

Mapping Financial Mechanisms for Enhanced Rainfed Agriculture in Africa



This document has been written by South Pole and Stockholm International Water Institute (SIWI) as part of the Transforming Investments in African Rainfed Agriculture (TIARA) initiative. We would like to acknowledge the support of the Stockholm Resilience Centre (SRC) and the Sustainable Development Goals Center for Africa (SDGC/A) in the development of this work.

TIARA is an emerging effort to scale up green water and enhanced rainfed agriculture across Africa through financial investments and political leadership. The idea emerged from the 2016 Malin Falkenmark Symposium at World Water Week, where experts called for a revolution to alleviate the world water and hunger crisis. Working through several local, national and international partners, the TIARA initiative is scaling up green water and rainfed agriculture by i) understanding the challenges and opportunities of implementing green water solutions; ii) enabling high-level leadership and political commitments on green water and iii) unlocking public and private investments in green water across Africa.

Acknowledgements to: Xanani Baloyi (SIWI), Cecile Biccari (Contrast Capital), Anton Earle (SIWI), Camélia Essid (South Pole), Alexandra Frank (South Pole), Andre Kruger (SIWI), Alexis Reynoso López (South Pole), Robert Mangani (SIWI), Roel Martens (EIB), Nathaniel Matthews (GRP), Mariano Mejia (South Pole), Tekalign Tsige Sahilu (SDGC/A), Marc Stephens (Open Cities), Anna Tenberg (SIWI) and Peter Vos (GGGI).

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How to cite: Fränkl, L., Madden, K., & Silber, T., (2019), Mapping Investments in Enhanced Rainfed Agriculture.

Cover photo: iStock

Design: Alison Beanland

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Foreword

Natural infrastructure is an area or a system strategically managed by humans such as a forest, wetland or working landscape and provides essential services such as clean and abundant water supply, aquifer recharge and flood control.¹ Natural infrastructure relies on green water, the rainfall available in the soil for plant growth through transpiration.

95 per cent of Africa's agricultural land is rainfed and heavily dependent on green water. Enhanced rainfed agriculture encompasses efforts to direct, capture or store green water. It is a proven and cost effective approach to improving agricultural productivity, reducing vulnerability to climate change and building sustainable livelihoods. Despite low yields and limited alternatives, there has not been wide spread adoption of enhanced rainfed agricultural practices across Africa.

The main barrier to accelerating enhanced rainfed agriculture is a lack of investment. Most farmers struggle with low levels of infrastructure, inadequate advisory services and poor access to capital and to markets. Investors have limited interest in African agriculture due to country, market and climate risks.

Moreover, enhanced rainfed agriculture has remained largely invisible in the discourse around African development with a bias for high tech solutions and largescale dams.

This document shines a light on international financing mechanisms, sources and approaches with the potential to scale investment into enhanced rainfed agriculture. The non-exhaustive mapping include i) public and philanthropic funding, ii) carbon financing, iii) payment for ecosystems services, iv) corporate practices, grants and sustainable procurement, v) impact investments, and conservation finance, and vi) crop and weather insurance.

Written to support the work of Stockholm International Water Institute (SIWI) and South Pole, this mapping provides critical insights for a range of stakeholders involved in enhanced rainfed agriculture including foundations and private donors, international institutions, development banks, national and regional governments, corporates, impact investors, insurance and /or reinsurance companies and risk management services.

South Pole, a leading provider of global sustainability financing solutions and services works with businesses and governments across the globe. South Pole helps realise deep decarbonisation pathways across industries, based on a thorough understanding of climate risks and opportunities in specific sectors, as well as the highest emission reduction standards. A team of over 250 social entrepreneurs globally are developing innovative solutions tailored to the needs of specific organisations and entire sectors and are identifying and implementing actions on the ground with lasting positive impacts on the environment, communities and thereby business.

The Stockholm International Water Institute (SIWI) is a policy institute that generates knowledge and informs decision-making towards a water wise world. SIWI conducts research, builds institutional capacity and provides advisory services in developing countries in areas related to water governance and transboundary water in response to water-related pressures of climate change, energy provision, food production and urbanisation. SIWI organises World Water Week in Stockholm – the leading annual global meeting place on water and development issues – and hosts the Stockholm Water Prize and the Stockholm Junior Water Prize.

Context



Green Water and Enhanced Rainfed Agriculture

Green water is the rainfall available in the soil for plant growth through the process of transpiration. There are critical points in the growth cycle of crops where plants need moisture – brief dry spells in the growing season that may result in significantly reduced yields, even when the overall seasonal rainfall may be sufficient.² The key to managing green water and successful rainfed agriculture, is therefore to capture and maintain soil moisture.

There are a number of well-known and comparatively simple approaches to capturing and maintaining soil moisture. There are different upfront costs for the various approaches including inputs (e.g. seeds, building materials and fertilizers) and labour costs. Some approaches will result in immediate benefits where as others will require a longer term perspective. Some will have ongoing maintenance costs where as others will need the involvement of specific experts, stakeholders or even community organisation. All approaches need to be properly tailored to the local physical and socio economic conditions and need capacity building, training, expertise and technical knowledge. Incentivising farmers to adopt these practices is key.

Capturing green water increases the availability of water by reducing runoff and groundwater seepage. Roof catchment rainwater harvesting system can be easily installed through guiding roof pipelines or more sophisticated Impluvium tanks. Flood flow harvesting comes from valleys, gullies, temporary streams and is then stored in ponds, weirs or small dams. Runoff harvesting is from open surfaces and paths, roads, rocks, and then stored in ponds, underground tanks or other available structures.

There are approximately **33 million** smallholder farms in sub-Saharan Africa representing **80%** of all farms in the region. Small holder farmers contribute up to **90%** of food production in some sub-Saharan African countries.

Maintaining soil moisture or storing water reduces evaporation turning nonproductive evaporation into productive transpiration. Water storage can be achieved through zero tillage, conservation tillage methods and applying agro-ecology methods such as grass strips, mulching, bunding, intercropping, windbreaks, the application of organic/inorganic fertilizer, timely planting, weeding and pest control.³

Green water is a necessary but not sufficient condition for successful rainfed agriculture. The techniques described in this report therefore go beyond pure green water and include soil moisture interventions and in situ water management termed here “enhanced rainfed agriculture”. Conservation agriculture, climate smart agriculture, regenerative agriculture alongside the other solutions described in this document would all fit under this umbrella term.

At a fraction of the cost of large-scale irrigation schemes (see box), enhanced rainfed agriculture can increase yields and enhance local-level food security. Approaches can improve water resources, support catchment management services such as soil erosion and reduce vulnerability to climate change. Effective enhanced rainfed agriculture can also enable rural communities to participate in local value chains and to invest in education and healthcare. Such solutions are creating sustainable livelihoods and providing a route out of poverty which in turn can prevent further ecosystem degradation.

Enhanced rainfed agriculture is a proven and cost-effective way to improve farm output with large scale applications in China and India.⁴ While there have been similar on farm experiments in Burkina Faso, Ethiopia and Kenya with positive impacts and outcomes however, enhanced rainfed agriculture is not being widely implemented across Africa.

Costs of Enhanced Rainfed Agriculture

In a report from 2016, the World Bank summarised investment costs per hectare (ha) of rainfed green water, small-scale (individual, community-based) and large-scale (commercial) irrigation. This study identified that the estimated cost of green water management in rainfed smallholder farms is \$250-\$500 per ha (compared to \$4,500/ha for small-scale irrigation, and \$12,000/ha for large-scale commercial irrigation), which mainly encompasses the upfront costs of establishing the solution, with operation and maintenance costs remaining relatively low. The investment costs associated with rainfed agriculture includes the costs of labour for designing, the purchasing of materials and labour inputs for the construction of infrastructure.

While the study identified that large-scale irrigation had the highest yields (8 t/ha against 2 t/ha for small scale irrigation and 1-2 t/ha for rainfed agriculture), it highlighted that rainfed agriculture had the highest potential to scale and achieve high production at the lowest cost. The latter is linked to Africa's precipitation patterns, topography and surface conditions, which severely limit the areas where irrigation agriculture can be developed. For this reason, rainfed agriculture represents a cost-effective and sustainable solution for increasing productivity while providing many co-benefits to small-scale farmers.⁵

Agriculture in Africa

Agriculture is the backbone of most African economies. Agriculture accounts for 32 per cent of Africa's GDP and more than 60% of the population, or approximately 640 million people, are supported by agriculture.⁶ Meeting the growing food demands of over 1 billion people, a number expected to double by 2050, is a massive challenge to be undertaken. This challenge is exacerbated by land degradation which has reduced the productivity of land and agricultural output by decreasing the ability of soil to retain water and therefore the amount of water available in the soil to facilitate growth.

Looking forward, the adverse impacts of a changing climate, namely increasing temperatures and changes in precipitation patterns, will further challenge these already fragile agricultural and natural systems.⁷ African farmers are water managers and play a critical role in growing food, protecting the environment and managing the water cycle. As the impacts of climate change are increasingly felt, these farmers will play an even more important role in terms of adaptation and mitigation strategies.

In Africa, 95% of agriculture production depends on rainwater. Existing crop yields are low and agricultural productivity in Africa is amongst the lowest in the world, in part due to low tech farming solutions and poverty levels. Productivity is generally achieved by cultivating more land and by mobilising a larger agricultural labour force, that overall produces very little improvements in crop yields.⁸ In this regard, there is significant scope to achieve higher yields through enhanced rainfed agricultural techniques. And there are limited alternative solutions since just over 5% of the cultivatable land area in Africa is irrigable.

All types of farmers, from smallholders through to large scale commercial farmers, can benefit from rainfed agriculture. Subsistence farmers only grow enough to feed themselves and typically have no left over surplus crops to sell at market. There are approximately 33 million smallholder farms in sub-Saharan Africa representing 80% of all farms in the region. Small holder farmers contribute up to 90% of food production in some sub-Saharan African countries.⁹

Small-scale commercial farmers are operating on small parcels of land, lacking advanced and expensive technologies such as irrigation or heavy machinery to assist them on their farms. Their primary objective is to sell products to local or international markets. Large scale commercial farmers utilise large tracts of land to harvest products to be traded in local or international markets where they rely heavily on the use of technologies, agrochemicals, pesticides and irrigation to maximise production.

Enhanced rainfed agriculture projects that specifically focus on women or youth could have a significant impact on agricultural societies in Africa. Women make up 50% of the African agriculture labour force and are mainly focussed on subsistence and smallholder farming. Gender-related issues are often neglected, especially when it comes to the application of such rainfed technologies.¹⁰ With 200 million people between the ages of 15 and 24, Africa has the largest population of young people in the world. Youth unemployment rates, however are double that of adults,¹¹ so enhanced rainfed agriculture offers an excellent employment solution for the youth when there are few practical alternatives.

Investments in Agriculture

Across Africa, there is limited investment in the agricultural sector and even less when it comes to rainfed agriculture and / or smallholder farmers. Even though half of Africa's population is employed in this sector, providing one third of GDP, less than 1% of overall bank lending in Africa is directed towards the agricultural sector.¹² In addition, climate change impacts are expected to be more significant than in other regions of the world, yet Africa only receives a total of 5% of global climate finance investment.¹³

The use of credit (formal, informal, tied, and untied) for financing farmers' working capital is extremely low.¹⁴ Across Africa, farmers primarily finance agricultural activities with cash from nonfarm activities and crop sales. The total amount of debt financing available to smallholder farmers in the developing world is approximately USD9bn. This amount equates to less than 3% of the financing needs and demands of smallholders in Africa, calculated to be USD450bn globally.¹⁵ To date, small scale investments in enhanced rainfed agriculture would be unlikely to attract commercial finance and financing has predominantly come from public sources. The level of public and private expenditure in rainfed agriculture has long been insufficient to foster a conducive environment to sustain rural livelihoods.

Enhanced rainfed agriculture has struggled to attract investment for a complex set of reasons. One key barrier is the nature of farmers, particularly smallholder farmers who tend to suffer with low levels of infrastructure and utilities, poor access to markets, limited access to credit and other financial services alongside issues with land tenure and lack of knowledge and inadequate extension services. Any investment in enhanced rainfed agriculture would therefore have to address these challenges including financing into capacity development, awareness raising and knowledge generation. Providing funding to large numbers of African farmers would have high administrative costs and sustainability of enhanced rainfed agriculture projects is also a concern due to efforts that have failed in the past.

Another key barrier is the context specific nature of enhanced rainfed agriculture solutions. What works in one area may not work in others due to soil structure, rainfall patterns, climatic variations and other geographical features. This makes replication and scale up difficult. To some degree, the solutions are simple but how investments are made can vary significantly, from individual farmers to collective groups, from single

interventions to integrated approaches and from on farm solutions to landscape approaches. These variables mean the associated costs and benefits will vary significantly and are difficult to compare and assess.

Investors have tended to view the risks associated with financing African agriculture as too high; due to country, market and climate risk; including the risk of droughts. This is often further complicated by inefficient systems and a poor governance culture. The Return on Investment (RoI) is seen as unattractive to many investors due to the fragmented nature of farmers, high administration costs and the inability to benefit from the economics of scale. Coupled with the enhanced risk profile that now goes hand in hand with a changing climate, enhanced rainfed agriculture can be a difficult sell.

Green water and enhanced rainfed agriculture have remained largely invisible in discussions around African development. This is partly due to the challenges in categorising green water and enhanced rainfed agriculture, which tends to fall between traditional areas of responsibility or the Sustainable Development Goal (SDG) targets (rainfed agriculture touches on targets set out in SDG 2 (Zero Hunger), 6 (Clean Water and Sanitation), 13 (Climate Action) and 15 (Life on Land)). Subsequently, enhanced rainfed agriculture has not been viewed as a development opportunity and garners little attention, often falling between the cracks.

In the agricultural water sector, central governments can be biased towards blue water infrastructure with technologies such as rainwater harvesting considered to be a household or farm-level task.¹⁶ Both policymakers and farmers alike perceive rainfed agriculture as an outdated technique designed to keep African agriculture on a low-tech level rather than helping it strive to modernise. Linked to this, investment tends to prefer and react to new technologies, so the perceived lack of innovation and modernisation can be unappealing for investors.

These political, social, technical, institutional, and environmental barriers make it complex for investors to consider parting with their money. Yet at the same time significant resources will be required to shift flows of investment towards green water and enhanced rainfed agriculture. Meeting these needs will require a scale up of existing solutions and exploring new ones.

Finance Mechanisms







This briefing document is centred around six financial mechanisms for enhanced rainfed agriculture. Based on both primary and secondary research, the six mechanisms reflect existing efforts to fund green water solutions in Africa and potential opportunity areas.

Financing for enhanced rainfed agriculture in Africa is relatively unexplored and access to credits for agricultural activities is limited for farmers. While this report did not focus on distribution mechanisms it mapped a non-exhaustive list of international financing mechanisms with the potential to scale investments into enhanced rainfed agriculture.

They include i) public and philanthropic funding, ii) carbon financing, iii) payment for ecosystems services, iv) corporate practices, grants and sustainable procurement, v) impact investments, and conservation finance, and vi) crop and weather insurance. A summary of these findings can be found in Appendix I.

Under the six headings, there is a high-level definition explaining how each financial mechanism functions, along with two to three indicative examples.

Finally, comments are provided on the risks and opportunities for each financial mechanism, including the potential for achieving an impact in terms of scale and applicability for different farming segments. This is not a comprehensive assessment of financial flows into African rainfed agriculture but offers some valuable insights into the potential opportunities and innovations in this context.

1  Public and Philanthropic Funding	4  Corporate Practices, Grants and Sustainable Procurement
2  Carbon Finance	5  Impact investments and Conservation Finance
3  Payment for Ecosystem Services	6  Crop and Weather Insurance

1 Public and Philanthropic Funding



OVERVIEW

Donor and philanthropic grants are one of the main instruments used to finance sustainable agriculture in developing countries. In Africa, grants have been widely used in different contexts by government departments, international agencies, multilateral development banks (MDBs) and foundations. In terms of rainfed agriculture, financial institutions, international governments and development agencies have provided finance grants to local organisations who in turn is tasked with delivering capacity building or green water management practices, at the farm level.

Grants typically require written applications that come with reporting obligations and are therefore limited to applicants with relevant technical and institutional capacities, such as NGOs and large-scale commercial farmers. This can make it difficult to ensure that financing directly reaches smallholder farmers. However, the grants provided can indirectly help smallholder farmers to improve water management practices through the development of technical capacities or enabling training and material inputs.

Definition	Non-recoverable or recoverable funding that is provided at below-market conditions.
Key stakeholders	Development agencies and MDBs funds by public/private partnerships, local NGOs.
General incentives	Climate change mitigation and adaptation, sustainable development, food security, agricultural productivity, business growth, water scarcity.
Typical investment mechanisms	Grants, subsidies, guarantees, soft loans, guaranteed philanthropy.

EXAMPLE

African Water Facility

The African Water Facility (AWF) was established in 2004 by the African Ministers Council on Water (AMCOW) and is hosted and managed by the African Development Bank (AfDB). AWF awards grants of between EUR50,000 and EUR5,000,000 to water projects requiring financial and technical assistance in order to implement it. The AWF supports project preparation, water governance and water knowledge projects designed and acts as a catalyst when it comes to the development of the water sector in Africa. Occasionally, the AWF also provides grants to implement small-scale pilot projects.

Since 2016, the AWF has mobilised EUR151.2 million from international financial institutions, international foundations and African governments to over 104 projects.¹⁷ For projects to be awarded a grant, they must be bankable and direct beneficiaries typically include national governments, municipalities and NGOs who can then channel resources to farmers or other indirect beneficiaries.

● Community water management improvement project for traditional farmers in Zambia¹⁸

The AWF provided a grant to a Zambian NGO, Development Aid from People to People (DAPP) whose goal is to strengthen the water management skills of local farmers. The grant supports the management of on-farm water resources to increase productivity and income generation. In turn, this helps subsistence farming to become more commercially viable and includes a rain-fed farming component through improving water infrastructure.

This project focuses on improving the conditions and governance of existing and new water storage infrastructure. Three multi-purpose small dams were successfully rehabilitated and a new one constructed. The funding was used for these construction activities, associated project management and developing guidelines for the construction of dams and for the preparation of bankable projects.¹⁹ Farmers did not receive direct funding but were instead indirect beneficiaries from the construction and use of water harvesting infrastructure.



EXAMPLE

World Bank Adaptation Fund

The Adaptation Fund was designed to finance climate change adaptation projects and programs in developing countries and since 2010 has committed USD532 million to projects. The Fund is financed by governments, private donors and a 2% share of proceeds from the Certified Emission Reductions (CERs) issued under the Kyoto Protocol's Clean Development Mechanism (CDM). Funding is available in the form of innovation grants up to USD250,000 and are accessible to accredited national implementing entities (NIEs). Currently, there are 28 accredited NIEs including legal entities in Ethiopia, Kenya, Morocco, Namibia, Niger, Rwanda, Senegal, South Africa and Tanzania. Three out of nine thematic areas are relevant to sustainable agriculture, including water management, agriculture and food security. The Fund also provides readiness grants to help NIEs provide peer support to countries seeking accreditation.

● Promoting Climate-Smart Agriculture in West Africa

The Adaptation Fund provided USD14,000,000 for a Climate-Smart Agriculture initiative in West Africa which was led by the ECOWAS the Regional Agency for Agriculture and Food and the Directorates in Charge of Environment, Agriculture and Livestock in Benin, Burkina Faso, Ghana, Niger and Togo. The regional initiative had three components; strengthening knowledge and technical capacities, scaling up best practices in agriculture and pastoralism and sharing knowledge. The grant also included financial support for project management and implementation. As part of scaling up best practices, the project promoted the adoption of activities related to water management on 3,000 ha of land. While farmers were not the direct beneficiaries of the project, they were consulted as part of a larger stakeholder group that included regional institutions, NGOs, technical professionals and other stakeholders. The project was approved in 2018 and will remain active until 2021.

EXAMPLE

Land Degradation Neutrality Fund

The Land Degradation Neutrality (LDN) was launched at the Conference of the Parties (COP)13 by the United Nations Convention to Combat Desertification (UNCCD), the Sustainable Trade Initiative (IDH) and asset manager, Mirova. With an initial target of USD300 million, it is leveraging public money to raise private capital for sustainable land management and landscape restoration activities worldwide. A Technical Assistance Facility (TAF) is being set up to support those seeking help to develop sustainable land use projects. Managed by the IDH, the TAF is sponsored by public institutions and private donors and presents a good example of utilising grants to prepare projects for commercial funding. In January 2019, the LDN made its first investment in Urapi Sustainable Land Use (Urapi), a programme designed to restore degraded land in Latin America through agroforestry practices.²⁰

EMERGING INSIGHTS

Donor and philanthropic investments are a key source of financing for sustainable agriculture in Africa and therefore have the potential for enhanced rainfed solutions. Donor and philanthropic grants have been historically used to support subsistence farmers, small-scale commercial farmers and large-scale commercial farmers directly through subsidies for the acquisition of raw materials and construction materials and indirectly through the construction of water infrastructure and capacity building.

Donor and philanthropic grants have the potential to make a greater contribution to aid enhanced rainfed solutions. Although there is financing for a broad set of sectors and agricultural activities, in practice the scope is often so wide that it tends to limit the financial resources used specifically for agricultural water management. If topic-specific finance solutions were designed to target small-scale and subsistence farmers, there could be a greater focus on enhanced rainfed agriculture particularly if solutions target relevant, local NGOs. Disbursement of funds can also be complex as grants are only provided to accredited institutions, such as NGOs or local governments thus limiting its scope, or requiring multiple stakeholders to be involved. This is reducing the number of funded projects while also restricting accessibility to funding.

A core message for funding organisations is that they need to provide specific funding windows that focus on enhanced rainfed agriculture and are adapted to the specific contexts of agricultural smallholders. Donors and philanthropic institutions could then map the NGOs working along side subsistence and small-scale commercial farmers in priority regions. Capacity building activities could also familiarise stakeholders with different mechanisms and how to make enhanced rainfed projects bankable in the short to mid term.

Donor and philanthropic grants are of critical importance in reaching smallholder farmers but are limited in terms of their impact and scale. It is therefore essential to make effective use of such grants and leverage this funding source, for example, by kick-starting investment processes. Blended finance approaches, where donor or philanthropic grants are combined with loans or equity from public and private financiers, are viable innovative financial mechanism for the funding of enhanced rainfed agriculture. For example, a Technical Assistance (TA) grant made available from the LDN Fund TAF, would have the added benefit of providing TA that would assist with the preparation of projects so that the farmers could reach the bankability and eligibility thresholds for investment, allowing more scalable funding to be available.



OVERVIEW

Carbon finance uses market-based approaches to incentivise the reduction of greenhouse gas (GHG) emissions. Carbon finance includes financial transactions with voluntary carbon markets, where carbon credits generated from emissions reduction projects are then on sold, to voluntarily offset emissions. Carbon credits generated from emissions reduction projects can also be used for compliance markets, where private sector players use a carbon credit system to cover emissions that would otherwise need a carbon price for example in Europe, Australia, Colombia and South Africa.

Governments can also pay other governments to reduce their emissions through multilateral mechanisms such as the World Bank's Forest Carbon Partnership Facility. A new international mechanism under Article 6 of the Paris Agreement, enables bilateral payments of carbon reductions that generate Internationally Transferred Mitigation Outcomes (ITMOs), where one government pays for emissions to be reduced in a host country. However, the reductions are featured in the GHG inventory of the country that paid for them, and as such, must be additional to the policies and targets listed in the host country's own Paris Agreement targets represented in the nationally determined contributions (NDCs) plans.

Definition	GHG emissions (usually measured as tonnes of CO ₂ equivalent) are assigned a price, and therefore, the value of projects is assessed in terms of emissions reduction. There are three main approaches: ²¹ <ul style="list-style-type: none"> • offsetting: Companies or individuals can invest in climate protection projects to compensate for their own carbon emissions. Investors do not have to directly decrease their own emissions, but they provide the funding for projects which contribute to an estimated future emissions reduction, therefore 'offsetting' their own; • insetting: This concept refers to companies or investors seeking to develop climate protection projects within or closely related to their value chain to reduce emissions. • public sector carbon finance transactions: Funds are allocated through carbon instruments with the purpose of scaling up emission reductions, focusing on readiness for market-based carbon initiatives, increasing access to energy in less developed countries and reducing emissions from deforestation and forest degradation.
Key stakeholders	Private sector players with climate neutrality targets, multilateral development banks, governments, NGOs.
General incentives	Climate change mitigation and adaptation, water and soil conservation practices, rainwater harvesting, sustainable development, food security, agricultural productivity, water scarcity, ecotourism, resilience.
Typical investment mechanisms	Result-based payments, grants.

EXAMPLE

Lake Naivasha Reforestation, Kenya²²

In Lake Naivasha, reservoir water was of poor quality and quantity due to unsustainable land use, a poorly functioning sewage treatment system and significant extractions of water abstraction by downstream farms, cities and to facilitate electric power generation.

To reduce environmental and water pressures, the Lake Naivasha Reforestation Project designed and implemented agroforestry activities for smallholder farms such as shading, decreased run-off, increasing soil organic matter, increasing soil humidity, and green water management practices. South Pole managed the overall project, while the World

Wildlife Fund (WWF) coordinated activities and conducted capacity building with farmers. The Swiss retailer Coop provided their suppliers with high-quality seedlings and technical support to upscale a functioning nursery. The implementation of sustainable land and water use practises aims to offset up to 42,000 tCO₂e of Coop Switzerland's emissions. Coop suppliers have been encouraged to improve their corporate water stewardship practice as they participate in the analysis and support of the basin's reforestation activities. So far, the project has helped communities alleviate soil erosion, air pollution, firewood shortages, and protect water resources.



EXAMPLE

World Bank Carbon Finance Funds

Carbon funds can provide solutions for financing cost-effective emission reductions and direct mitigation finance towards developing countries. One example illustrates this.

The BioCarbon Fund is a public-private initiative that mobilises financing to reduce emissions aimed at projects that sequester or conserve carbon in forests and agro-ecosystems.

The BioCarbon Fund supports sustainable landscapes, climate-smart land use and green supply chains through planning, policies and practices. The Forest Carbon Partnership Facility is a global partnership created to reduce emissions from deforestation and forest degradation. The Facility promotes forest carbon stock conservation, the sustainable management of forests and the enhancement of forest carbon stocks (REDD+). It is made up of two separate but complementary funds: a Readiness Fund to prepare for REDD+ and a Carbon Fund to provide payments for verified emission reductions from REDD+ programmes.

● The Kenya Agricultural Productivity and Sustainable Land Management Project

Key stakeholders: World Bank BioCarbon Fund,²³ Vi Agroforestry, Government of Kenya

Farmers in Kenya's Nyanza and Western provinces have been exposed to unpredictable rainfall, droughts and soil degradation. The Kenya Agricultural Productivity and Sustainable Land Management Project (KAPSLMP) facilitates farmers in strategic areas to adopt smart agriculture skills without reducing their incomes; to reduce and mitigate land degradation and to support the maintenance of critical ecosystem functions and structures. Activities and resources that trickle down to farmers include capacity building for sustainable land management (SLM) and investments into community SLM micro-projects for combating land degradation. Other resources were allocated for policy and institutional strengthening.

In 2015, the project revealed that 25,000 tons of carbon was captured, thus generating carbon credits paid from the BioCarbon Fund, that provided an extra layer of support and income to small and medium-sized landholders.²⁴ Despite challenges with the methodology and concerns over baselines and monitoring, reporting and verification (MRV),²⁵ the potential of this solution for scaling up enhanced rainfed agriculture is notable since carbon sequestration practices complement green water management. However, carbon funds may struggle in achieving scale up.

EMERGING INSIGHTS

Carbon finance presents a financial opportunity for large-scale commercial farms or organised farmer groups, particularly those operating within the supply chain of an agribusiness. For example, REDD+ plays host to a wide range of parallel activities, where enhanced rainfed agriculture could be incorporated efficiently into national strategies to increase the likelihood of receiving funding through government-to-government agreements, Norway and Indonesia's cooperation on deforestation,²⁶ or multilateral carbon funds. However, in order for payments to trickle down to participating farmers, land tenure reforms are necessary – but also challenging in Africa – causing real impediments to the success of REDD+²⁷. The private sector can fund emission reductions through voluntary frameworks such as the Verified Carbon Standard (VCS), the Gold Standard and UNFCCC's (Clean Development Mechanism's (CDM)) Climate Neutral Now. Across a company's value chain, insetting encourages green water and carbon sequestration synergies within the supply chain activities of agribusiness both in a local context and voluntary carbon schemes.

Despite the potential of carbon financing for rainfed agriculture, there are still barriers blocking implementation at scale. Offsetting and insetting projects provide farmers access to carbon finance but any interventions must generate carbon credits. Tree planting and forest conservation are accessible ways to create carbon credits, but less attention has been given to soil management and rainwater harvesting techniques where credits are harder to generate, and offset potential is still under development. Significant scaling of offsetting and insetting would further require full implementation of MRV systems and the establishment of multilateral mechanisms.

Carbon finance still presents a significant potential opportunity. Detailed rules on accounting for Science Based Targets (SBTs)²⁸ – a key initiative from the private sector that will spur additional demand for on-farm, low-carbon interventions – are still under discussion and may have reduced MRV requirements compared to offsetting or insetting. This will allow for a more pragmatic approach to account for factors like soil carbon sequestration. This means untapped potential for enhanced rainfed agriculture, such as boundary planting, reduced tillage or composting, to access carbon finance. There is also momentum to develop MRV methods for soil organic carbon stocks and stock changes.²⁹ Positive impacts off-farm, for example, reduced or reverted land degradation or increased water retention and availability, are strong arguments to support and adopt enhanced rainfed agriculture and compensate farmers for their efforts to increase carbon sequestration.

Voluntary and compliance offsetting are evolving as NDCs continue to develop. While all African governments have submitted an NDC, developing comprehensive NDCs are a challenge. African countries do not always have the resources or capacity to report and update their NDC plans and targets according to the new Paris Agreement rules. This also involves developing the appropriate MRV systems to establish carbon baselines and to measure progress. South Africa is the only African country that has a carbon price (through a carbon tax). While the Ivory Coast is considering implementing a carbon price, it will take time for more African countries to use carbon pricing as a way of mobilising domestic carbon finance.

Other financial instruments in carbon finance are continuing to gain traction, such as concessional loans. A key driver here is the Green Climate Fund (GCF)³⁰ which was financed by the African Development Bank, through the Programme for Integrated Development and Adaptation to Climate Change in the Niger Basin (PIDACC/ NB) with a USD10 million concessional loan and a USD58 million grant. The programme is striving to preserve basin ecosystems and biodiversity, improve adaptability to climate change and reduce more than 7 million tCO₂e emissions throughout the project's lifetime.³¹

3

Payment for Ecosystem Services



OVERVIEW

There is an increasing recognition of the importance of ecosystems and the service they provide when it comes to food, fresh water, fuel and habitats. Various attempts have been made to value these services and to use market mechanisms to finance their protection. Payments for Ecosystem Services is the name attributed to the variety of arrangements through which the beneficiaries of environmental services, from watershed protection and forest conservation to carbon sequestration and landscape enhancements, reward those whose lands provide these services with subsidies or market payments.³² Enhanced rainfed agriculture also provides such services including soil conservation, structure and fertility of soil, carbon sequestration, erosion control, nutrient recycling, water management and even improved resilience to climate change.

PES schemes include Green Water Credits (GWCs), evapotranspiration quotas and payments for watershed services.³³ In Africa, there is limited empirical information on PES schemes; however, determined to provide water to densely populated areas, two PES programmes were created in Kenya and Tanzania.

Definition	Landowners or managers are paid for the provision of defined environmental services, or for a particular strategy that will contribute to generating desired environmental services. This will be paid by users or beneficiaries of these services, for example, city users seeking to protect their water resources (payments for ecosystem services, PES). There are three broad types of PES schemes: <ul style="list-style-type: none"> • public payment schemes through which governments pay land or resource managers to enhance ecosystem services on behalf of the wider public; • private payment schemes, self-organised private deals in which the beneficiaries of ecosystem services contract directly with service providers; and • public-private payment schemes that draw on both government and private funds to pay land or other resource managers for the delivery of ecosystem services.
Key stakeholders	Landowners or managers, NGOs, companies, governments
General incentives	Climate change mitigation and adaptation, water and soil conservation practices, rainwater harvesting, sustainable development, food security, agricultural productivity, business growth, water scarcity, resilience.
Typical investment mechanisms	Grants, results-based payments or water fund vehicles. Green water credits have been developed as a specific mechanism but have not generated significant traction.

EXAMPLE

GWC Schemes and Upper Tana-Nairobi Water Fund

In Kenya's Upper Tana catchment area, the GWCs programme has been successful due to recognition by users that as land and water resource demand increases, so does its deterioration. Downstream water users are willing to pay for water management in the catchment area and policies, such as the enabling framework of the 2002 Water Act, implemented by the Water Resources Management Authority demands that water be preserved as an economic benefit.³⁴ While GWCs are an innovative approach, it did not manage to gain traction among farmers.

Building on the GWCs programme, the Upper Tana-Nairobi Water Fund brings together public and private donors as well as major water consumers downstream to contribute to the Fund and support upstream water and soil conservation measures (including Nairobi City Waters & Sewage Company, Kenya Electricity Generating Company, Pentair Inc, Coca Cola, East Africa Breweries Ltd, International Centre for Tropical Agriculture, the Global Environment Facility, the Government of Kenya, Water Resources Management Authority, Tana & Athi Rivers Development Authority, the International Fund for Agriculture and Frigoken Kenya Ltd). The Water Fund aims to improve water supply, foster

a healthier freshwater ecosystem and improve the livelihoods of farming communities.

The Water Fund model brings together several stakeholders – the farmers, the water users and the water suppliers, while also training and providing resources and equipment to assist farmers. The Fund's business case indicated that a USD10 million investment in water-fund interventions is likely to return USD21.5 million in economic benefits over a span of 30 years. The Nairobi Upper-Tana Water Fund³⁵ was created to provide benefits, but the fund has struggled to raise sufficient local investment to the scheme.

EMERGING INSIGHTS



PES is attracting significant global attention as a market-based approach to valuing and managing the environment and there are some successful examples such as the Nature Conservancy's Water Funds in Latin America. PES appears a good fit for enhanced rainfed agriculture particularly in terms of reaching subsistence and smallholder farmers. However, there are also a few successful cases in Africa to build on but PES schemes are not without challenges. Most schemes are local in nature which make them challenging to replicate or scale up. Most schemes have struggled to attract blended finance and/or international corporate finance. In Tanzania's Uluguru Mountains, the potential for success largely depended on the participation of smallholders and for others on how best to incentivise the participation of these farmers.

PES implementation barriers are related to land tenure issues, high transaction costs, lack of clarity in terms of opportunity costs, high investment costs of adopting PES-related land-use practices, lack of awareness and inefficient technical knowledge required for measuring and monitoring the impact of PES activities.⁴⁰ In Africa, there is an additional challenge on the demand side since water is under-priced and stakeholders are reluctant to participate or invest, despite the promising benefits. This is known as the free rider risk, whereby those stakeholders who do not pay still reap the benefits of the investments of others. For this reason, Tanzania has struggled with companies that are unwilling to join payment for ecosystem service schemes.

Collective action funds can provide an opportunity to engage several water users around a shared goal and overcome some of the challenges of PES. Companies can also partner with an independent organisation to lead the process which can avoid local resistance and ensure good governance. Local Water Balancing Funds (WBFs) combine the idea of Collective Action funds with 'water balancing' strategies, such as that from Coca-Cola, PepsiCo and LafargeHolcim, where the local water footprint is 'balanced' by investing in watershed projects with quantifiable water outcomes. Local WBFs could make it easier to understand the stakeholders concerns and thus reduce the problems of free riding within watersheds. Emerging methodologies on SBTs for water could also create a localised demand for water benefits and thus contributions to local water funds are made from the private sector.

Good payment services and transparent fund management can further promote the upscaling, continuity and sustainability of PES programmes. Technological tools, such as apps or even blockchain applications, could provide a solution for facilitating payment for the services that local farmers are implementing. This could also keep them up to date on the prices and innovations that their neighbours are achieving to improve their resilience through a rainfed agricultural livelihood.

Without some innovation, the potential scale up of PES remains low.

EXAMPLE

'Equitable Payments for Watershed Services' Programme in the Uluguru Mountains, Tanzania

The Equitable Payments for Watershed Services' Programme was intended to protect the Ruwu River's water supply to Dar es Salaam by establishing an operational, self-sustaining PES over a five year period (2006-2011). Working with a range of partners including WWF, CARE Denmark, Dar es Salaam Water and Sanitation Company (DAWASCO) and Coca Cola Ltd, the project aimed to introduce incentives for sustainable and alternative land-use systems and technologies such as terracing, boundary planting and the elimination of slash-and-burn techniques. The idea was that downstream water users would compensate farmers who engaged in sustainable land management activities upstream.³⁶

The largest users of water signed a memorandum of understanding in 2006 but by 2010 only USD1,600 had been received and transferred to 144 participants. Each farmer received between USD8-USD48, according to the area of land converted to improved farming technologies.^{37,38} Since a small number of farmers joined the scheme, only small amounts of funds were forthcoming and DAWASCO remained the only beneficiary to make payments.³⁹ Today, the future of the scheme is uncertain.



OVERVIEW

Corporate sustainability funding has become a significant source of financing for sustainable agriculture and water use.⁴¹ Aside from philanthropy, the private sector is not directly linked when it comes to accessing capital but corporate practices, grants and sustainable procurement offer a relatively unexplored financing opportunity. There are different ways that companies incentivise sustainable practices and present opportunities to scale enhanced rainfed agriculture by (1) certification and standards (2) allocating specific funding to projects along their supply chain and (3) incorporating them into their core business practices.

As consumer responsibility is on the rise, companies must comply to various standards and certification schemes along their value chains. However, for agribusiness or corporations, most enhanced rainfed agriculture are relatively new and are not yet integrated into such standards and practices. So while enhanced rainfed agriculture must be integrated into the various frameworks that corporations are signatories to, this is a promising opportunity to upscale solutions among large, medium and small-scale farmers.

Corporate investments have been given a lot of attention to funding social innovation via grants or funds (e.g. Knorr, Danone) which invite several players such as NGOs, local beneficiaries, suppliers and buyers to co-create and build sustainable solutions for the activities and resources of the business value chain. There is value in reviewing such corporate investments and exploring if and how green water can be integrated into such grants and funds.

However, there is an opportunity to go one step further and embed enhanced rainfed agricultural solutions across core business practices. Africa's agribusiness sector is predicted to reach USD 1 trillion by 2030, and the sector has been described as the 'new oil' on the continent.⁴² Investment from the private sector, namely multi-national agribusiness, can have significant influencing power over farming communities within their supply chain by increasing capacity and incomes.

Definition	Corporate grants and sustainable procurement pursue societal goals, specifically those relating to sustainable development – environmental protection, social justice and equity, and economic development – and at the same time, recognising the importance of corporate growth and profitability.
Key stakeholders	Private sector (e.g. Nestlé, Procter & Gamble, Unilever and IKEA), NGOs and the public sector, IDH.
General incentives	Sustainable sourcing, SBTs and other climate targets, water stewardship, zero deforestation, biodiversity conservation, resilience, community livelihoods, legal compliance, food security, agricultural productivity, business growth, CSR communication and certification.
Typical investment mechanisms	Price premiums, grants and corporate fund vehicles.

EXAMPLE

Corporate Funds

The Knorr Sustainability Partnership Fund⁴³ is intended to support the suppliers of the company and has partnered farmers on sustainable agriculture. Knorr invests half of its budget as defined in a specific project and the other half is then matched by investment from partnered farmers.

The fund primarily focuses on innovative ideas and the implementation of sustainable agricultural practices. This includes, ensuring that water resources are protected and sustainably used within a landscape, as well as

supporting farmer-led experiments for capacity building that include irrigation practices and soil protection. Each year, the fund co-invests EUR1,000,000 which is distributed to the winning applicants (suppliers and farmers) in the form of expertise and necessary equipment to accelerate the implementation of sustainable practices.

The Danone Ecosystem Fund⁴⁴ is a social innovation fund created in 2009. The goal is to develop inclusive business solutions in line with Danone's social and economic values together with its ecosystem partners that include small

producers, farmers, distributors, vendors, and micro-entrepreneurs. Projects are proposed by local subsidiaries of Danone and co-developed with various NGOs (e.g. Care, Ashoka) and the 'beneficiaries' or small players in the local economy.



EXAMPLE

Unilever and Government of Tanzania in the Tea Industry

In 2013, Unilever and the Government of Tanzania signed an agreement to reinvigorate Tanzania's tea industry. In cooperation with the government, Unilever trained 96,000 farmers within their Sustainable Agriculture Programme to source tea from 6,000 ha of smallholder farmers in order to improve the supply chain, the quality of tea provided, and the livelihoods of the farmers.⁴⁵ This case study highlights the role of sustainable procurement targets in providing an incentive for investments into farming communities.

EXAMPLE

Standards and Certification Schemes

The Alliance for Water Stewardship (AWS) Standard⁴⁶ offers a plan for water users to sustainably manage their own water usage and analyse the impacts. It also encourages collaboration and transparency for sustainable water management within a wider water catchment area context. Certification demonstrates that a site has successfully completed each of the six steps set out in the AWS Standard and it must be renewed every three years. Corporations, such as Nestle, have as a result, improved water management in their manufacturing sites, in local watersheds, across their agricultural supply chains and in delivering access to water to the communities in which they are present.

The Rainforest Alliance (RA)⁴⁷ assists farmers in protecting ecosystems and biodiversity by transforming land-use and corporate practices through a variety of forestry, agriculture, and, tourism programmes. Products are labelled and the programmes are implemented through a network of NGOs that also function as certification bodies. To ensure market access, RA encourages consumers to buy certified products at a higher price through a free market approach as the programme does not set a fixed price premium. RA works with a number of basic principles including environmental, social and economic aspects.

EMERGING INSIGHTS

Corporate financing of enhanced rainfed agriculture can be incentivised through certification schemes and standards. The potential of this approach is currently limited as there is no specific criteria for enhanced rainfed agricultural solutions in existing certification and standard frameworks. Most agricultural certification standards regard 'efficient' water as an accepted solution and, in most cases, farmers choose to use drip irrigation in order to fulfil the criteria to receive certification. Existing and widely used standards such as the Global GAP SPRING⁴⁸ standard for sustainable water management at the farm level or the ISCC Plus,⁴⁹ a certification for food, feed, bio-based products, energy and biofuels outside the EU), can adopt the use of enhanced rainfed agriculture into their criteria.

A further incentive for scale amongst farmers is access to price premiums, which are typically available when applying for a certification standard. Similarly, target setting by corporations that include green water practices, or development of a global commitment for corporations, for example, a 'Corporate Green Water Alliance' similar to the Net Positive Project,⁵⁰ Nature4Climate⁵¹ or RE100⁵² could further incentivise corporations to invest in rainfed agriculture systems along their supply chains.

Through disclosing corporate social responsibility (CSR) efforts and targets corporations can have a significant influence on sustainable practices operationally and along their supply chains. Agribusinesses often have 'Responsible Sourcing Principles' or 'Good Agricultural Practices' policies that they share publicly in their CSR reporting and cover a range of issues from human and labour rights to environmental and business integrity. These principles and policies are applied to all suppliers and therefore also apply to farmers along the supply chain. Such policies present a potential avenue for sustainable water and soil management practices to be encouraged or required.

Funded projects have a direct benefit in the business value chain and the funding is intended to be accessible to suppliers, farmers and farmer groups. While there are few existing options that focus on enhanced rainfed agriculture, the Coca Cola funded Agriculture of the Future Project⁵³ is an example of corporate financing of a green water solution, whereby farmers were encouraged to take part in training sessions and granted access to seeding machines that retained soil moisture in their fields. Corporations have the capacity to reach vulnerable communities where the need for adaptation measures remains high. Funds and grants mainly focus on smallholders rather than larger commercial partners, resulting in sustainable practices being diffused locally. Capacity building and education should also be provided to farmers to lower the risk of failure and foster the momentum needed for adopting any new green water management practices.



OVERVIEW

Impact investments aim to generate positive, measurable environmental and social impacts, as well as financial returns. In 2018, the International Finance Corporation (IFC) indicated that the impact investment market grew fivefold between 2013 and 2017 and is now estimated to have USD228 billion in assets under management with further growth expected.⁵⁴ Conservation finance is a form of impact investment that focuses particularly on sustainable agriculture, forestry, fishery and tourism. As investors track GDP and sector growth as key variables for potential investments, recent developments in Africa have attracted the attention of investors. Particularly, in Kenya and Uganda, where both countries have been the focus of impact investment in the region.⁵⁵

Depending on the investor's goals and the market of interest, returns can be expected to be below or at market rates. Impact investments are usually made into companies, organisations, vehicles or funds and can be used to provide microfinancing through local microfinance institutions (MFIs). These MFIs lend on international investments to local smallholders based on a set of agreed conditions. Providing smallholder farmers with access to credit is key to unlocking sustainable, long-term gains in terms of income and productivity for the farmer.

Banks, pension funds and impact investors have already begun investing in rainfed agriculture projects in Africa. Finance tends to be directly available for large-scale commercial farms in the form of loans, guarantees or equity. For smallholders, it must be channelled through MFIs. On occasion, local agribusinesses can act in a similar role to an MFI. There are generally few agricultural finance products available to small holder farmers because of perceived risks and a lack of knowledge on how to structure agricultural loan products from the banking sector.⁵⁶ By providing financial tools for farmers, who make up the largest and poorest group at the bottom of the pyramid, it can have a high impact potential.

Definition	Investment in for-profit projects that generate social, environmental and financial returns.
Key stakeholders	Banks such as Deutsche Bank, Credit Suisse, Rabobank, EIB, KfW, NGOs including TNC or WWF and specialised asset managers (Global Partnerships, Mirova-Althelia, Moringa, Root Capital, Shared interest, Impact Assets, Calvert Impact Capital, AgDevCo).
General incentives	Internal rate of return, competitive advantage by investing in sustainable projects/practices, environmentally friendly strategies for marketing purposes, portfolio diversification.
Typical investment mechanisms	Equity, loans, guarantees, microfinance (microcredits, micro-leasing, micro-loans, community managed microlending), environmental impact bonds

EXAMPLE

Deutsche Bank's Agricultural Investments for More Productivity and Sustainability⁵⁷

Deutsche Bank aims to improve food security in Africa by supporting more productive, efficient and sustainable agriculture. The bank supports projects that improve yields and use resources effectively by offering credit opportunities to agricultural businesses, trading companies and food producers in the form of loans. These loans can be used to finance projects relating to environmental and climate protection and are not exclusive to the agricultural sector. However, the priority area is energy efficiency and sustainable energy.⁵⁸

Additionally, the bank uses investment funds to enable investments throughout agricultural value chains. This is done through shares, direct investments and special funds such as the Africa Agriculture and Trade Investment Fund (AATIF).⁵⁹ The AATIF targets small, to medium and large-scale agricultural farms and businesses and provides both direct investments to farms, processing companies, cooperatives and indirect investments to local institutions and intermediaries. Loans vary in size ranging between USD5 to USD30 million. Rainfed agriculture, green water or water efficiency is not a specific topic.

EMERGING INSIGHTS

Impact investing provides multiple investment opportunities for enhanced rainfed agriculture solutions. Traditional commercial investments such as equity, loans and guarantees have been present in the market for a long time now. They are directly applicable to subsistence and smallholder farmers via micro-financing, as well as agricultural companies via loans and funds. However, there are significant differences between subsistence and commercial farmers when it comes to accessing financial schemes other than microfinancing. Access to green water management programmes and financial mechanisms is usually easier for more developed, commercial farmers, while small holder farmers still often lack the required collateral to access financial mechanisms. Overall, funds and microfinance that are specifically designed to improve water management in an agricultural context represent the most significant opportunity area for enhanced rainfed agriculture.

Sharing knowledge and building capacity is critical. Smallholder farmers often lack basic financial literacy and struggle to access available financial incentives even through microfinance schemes. Technical Assistance Facilities, such as the LDN TAF, can provide the TA funding through grants and philanthropic funding to prepare them for conservation finance. Capacity building initiatives should cover both financial and insurance mechanisms and should leverage the work that has already been done by NGOs. Access to market information and a well-established local payment mechanism for farmers will also be needed. Sustainable agricultural practices are often pre-defined for farmers who strive to access microfinancing. If enhanced rainfed agriculture were included in these criteria it could boost such practices.

Public-private partnerships (PPPs) can improve access to financing and provides technical support. PPPs for environmental impact bonds (EIB) is one such tool available. EIBs use a 'pay for success' approach to provide up-front capital from private investors for environmental projects, either to pilot a new approach or scale up a solution that has already been tested and approved. Furthermore, commercial and impact investments face high risks in an agricultural context, which arises from the direct exposure of agricultural projects to weather events such as fires, flooding or drought, all of which are increasing in frequency and severity as a result of climate change. These investments can be better scaled if bundled within public-private initiatives, such as a fund, and protected by crop and/or weather insurance.



EXAMPLE

Calvert Impact Capital's Microfinance Through Oikocredit⁶⁰

Calvert Impact Capital is a non-profit investment firm that works with investors to move capital into communities around the world. Calvert Impact Capital provides financial support to several organisations including those that provide microfinance services for farmers to implement sustainable agricultural practices.

One example is the financial institution Oikocredit, which provides loans and investments to partner organisations who strive to promote sustainable agriculture. By the end of 2017, Oikocredit had provided development financing to 747 partners in 71 countries, including several African states. An example of the financing support by Oikocredit is the USD5to USD32 million loan provided to the sustainable social enterprise SEKEM Holding in Egypt.⁶¹ This loan supported the company's operations to reclaim desert lands to produce organic and fair-trade products such as cotton, through efficient water irrigation and sustainable agricultural yields.

EMERGING INSIGHTS continued

Investors are attracted by new technology. This is difficult for enhanced rainfed agriculture where climate-smart technology has rarely been featured. Looking forward however, soil moisture sensors or combining rainwater harvesting with solar panels may be an interesting technology-based intervention that could make investments in enhanced rainfed agriculture more attractive.

Investment funds tend to target agriculture through increased market access, promoting crop diversification, making the use of fertilizers more efficient, reducing post-harvest losses and increasing yields. When addressing the issue of water, such funds tend to focus on access to water and consumption rather than water resource management. Enhanced rainfed agriculture sometimes fall between the cracks. This lack of focus by impact investing and conservation finance could be tackled by developing specific funds that target improved water management within the agriculture sector. Water management related indicators could be developed as part of an industry-wide initiative to align reporting practices, which would significantly increase the potential of commercial and impact investments in improving rainfed agriculture.

EXAMPLE

European Solidarity Financing Fund for Africa

The European Solidarity Financing Fund for Africa (FEFISOL), is a high impact microfinance initiative, created in 2008 by Alterfin, a Belgian development organisation, in collaboration with Solidarité Internationale pour le Développement et l'Investissement (SIDI), a French NGO that provides financing and technical assistance to organisations in developing countries (manages FEFISOL), and Etimos, an Italian social investment company.⁶² The fund has been operational since September 2011 and provides debt, equity and guarantees in Africa, focusing on sub-Saharan Africa and the Maghreb.

FEFISOL provides microfinance funds in local currency for on lenders and focuses on two activities. Firstly, it strives to empower small-scale farmers who trade in local markets (mainly organic and fair trade) by contributing to food security and giving priority to family-based agriculture. This is done with medium-term financing to rural MFIs and small producer businesses. Secondly, the FEFISOL invests in MFIs that provide financial services to micro and small entrepreneurs often excluded from bank services, as well as smallholder producer organisations and rural SMEs that sell on national, regional or international markets.

6 Crop and Weather Insurance



OVERVIEW

Crop and weather insurance is a type of financial protection against losses caused by measurable and adverse weather conditions. As physical climate risks continue to affect weather patterns and directly impact farmers' yields, insurance companies are exploring different ways to protect farmers against undesirable temperatures, floods, hail, extended dry periods and similar events. Under such a scheme, insurance companies would define a threshold with insurers on what are normal weather conditions as well as the compensation that would be provided to the insurer if this threshold is surpassed. Compensation provided to the insurer/insured/reinsurer depends on the likelihood of the threshold being breached – higher compensation will be associated with lower likelihoods. Even though this approach is still at an early stage of development particularly in its application to small-scale farmers, it has the potential for scale up as the physical climate risks become more acute.

Definition	Favourable (specialised) insurance policies for production risks related to agriculture.
Key stakeholders	Allianz, Swiss Re, ACRE, World Bank.
General incentives	Tap into agricultural market, climate change mitigation and adaptation, CSR communication, development of new products, indexes and methodologies
Typical investment mechanisms	Specialised products, development of tools/indexes for insurance development, microinsurance.

EXAMPLE

Swiss Re's parametric insurance⁶³

Swiss Re provides parametric or index-based insurance solutions to protect businesses against uncertain weather impacts. These mechanisms are designed to be simpler than traditional indemnity-based insurance, mainly by linking payments when a predefined weather parameter is exceeded (e.g. water levels above or below a certain level) and avoiding a loss investigation process. An example of this type of insurance in a water context is Swiss Re's FLOW.⁶⁴ FLOW is a water-based insurance mechanism designed to cover companies with revenues and costs exposed to high or low water levels at defined river gauges. FLOW has a term of up to three-years, with a cover capacity of up to USD50 million and a pay-out time within 21 days when a claim is made.

This type of insurance has not been specifically explored by Swiss Re in the context of water agricultural management; still, the model could be piloted with large agricultural companies that rely on rainfed agriculture. Alternatively, the model could be explored with municipalities and through the formation of unions of small scale farmers at a watershed level. Insurance companies could target municipalities in areas with large potential for rainfed agriculture and agree on a relevant water threshold (e.g. extended periods of dry, number of heatwaves) to compensate individual farmers in the area if the threshold is exceeded.



EXAMPLE

Example: WINnERS project

WINnERS⁶⁵ is an initiative that offers risk management services to build resilient supply chains from smallholders to global retailers. The initiative puts together academics and climate scientists from leading universities, as well as insurance industry experts and global food buyers to build products and services that promote food security (World Bank, Climate-KIC, EIT, University of Reading, Sainsbury's, Imperial College London, University of Reading, University of Hamburg, Ecole Polytechnique, Willis Towers Watson, World Food Programme). The programme is focused on modelling weather and climate risk exposures through state-of-the-art technology and investing in smallholder farmers to improve farming practices and creditworthiness. Additionally, the initiative aims at distributing risks across supply chain actors through the use of weather and climate index-based insurance services and promoting supportive regulatory environments for insurance products in developing countries.

The project aims to develop a commercially translatable insurance product that will be designed, priced and tendered in collaboration with Willis Towers Watson and the World Food Programme. As part of the project, WINnERS also aims, to provide food buyers, manufacturers and retailers with an estimate of revenue savings for short to medium term commodity purchases.

EMERGING INSIGHTS

Traditionally, the insurance market charges higher insurance premiums as the risk increases, e.g. the risk of crop failure due to changing rainfall patterns.

The use of innovative models, such as weather indexes and geographical diversification and reinsurance, can be used to distribute risks and scale up insurance for the agricultural sector. By gaining access to climate information, farmers can effectively reduce their risk exposure to weather conditions. For example, by having access to seasonal, 10-day and daily forecasts and instant/daily forecasts for extreme events, farmers would be able to better adjust their agricultural management practices.

Crop and weather insurance focused on enhanced rainfed agriculture is still at an early stage, especially in terms of small-scale farmers. Even though a scheme such as this would be highly beneficial for both farmers and investors and could complement commercial investments increasing investors' confidence by reducing risks from their investments, there is only a limited range of solutions on the market. Currently, smallholders and subsistence farmers would need more subsidies and greater donor support in order to access these services more easily. There is potential for replication and scale, particularly considering the increased impact of physical climate risks and the lack of protection to small-scale farmers. Building capacities within investor communities and farmer groups would also be an important step to scale up these services among farming communities.

For commercial farms, especially those working in the value chain of large multinationals, crop and weather insurance is often more accessible. Partnerships between academics, insurance experts and food companies such as WINnERS could provide an interesting framework for the development of tailor-made solutions for large agricultural companies that rely on rainfed solutions and increasing accessibility for farmers along their supply chain. Such partnerships could be explored in an African context by connecting local stakeholders with organisations pioneering this work in other regions.

The establishment of crop and weather insurance mechanisms between municipalities and insurance companies is a further area to explore. These mechanisms could target municipalities with a large potential for rainfed agriculture and high exposure to physical climate risks, essentially insuring local governments against climate change and having the potential to embed enhanced rainfed agriculture at a regional-level. As these mechanisms are highly adaptable, municipalities and insurance companies could agree on a relevant threshold for specific watershed conditions, and compensate individual farmers in the area if the threshold is exceeded.

Reflections

This final section highlights that enhanced rainfed agriculture is an untapped opportunity in Africa and that a range of mechanisms are starting to demonstrate how enhanced rainfed agriculture can be financed. It concludes that there is an urgent opportunity to increase investment into enhanced rainfed agriculture and makes five key recommendations.

Enhanced Rainfed Agriculture Presents an Untapped Opportunity

Enhanced rainfed agriculture presents an untapped opportunity in Africa by managing rainfall variability and moving farmers out of poverty. Green water is rainfall that is available in the soil for plant growth through transpiration. The capture, storage and use of green water through enhanced rainfed agriculture is key to maintaining soil moisture and increasing productivity. It is a proven and cost-effective way to improve food security, reduce vulnerability to climate change and build sustainable livelihoods across the continent.

Enhanced rainfed agriculture is particularly important in Africa, where 95% of agricultural production depends on rainwater and crop yields are amongst the lowest in the world. With limited alternative solutions, enhanced rainfed agriculture is the only viable solution and a unique opportunity for both women farmers and for the growing proportion of unemployed young people. Yet, enhanced rainfed agriculture is either unknown or unaccepted and there are only a few examples of good practice.

Although full quantitative mapping of current financial flows around green water and enhanced rainfed agriculture is required, this brief highlights there is limited investment in African agriculture and even less into rainfed and / or smallholder agriculture. To date, financing for this sector has predominantly come from public sources and has largely focused on blue water infrastructure. Significant investment is required yet 80% of farmers in Africa are smallholders and are amongst the poorest in the world. Most smallholders suffer with low levels of infrastructure, poor access to markets and limited access to credit. Investors have limited interest in African agriculture viewing it as high risk due to country, market and climate risks. Green water and enhanced rainfed agriculture are often not understood or accepted sometimes viewed as an outdated technique with limited impacts. And enhanced rainfed agriculture has remained largely invisible in the discourse around African development with a bias for high tech solutions and large-scale dams.

Looking forward, contributions will be required from a range of different sources including foundations and private donors, international institutions, development banks, national and regional governments, corporates, impact investors, insurance and / or reinsurance companies and risk management services and of course, the farmers themselves. The challenge will be in understanding the potential contribution of both public and private contributions and who should pay for landscape management, particularly around natural infrastructure and ecosystems services.

Innovative Solutions Demonstrate How Enhanced Rainfed Agriculture can be Financed

There is no single approach to financing enhanced rainfed agriculture. Specific mechanisms will be more effective with particular farming segments and contexts. For example, large-scale, commercial farmers have more potential to access bank loans or crop insurance due to the availability of collateral or their ability to manage risk. On the other hand, issues with financial literacy and access to capital suggests micro finance is better aligned to smallholder and subsistence farmers. Payment for Ecosystem Services tend to be more effective when farmers are grouped into a collective whereas corporate certification and standards will have a greater impact on those already part of a formal value chain.

However, there are a number of solutions emerging that have a potential for impact at scale. Donor and philanthropic grants are a traditional source of finance but must be used innovatively to maximise their impact. Grants are particularly important for reaching smallholder farmers but are limited in terms of impact and scale. Grants can therefore fund the public good component of enhanced rainfed agriculture, thus making it more attractive to mainstream financial sources.

Corporations are a relatively unexplored source of finance yet have the potential to generate impact at

scale. Corporations incentivise sustainable practices and present opportunities to scale green water solutions through certification and standards, funding innovative solutions, and mainstreaming agricultural practices along their value chains. International supply chains present a highly promising opportunity for enhancing green water solutions, with certification schemes acting as a key enabler to advocate for a stronger role of green water solutions.

Redirecting carbon finance presents a hidden opportunity for funding green water solutions. There is significant potential in carbon finance, resulting from the dynamic global offset market, insetting projects and Science Based Targets. Carbon finance and sustainability along corporate supply chains should be strongly integrated, as together they can provide a principal source of finance for enhanced rainfed agriculture and thereby generate supply

chain resilience. Finally, crop and weather insurance presents an interesting option for enhanced rainfed agriculture although it needs to be further developed. This solution could also be blended together with corporate sustainability funding.







The list of financing mechanisms is by no means exhaustive but aims to shine a light on international financing mechanisms with the potential to scale investment into enhanced rainfed agriculture. This brief highlights there is a significant opportunity to increase investment into enhanced rainfed agriculture. To facilitate this investment at scale, this brief concludes with five suggestions.

Suggestions	
Increase advocacy for green water and enhanced rainfed agricultural solutions	Green water and enhanced rainfed agriculture are largely invisible in terms of policy and investment decisions. It is difficult to finance concepts that are not well understood, that are used interchangeably (for example alongside Conservation Agriculture, Sustainable Land Management, soil health) and that are not widely used in principles, policies, framework criteria and standards. To increase financing, there must be clarity around the terms 'green water solutions' or 'enhanced rainfed agriculture' and solutions must be effectively advocated to policy makers, development experts and investment providers. This is likely to require better cross-sectoral coordination between the water and agricultural sectors.
Develop a credible and compelling business case	Enhanced rainfed agriculture solutions have been around for centuries but they are relatively unknown and there is limited evidence of the benefits. Proof of concept and stronger evidence are essential to unlock mainstream funding sources from both the public and private sector. This is particularly true at farm level, but costs and benefits must be also be recognised more broadly, for example in terms of climate resilience and rural regeneration.
Recognise the need for knowledge development and capacity building	Capacity building at farmer level is an essential investment both in terms of financial capacity and technical knowledge about techniques and solutions. Significant synergies thus exist with other initiatives, for example, those that increasing smallholder access to certification standards or finance for broader purposes.
Use technology to increase investment potential	Enhanced rainfed agriculture can have a negative reputation, drawing on traditional approaches without mechanised solutions. Innovative technologies can help overcome this making rainfed agriculture more attractive to the farmer, policy maker and the investor. For example, soil moisture monitors or combining rainwater harvesting systems with solar panels can produce higher yields. Another example is the use of blockchain applications to improve payment management and transparency for smallholders within Payment for Ecosystem Services models.
Blend finance to de-risk more traditional instruments	There is a need to clarify the role of public and private investors including blending in concessional finance to de-risk investments and leveraging private funding via international supply chains. It is also necessary to ensure projects become bankable for example in the short term, blended financing where public bodies co-fund private activities can be a viable solution. In the mid-term, blended financing that utilises short-term funding in a way to ensure that projects become 'bankable' so that in the mid-term they can attract more significant funding.

Acronyms and abbreviations

AATIF	Africa Agriculture and Trade Investment Fund
AfDB	African Development Bank
AMCOW	African Ministers' Council on Water
AWF	African Water Facility
AFD	Agence Française de Développement
AWS	Alliance for Water Stewardship
BMZ	Federal Ministry of Economic Cooperation and Development (Germany)
CERs	Certified Emission Reductions
CDM	Clean Development Mechanism
COP	Conference of the Parties
CSA	Climate Smart Agriculture
DAWASCO	Dar es Salaam Water and Sanitation Company
DAPP	Development Aid from People to People
IDH	Dutch Sustainable Trade Initiative
ITMOs	Internationally Transferred Mitigation Outcomes
EIB	Environmental Impact Bonds
FEFISOL	European Solidarity Financing Fund for Africa
GCF	Green Climate Fund
GWC	Green Water Credits
ha	Hectare
IFAD	International Fund for Agriculture Development
LDN	Land Degradation Neutrality
SLM	Sustainable Land Management
MFI	Micro finance institutions
MDBs	Multilateral Development Banks
NIE	National Implementing Entities
NDC	Nationally Determined Contribution
OECD	Organisation for Economic Co-operation and Development
PES	Payments for Ecosystem Services
PPP	Private-Public Partnerships
RA	Rainforest Alliance
REDD+	Reduce Emissions from Deforestation and Forest Degradation
Rol	Return on investment
SBT	Science Based Targets
SIWI	Stockholm International Water Institute
SDG	Sustainable Development Goals
TAF	Technical Assistance Facility
TNC	The Nature Conservancy
UNFCCC	United Nations Framework Convention on Climate Change
USD	United States dollar
VCS	Verified Carbon Standard
tCO _{2e}	Tonnes of carbon dioxide equivalent
TIARA	Transforming Investments in African Rainfed Agriculture
WBF	Water Balancing Fund
WWF	World Wildlife Fund

Appendix 1 Overview of the mechanisms, sources and potential solutions for green

MECHANISM	SOURCES OF FINANCE	POTENTIAL SOLUTIONS	CHALLENGES
Donor and philanthropic funding 	Foundations, private donors International institutions, development banks, governments	Grants, subsidies	Accessibility typically through accredited entities such as NGOs or local governments • Limited scalability • Farmers do not often receive direct funding.
		Concessional loans for governments	Lack of technical expertise for attracting funds • High administrative and reporting burden • Green water / rainfed agriculture is not a high priority for local governments or entities that provide the loans.
	Technical Assistance (TA) facilities	Smallholders can struggle to create scalable projects that access TA funding • Projects need to demonstrate potential to become bankable, often linked to an investment fund.	
Carbon finance 	International institutions and development banks	Carbon funds	Activities typically need to lead to verified emission reductions • Full implementation of monitoring, reporting and verification (MRV) systems • Lack of technical skills on MRV • Smallholder projects struggle to achieve sufficient scale.
	National governments	NDCs	Rules are still under development and are constantly changing • Full implementation of MRV systems • Lack of technical skills on MRV.
		REDD+	Government-to-government agreements • Full implementation of MRV systems • Land tenure rights • Hidden burden of MRV and the struggle to get carbon credits for soil carbon sequestration.
	Corporates	Offsetting	Significant scale needed • Full implementation of MRV systems • Lack of technical skills on MRV • Interventions need to generate carbon credits, which is challenging for agricultural management.
		Insetting	Full implementation of MRV systems • Interventions need to generate carbon credits, which is challenging for agricultural management.
		SBT funding	Monitoring guidelines still under development, funding approaches still unclear • High potential, but questions are open regarding funding streams and eligibility of interventions.
	Corporate carbon funds	Similar to insetting/offsetting	
Payments for ecosystem services (PES) 	National governments/ corporates	Green water credits	To date, limited ability to raise significant funds.
		Water funds (PES)	Free rider issues • Generally accessible, but limited availability • Limited experience in Africa.
		PES through state-owned utilities	Free rider issues • Currently few schemes exist • Difficult to ensure those living in poverty are not excluded from participating.
Corporate grants and sustainable procurement 	Corporates	Corporate sustainability grants	Few existing options with a focus on green water / rainfed agriculture.
		Standards and certification	Certification costs can be an access barrier for smaller players • Green water / rainfed agriculture is not well represented in existing standards and certification schemes.
Impact investments and conservation finance 	Impact investors (e.g. Deutsche Bank, Credit Suisse, Rabobank, Mirova)	Microfinance	Financial illiteracy • Majority of smallholders are not aggregated for local trade • More suitable tools needed for assessing and managing risks in agricultural finance • Women less likely to access financial services.
		Bank loans	Green water / rainfed agriculture is not a specific topic • Lack of bankable projects particularly related to smallholders • Accessible for large-scale projects only.
		Investment funds	Does not have a water component • Africa is perceived as high risk & impacts of climate change.
Crop and weather insurance 	Insurance/reinsurance companies (e.g. Swiss Re, Allianz, Munich Re, ACRE)	Parametric products, microinsurance	Limited number of services on the market • Early stage of development • Inaccessible solution for subsistence farmers.
		Risk management services	Needs more exploration within the African context • Need to build capacity within investor communities and farmer groups.

water solution investments

OPPORTUNITIES	EXAMPLES
Topic-specific grants or funds could be developed for green water / rainfed agriculture that target NGOs, small-scale and subsistence farmers • Subsidies can focus on the acquisition of input materials for upscaling green water / rainfed agriculture • Farmers are indirect beneficiaries through inputs, training etc.	World Bank Adaptation Fund (Promoting Climate-Smart Agriculture in West Africa) The African Water Facility
Green Climate Fund provides loans to governments and institutions but need to advocate for green water / rainfed agriculture.	Green Climate Fund (African Development Bank Programme for Integrated Development and Adaptation to Climate Change in the Niger Basin)
Blended finance approaches • Larger businesses struggle less to create bankable projects and to access TA funding.	Land Degradation Neutrality (LDN) Fund
Opportunity to work with organised farmer's groups to advocate carbon finance and green water/ rainfed agriculture • Synergies between carbon sequestration practices and green water / rainfed agriculture.	World Bank Carbon Finance Funds
NDCs are determined by national authorities and contribute to an estimated future emissions reduction • Large scale implementations.	
Green water / rainfed agriculture could have a higher profile in national REDD+ strategies and increase the likelihood of funding through government-to-government or multilateral carbon funds.	
Significant demand for nature-based carbon credits • Access to offsetting as a form of carbon finance is viable, especially for commercial farms • Integration of mitigation applications (solar panels) with green water solutions.	
Significant demand for nature-based carbon credits • Insetting accessible form of funding for farmers and the partners along supply chains • Synergies between carbon sequestration practices and green water / rainfed.	Lake Naivasha Reforestation (Swiss retailer, Coop)
Science Based Targets will generate additional demand, particularly for on-farm emission reductions, including soil carbon.	
Build resilience to climate change through climate-smart credits.	
Public subsidies • Blockchain technologies could be used to improve the payment of the services.	Upper Tana-Nairobi Water Fund
Collective action funds can engage a number of water users towards a collective common goal.	
Blockchain technologies could be used to improve the payment of the services.	Equitable Payments for Watershed Services Programme in Uluguru Mountains, Tanzania
Corporates tend to prefer giving grants to smaller organisations, rather than larger commercial partners • Localised funds and grants for small holders and subsistence farmers.	Knorr Sustainability Partnership Fund and Danone Ecosystem Fund
Certification schemes as entry for stronger green water / rainfed agriculture presence • Synergies to increase smallholder access to certification standards • Localised funds and grants for smallholders and subsistence farmers • Capacity building increases the adoption of practices and lowers the risk of failure (to all farmer segments).	International Water Stewardship Standard Rainforest Alliance certification
Microfinance institutions (MFIs) and local agribusiness as providers of microfinancing and loans to smallholders • Connecting global financial markets via funds and microfinance programmes to improve water management in agriculture • Mobile services for facilitating accessibility and upscale • Potential synergy of a green water programme and carbon financing.	Calvert Impact Capital's microfinance through Oikocredit European Solidarity Financing Fund for Africa (FEFISOL)
Public-private partnerships for improving access and providing technical support.	Deutsche Bank's agricultural investments for more productivity and sustainability
Investment in technology for synergies between water programmes and carbon finance • Combining rainwater harvesting with solar panels.	Deutsche Bank's agricultural investments for more productivity and sustainability
Increased climate risks and lack of current protection by small-scale farmers provides room for scalability • Blend together with corporate sustainability funding and conservation finance • Municipalities and insurance companies could agree on a relevant threshold for specific watershed conditions and compensate individual farmers • Larger commercial farms can access these services.	Swiss Re's parametric insurance
Services for supply chain actors and specific sourcing sites.	WINnERS project

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This work is supported by a grant from the Swedish International Development Agency. The views in this report are those of the author and not representative of Sida or any other organisation.

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