

## CLIMATE RESILIENT AFRICA FUND IMPACTTHESIS



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### **EXECUTIVE SUMMARY**

Climate Resilience Africa Fund 1's (CRAF1) impact thesis addresses Africa's vulnerability to the dual climate and nature crises. CRAF 1 is a venture capital fund that invests in early-stage businesses that enable agri-food systems to adapt to climate change and become more climate-resilient, and/or reduce nature loss by generating financial value from healthy natural ecosystems.

This is based on the belief that the African agri-food sector is both a casualty of this climate/nature nexus, but also holds solutions to mitigating global climate crisis through African biodiversity resources.

Our impact thesis is informed by scientific foundations of the The Global Assessment report on Biodiversity and Ecosystem Services (source), IPCC AR6 Climate Change Synthesis Report 2023,IPCC WG 2 Climate Change 2022: Impacts, Adaptation and Vulnerability, and Richardson et al's 2023 report on Planetary Boundaries framework. It is aligned with UN Sustainable Development Goals. Our focus areas are based on our experience in early-stage investing, experience in African agrifood and one year of primary research with farmers, stakeholders, founders and civil society in agriculture and the nature economy in Africa and beyond.

The fund addresses problems of climate vulnerability and a lack of adaptive capacity in the African food value chain, particularly negative impacts on smallholder groups, as well as the destruction of natural African ecosystems and natural capital resources.

#### The fund aspires to deliver changes that result in:

I) African farming becoming more profitable and climate-smart, producing more climate-proof food, and farmers having the tools and technology needed to respond to climate shocks.

II) African nature loss being mitigated or reversed.

- This is achieved through investing in innovative, early-stage businesses which (i) drive the adoption of practices and tech that enhance resilience to climate change in agrifood
  - (ii) drive the adoption of practices and tech that slow or reverse nature loss

The following table (Figure 1.0) summarizes our approach and outline change indicators. CRAF 1 investments are screened against this impact thesis and applicable change indicators. CRAF 1's investment team uses this impact thesis throughout the screening and due diligence processes, the investment committee must approve impact thesis fit and portfolio companies report on change indicators on a regular basis.

### **SUMMARY TABLE (FIGURE 1.0)**





Climate-smart agritech supports reaching internationally agreed goals such as the SDGs and the Paris Agreement. It aims to tackle three main objectives: sustainably increasing agricultural productivity and incomes; adapting and building resilience to climate change; and reducing and/or removing greenhouse gas emissions,

2 Biodiversity-specific universal metrics to be added



## AFRICA'S AGRIFOOD SYSTEM IS FRAGILE AND HIGHLY VULNERABLE TO THE CLIMATE CRISIS

Climate change is caused by a disruption in the global carbon cycle. The primary driver of this is anthropogenic burning of fossil fuels and resultant greenhouse gas emissions. According to the IPCC, 24% of global emissions come from agriculture, forestry and land use sectors. Deforestation alone causes 10%, farming another 10%, and 2% from production of synthetic fertilizer (RA).

Notably, despite having 17% of the world's population, Africa has contributed less than 2-3% of global greenhouse gas emissions (WMO). The average emissions per capita in Africa is a fraction of an equivalent in Asia, the Americas or Europe.



Figure 2.1

Meanwhile, despite its minimal contribution to the climate crisis, Africa as a continent is more vulnerable to the climate crisis than any other region. According to the UNFCCC, climate change will cause GDP in Africa to decrease between 2.25-12.2%, depending on global temperature increase.

This is, in large part, due to its reliance on natural resources and lower climate resilience in agriculture, industry and urban areas.



Figure 2.2

Notre Dame Global Adaptation initiative 2023.



SMALLHOLDER FARMERS - ESPECIALLY WOMEN -ARE CLIMATE-VULNERA-BLE AND LACK ADAPTIVE CAPACITY

In Africa, agricultural productivity growth has reduced by 34% since 1961 due to climate change, more than any other region (IPCC AR6).

Climate change also threatens livestock production across Africa. Rangeland net primary productivity is projected to decline 42% for West Africa by 2050 at 2°C global warming. Vector-borne livestock diseases and the duration of severe heat stress are both projected to become more prevalent under warming.



Climate change also poses a significant threat to African marine and freshwater fisheries. Fisheries provide the main source of protein for approximately 200 million people in Africa and support the livelihoods of 12.3 million people. At 1.5°C global warming, marine fish catch potential decreases 3–41%, and decreases by 12–69% at 4.3°C by 2081–2100 relative to 1986–2005 levels.

Climate change also impacts fisheries, with a pronounced impact on health due to fish being a primary protein source in Africa. Under 1.7°C global warming, reduced fish harvests could leave 1.2–70 million people in Africa vulnerable to iron deficiencies, up to 188 million for vitamin A deficiencies, and 285 million for vitamin B12 and omega-3 fatty acids by mid-century. For inland fisheries, 55–68% of commercially harvested fish species are vulnerable to extinction under 2.5°C global warming by 2071–2100.

Smallholder farmers are particularly vulnerable to the impacts of climate change, such as droughts, floods, and changing rainfall patterns. Their limited capacity to adapt and lack of access to climate-resilient technologies and practices further exacerbate their vulnerability.

Within smallholder farmers, women suffer disproportionately. This is because women comprise an estimated 70% of sub-Saharan agricultural workers, and account for about 80% of food processors (United Nations Division for the Advancement of Women). Despite higher participation in farming, women are disadvantaged relative to men in terms of land ownership, access to education, access to extension services, and access to finance. Due to gender inequities, women have less access to land, assets, social protection and tech, leaving them less capable to respond to climate shocks, and climate-vulnerable.

## AFRICA IS EXPERIENC-ING RAPID NATURE LOSS

Between 1970 and 2016, the stock of natural capital in African countries fell on average by 65%, driven largely by land-use change.

The following are examples of nature loss in Africa (ANCA)

Overexploitation has caused the stock of mammals, fish, amphibians and reptiles to fall by ~65% between 1970 and 2016

Freshwater biodiversity has declined 84% since 1970 As climate change erodes the value of coral reefs, Egypt may lose up to 94% of coral reef tourism-related value, which accounts for 3.5% of its GDP (ICRI)

Globally, food systems are the primary driver of biodiversity loss, causing changes to uses and characteristics of land and sea and threatening more than 85% of species with extinction.

Agriculture expansion is the main driver of deforestation, causing 75% of deforestation in Africa (Chatham House). According to the UNEP, nature loss exacerbates climate change vulnerability, undermines food security, and puts people and communities at risk. Specifically 100-300 million people are at increased risk of floods and hurricanes because of coastal habitat loss today (UNEP).

Half the world's GDP, \$44 trillion, is at immediate risk due to nature loss. Africa is disproportionately impacted by nature loss because the economic wellbeing of Africans is more dependent on agriculture, forestry, fishing, and mining than other regions.

In their Nature Risk Analysis, PwC and WEF estimate yearly loss of natural capital in Africa of \$195BN, equivalent to 6% of Africa's GDP.







## NATURAL ECOSYSTEMS ARE BOTH A DEFENSE AGAINST CLIMATE CHANGE BUT ALSO A CASUALTY OF IT

The nature crisis in Africa is exacerbated by global climate change. As average temperatures rise and extreme weather events increase, ecosystems fail.



Figure 2.4 Average temperature increase and biodiversity loss, World Resources Institute

In addition to helping local communities adapt to increasing climate change, healthy ecosystems in Africa are a critical resource in the effort to mitigate global climate change. Healthy natural ecosystems are carbon sinks that sequester carbon dioxide from the atmosphere.

With the exception of decarbonising energy, the most significant actions needed to mitigate climate change lie in nature protection, management and restoration. These could account for 37% of mitigation needed until 2030 to achieve the targets of the Paris Agreement (Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services).



Figure 2.5

The Nature Conservancy

Africa has a wealth of ecosystems that store carbon and further sequester carbon for the benefit of broader planetary health. The Congo Basin alone, one of the most bio-diverse regions globally, is said to store upwards of 4% of global emissions.



## OUR THEORY OF CHANGE

### **OUR THEORY OF CHANGE**

We imagine African farming becoming more profitable and climate-smart, producing more climate-proof food, and farmers having the tools and technology needed to respond to climate shocks. African agrifood becomes less fragile and its people more food secure.

African farming transforms to become regenerative – as opposed to extractive – and natural resource-efficient. New value chains emerge which are naturepositive. Farmers, land owners and land stewards adopt nature-positive practices and are rewarded for nature-positive activities. African natural capital resources are properly valued for their role in regulating the global climate and improving planetary health, and finance is mobilized towards these ecosystems, making them worth more dead than alive for local stakeholders, slowing their impending destruction.

Our fund thesis centers on investee companies delivering two main changes:

- Enhancing farmer and agrifood climate-resilience
- Reducing and reversing nature loss

## ENHANCING FARMER AND AGRIFOOD CLIMATE-RESILIENCE

Building resilience for smallholder farmers involves increasing their capacity to deal with climate shocks, including resource scarcity, extreme weather events, supply chain disruptions and financial crises.

To identify desired areas for change, we identified the highest-impact climate responses and adaptations from the IPCC AR6 Climate Change Synthesis Report 2023. From the table below, we identified climate responses and adaptation options in land, water and food.

We then identify the highest climate-caused loss and damage risks associated with food systems specifically in Africa in IPCC Climate Change Impacts, Adaptation and Vulnerability Report (link). From this, we identified reduced crop productivity and revenues, increased livestock mortality and price shocks, decreased fodder and pasture availability and reduced fisheries catch and fisher livelihoods as being both relevant and high impact. Combining IPCC\_AR6\_WGII and IPCC 2023 synthesis report with our understanding of the African agrifood sector and commercial opportunities therein, the identified the changes needed to deliver impact and create adaptive capacity among smallholders are:

- Improving farmer access to inputs, markets, finance, data and services
- Introducing climate-smart agricultural technology and practices
- Increasing resource efficiency
- Reducing import-dependence
- Reducing farm-to-plate waste
- Improving equity in agriculture



## REDUCING AND REVERSING NATURE LOSS

To define the desired change through investment in limiting the degradation of scarce natural resources in Africa, we approach nature loss through the planetary boundaries framework. We consider where we are operating beyond the safe zone, in biosphere integrity, land-system change, freshwater change and bio-geochemical flows. Whereas the climate change mitigation challenge is global and historically, Africa has had a minimal contribution to it, non-climate nature loss challenges are more local and require local intervention so slow their destruction.

The changes needed to deliver impact are around reducing the destruction of natural ecosystems in Africa. This is split into two activities :

## 1. Building lucrative, nature-positive value chains that incentivize the sustainable use of limited natural resources.

This is built on our research finding that to conserve healthy ecosystem value chains must emerge that enable local communities to thrive off these ecosystems. As long as ecosystems are worth more dead than alive, they will be destroyed. A forest must generate more value for a local community alive than harvested timber would for said forest to survive.

Similarly, to encourage sustainable practices and technology in agrifood, there must be an incentive for farmers and local stakeholders. This includes sustainable value chains that depend on healthy ecosystems, but could also include things like carbon

## 2. Substituting nature-harmful products and practices for less harmful products and practices resources.

In order to displace existing nature-harmful products and practices, innovators must bring forward sustainable alternatives that have a lower impact on the environment.







-INVESTING IN TECHNOLOGY & ACTIVITIES FOR CHANGE

## INVESTING IN CLIMATE ADAPTATION IN AGRI-FOOD

We invest in innovative companies that increase African agrifood value chain's adaptive capacity. Within this, we focus on these areas of intervention

- 1. Improved farmer access to inputs, markets, finance, data and services
- 2. Introducing climate-smart agricultural technology and practices
- 3. Improved farm management
- 4. Developing and scaling locally produced import substitutes
- 5. Models to reduce/ reuse farm-to-plate waste

6. Post-harvest value creation including processing, logistics, distribution and supply chain traceability, with

an emphasis on waste reduction

#### **Impact indicators**

Companies we invest in screened for investment will have to be eligible for one of our universal metrics. Fund-level impact indicators for climate adaptation:

1. Farmers reached with climate-smart agritech (# farmers)

- 2. Yield improvement (units/acre)
- 3. Income improvement (unit=\$)
- 4. Import-substituting new food groups (kg)
- 5. Waste reduced /reused (tonnes)
- 6. Female farmers reached (# farmers)

In addition to the above mentioned portfolio-level change indicators, we will work with portfolio companies to define company specific impact indicators. Sample company-specific KPIs could include:

- Local inputs created (\$)
- Topline improvement (\$)
- Cost reduced (\$, %)
- Value of goods traced (\$)
- Shelf life improvement (days)



## INVESTING IN NATURE-POSITIVE VALUE CHAINS AND ACTIVITIES



We invest in innovative companies that slow or reverse nature loss in Africa. Within this, we focus on these areas of intervention:

- Building nature-positive agri value chains at scale
- Building nature-positive forestry value chains
- Enabling planet -friendly land/sea practices
- Developing sustainable alternatives to ecologically damaging products
- Leveraging carbon markets and tech to reward nature-positive land and sea use
- Processes that reduce environmental harm or drives benefit

#### Indicators for change:

- CO2 removed\* (tCo2e)
- Nature-positive value created (\$)
- Chemical inputs avoided (tonnes)
- Water saved (m3)

In addition to the above mentioned portfolio-level change indicators, sample company-specific KPIs would include:

- Increase in soil carbon (%)
- Ecosystems monitored/data points captured (acres, species)
- Tonnes of wild fish displaced (tonnes)

SUSTAINABLE DEVELOPMENT GOAL ALIGNMENT

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## SUSTAINABLE DEVELOPMENT GOAL ALIGNMENT

The CRAF Impact approach is aligned with the UN Sustainable Development Goals, with a particular focus on SDGs 2: zero hunger, 12: responsible production and consumption, 13: climate action, 14: life below water and 15: life on land. The connection between each CRAF impact metric and the relevant SDG is highlighted below



#### **Relevant SDG**



**Responsible production and consumption**: ensure sustainable consumption and production patterns

#### Aligned SDG Targets

**12.a** Support developing countries to strengthen their scientific and technological capacity to move towards more sustainable patterns of consumption and production

**12.2** Achieve the sustainable management and efficient use of natural resources

**12.3** Halve per capita global food waste at the retail and consumer levels and reduce food losses along production and supply chains, including postharvest losses

**12.4** Achieve the environmentally sound management of chemicals and all wastes throughout their life cycle, in accordance with agreed international frameworks, and significantly reduce their release to air, water and soil in order to minimize their adverse impacts on human health and the environment

**12.5** Substantially reduce waste generation through prevention, reduction, recycling and reuse

**12.6** Encourage companies, especially large and transnational companies, to adopt sustainable practices and to integrate sustainability information into their reporting cycle

**12.7** Promote public procurement practices that are sustainable, in accordance with national policies and priorities

**12.8** Ensure that people everywhere have the relevant information and awareness for sustainable development and lifestyles in harmony with nature

#### Relevant CRAF Portfolio Indicators

Farmers reached with climate smart agritech (reached)

Income improvement (unit=\$)

Waste reduced /reused (tons

Chemical inputs avoided (tonnes)

Water saved (m3)

#### **Relevant SDG**



**Climate action:** Take urgent action to combat climate change and its impacts

#### Aligned SDG Targets

**13.1** Strengthen resilience and adaptive capacity to climate-related hazards and natural disasters in all countries

**13.3** Improve education, awareness-raising and human and institutional capacity on climate change mitigation, adaptation, impact reduction and early warning

**13.b** Promote mechanisms for raising capacity for effective climate change-related planning and management in least developed countries and small island developing States, including focusing on female, youth and local and marginalized communities

#### Relevant CRAF Portfolio Indicators

#### CO2 removed (tCo2e)

Farmers reached with climate-smart agritech (# farmers)

Import-substituting new food groups (kg)

Female farmers reached (# farmers)

#### **Relevant SDG**



Life below water: Conserve and sustainably use the oceans, seas and marine resources for sustainable development

#### **Aligned SDG Targets**

**14.1** Prevent and significantly reduce marine pollution of all kinds, in particular from land-based activities, including marine debris and nutrient pollution

**14.2** Sustainably manage and protect marine and coastal ecosystems to avoid significant adverse impacts, including by strengthening their resilience, and take action for their restoration in order to achieve healthy and productive oceans

**14.4** Conserve at least 10 per cent of coastal and marine areas, consistent with national and international law and based on the best available scientific information

**14.7** Increase the economic benefits to Small Island developing States and least developed countries from the sustainable use of marine resources, including through sustainable management of fisheries, aquaculture and tourism

**14.a** Increase scientific knowledge, develop research capacity and transfer marine technology, taking into account the Intergovernmental Oceanographic Commission Criteria and Guidelines on the Transfer of Marine Technology, in order to improve ocean health and to enhance the contribution of marine biodiversity to the development of developing countries

**14.b** Provide access for small-scale artisanal fishers to marine resources and markets

**14.c** Enhance the conservation and sustainable use of oceans and their resources by implementing international law as reflected in United Nations Convention on the Law of the Sea

#### Relevant CRAF Portfolio Indicators

CO2 removed\* (tCo2e) Nature-positive value created (\$) Chemical inputs avoided (tonnes) Water saved (m3)

#### **Relevant SDG**



Life on land: Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss

#### **Aligned SDG Targets**

**15.a** Mobilize and significantly increase financial resources from all sources to conserve and sustainably use biodiversity and ecosystems

**15.b** Mobilize significant resources from all sources and at all levels to finance sustainable forest management and provide adequate incentives to developing countries to advance such management, including for conservation and reforestation

**15.c** Enhance global support for efforts to combat poaching and trafficking of protected species, including by increasing the capacity of local communities to pursue sustainable livelihood opportunities

**15.1** Ensure the conservation, restoration and sustainable use of terrestrial and inland freshwater ecosystems and their services, in particular forests, wetlands, mountains and drylands, in line with obligations under international agreements

#### Relevant CRAF Portfolio Indicators

Waste reduced /reused (tons) Nature-positive value created (\$) Chemical inputs avoided (tonnes Water saved (m3) 15.2 Promote the implementation of sustainable management of all types of forests, halt deforestation, restore degraded forests and substantially increase afforestation and reforestation globally
15.3 Combat desertification, restore degraded land and soil, including land affected by desertification, drought and floods, and strive to achieve a land degradation-neutral world
15.5 Take urgent and significant action to reduce the degradation of natural habitats, halt the loss of biodiversity and protect and prevent the extinction of threatened species
15.6 Promote fair and equitable sharing of the benefits arising from the utilization of genetic resources and promote appropriate access to such resources
15.9 Integrate ecosystem and biodiversity values into national and local planning, development processes, poverty reduction strategies and accounts

