaders can no longer reach the implementation sites because of the lockdown. Similarly, farmers are facing difficulties in transporting their products to major markets.

E. DISCUSSION

FP043 demonstrates strong country ownership by aligning the project with relevant national laws and climate-related policies, strategies and programmes. Stakeholders on the ground valued the inclusiveness during the project's design and implementation. The impact of this project has started to be realized by local communities in different districts where project activities are implemented, including:

- Restoration of more than 4000 ha of degraded wetlands
- Increase in household income from alternative livelihood options
- Building capacity through training in wetland management and the adoption of alternative livelihood methods

One of the excavated fishponds; excavation activities at the Agu demonstration site have produced another four ponds

Chapter V. CONCLUSION

Three project deep dives have taken a case study approach to assessing (expected) project impacts. The deep dives have examined three projects that are archetypical of adaptation interventions through their nature-based solutions, structural interventions and market-based activities – all of which illustrate different approaches to increasing resilience. Based on literature and qualitative data regarding Kenya and Morocco, the evaluation team compared how interventions support adaptation in practice with what would be expected to happen in a theoretical scenario. In Uganda, the evaluation drilled down as far as possible towards beneficiaries to elicit qualitative data on how effectively the project improved household well-being.

The ARAF approach in Kenya aims to achieve social impact results from the platform business to reach smallholder farmers and improve their resilience. GCF's role as an anchor investor appears pivotal. Without the GCF, ARAF would not have been able to leverage additional financing so quickly to enable it to close its funding round. In one interviewee's words, the GCF's brand is the gold standard because it reassures investors that the climate angle would be of the highest priority. The project holds considerable demonstration potential effect.

The example of FP042 in Morocco illustrates how adaptation interventions can be considered a subset of development activities in regions with high climate risks. The project's deep dive found that, without the GCF's involvement, FP042 could easily be perceived as a traditional development project similar to AFD funded projects. AFD explicitly involved the GCF to make the project appear more holistic. It provides more than USD 40 million for component one of the project, building the adduction pipeline to irrigate the agricultural areas. The GCF's financial contribution (alongside the government) makes the project more inclusive. It also appears to have made the project more climate focused. The project's success depends on the ability and willingness of small and large farms to pay for drip irrigation, which appears uncertain. A more precise set of estimations using willingness-to-pay contingent valuation approaches would have provided a much clearer basis for assessing the project's sustainability and impact.

FP043 in Uganda illustrates strong country ownership and a reasonable degree of inclusiveness. This project's impact has started to be realized by local communities, but project implementation has been delayed due to various reasons. The implementation that has taken place suggests that recipients will benefit considerably – the regeneration of the wetlands has increased incomes and improved local health status, improved agricultural production and diversified livelihood strategies. Faster implementation is critical, despite current challenges.

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