



METRICS FOR INTEGRATED SYSTEMS AND CONTEXTS

Côte d'Ivoire Climate Vulnerability Reduction Credit
Feasibility and Pilot Design

In support of UNDP Project CIV 10 00103170: "Renforcement de l'intégration de l'adaptation
au changement climatique dans la planification du développement en Côte d'Ivoire"

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Metrics for Integrated Systems and Contexts: Côte d'Ivoire Climate Vulnerability Reduction Credit Feasibility and Pilot Design

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Signed by:

Karl Schultz, Executive Chairman, The Higher Ground Foundation

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About the Higher Ground Foundation (HGF)

The Higher Ground Foundation facilitates adaptation to climate change through the development and promotion of an adaptation credit framework based on Vulnerability Reduction Credits (VRCs), which are generated through activities and interventions that are independently certified to reduce vulnerability in a quantifiable manner.

Since its founding in 2011, the Higher Ground Foundation has been run by a team of professionals headquartered in London, UK with participants based in Europe, North America, Africa, and Asia.

Currently, Higher Ground Foundation operates as an initiative of Climate Adaptation Works Ltd. (CAW), and all contracts and agreements with counter parties are signed with CAW.

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Abbreviations used in this report

ABM	Adaptation Benefit Mechanism
COP26	26th Conference of Parties to the United Nations Framework Convention on Climate Change
LoCAL	Local Climate Adaptive Living Facility
MRV	Monitoring, Reporting and Verification
NAP	National Adaptation Plan
NDC	Nationally Determined Contribution
PND	Côte d'Ivoire National Development Plan
PIPP	Pilot Implementation and Partnerships Phase
RCI	(Republic of) Côte d'Ivoire
SRI	System of Rice Intensification
VPA	VRC purchase agreement
VRC™	Vulnerability Reduction Credit
VRCPF	Vulnerability Reduction Credit Purchase Facility

Organizations mentioned in this report

AFD	Agence Francaise de Développement (French Development Agency)
AfDB	African Development Bank
BCCRF	Bangladesh Climate Change Resilience Fund
CAW	Climate Adaptation Works Ltd.
CDC-CI	Caisse Des Dépôts et Consignations de Côte d'Ivoire (Ivory Coast Deposits and Consignments Fund)
CNRI	Centre national de recherche agricole (National Agricultural Research Center)
COASI	(Cacao cooperative located in Soubéré)
COPRORIZ	(Rice cooperative located in Yamoussoukro)
CPI	Climate Policy Initiative
FAO	Food and Agriculture Organisation
GCF	Green Climate Fund
GEF	Global Environment Facility
GGGI	Global Green Growth Institute
GIF	Global Innovation Fund
HGF	Higher Ground Foundation
ICRAF	World Agroforestry Centre
IMPACTUM	Consulting company working on agroforestry for cacao
LOCAGRI	Private Company in the agriculture sector, including rice
LONO	Private Company focusing on agriculture including composting
MINADER	Ministère de l'Agriculture et du Développement Rural (Ministry of Agriculture and Rural Development)
MINEDD	Ministre de l'Environnement et du Développement Durable (Ministry of the Environment and Sustainable Development)
PNCC	Programme National sur le Changement Climatique (National Climate Change Programme)
SODEXAM	Societe D'Exploitation Et De Developpement Aeroportuaire, Aeronautique Et Meteorologique (Airport, Aeronautical and Meteorological Exploitation and Development Company)
UNCDF	United Nations Capital Development Fund
UNDP	United Nations Development Programme

Abstract

Assessing and building climate adaptive capacities at the national level is both a great challenge and an opportunity to better ensure sustainable development in spite of climate change.

To this end, this study was undertaken as a scoping effort to aid Côte d'Ivoire in formulating a program of readiness and preparatory support through which it is addressing a number of obstacles to the advancement of its adaptation planning process.

The study assessed the potential for using the [Higher Ground Foundation's](#) (HGF's) climate [Vulnerability Reduction Credit \(VRC™\)](#) to support project development, funding, monitoring and evaluation, to scale up project mobilizations and finance, and to support the evolving national monitoring, reporting, and verification system for adaptation. In this context, the VRC can serve as both a finance instrument and as a metric that, alone or in conjunction with other metrics, can translate information on results at the project level to the national level to enhance reporting and management under Côte D'Ivoire's Paris Agreement transparency framework.

This project analyzed prospects for: 1) piloting a VRC project in-country, 2) deploying the VRC for project funding, and 3) using VRCs to support the national adaptation planning and management system.

The work was carried out from July 2021 through June 2022 and involved the following elements:

- *Desk research:* A thorough literature review of both publicly available and internal documents was carried out that provided a framework assessing the context under which each project element might be developed.
- *Mission to COP26:* We attended the 26th Conference of the Parties in Glasgow to raise awareness of the project through a workshop for the Ivorian delegation and through meeting with potential partners and funders.
- *Country Mission:* We travelled to Côte d'Ivoire to meet with key stakeholders, including ministries, businesses, NGOs, and climate-affected communities/businesses and conducted an atelier on the project.

Despite the exceptional cooperation provided by those we engaged with, there remain significant gaps and questions regarding each of the programmatic elements we investigated:

- *VRC Project:* Although the process and therefore tools needed for generically implementing an “adaptation project” are well understood, particularly in this context, the particulars of the VRC process indicate the need to build new capacities and methodologies. In addition, as noted copiously The availability and usability of data remains a significant potential barrier, and the contingent evolving state of the climate system makes understanding how well we understand the degree to which

adaptations can faithfully track the future climate state essentially unknowable (but, we hope to demonstrate, manageable with the right tools).

- Project Funding: As discussed in Section IV, the VRCPF can be modeled to a certain extent following existing structures, as in fact the VRC mechanism is, to a certain extent, designed to extend the functionality of “carbon” credits for mitigation to the domain of adaptation. However, it will represent a prototype and methodological clarification and capacity building will be required to build it and then integrate it into a potential national finance structure. As VRCs will eventually be operating within what will be a market, a significant effort will be needed to obtain data related to what are currently latent demand and supply volumes.
- National Management System will also need to be defined to organizationally conform to what is still a proposed system---the National Adaptation Agency---and corresponding capacity needs to be built. This component will also be heavily influenced by the final form attained by relevant laws and international contributions such as the NAP and NDC as well as the degree to which various standards such as Sendai and SDGs are adhered to.

While there are many unknowns in our understanding of the implementation feasibility, we have found from our engagements with experts, officials, funders, and farmers that there is both interest in and capacity to pilot VRCs for Côte d’Ivoire. It is only through pilot work that many of the unknowns will become knowns at the project, funding, and national management levels. To continue these efforts, we have developed a roadmap for a follow-up “Phase 2” in which we collaborate with the national government, funders, and experts to formulate a practical, costed project.

Introduction

Climate change adaptation is now understood to be as necessary as climate mitigation. This is reflected in the Paris Agreement, which aspires to provide a funding balance between adaptation and mitigation, and has called upon signatory countries to “engage in adaptation planning and implementation through e.g., national adaptation plans (NAPs), vulnerability assessments, monitoring and evaluation, and economic diversification.”ⁱ Assessing and building capacities in these areas is thus a priority if adaptation by countries is to be successfully implemented to reduce climatic vulnerabilities and enhance resilience.

For its part, Côte d’Ivoire (RCI) is formulating its NAP for action at the national and sectoral levels, including legislative initiatives such as a Climate Law and investigating creation of a National Climate Agency and National Climate Fund.ⁱⁱ The Green Climate Fund (GCF) is supporting, through United Nations Development Program (UNDP), a program of readiness and preparatory support through which it is addressing a number of obstacles to the advancement of its adaptation planning processⁱⁱⁱ, including, among other barriers:

- Institutional and policy barriers: lack of national to sub-national coordination,
- Information and knowledge barriers: lack of sufficient information to prioritize adaptation interventions, no Monitoring, Reporting and Verification (MRV) system for adaptation, and
- Financial obstacles: lack of formal financial mobilization strategy or framework; private sector funding potential unexplored.

This study is a component of this readiness program. The study aims to set the groundwork for overcoming the barriers described above through a thorough gaps analysis. We then assess the feasibility of applying the Higher Ground Foundation’s (HGF’s) climate Vulnerability Reduction Credit (VRC™) to support project development, funding, monitoring and evaluation, to scale up project mobilizations and finance, and to support the evolving national MRV system for adaptation.

Linked throughout all the above barriers, a principal challenge to the funding and mobilization of adaptation is acquiring and applying the knowledge, skills, and mechanisms to directly support and empower communities to be able to take a lead themselves in addressing climate hazards and associated impacts. This requires working and learning with stakeholders to advance informed, forward looking, and incentivized adaptation practices whose outcomes can be measured to quantify and show the impact of climate change adaptive management.

However, there is a lack of an articulated, cross-system, national adaptation framework for: outcome evaluation; intervention prioritization; incentives; planning; and learning from vulnerability reduction interventions. This leads to a lack of coherent direction in prioritizing and guiding adaptation practices, and processes.^{iv}

As a result of this disconnect between adaptation aspiration and documented results, funding is available for projects, but proposed projects often have difficulties in securing funding. This somewhat counterintuitive outcome is apparent in the track record of funding approval by the GCF, which is heavily weighted to easier-to-measure carbon reduction projects.^v The GCF and other funders, along with vulnerable countries, are thus in need of viable instruments and frameworks to support their funding decisions and to scale up resourcing to meet adaptation needs.

The objective of this study is to carry out an initial analysis and feasibility assessment that will help to guide the RCI's Ministry of Environment and Sustainable Development (Ministère de l'Environnement et du Développement Durable, Côte D'Ivoire, or MINEDD) and partners in the successful development of VRC projects and a registry that will enable RCI to more effectively identify, support, implement, communicate and secure funding of adaptations to climate change in accordance with its NAP under the 2015 Paris Agreement and the framework that has been developed with the GCF.

The study shall also support completion and implementing of a proposed Memorandum of Understanding between Climate Adaptation Works Ltd. (CAW, the owner of the Higher Ground Foundation) and MINEDD to demonstrate the potential for using VRCs to define and

What is the Higher Ground Foundation (HGF)?

- The [Higher Ground Foundation](#) aims to create a future where the best responses to climate change are the choices the world wants to make.
- It created the [Vulnerability Reduction Credit, or VRC™](#), to encourage investment in climate adaptation projects.
- VRCs are a means to quantifiably assess a project, based on sustained attention to maintaining climate resilience. As such they may be used for monitoring and evaluating projects, prioritizing investments, and could be purchased by parties interested in securing verifiable reductions in climate vulnerability from climate adaptation.
- After development and a comprehensive review by over 40 experts, we have released of [VRC Standard Framework](#) and launched our "[Pilot Implementation and Partnerships Phase](#) (PIPP)."
- This study and our partnership with Côte d'Ivoire is part of the PIPP, to pilot projects and improve the Standard Framework, to meet our aim.

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manage adaptation projects, viably finance these projects, and manage adaptation and communications at the national level.

Specifically, the study explores current prospects for:

- (1) piloting a VRC project in-country,
- (2) deploying the VRC for project funding, and
- (3) using VRCs to support the national adaptation planning and management system.

This is based on an evaluation of the existing adaptation experiences and capacities, including:

- (1) how projects have been identified, implemented, and evaluated and the data and analytical tools used;
- (2) the existing and potential domestic and international climate financial resources and potential for using VRCs as a financing instrument, and;
- (3) how the current and developing MRV and overall adaptation planning environment would be able to integrate VRCs.

The approach used in this study is to take stock of the existing and future “baseline” capacities, compare these to the [VRC Standard Framework](#) requirements (scientific, environmental, social, and governance), highlight the “gaps” between these, and consider how capacities could be developed to bridge these gaps. The findings of the study may serve as the foundation for the subsequent design and proposal to pilot VRCs in Côte d’Ivoire (Phase 2), through a pilot adaptation project using VRCs, detailed design of a system for integration of VRCs into climate funding facilities, including testing VRCs for funding the pilot project, and detailed design and testing of VRCs deployment in the national MRV system.

The study was undertaken from September of 2021 through June of 2022, and comprised a literature review, engagement with experts, financial bodies, and Ivorian and international policymakers at the 26th Conference of Parties to the United Nations Framework Convention on Climate Change (COP26) in Glasgow, Scotland, a field and data gathering visit to Côte d’Ivoire to meet experts, officials, and farmers and farm cooperatives, and follow-up and analysis that resulted in this synthesis report.

The remainder of this paper is structured as follows: Section I considers the adaptation challenges for RCI. In Section II, we present a theory of change for overcoming these challenges and the purpose of the present study. Sections, III, IV, and V discuss the feasibility of using the VRC approach in project development and monitoring, securing project finance, and informing national management, respectively and, finally, we present a conclusion and roadmap for further activities in Section VI.

I. Adaptation challenges for Côte d'Ivoire

A. Challenges of climate change

Côte d'Ivoire's national development plan for 2021-2025 aims to achieve economic and social transformation to make the country an upper-middle income country.^{vi} It is based on six pillars, including one on balanced regional development, preservation of the environment and the fight against climate change. This pillar is critical as key issues identified in the RCI's Nationally Determined Contribution to the UNFCCC (NDC)^{vii} include addressing self-sufficiency and food security, improved productivity and competitiveness, reduced population vulnerability, and increased resiliency to climate change. Poverty, water resources, health, food security, infrastructure, along with economic productivity are all impacted by climate change.

As the NDC notes, climate change threatens to:

1. push nearly one million more Ivorians into extreme poverty
2. increase the risk of water stress, with more and more regions expected to have more than 10% of their population in water shortage, and
3. increase the incidence of air- and water-related diseases among susceptible populations.

Furthermore, "women are particularly vulnerable to the negative consequences of climate change because of the division of labor and gender roles, economic disparities, and imbalances in drudgery and time spent on domestic tasks that penalize their opportunities for adaptation."^{viii}

The negative repercussions of climate change are perceptible in many sectors in Côte d'Ivoire, sectors. Notably, the latest NDC identifies the five following areas of concern^{ix}:

- Agriculture, livestock, aquaculture, with effects leading to changes in the agricultural calendar, reductions in production volumes for certain crops, and changes in climatic zones favorable to crops, and degradation of pastureland.
- Forests and land use, including dieback, increased risk of forest fires and increased soil degradation and desertification.
- Water resources, with decreases in the availability of surface and groundwater.
- Health effects arising from increases in air temperature leading to respiratory conditions and heat stress and increases in precipitation potentially amplifying the risk of vector-borne disease.
- Coastal areas, with effects including intensification of coastal erosion and increased risk of flooding and marine submersion.

To understand these challenges, it is important to have a basic understanding of what has been happening to the climate in Côte d'Ivoire and what are plausible future scenarios. Climate fluctuations in Côte d'Ivoire have been increasing since the 1960s, with the national average temperature rising by 0.5 to 1.0°C^x. Temperatures are expected to increase, although the rate of gain is projected to vary by region (see Figure 1). Projections show a temperature increase of about 1.3°C in 2030, 1.8°C in 2050, and 2.1°C in 2070. The northern, eastern, and central regions of the country are likely to experience relatively more heat than the southern and western regions of the country^{xi}.

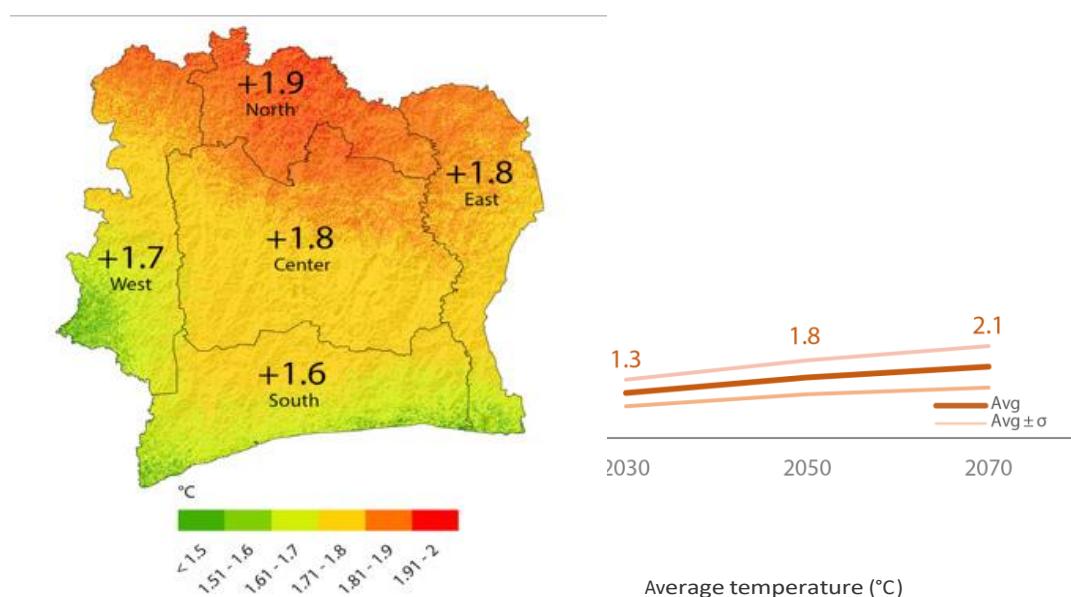


Figure 1: Projected changes in temperature in Côte d'Ivoire by 2050

Source: World Bank, 2019

Although climate models show little change in total annual rainfall in the future, with gains of 0.4, 0.3, and 1.2% in 2030, 2050 and 2070, respectively (see Figure 2), interannual rainfall is now significantly reduced relative to historical trends in some regions, which are experiencing shorter rainy seasons and longer and more frequent droughts. Climate change is expected to further alter the spatial and temporal(both inter- and intra-seasonal) variations in rainfall patterns, as well as agriculture-impacting factors such as humidity and evapotranspiration. As shown in Figure 2, the north and west are likely to experience increases in rainfall of about 1.5 and 1.4%, respectively, while the center, east, and south of the country are likely to experience decreases of about 0.1, 0.2, and 0.7%, respectively^{xii}.

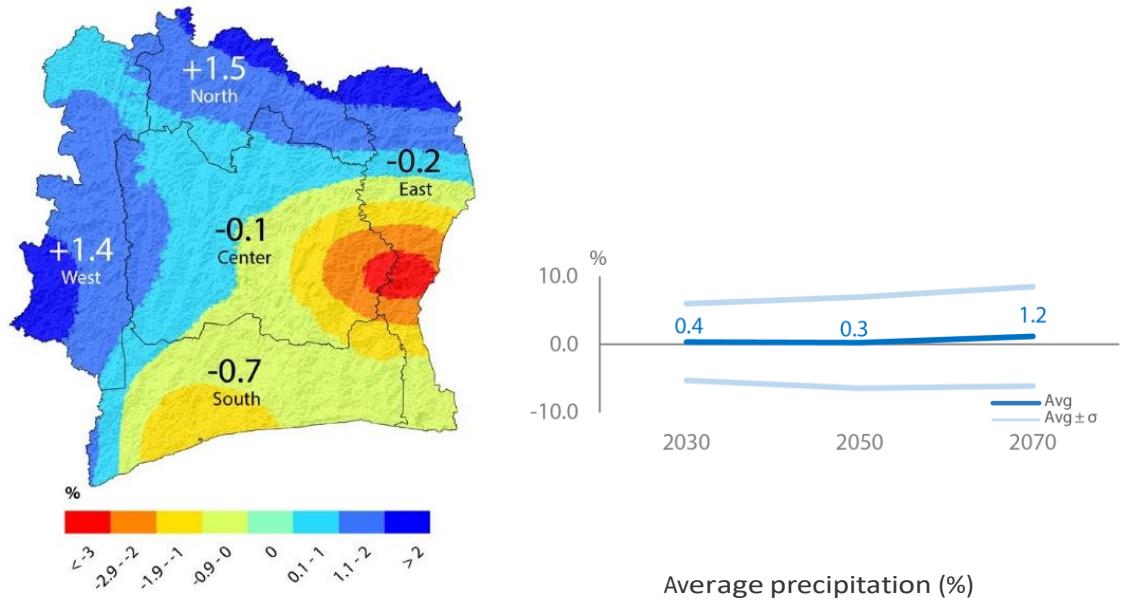


Figure 2: Projected changes in precipitation in Côte d'Ivoire by region by 2050

Source: World Bank, 2019

The detrimental effects of projected climate impacts on the economic, health, and social wellbeing of Ivorian citizens, particularly lower-income workers seeking to break into the middle class, represent a serious threat to the country's overall developmental aspirations: the World Bank estimates that Côte d'Ivoire could incur climate-related losses of CFA 380 to 770 billion^{xiii} (USD 611 million to 1.2 billion at 2022 exchange rates) through the end of the century, with the heaviest impacts on agriculture, services, and infrastructure. The country's agriculture sector, which is currently dominated by rainfed production, is particularly vulnerable to lack of water availability under enhanced drought scenarios,^{xiv} the effects of which could be exacerbated by increasing competition for water resources as the agricultural sector continues to grow.

B. National adaptation priorities and areas of concern

As a signatory to the Paris Agreement, Côte d'Ivoire is expected to finalize its NAP in the near future and, in the process, has identified five priority sectors for adaptation^{xv} roughly corresponding to the NDC areas of concern, namely water, land use planning, health, coastal zones, and agriculture. The NAP documents further identify five key observed and anticipated climate change impacts on these sectors: sea-level rise, increased variability in rainfall, increased rainfall event frequency and intensity, increased temperatures, and increased duration of long heat waves.^{xvi}

The five priority sectors enumerated in the NAP process cover the primary areas of climate vulnerability as identified by the government, as represented by coordinating ministry MINEDD, in conjunction with other stakeholders and experts involved in developing the NAP. Despite the variance in many of the metrics that can be used to measure these vulnerabilities, tools exist to quantify and evaluate current and projected losses in these sectors, and the

authors hypothesize that it is even technically possible to do so using a single metric such as the VRC.^{xvii}

As is explained below, this study chose to focus on agriculture for the pilot project. Factors ranging from the state of the adaptation and technical literature, the overall structure of the Ivorian economy, the need to simplify assumptions underpinning an initial pilot effort, and even the orientation of the agencies and ministries sponsoring and cooperating on this study heavily weighted agriculture as an entry point into our investigation.

Agriculture as a priority case

In 2021, agriculture accounted for 21.4% of the overall GDP and 40% of the total workforce employment.^{xviii} Of the key impacts enumerated in the NAP process, four (increased temperature, increased rainfall variability, increased intensity and variability in heavy rainfall events, and increased duration of long-term droughts) have direct impact on all agricultural activities and outputs, whereas the fifth (sea-level rise) has potential impacts on coastal agriculture as well as indirect effects on crops in terms of salinization. Given the overall exposure (in terms of percentage of GDP devoted to crop production) and sensitivity of this sector, the availability of prior research, results, and methodologies revealed in our desk, field, and literature review, and the general advice of key stakeholders we engaged with, we have focused primarily on agriculture vulnerability reduction in our initial adaptation project assessment.

Climate impact on crops in Côte d'Ivoire

The second-generation National Agricultural Investment Plan^{xix} prioritizes agriculture vulnerability for food and cash crops based on an analysis of each of the country's nine identified agricultural regions. Rice was identified as a food crop to be promoted for the most regions (seven---versus five, three, and three for cassava, vegetables, and yams, respectively). Cacao was the most prioritized cash crop, as it was listed for six out of the nine regions (Table I).

Table I - Crops identified as priorities for the nine national agricultural regions

Food crops		Cash crops	
Crops	Number of Regions	Crops	Number of Regions
Rice	7	Cocoa	6
Cassava	5	Cashew nuts	5
Vegetable crops	3	Coffee	4
Yam	3	Natural Rubber	3
Plantain	2	Oil palm	3
Millet and sorghum	1	Cotton	2
Maize	1	Fruits (mangoes, bananas)	1
Soybean	1		

Source: Adopted from World Bank, 2019

Tables II and III below demonstrate the effects of projected climate impacts on key rainfed and irrigated crops, respectively, based on a multiple-climate-model simulation of key crop impacts through 2050 for Côte d'Ivoire. Note that, whereas the areas under cultivation for some crops increase under some models as a result of expanded cultivation, all yields decrease relative to baseline under both RCPs and in both 2030 and 2050, reflecting the destructive effects of climate impacts on productivity.

Table II - Percentage point differences in yield and area of production with different levels of climate change for irrigated crops in Côte d'Ivoire (shown as percentage point differences over the baseline No-CC for RCP 4.5 and 8.5 projections, respectively)

	Difference in yield (SSP3)				Difference in area of production (SSP3)			
	RCP 4.5		RCP 8.0		RCP 4.5		RCP 8.5	
	2030	2050	2030	2050	2030	2050	2030	2050
Rainfed crops								
Banana	-1.7	-4.5	-1.0	-2.7	0.	1.0	0.9	2.
Cassava	-1.2	-3.3	-1.2	-3.2	0.	0.	0.1	0.
Cotton	-2.5	-7.7	-2.7	-7.2	-0.8	-2.1	-0.3	-0.8
Cowpeas	-1.6	-5.5	-1.7	-5.6	0.	0.	0.5	1.
Groundnut	-3.4	-9.3	-4.6	-12.4	1	3.	2.0	6.
Maize	-5.9	-17.2	-7.6	-21.7	-	-0.5	0.2	-0.3
Millet	-1.7	-6.5	-2.4	-9.2	0.	0.	0.4	1.
Potato	-1.5	-4.7	-1.0	-3.7	1.	1.1	2.2	2.
Rice	-1.7	-5.9	-2.3	-7.6	0.	0.9	0.8	1.
Sorghum	-1.4	-5.4	-2.3	-9.0	0.	1.2	0.3	0.
Soybean	-2.3	-5.1	-3.7	-7.8	0.	-0.1	-0.2	-0.4
Tea	-	-5.5	-1.3	-3.6	-	-0.1	0.4	1.
Tropical fruit	-2.7	-7.1	-2.8	-7.0	-	-0.8	0.0	0.
Yams	-0.9	-2.3	-1.0	-2.4	0.	0.	0.1	0.

Source: Adopted from World Bank, 2019

Table III - Percentage point differences in yield and area of production with different levels of climate change for rainfed crops in Côte d'Ivoire (shown as percentage point differences over the baseline No-CC)

Irrigated crops	Difference in yield (SSP3)				Difference in area of production (SSP)			
	RCP 4.5		RCP 8.0		RCP 4.5		RCP 8.5	
	2030	2050	2030	2050	2030	2050	2030	2050
Cowpeas	-	-7.9	-1.9	-8.2	0.	2.4	1.1	3.
Groundnut	-3.6	-11.5	-4.5	-14.2	1.	7.9	2.7	13.3
Maize	-6.3	-21.2	-8.0	-26.7	0.	-1.0	0.4	-0.6
Millet	-	-5.3	-2.2	-8.2	0.	2.1	0.9	2.
Rice	-	-6.0	-2.2	-	1.	3.2	1.4	4.
Sorghum	-	-5.0	-2.2	-8.3	1.	3.4	0.6	1.
Sugarcane	-2.8	-7.3	-3.6	-9.5	1.	4.3	2.5	5.
Sweet Potato	-	-3.7	-1.5	-4.3	-0.1	0.1	-0.2	0.
Vegetables	-2.9	-11.3	-3.7	-14.2	-1.4	-5.3	-1.8	-6.8
Wheat	-2.6	-6.9	-4.4	-11.3	-2.8	-6.7	-4.3	-9.3

Source: Adopted from World Bank, 2019

C. Key crops: Impacts on rice and cacao

The study focused on two different crops that are important to Côte d'Ivoire: rice and cacao in the Central and Southwestern regions, respectively. They were chosen to understand how a staple crop and a cash crop are understood to be vulnerable to climate change in different regions, as representative of the understanding of their climatic vulnerabilities, data and articulation environments, and capacities of the farming and broader stakeholder communities. Any subsequent pilot project may be informed by these general understandings, but other crops and regions could be selected based on further project design work.

Rice

Rice was chosen for this study as a representative staple crop grown across the country and by some of the poorest farmers. Although RCI was once a net exporter of rice, the removal of government involvement in the market has led to the country becoming a net importer, with 50% of rice consumption currently supplied from imports. Rice cultivation in RCI has been described as "highly informal, fragmented and inefficient, and therefore suffer[ing] from a lack of competitiveness against imported rice."^{xx}

In addition to these structural problems, the rice crop appears to be under considerable current and potential strain from climate change. Crop modeling results indicate that Côte d'Ivoire's rice crop is threatened by temperature increases and shortening of the growing season^{xxi}, stressors that are projected to intensify by the end of the century.^{xxii} Although the rice plant has been shown to be capable of some self-adaptation to heat sterility,^{xxiii} crops, particularly those relying purely on rainfall, remain vulnerable to precipitation trends. Although irrigation is increasingly being used to supplement rainfall, this can have the effect of simply moving the water scarcity issue upstream. For instance, the Food and Agriculture Organisation (FAO) reports that, in the MBE2 / BOUAKE project area, which is downstream from a reservoir that has been in use for 30 years, droughts have made the highlands no longer arable and rice cultivation is only possible in the lowland valleys. Furthermore, the normal twice-yearly crop cycle has been reduced to one planting.^{xxiv}

These documented and projected wide-scale effects were largely echoed by the opinions and observations of representatives and members of the CORPRORIZ rice cooperative outside of Yamoussoukro we interviewed, who reported reduced output in recent years, which they attributed to a variety of factors, including those arising from what they specifically acknowledged to be "climate change."^{xxv}

To help document losses, the cooperative provided us with overall and by-farmer production figures corresponding to various plantings by year going back to 2014. The associated datasheets are included as an external annex to this report.



Figure 3 – CORPRORIZ Cooperative member rice paddy outside of Yamoussoukro, showing example of irrigated rice system.

Cacao

Cacao was chosen as the cash crop equivalent to rice for this study owing to its important role in the agricultural economy of Côte d'Ivoire and the abundance of literature and general level of effort that has been made in understanding the effects of climate on this vital export crop. Cacao is notably the base component of chocolate and is sold through an international market, worth tens of billions of US dollars annually, in which Côte d'Ivoire is the largest national producer.

There is a long-established literature exploring the relationship between climate and cacao production. Essentially, productivity is a function of temperature and water availability, and regular growth and fruiting of cultivated cocoa trees requires rainfall within specific annual and wet and dry-season ranges along with an optimal daily^{xxvi xxvii}.

Sources in the literature^{xxviii} and our direct discussion with in-country stakeholders^{xxix} indicate that changes in precipitation and alteration of the rainy season have been adversely affecting the cacao crop on many plantations. Notably, spatial variation in the nation's climate patterns have caused the cacao-suitable region of RCI to move toward the southwest, a trend that could potentially move the growing region "into the sea," i.e., eliminate it.^{xxx}

Our meeting with a representative cacao cooperative (COASI, located in the town of Meagui, outside of Soubéré), revealed an awareness similar to that of the farmers in the rice collective of current climate change impacts, albeit somewhat more analytical based on a better funding base (the cooperative representative indicated that the primary buyer, a major international agribusiness, had become involved in close tracking of cacao tree inventories and income at the farm family level. Furthermore, the German government consultancy Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) had performed assessments to collect historical data on tree growth and had a report on changes in the optimal temperature zones awaiting publication in 2023.



Figure 4 – Shade tree sapling, Meagui. Once grown, this tree will provide sun cover to cacao plants.

In terms of actual adaptation interventions, the COASI representative noted that efforts so far had been limited to reforestation, involving the planting of shade trees to cool the cacao plantations, along with some adaptation payments to cacao growers reflecting “payment for ecosystem services.” Interestingly, the COASI personnel echoed the hopes of World Agroforestry Centre (ICRAF) researchers that planting sufficient shade trees would change the weather above the cacao plantations, bringing more precipitation.^{xxx}

D. Key challenges to implementation: what is good adaptation in national context?

Our outreach efforts and field research at COP26 and then in Côte d'Ivoire itself revealed considerable energy and imagination toward solving the problems of designing effective adaptation efforts and then obtaining funding for providing adequate assistance. Expressed interest in our mission was high from both government and relevant nongovernmental organization representatives but particularly so on the part of vulnerable individuals and associations with whom we interfaced.

At the same time, we were reminded of the multiple barriers, revealed in our research and discussions with outside experts, to achieving the necessary adaptation funding. These can be categorized as problems arising from: a lack of intercontextual communication or cooperation, for instance, “siloing” between institutions, governments, and various components of civil society); and poor articulation of project goals and outputs.

As shown in Table IV below, barriers to adaptation can be characterized as either issues of cooperation or articulation categories. These issues exacerbate the inability of multilateral and other donors to efficiently evaluate and approve projects for funding, resulting in the approval of projects that might not bring about climate adaptation or, conversely, a lack of funding for robust projects.

Table IV - Barriers to Adaptation

	Issue
Articulation issues	Missing or unobtainable data (insufficient records or decayed/outdated media)
	Inherent randomness and uncertainty in relevant systems
	Need to compare across sectors
	Need to interpret results
	Need to articulate project goals
Siloing Issues	Institutional/database separation (lack of system connectivity)
	Lack of professional connectivity (specialists not conferring across institutional lines)
	Data ownership issues (including institutional reluctance in addition to standard IP restrictions)

II. Theory of change and study aims

This section describes the proposed project's "Theory of Change" to support overcoming the challenges to adaptation in Côte d'Ivoire previously discussed. It also describes how this study aims to understand the context and capacities under which the project could be undertaken, and thus support the project design.

A. Theory of change

The project's Theory of Change is that VRCs integration into project development, finance, and national policy planning, management and communications can address the set of adaptation implementation and sustainability challenges identified in the previous section by creating an analytical framework for well justified decisions to fund and better implement adaptation measures.

- Project development is enhanced as the VRC Standard Framework supports the identification of climate vulnerability and measures to reduce vulnerability, in a manner that is quantified and following approaches that enable sustained and sustainable resilience.
- Funding of adaptation programs and projects is enhanced because the framework permits pricing of VRCs and payment upon proof (VRC certificates) that adaptation measures are maintained to pre-formulated standards. Pricing VRCs may encourage private finance and give all potential funders confidence that projects are meeting adaptation objectives.
- National management of adaptation is improved because VRCs offer a non-exclusive, quantitative measure of adaptation activity, over time, at the local level that may be aggregated. This may support adaptation prioritization, funding allocations, national program planning, monitoring and evaluation, and communication to stakeholders.

B. Study aims

This study aims to serve as the basis for evaluating the feasibility and informing the potential design of a set of pilot activities related to VRC integration into project development, project finance, and national adaptation management (especially monitoring, reporting, and verification – MRV).

As such, it is exploring the baseline capacity environment in Côte d'Ivoire under which the theory of change would either succeed or fail, identifying capacity gaps and thus framing the needs and proposed next steps if VRCs integration is to become a part of the nation's adaptation strategy. In particular, the information and analytical articulation and siloing issues outlined in Section I are the subject of this study. Each of these issues is, in effect, a capacity environment issue.

The study further serves as a potential model for undertaking similar analyses both within Côte d'Ivoire for different sectors and adaptation challenges, and in other countries.

III. VRC feasibility – project level

This section, and subsequent sections on a proposed VRC funding mechanism and national planning system for Côte d'Ivoire, aims to understand if, and how VRCs can enhance adaptation capacity and effectiveness.

It takes stock of the existing and future “baseline” capacities,” compare these to the VRC [Standard Framework requirements](#) (scientific, environmental, social and governance), highlight the “gaps” between these, and consider how capacities could be developed to bridge these gaps. The findings of the study may serve as the foundation for the subsequent design and proposal to pilot VRCs in Côte d'Ivoire, through a pilot adaptation project using VRCs, integration of VRCs into climate funding facilities, and VRCs deployment in the national MRV system.

This particular section describes the methodology taken, and then introduces the VRCs and the VRC Standard Framework requirements for projects (see Figure 5). It then describes the relevant information and perspectives discovered, and concludes with an assessment of the capacities, gaps, and capacity building required for deploying VRCs for a potential pilot project.

A. Methodology

The key purpose of the proposed VRC-based pilot project is to serve as a “proof-of-concept” that reliable and replicable technologies and practices can be applied to measurably reduce vulnerability at the project implementation scale and that the results of this application can be quantified through simple and appropriate output-based metrics.

Through this effort, we seek to address the technical question of VRC pilot project *feasibility*, that is, whether it is reasonably possible to implement a project on the ground, using the VRC Framework principles and procedures, that can measurably and quantifiably reduce vulnerability to specific, enumerated climate impacts through an existing or bespoke technology or approach that is appropriate to the task and context.

To be fully successful, the outcome must serve as a template for the reapplication of the project plan elsewhere and the further extension of the VRC approach to more general adaptation needs and scales. Ultimately, the pilot project results should link to the national management and fund development pillars of this study through the leveraging of further adaptation finance and the building of the capacity of Côte d'Ivoire to monitor, report, and evaluate its overall progress in adaptation.

Specifically, the following key technical criteria for project and methodology selection under the VRC Standard Framework must be met (Table V):

- *Attributability* of impacts (existence of correlation with changes in the climate);
- *Availability* of relevant climate data and projections to measure impacts (together with attributability, this factor determines whether climate impacts can be identified and measured);
- Representativeness of pilot impacts (replicability);
- Political and social viability, and;
- Economic and logistical viability.

The criteria of attributability and availability are related to data and modeling capacity and are discussed in the context of pilot project viability in Section III. The viability criteria are related to developmental, financial, and institutional capacity and relate to the fulfilment of the VRC Project Cycle (Figure 3). Carrying out this cycle requires identifying and designing projects and methodologies and financing and implementing the associated work program and infrastructure build. Our field visit, while brief, provided us with insight into how these elements might come together based on our discussions with cacao and rice cooperatives, marketing, financing, and agribusiness companies, and various governmental and nongovernmental agencies tasked with connecting projects with funding: see the breakdown of our meeting and engagement schedule in Table XI. Another vital capacity criterion involves the need for designing, validating, and verifying VRC projects and generation under our Standard Framework. This effort includes the need to design an approach to registering VRCs and to monitor results using an appropriate third-party verifier and must be addressed further in Phase 2.

Table V – Key Selection Criteria and Requirements for VRC Projects and Methodologies

VRC Requirement/Criterion	Indicators that this criterion is/can be met	Types of sources	Findings/Sources	Gaps
Physical Criteria				
Attributability of impacts to climate change (correlation with climate signal)	<ul style="list-style-type: none"> -Available validated study results on multi-crop impacts (in the academic literature and/or supplied by ministries/NGOs) -Results should be quantified in terms of, e.g., kg/ha or ha in production 	<ul style="list-style-type: none"> Impact modeling -Replicable field results -Site-specific data demonstrating a <i>high-confidence</i> climate response signal 	<ul style="list-style-type: none"> -Research in the literature^{xxxii} identified -Findings from in-country studies^{xxxiii} -Cooperative records^{xxxiv} 	<ul style="list-style-type: none"> -Uncertainty regarding change in response to future enhanced climate signal (increased temps.) -Uncertainty regarding representativeness of available samples (e.g., time coverage, small sample size, location specificity)
Availability of relevant climate data and projections to obtain impacts (sufficiently intense climate signal)	<ul style="list-style-type: none"> -Rich sets of collected historical measurements of key impacting factors (temperature/rainfall) -Available downscaled projections of daily/monthly series of key factors 	<ul style="list-style-type: none"> -Current and historical weather station measurements (min. 10 years) -Downscaled series obtained from IPCC GCM output 	<ul style="list-style-type: none"> -SODEXAM weather station data sets have been made available; ministry indicated downscaled data will be available in early 2023 -Model products available from IPCC and other organizations (per desk research) 	<ul style="list-style-type: none"> Potential problems with sparsity and accuracy of weather station need to be explored and characterized
Representativeness of pilot impacts and data availability (replicability)	<ul style="list-style-type: none"> - Indication that study findings or projections are sufficiently broad (national or regional scope) 	<ul style="list-style-type: none"> -Data and projections of crop sales volumes and prices. -Demand analysis studies 	<ul style="list-style-type: none"> Previous in-and out-of-country studies on crop and other interventions bolster the case for replicability 	<ul style="list-style-type: none"> -Have not been able to access national data on rice/cacao or other crops to facilitate extension of pilot approach, although ministry contacts tell us they are available

VRC Requirement/Criterion	Indicators that this criterion is/can be met	Types of sources	Findings/Sources	Gaps
	<ul style="list-style-type: none"> -Indication that studies or methodologies have been repeated/repeatedly applied. -Indication that results are economically/socially relevant (the crops investigated make up a sufficient component of national economic or subsistence activity) 	<ul style="list-style-type: none"> -Analysis of subsistence demand patterns and consumption. -Replicated or well-referenced pilots studies that indicate robustness and applicability of interventions. 		<ul style="list-style-type: none"> -Lack of findings on specific demand and consumption patterns; probably need to conduct data-gathering to obtain some information on this at the project (local) level
Social and Structural Criteria				
Political and social viability	<ul style="list-style-type: none"> -Ensuring acceptance and participation on part of pilot host community and leaders as well as relevant national ministries. -Is the project design inclusive, sustainable, and carbon-neutral? 		<p>Talks with local leaders and community members have been positive; this is not assured to be the case everywhere</p>	<p>Need to secure following expertise:</p> <ul style="list-style-type: none"> • Gender and inclusivity specialist • Consultant to assess net carbon emissions
Economic and logistical viability	<ul style="list-style-type: none"> -Is there sufficient funding to overcome initial financial hurdles? -Can the needed expertise, tools, and materials be leveraged? 		<ul style="list-style-type: none"> -Have held preliminary discussions with finance experts, as summarized in Annexes I and III -Developed and disseminated a survey on finance needs and goals as part of the study 	<p>Despite reach-out to companies and individuals in the finance and project development field, there has been a lack of follow-up from them</p>

B. VRCs application in Côte d'Ivoire for adaptation projects

VRCs background

Adaptation is, in the general sense, understood to be more “difficult” than mitigation. Broadly speaking, relative to mitigation projects adaptation activities cover a wider scope of activities and non-standardized metrics. Unlike greenhouse gas mitigation, measuring and evaluating adaptation is not a straightforward task of “counting tonnes.” Indeed, no one-size-fits-all definition of “adaptation” is likely to be agreed upon, which has led to the coining of a broad range of metrics designed to be applicable to unique adaptation contexts and reporting requirements. Only recently have the first efforts been made to fashion a generally agreed-upon adaptation metric framework.

The contribution of the VRC Framework to addressing many of these adaptation challenges is to present a metric of adaptation designed to quantify vulnerability reduction obtained from adaptation activities through a singular, or “universal,” metric constructed based on a set of robust principles, as described in Table V. Although VRCs can be extracted from a wide variety of activities embodying different approaches to “valuation,” each VRC generated measures the same monetary output—50 Euros worth of income-normalized avoided impact cost—making the VRC an example of a “universal,” single-indicator metric.

Although measuring all adaptation activities everywhere using a universal metric is unrealistic,^{xxxv} the VRC as a single-number indicator is easily aggregable from the project level upward, making it a promising tool for linking to regional, national, and, ultimately, global-level metrics of adaptation performance, as will be discussed further in the National Management section (Section V). Furthermore, the VRC can be denominated as a fungible credit, making it potentially attractive as an investment and financing vehicle for adaptation funding; this will be discussed further in Section IV.

Vulnerability Reduction Credits (VRCs™)

- A [VRC™](#) is the monetized cost of the estimated impact of climate change, adjusted for the income level of the community, that will be avoided as a result of the project.
- The [Higher Ground Foundation](#) created the VRC instrument and developed an expert-reviewed Standard Framework to ensure VRCs met key scientific, environmental, social and economic criteria.
- In brief, it is a credit for work done to avoid damages or losses owing to climate change - a vulnerability reduction credit.
- A VRC is €50 worth of income adjusted avoided impact costs.
- The VRC may serve as a finance instrument and as a metric that, alone or in conjunction with other metrics, can translate information on results at the project level to the national level to enhance reporting and management under Côte D'Ivoire's Paris Agreement transparency framework.

VRC Standard Framework requirements for projects

Under the VRC Standard Framework, projects that support climate resilience through demonstrated and validated climate adaptation measures may be awarded VRC certificates by the HGF. The HGF manages the process of VRC project development, execution, and monitoring through a multi-step process in conjunction with all project stakeholders and also with third-party auditors (Figure 5).^{xxxvi}

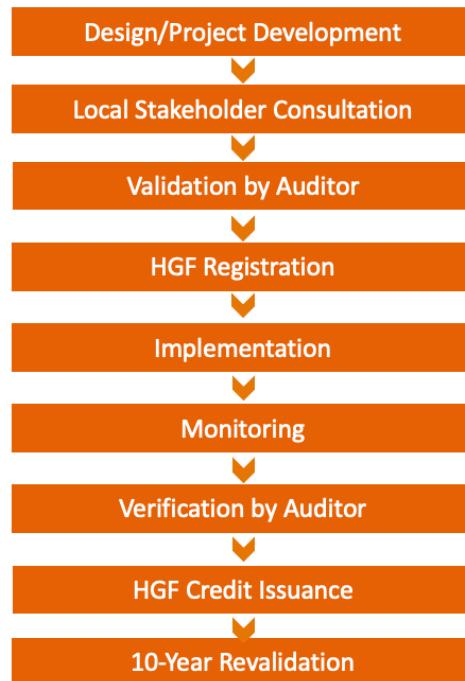


Figure 5 - Project inception, validation, execution, and verification of VRCs produced under Standard Framework

Source: VRC Standard Framework

The VRC Standard Framework guides the creation of VRC project methodologies, project registrations, and awarding of VRC. Projects must meet rigorous voluntary validation, registration, monitoring and verification standards and, in doing so, achieve certification as VRCs. It is guided by a set of principles including avoidance of harm, community consultation, sustainability, completeness, consistency, accuracy, transparency, and conservativeness. Included are templates for methodologies and projects documents, that demand attention to baselines and outcomes confidence, and principles driven requirements such as environmental and social impacts and consultation.

VRC requirements and the Côte d'Ivoire Pilot Design

As noted above, the key purpose of implementing a VRC-based pilot project is to develop a “proof-of-concept” that reliable, measurable, and replicable technologies and practices for reducing vulnerability in RCI can be applied.

Procedurally, under the VRC Framework the pilot identification process can be represented as follows:

1. Identification of impacts on vulnerable systems and attribution to climate change factors
2. Selection/design of methodologically backed intervention(s) to address impacts
3. Assessment of applicability of intervention, including availability and suitability of pilot project sites
4. Scoping of plan for monitoring results/accounting of vulnerability reductions against design
5. Assessment of pilot approach replicability

In the following, we discuss our current research and outreach-based understanding of the constituent elements and drivers of 1–5 above, identify the gaps between our current understanding and data and the state of affairs we believe will be needed to credibly implement a pilot project, and present some options for overcoming these gaps.

Climate impacts identification and attribution

The literature (see, e.g., the information obtained through the desk research as summarized in Section II) indicates a clear linkage between model-projected changes in climate factors such as rainfall distribution and temperature and damages to output in the agricultural sector, particularly rice and cacao. Our relevant findings from the literature and from our field visits with stakeholders in the rice and cacao sectors in RCI are summarized in the subsection ["Key Crops: Impacts on Rice and Cacao"](#) above.

The issue of localization is vital to addressing the issue of vulnerability at the project level. There can be significant climate pattern differences between regions or even localities, particularly in settings characterized by complex, mixed-altitude terrain such as the central highlands of Côte d'Ivoire. To design a robust VRC project under which future impacts can be anticipated within an acceptable margin of confidence, it is necessary to understand the extent to which it is possible to obtain, for instance, full weather station data and downscaled projections to represent historical and future projected trends at the project site level, respectively.

To test the baseline level of data confidence and availability, we entered into agreements with SODEXAM to access their weather station data covering measurements taken from 1980 to the present. In terms of downscaled data, SODEXAM plans to have available, by the end of 2022, downscaled climate models covering the country from which future trends at a local level can potentially be extracted. SODEXAM downscaling results would be of particular interest as a cross-reference to the CLIM5 model results, identified in the preceding sections, available through the Digital Atlas of Climate Change.

As of this writing, we have received the data sets requested from SODEXAM. These comprise primarily 1980 to 2021 readings taken from weather stations that were identified with the

labels “Yamoussoukro” and “Soubré,” which we could use as indicative data relevant to primary rice- and cacao-producing regions, respectively. The data fields provided include temperature maxima and averages, monthly and annual rainfall maxima and averages, and evapotranspiration, which were chosen by us to reflect weather parameters that affect rice and cacao productivity.

To assess the attributability of crop productivity to the climate change signal, we have requested from MINADER, along with several cooperatives (rice and cacao), production figures for key crops, e.g., rice and cacao. We further requested from the cacao cooperative a copy of a report they held regarding the climate impacts on Ivorian plantations. To date, we have received a data set covering recent (from 2014) rice productivity by rice cooperative farmers and are expecting a broader set of production statistics from MINADER.

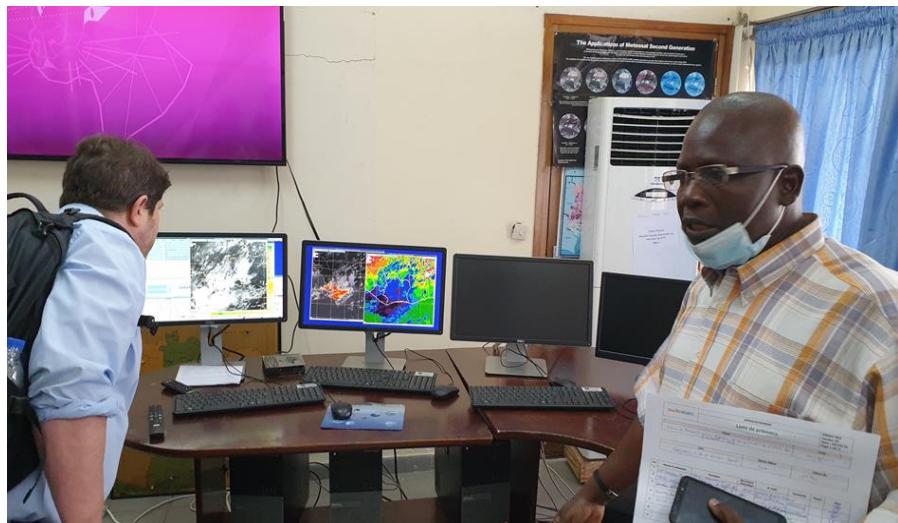


Figure 6- SODEXAM meeting. Mission member examining PUMA regional weather forecast system, which shares real-time satellite data across Sub-Saharan Africa.

The data sets and reports received to date are included as a separate annex to this report.

Intervention and monitoring methodologies

Once historical and projected climate impacts have been understood and quantified in terms of enhanced vulnerability, the project developer must identify tools (techniques and technologies) through which vulnerability reduction is carried out (i.e., a valid project methodology or methodologies must be identified). These tools can be specifically developed for the project or be existing and tested to the point that they can be applied through modification or even off-the-shelf; it is also entirely possible that an existing or planned project—that happens to be aligned sufficiently well with the requirements of our framework—could be “adopted” or “piggybacked” onto as a full-blown VRC project. Regardless of the degree to which the pilot project approach is newly developed or adapted, under the current Draft VRC Standard Framework the developers must apply an in-depth process in specifying project boundaries and vulnerability conditions, potential externalities, and formulas for quantifying baseline and reduced vulnerability.^{xxxvii}

Site selection and preparation

Our outreach efforts at COP26 provided us with a high-level view as to the sectors and programmes that could serve to “host” a VRC project.^{xxxviii} Our subsequent country visit in February-March 2022 helped to further focus both the sector search and site selection process. In all, we held discussions with representatives of two agricultural cooperatives, two private businesses operating in the agriculture or adaptation-adjacent space, six RCI government ministries, and eight key international relief and development agencies, many of which had ongoing or recently completed projects in country addressing adaptation issues facing rice or cacao.

Although a significant narrowing effort will be required in the actual piloting of VRCs in an adaptation project, the content and direction of our discussions provide some broad contours of the siting and sector of a pilot VRC project:

- rice or cacao project located in the north-central or southwest region of the country, respectively (although we do not rule out the possibility of another or multiple crops of focus);
- a natural setting for the project would be the farms comprising an agricultural cooperative that has already partnered with a multilateral agency/research organization or has a developed relations with our government partners or the funders and implementers of this study.
- Our data gathering efforts suggest that the size of such a project would be on the scale of the low hundreds of smallholder farms, which in turn provides us with a scale for estimating implementation costs.

Implementation capacity

Representativeness of pilot impacts and data availability (replicability)

The pilot project inaugurated at the end of Phase 2 and then carried out cannot be considered a successful test of the VRC Framework approach unless it can serve as a “template” for replication. In the most direct and easily implemented sense, such replication involves finding project settings to which the methodologies and general project design elements can be transferred in a relatively one-to-one manner owing to inherent similarities in terms of setting, crops, and vulnerabilities involved. In terms of replicating at scale the pilot effort in RCI, this constitutes a strength of our chosen strategy of focusing on widely grown country-general crops such as rice and cacao.

In the preceding sections, we presented reasons--including abundance of settings, low barriers to entry, importance of the sector, etc.--for using a rice or cacao agricultural project as an *entry-point* into more general adaptation methodologies. From a longer-term view, however, replicability and scalability will require the extension of the VRC framework in a more general sense, that is, to projects addressing the vulnerability of other crops and agricultural activities and, ultimately, beyond this scope to other sectors and a to projects that can be implemented in settings beyond Côte d’Ivoire.

C. VRC for Projects: Gaps analysis

Impacts identification and monitoring

The *availability* of accurate and appropriate data can be a significant barrier to the climate impacts attribution and measurement task and, as discussed above, the process of obtaining appropriate data is challenged by the complexity of the sourcing process (in terms of identifying, reaching out to, and obtaining a data extraction agreement from the appropriate holders) and the patchiness and potential lack of representativeness of the data itself. Table VI lists the data sets and sources we requested over the course of the field visits, the completeness of the data supplied, and the corresponding gaps. As of publication (approximately four months following the visits), six of eight (75%) of the categories requested had been fulfilled, at least in part. Of the fulfilled requests, waiting time varied from overnight (from one of the coops) to approximately one and a half months (some of the ministries).

The data sourcing barriers we observe can in part be understood as contributing to a “learning curve”—in which lessons were learned through our field visits and stakeholder outreach regarding initial which ministries and institutions held what and the appropriate channels through which to request these data—and we see an important scope for the future institutionalizing of these lessons as concrete procedures supported by clear protocols and standing agreements regarding data sharing.

Complementary to availability, data used to determine climate impacts are subject to a criterion of *attributability*, i.e., all VRCs generated against a vulnerability reduction project must demonstrably reflect impacts that can be *confidently* linked to changes in a verifiable climate signal.^{xxxix} In practice, this goal can be frustrated by issues of data mis-selection or mis-sourcing, or even simple chance for cases in which a site to be chosen for a project is simply not subject at the local level to the otherwise valid climate trends seen at the regional level. The challenge of attributability is further complicated by the need for anticipated impacts to track future changes in the climate state (the problem of *accurate tracking* is addressed by climate modeling and downscaling, as discussed elsewhere in this report, but inherently represents a key “known unknown” in adaptation planning).

Capacity gaps

In addition to the complexities of data definition, sourcing, and management, there remain a number of gaps in our understanding of how capacity can be drawn upon to implement, maintain, and monitor a pilot and succeeding adaptation projects. These questions generally attach to two categories of problems: human willingness and capacity to change behavior and practices; and the availability of tools---technological, methodological, and financial---for carrying out the work.

The issue of capacity is made more complex by the contingent state of the planning process: given that specific project sites and approaches need to be vetted and nominated, many of the issues discussed below will have to be addressed in an emergent manner. Finally, the human issues involved in this process will reflect a complex intersecting and conflicting set of human and institutional interests, many of which will be unfamiliar to international experts called upon to help facilitate the project implementation process and which must be therefore treated with careful consideration and respect for various parties involved.

Human issues:

- Participant buy-in: Can project participants---likely farmers and their families who currently operate at or near subsistence level with little margin---be convinced that undertaking a project involving the use of potentially new tools/technologies and unfamiliar practices is worth their time and effort? This evolves into an exit strategy problem once the project training and initial assessment period is completed and participants are tasked with autonomous and sustained operation.
- Leadership buy-in: Community and local leaders, as well as involved government representatives, will have interests and goals that align with those of farmer participants in some ways and diverge in others. The dynamics involved in ensuring appropriate cooperation of leaders and ensuring that their interests are met while aligning with those of the community need to be managed in an expeditious but sensitive manner.
- Education: This problem is similar to that of buy-in but additional to it in that, even if cooperation is sufficiently engendered, a project can still fail through mis-transmission of methodologies and/or practices. To help avoid this, a suitable theory of learning and change should be integrated starting from the inception; the question as to which theory and how it is to be applied

Tools:

- Scale of costs and availability of finance: Given the early state of the current planning process and the lack of an identified project, the start-up costs (including capital expenditures and recurrent costs until self-sufficiency) remain unclear. Although the prospective range of these costs is wide, we can refer to the literature for estimates, including figures for agricultural adaptation and costs per VRC generated.^{xl} Note that the VRC project is designed to self-fund based on the sale of VRCs at or above the per-VRC-generated levelized project cost^{xli}; however, the initial pilot will need to be implemented concurrently to the initialization of the VRC Purchase Fund (Section V) and, therefore, will require a source of seed funding.
- Availability of equipment and materials: A further uncertainty will be the availability of necessary equipment and materials, which will have to align with as-yet-determined requirements in terms of, e.g., feedstock and seeds, farming tools and equipment, water, fertilizer, measuring and monitoring

infrastructure, etc. It remains unclear as to the extent to which internal market conditions, along with the current global logistics logjams, will affect availability; this must be further assessed as a part of the overall market and economic assessment prior to 2023.

- **Logistics and planning:** As an agricultural project is assumed, the timing of the pilot intervention will be driven by factors related to the growing season (e.g., for rice crops, activities should be tied to the timing of at least two kharif seasons). The need to monitor, assess, and then readjust the approach based on interim results constrain the speed with which the pilot project can proceed, with a two-kharif schedule dictating a start date of no earlier than the Q1 2023 and a transition to full-blown project activity (Phase 3) no earlier than Q4 2024 (see Roadmap in Section VIII).
- **Methodologies:** A variety of methodologies will need to be developed and/or adapted for application under the [VRC Framework](#). A number of gaps and uncertainties attach to the following:
 - Practical/technical (“field methodologies”): As with other tools pertaining to project development, a methodological treatment of the pilot project will require quantified data on climate impacts, the associated vulnerabilities, project scope (including participants, location, and geographic boundaries, and stocks and flows). The process in developing the field methodologies will follow, the [HGF VRC Methodology Template](#) (Section 14 of that document).
 - Definition of community social and economic factors: In addition to physical boundaries, considerable care will be needed to define the social and economic properties of the overall project and individual participants. VRC projects apply an “[Income Equalization Factor](#) (IEF)” (Section 4.9 of that document) to ensure comparability of results valuation across economic context (i.e., projects taking place in lesser or least-developed economic contexts are awarded inflated VRC valuations depending on a localized measure of GDP). As the IEF should be tuned as closely as possible to project-specific conditions, the incomes and wealth of the project participants will have to be measurable.
 - Monitoring and evaluation: To generate VRCs, project adaptation activities and infrastructure must be confirmed to be maintained within the guidelines of the project document. Under the [VRC Framework](#) (Section 5.2.4), this validation should be carried out by a third-party auditor. To date, there has been no concrete opportunity to identify who could carry out this role in the context of the pilot and whether a national or international expert or consultancy (e.g., accounting firm) should be secured.

Table VI – Datasets requested, provided, and gaps

Dataset or study	Time series range requested	Location(s)	Source	Time series delivered	Location delivered	Completeness Gaps	Quality Gaps
Average, max, and min annual temperatures	1980-present	Yamoussoukro (Yams)/ Soubré	Ministry	1980-2021	Yams	Soubré (missing)	
Average, max, and min monthly temperatures	1980-present	Yams/ Soubré	Ministry	1980-2021	Yams	Soubré (missing)	
Total annual rainfall	1980-present	Yams/ Soubré	Ministry	1980-2021 (Yams); 1980-2017 (Soubré)	Yams/ Soubré	Soubré (partial)	
Monthly rainfall	1980-present	Yams/ Soubré	Ministry	1980-2021 (Yams); 1980-2017 (Soubré)	Yams/ Soubré	Soubré (partial)	
Daily evapotranspiration	1980-present	Yams/ Soubré	Ministry	1980-2017 ex. 2004-2007 (monthly figures)	Yams	Soubré (missing) Yams. (partial)	Monthly instead of daily figures*
Production figures for nine food and cash crops**	1980-present	National totals	Ministry	Not yet provided	NA	pending	pending
Coop rice production	Asked for what could “reasonably be supplied”	Yams rice coop	Coop manager	2014-2020	Coop wide	None apparent+	
Coop cacao report	Asked for		GIZ	Not yet provided++	NA	pending	pending

*We note that the daily evapotranspiration figures for two locations from 1980-2021 would require on the order of 30,680 records and would therefore likely be prohibitive

**Rice, cacao, maize, corn (wheat), cashew, tomato, peanuts, cassava, cotton

+The challenge of obtaining long-standing production records has limiting factors including age of the cooperative as well as availability of older, pre-computerized data

++Potentially unavailable until early 2023

IV. Feasibility of VRCs as a national financing instrument

A. Methodology

A key potential contribution of the VRC instrument is to support the incentivization of adaptation and encourage good adaptation practices. VRCs may be priced, and adaptation activities funded through payment for VRCs earned. As discussed in Section III, the project's 'Theory of Change' suggests that VRCs may aid not just in encouraging good adaptation practices, but, through the demands of the VRC process and confidence this may give funders, which in turn would encourage additional mobilization of finance for adaptation.

This study starts to consider if and, if so, how VRCs could be deployed alongside the existing and emerging national climate adaptation finance environment, in order to gauge the potential approaches, capacities and challenges for integrating VRCs for national to project-level funding in Côte d'Ivoire. This subsequent 'gauging' is undertaken by linking today's, and potential future funding capacities and institutional structures to the processes, governance conditions and assurances, and management systems that could integrate VRCs for finance.

Key criteria considered for evaluating the capacities and potential for VRC funding mechanisms include:

- How existing adaptation funding has been identified and deployed for projects, and how these projects have been evaluated against their reduction in vulnerabilities and enhancing adaptive capacities.
- The challenges existing or potential funders of climate adaptation in Côte d'Ivoire articulate regarding the suitability of current or potential projects, and how they consider the potential for VRCs to overcome these challenges,
- The financial capacities and needs of vulnerable communities (in terms of levels and type) that would sufficiently incentivize adaptation, and
- How the emerging climate finance regimes at both the international and national levels are emerging and what could be the potential entry points and synergies between these and VRCs that would catalyze and expand finance.

These criteria and the available findings are important starting points for the subsequent design and feasibility analysis of a pilot VRC funding mechanism, that would require a detailed study by finance, development, and institutional experts in order to be responsive to the emerging climate finance environment.

B. VRC feasibility as instrument for finance

Existing and emerging climate Adaptation finance in Côte d'Ivoire, challenges, and capacities

Côte d'Ivoire's 2014 Climate Change Strategy Paper notes that "In order not to annihilate development efforts, financing mechanisms will have to be found at the national level so that national actors can be supported in their adaptation and mitigation approach to climate change."^{xlii}

A study supported by the European Development Fund and prepared by Marcel and Daubrey^{xliii} provides a basic overview of the existing climate finance infrastructure and processes for Côte d'Ivoire. Based on the study's literature review and stakeholder consultations, It calls for formation of a National Climate Agency, to "federate all climate initiatives" and a National Climate Fund to overcome the existing problems of:

- the low capacity to mobilize international financing,
- the low level of knowledge of climate finance mechanisms,
- the lack of national skills in climate finance.

Currently, as Marcel and Daubrey describe, authority over climate actions overlaps among a variety of different ministries and agencies. They further note that "no funds are yet operational for climate change in Côte d'Ivoire."^{xliv} Stakeholder consultations led it to consider adaptation financial mobilization as "far from the mark" for the reasons noted above, and stakeholders overall support creation of a national climate fund to support low-carbon development and increase resilience capacities.

Discussions with agencies involved in funding climate adaptation during our study's March mission generally supported or were agnostic regarding Marcel and Daubrey's conclusions on the challenges of climate finance in Côte d'Ivoire. Specifically:

- The European Commission's representatives in Abidjan indicated that project attribution's as being climate adaptive was important, and they would be interested in working together to identify appropriate indicators for different sectors.
- There was also general interest by donors (AFD - Agence Francaise de Développement, FAO - Food and Agriculture Organization) in following, and possibly using donor-supported projects to test the viability of quantifying VRCs and using VRCs as an approach for project finance.
- The Ivoirian Focal Point for the Global Environment Facility offered practical guidance in identifying a variety of different international funding sources that might support a VRC pilot project

Private sector representatives interviewed during our March mission, who were involved in the natural resource/agricultural space (LONO, LOCAGRI) expressed interest in the potential for additional revenue streams that VRCs could offer their project developments.

Proposed national climate fund

Alternative approaches and structures for a national climate fund are analyzed by Marcel and Daubrey, including both a public fund scenario and private investment scenario, as articulated in Figures 7 and 8, respectively.

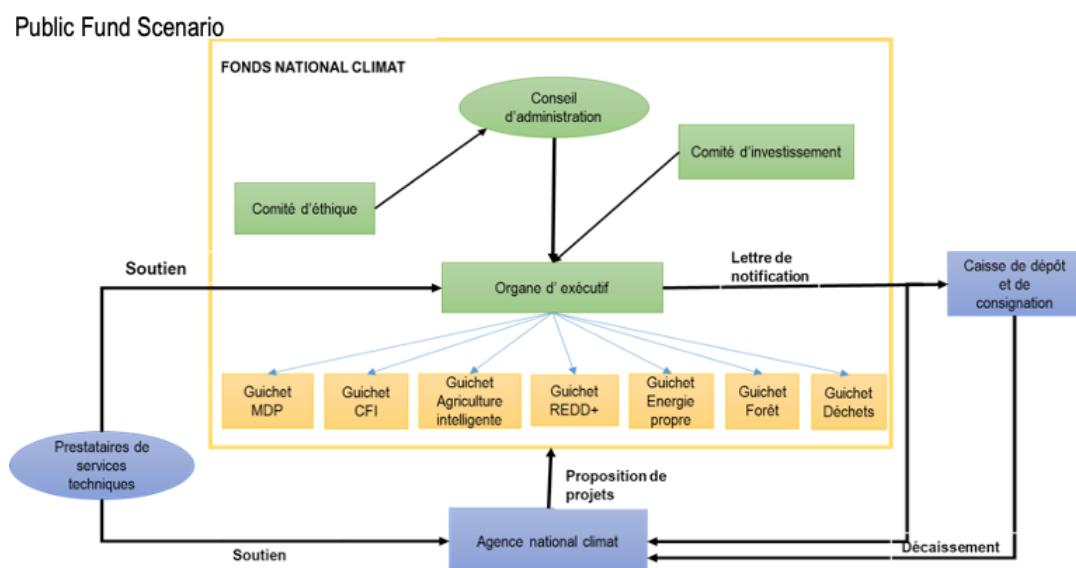


Figure 7 – Public Fund Scenario for Adaptation Finance

Source: Marcel and Daubrey, 2019

Private Investment Fund Scenario

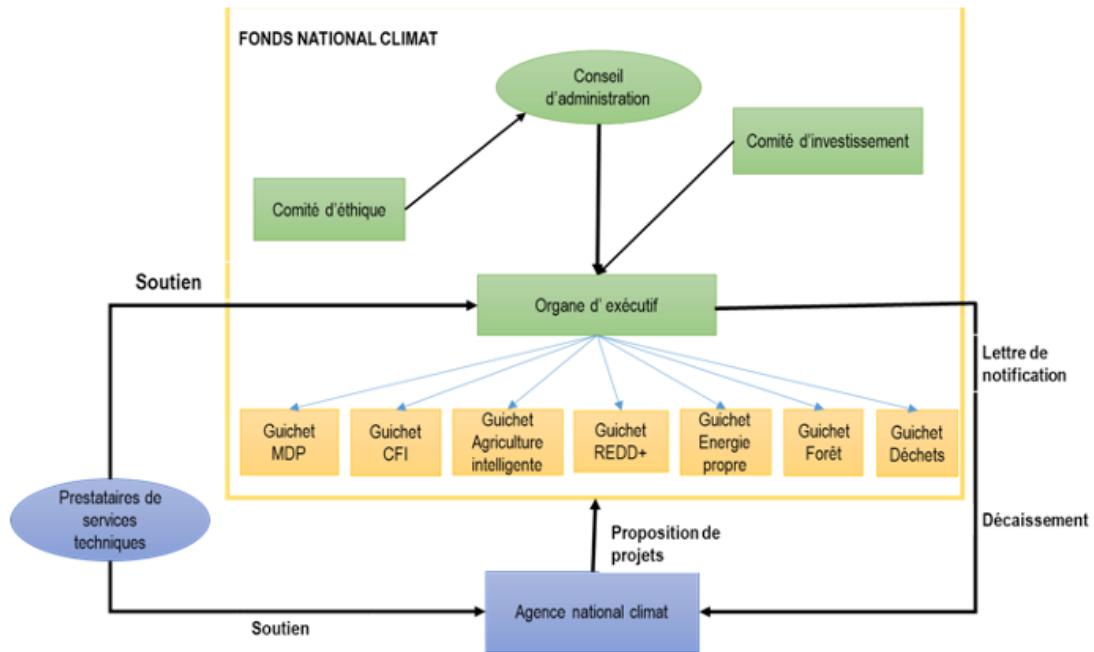


Figure 8 – Private Fund Scenario for Adaptation Finance

Source: Marcel and Daubrey, 2019

Based on estimates from the national INDC for 2015, the fund is expected to support investment costs of 1,442 billion CFA/year (U.S. \$2.3 billion/year) from 2020 to 2030. It includes public and private sources, from the Ivoirian treasury, and external sources, and considers deploying investments in grants and loans, blending public/philanthropic and private sector sources, and green bond issuances.

Neither the Climate Change Agency nor the Climate Fund are currently in existence. Marcel and Daubrey's study does offer a means of understanding how – regardless of any future fund structure – VRCs could be deployed to support Côte d'Ivoire's adaptation finance. As such, the below options for integrating VRCs are in line with these scenarios but may be deployed by any suitable financing facility.

Potential structures for VRC Purchase Facility (VRCPF)

Although a significant narrowing of scope for the use of VRCs will be required in Phase 2 of the VRC project, the content and direction of our discussions in this phase provide some broad contours of what VRC-associated adaptation finance approaches may look like.

VRCs integration into project finance can serve to link project activity to national management and reporting through the information on project and its results in reducing vulnerability to climate change, as further conveyed through a price signal carried by the Vulnerability Reduction Credit.

It can serve as an effective tool to identify and vet projects and incentivize development of projects. It further can be used to bring in different funding partners with different interests in adaptation and risk profiles. Consideration of the alternative structures and governance of a fund is the subject of this aspect of the project.

In particular, here we discuss the how VRCs might integrate into existing and emerging adaptation finance, to help secure and organize support for adaptation. The generalized structure is called here a VRC Purchase Facility (VRCPF) to be associated with official national funding of climate adaptation projects. To do so, we will have to evaluate existing structures and mechanisms, such as carbon markets, that are similar but not identical and, based on the differences in requirements, identify the implementation gaps in which new solutions must be supplied.

VRCs and tradeable instruments background

Formalizing VRCs in the Ivoirian climate finance system will be a first-of-its-kind. Another adaptation credit, the AfDB's Adaptation Benefit Mechanism (ABM), is currently being trialled; however, the ABM is not an exchangeable credit instrument^{xlv}.

Carbon markets, and a variety of instruments to mobilize finance for greenhouse gas emission reduction projects, is a developed field that may be used to identify appropriate models for a VRCPF.^{xlvii} Considering how 'carbon credits' have been deployed in project finance can help us understand some of the options for how a fund could be structured, along with considering how climate adaptation projects may have different needs, attributes, and thus may require specific modifications of carbon credit purchasing funds or facilities to be effective leverages of capital.

The carbon market, which includes project-based credits and allowances for emitting facilities has expanded considerably to an estimated \$277 billion in 2020.^{xlviii} While not an 'apples to apples' comparison, this contrasts with the Climate Policy Initiative's estimate of adaptation finance in 2020 of \$46 billion.^{xlviii}

Below is a basic outline of the different structuring options, the potential funding sources, and their interests in contributing to a VRC fund, and some basic considerations on how VRCs may be used as a 'currency' for stimulating adaptation projects through an effective financing mechanism.

VRCPF design considerations

The purpose of a VRC-purchase facility is to reduce the climate vulnerability of communities in Cote d'Ivoire, by directing financial resources to adaptation projects registered for VRCs that further meet the Ivoirian government's climate adaptation and broader sustainable development objectives.

Considering as a "base case," as discussed above related to the proposed that the Ivoirian government would manage or delegate management of a pool of resources from different sources (national government, external donors of different types, possibly private impact

investors) into a fund with the explicit focus on purchasing VRCs. The fund's scope may also include further facilitation and financing of adaptation projects and programmes that meet national, community, donor, and investor criteria. It might include grants to build capacity in VRCs, VRC methodologies and project documents, it might include loans or loan guarantees to facilitate capital investment that would subsequently be serviced from the revenues in VRC sales to a project owner, and it could possibly include equity investment from parties interested in getting returns – direct or indirect – from a project, including, but not necessarily exclusively from VRC sales revenues.

At a minimum, all projects linked to the VRCPF would be eligible to receive revenues in exchange for VRCs.

This phase of the project is focussed on understanding what may be possible, laying out the options, and considering at a high level the potential benefits, costs, risks, and opportunities entailed in each option and how they may interact. A future project study would be required to establish the feasibility and create the fund structure and governance regime.

VRCPF structure and participants

The structure of a VRCPF will depend on a variety of factors, including decisions on the stakeholders, the appropriate governance framework, and the scope of finance offered. Further research on experiences with similar resourcing (e.g. national and multi-lateral carbon credit purchasing funds like the Global Carbon Fund (GCF)) and national adaptation funding (e.g. Bangladesh Climate Change Resilience Fund (BCCRF)^{xlix}) would inform the design of a facility, criteria for inclusion of VRCs, and governance issues going beyond those of the National Climate Fund proposed by Marcel and Daubrey.

For insight and guidance on constituting a purchase facility structure, we reached out to experts and stakeholders in climate adaptation and carbon markets.^l Some potential stakeholders include the Green Climate Fund, African Development Bank, bi-lateral aid agencies (European Commission, AFD, etc.), philanthropic foundations (GIF - Global Innovation Fund) Ivoirian government entities, including MINNED, the Ministry of Finance, the National Environment Fund, and the National Development Bank, CDC-Cl. A variety of other potential VRCPF participants include Multi-lateral Development Banks, bi-lateral donors, philanthropic entities, impact investors, and private and public lenders.

As Figure 9 describes, a variety of different donors or investors could contribute to a VRCPF. The most fundamental contribution would be promises of money for VRC purchase agreements. The adaptation project owners would be paid this money as they were periodically created and sold to the Facility. The Facility could keep these or could transfer these to a funding entity. As discussed above, the proposed national climate fund could be the centralized aggregator and counter-party for all these funders and for all official national adaptation projects.

VRC purchase agreements (VPAs) could be used by the project owners to secure debt to finance the project. Or the funders could provide debt as a part of the funding package that would in turn become a part of a finance package that the VRCPF would enter into with a

project owner. In some instances, equity could be a part of a VRCPF package, that would give equity to participants in the fund, such as impact investors. The equity would offer growth and dividend potential for an impact investor from the VRC revenue stream created and ultimately funded by a party interested in paying for VRCs, and possibly could include other revenue streams that a project might have, such as agricultural commodity sales.

The VRCPF could also offer grants for projects, to support the development of VRC methodologies or preparation of VRC project documents for project registration, or they could be offered to projects, communities, or experts to build capacity that would create an enabling environment for VRC generating projects, such as education in climate adaptation practices, or formulation of policies that encourage or allow-for adaptation actions such as land use planning changes to be amenable for resettlement or prohibitions of building on flood prone lands.

Adaptation projects could be developed and proposed by a wide variety of actors. Both private companies interviewed, LONO and LOCAGRI, expressed interest in the potential additional revenue stream that a VPA could offer, and might stimulate additional activity by the private sector or local communities. Indirectly, this approach could attract private finance as debt and equity could be secured through the contracted VRC sales revenue stream.

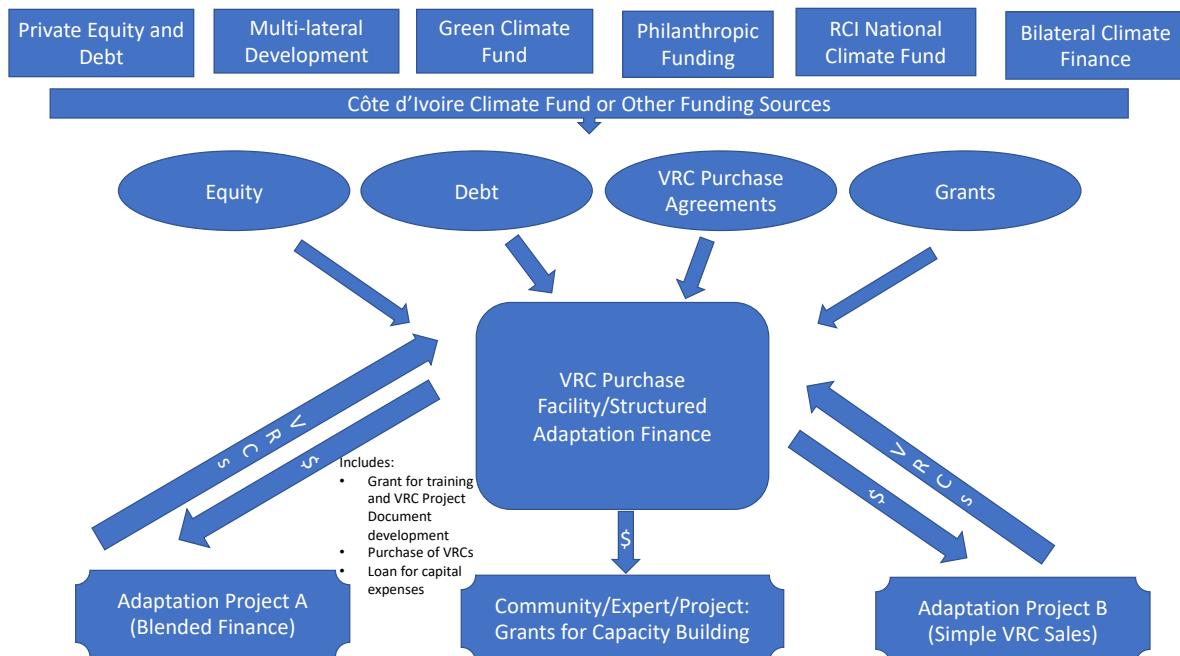


Figure 9 - Potential Functional Positioning of VRC Purchasing Facility

Participation in the VRCPF would provide a variety of benefits to different parties:

- The government would be able to support and centralize a portion of its adaptation portfolio in a mechanism that allowed for transparent understanding, adaptation

prioritization, tracking and reporting on project results. This in turn may encourage more climate adaptation finance.

- Donors would be able to provide flexible resourcing that meets their interests and capacities, into projects that offer transparent adaptation benefits. Projects would follow the VRC Standard Framework which provides assurance against maladaptation, good practice in environmental, social and governance, and in a manner that articulates the project's climate benefits.
- Communities and vulnerable entities (farms, cities, etc.) would have an opportunity to offer up their projects in a transparent manner for the funding that meets their needs and that forces sustained revenues to encourage sustained adaptation activity.
- NGOs, private companies, and other climate adaptation idea and development generators would gain the potential to bring their ideas, skills, and money to projects that motivate and align interests in reducing the vulnerability of communities to climate change.
- Private financiers would be able to identify bankable projects that bring about suitable returns on investment through the VRC revenue stream, among other revenue streams.
- Côte d'Ivoire thus is able to leverage more project funding, including bringing in private finance, that may increase climate adaptation and reduce its vulnerability to climate change.

The VRCPF could thus help overcome many of the articulated challenges in adaptation, namely: lack of clarity on the 'adaptation benefits' of projects, poor project articulation, challenges in prioritizing adaptation policies and resourcing, insufficient finance including private finance, and lack of capacity for adaptation.

Purchase Facility governance

The specific governance of the VRCPF needs to be investigated and options analyzed. A potential approach may be to create a separate entity with the government as the shareholder, and with a variety of government, donor, and independent experts on the board of directors. This model may be practical prior to the of any national climate fund, as it could be flexible. A streamlined set of contractual structures could be possible under alternative approach, of centralizing the facility in a national climate fund.

The options outlined in this preliminary study are, by definition, preliminary, but in effect, the facility could be viewed as a contractual structure for parties interested in realizing verified adaptation benefits:

- In order to outline their individual criteria for projects : scale, sector or project type of interest, region, level, or efficiency of VRC generation for project investment (e.g., number of VRCs/investment, or \$/VRC expected).

- To promise resources to, and set targets for the facility (VRCs, or investment levels).
- To additionally support capacity building in adaptation (through grants)
- To creatively work together with other parties (e.g., donor and private debt) to leverage more finance.
- To prove to ultimate funders (e.g., donors, taxpayers) the adaptation results of their investments.

Some critical issues that need to be addressed include the role the government plays in prioritizing different sectoral adaptations, and the criteria for selecting projects, pricing VRCs, and setting other financing terms.

A relationship between the Higher Ground Foundation and the Facility and/or Ivorian Climate Fund needs to be formulated. The draft Memorandum of Understanding between the HGF and the MINNED is a starting point for developing a program that would consider how the HGF undertakes and/or oversees VRC methodology development and approval, project registration and credit issuances. Questions related to the project validation and monitoring report verification, including third party audit, and how the VRCPF VRCs generated have status in the [HGF's Pilot Implementation and Partnerships Phase \(PIPP\)](#) need to be agreed.ⁱⁱ Property rights of VRCs is another issue that may require legal assistance.

A National VRC Registry will need to be designed and put in place to support the management of the VRCPF. The HGF can provide project registrations and issue credits, but a formal, transparent, and secure VRC registry at the national level may be useful and important to formulate to ensure the integrity of VRC transactions. If and as a VRC market develops, further international registry requirements, along with consideration of digital and governance assurances will need to be considered and foreseen. The use of distributed ledger technologies may be investigated for secure and immutable transfers of information (VRCs, other correlating information, and money).

Facility creation and implementation

The approach to structuring the VRCPF and raising participation needs to be clearly defined. Expertise in fund formation, purchase agreements, and other contractual and legal issues will need to be identified and deployed.

A Phase 2 VRCPF component, that would serve as a full feasibility study and fund preparation project, will be necessary. One important aspect of this second phase is detailed consultations, and even preliminary negotiations with potential stakeholders. This includes consultations and with vulnerable communities, adaptation experts and national entities that may be involved in VRCPF governance and project development, management, ownership, and finance. Donors, investors, and other international stakeholders will need to be approached and discussions made regarding their potential participation in the Fund.

The potential for broadening the VRCPF model to a wider set of countries in Africa and globally will need to be considered, as the opportunities for future international climate finance

governance could be substantial and overcome many issues not just related to project finance and management, but to international agreements on climate finance and integration into the UNFCCC's Paris Agreement Global Goal on Adaptation and the Global Stocktaking. The relationship between the VRCPF and the VRC National Management system, discussed in the next section, needs to be further formulated. In particular, how are VRCs and the corresponding information and metrics used by the MINNED and other government bodies to inform climate policy, strategy, and programmatic decisions.

C. VRCs for adaptation finance: gaps analysis

This study has identified a number of questions and gaps, or “known unknowns,” that will necessarily be important to address thoroughly in a pilot project design. Further to the gaps in project development capacity and data, and national management system, discussed in other sections, the following are specific issues related to the structuring and management of a VRC purchasing facility:

- How existing adaptation funding has been identified and deployed for projects, and how these projects have been evaluated against their reduction in vulnerabilities and enhancing adaptive capacities.
- The challenges existing or potential funders of climate adaptation in Côte d’Ivoire articulate regarding the suitability of current or potential projects, and how they consider the potential for VRCs to overcome these challenges,
- The financial capacities and needs of vulnerable communities (in terms of levels and type) that would sufficiently incentivize adaptation, and
- How climate finance regimes at both the international and national levels are emerging and what could be the potential entry points and synergies between these and VRCs that would catalyze and expand finance.

Gaps include:

- Demand for VRCs by funders: discussions with potential funders was positive but not expansive. A study survey^{lii} that focused on understanding a broad cross-section of donors and other stakeholders in a potential purchase facility received limited feedback, albeit generally positive feedback.

Further investigation of how VRCs and a facility could support funders' needs is required to know the extent and nature of demand.

- The potential uptake of VRC project designs, by sector, scale, and investment levels, is unknown.

A thorough national adaptation market analysis is required.

- *The options for integration of VRCs – and a corresponding purchase facility – with existing or new Ivorian national institutions requires detailed discussions and analysis.*

- The capacity of different parties, and the correlating need for capacity building will require a detailed capacity analysis. Existing literature indicates limited understanding of finance options, metrics applications for project finance, and management of adaptation investment projects.

A detailed survey of the capacities of potential parties to a VRCPF (project developers, vulnerable communities, local governments, potential project verifiers, private financial institutions, donors, and national climate funders and managers needs to be undertaken to further identify gaps and capacity building requirements.

- How the experience in Côte d'Ivoire could be applied in different national contexts.
A study of the replicability and plans for appropriate expansion of VRC purchase facilities can guide this process.

V. Feasibility of VRCs for national planning

A. Methodology

The third component of the VRC pilot project is to design and “stress-test” a proposed integration of the VRC metric for project-level adaptations into a proposed national climate adaptation agency as a planning and management system. This aspect of the pilot project considers the national climate adaptation strategy, plans, program and institutional arrangements at national and sub-national levels, and the needs for climate impact and adaptation metrics for tracking and reporting on needs and progress of adaptation programs in Côte d’Ivoire. It looks at how VRCs can support these functions, their value added, and the gaps in capacity that need to be overcome.

In order to determine if VRCs would be a value addition to the national system, we identified the following key questions, criteria, and approaches for evaluating capacities and potential for VRCs in the national adaptation planning system:

- How the results of this study’s assessment of the capacities and gaps for data and analytical attribution at the project level indicate broader capacity for VRCs reflecting needs and progress for a significant subset of Côte d’Ivoire’s overall climatic vulnerability and adaptation progress.

This requires a broader consideration of how data and analytical capacities can be applied to agriculture and other priority vulnerable sectors to inform VRC analysis and monitoring.

- How the current and planned national adaptation planning and management system would potentially benefit from VRCs.

This entails understanding the purpose of the national system, its current and potential activities and gaps and opportunities for VRCs to enhance the system.

- How would these capacities be developed?

At this stage, what needs to be understood regarding tools and expertise required to build capacity?

- What are the potential risks and costs of integrating VRCs into a national management system? Are these manageable and outweighed by the benefits?

A good response to each of these issues will guide the determination of not just if VRCs can be integrated into the system but how they may be best applied or not applied for particular purposes. As such, the possible follow-up project as it relates to national management will be less of a ‘pilot project’ than a platform for validation and a detailed design and institutional planning process.

B. Existing structure and agency development

The GCF’s “Readiness and Preparatory Support Proposal,” under which this study was commissioned, “describe(s) (1) the need to establish and strengthen National Designated Authorities or Focal Points and (2)...developing strategic frameworks for engagement with the GCF, including the preparation of country programmes.”^{lvi}

Currently, there is no national-level agency specifically dedicated to managing and funding climate adaptation; the Ministry Of The Environment And Sustainable Development (MINEDD) takes the lead role in coordinating activities through the National Climate Change Program (PNCC) and with the GCF serving as the National Designated Authority. A large number of ministries have and continue to cooperate with MINEDD in various capacities; however, there is a smaller set of ministries that have been identified as having key “cross-sectoral” responsibilities that provide an organizational backbone to the existing framework^{lv} (Table VII).

The current arrangement is challenged by a lack of a specific coordinating mechanism^{lv} and, to provide focus, Cote d’Ivoire is exploring a dedicated national adaptation management system and fund to be implemented under its developing governmental framework for addressing climate adaptation. Marcel and Daubrey discuss and evaluate a number of configurations of a finance facility (see discussion in Section IV) and national climate agency, including options for funds that operate under or within the agency. In terms of where the national agency itself is to be housed, they discuss and evaluate two options: housing within the Office of the Prime Minister, and housing within MINEDD.^{lvi} The discussion within the remainder of this section remains neutral with respect to these configurations, and the functionality through which VRCs can be used by the eventual national agency to coordinate adaptation planning and management is herein referred to in short as the “National Management System” or “National System.”

Table VII – Key cross-cutting agencies for adaptation^{vii}

Agency or Ministry	Purpose	Adaptation Responsibility	Potential Role of VRC System(s)
Ministry Of The Environment And Sustainable Development(MINEDD)	Implements and monitors the Government's policy on environmental protection and sustainable development.	Coordinates overall adaptation strategy through National Climate Change Program (PNCC); GCF National Designated Authority	Project development and planning; national management
Ministère du Plan et du Développement (MPD)	Implements and monitors the Government's development planning and programming policy.	Responsible for mainstreaming climate change into budget planning and NDP	Project planning; national management
Ministry of Economy and Finance (MEF)	Implements the Government's economic, financial and monetary policy	Implements budget items based on MPD mainstreaming	National adaptation budget planning
Ministère Etat, Affaires Etrangères (MAE)	Implements the Government's foreign policy.	Mobilization of external resources and climate treaty ratification	National adaptation plan development
Ministry of Territorial Administration and Decentralization(MATED) and Directorate General of Decentralization and Local Development (DGDDL)	Manage land use	Draft territorial climate plan	Agro and forestry project development and planning
Ministry of Women, Family and Children (MFFE):	Implements the Government's policy on the family and social affairs	Ensures gender mainstreaming in climate projects	Partner in ensuring gender mainstreaming and equity in projects
Société d'Exploitation et de Développement Aéroportuaire, Aéronautique et Météorologique (SODEXAM):	Manages the operation and development of airports, meteorology and aeronautical activities in Côte d'Ivoire	Established the national climate services framework; serves as national IPCC focal point	Serve as a primary client for data services

C. VRCs feasibility for national planning and management

National Management System functionality

Toward the goal of enabling the proposed national agency in coordinating activity, UNDP presents four strategic recommendations for “set[ting] up a good coordination mechanism”^{lviii} as follows:

1. *Support the implementation of sectoral strategies for adaptation to climate change (for sectors that do not have them);*
2. *Establish sectoral documents for the integration of climate change into budget planning;*
3. *Set up a forum for sharing climate knowledge and data;*
4. *Involve the main entities concerned with adaptation to climate change since the development of the terms of reference of the NAP process; encourage in each structure the creation of a department in charge of sustainability issues including climate change, with qualified staff. It is these personnel who must be involved from upstream to downstream in the planning process with the competent services of the Ministry in charge of the environment, from the development of the TDRs, to the implementation of the NAP, with a clear definition of responsibilities.*

Using VRC pilot, funding, and MRV capabilities, a National Management System could help address these goals as follows:

1. As a “universal metric,” the VRC is effectively sector-neutral and thus can be used to guide extension and adaptation of existing approaches and strategies to new sectors.
2. Again, as a “universal metric,” the VRC can serve as a single aggregated measure of adaptation results to enable planning at the single- and multisectoral scales (Figure 10).
3. Although much work is needed to implement a full architecture of knowledge sharing, the store of project and methodologies outputs and data that will accrue under implementation of the VRC mechanism can serve as a key repository of learned lessons with respect to adaptation practices, implementation, monitoring, and funding. The VRC is an inherently quantitative tool, and the records produced by the registration, monitoring, and awarding activities associated with the VRC framework will serve as a rich data pool for research analysis.
4. It will be a goal and challenge of future phases of this work to integrate the VRC approach into RCI’s structural reorganization of the national adaptation planning process. Working under the VRC Framework, the potential National System would house a registry of VRC projects and credits generated that would allow it to interface with both a VRCPF and ground-level project activity as shown in Figure 7. Beyond the

internal level, the National System could provide a platform for communicating and assessing national-level adaptation results against goals with respect to RCI's NDCs, National Communications as well as other benchmarks such as the Sendai Framework and Sustainable Development Goals.

Data and analytics, VRC registry

The VRC metric brings two principal functionalities to the table in helping meet RCI's national adaptation management challenges: it is *fungible* (i.e., can be used to compare results across and between projects addressing diverse climate vulnerability modalities); and it is *aggregable* (the VRCs produced by individual projects can be added to produce indicators of adaptation results within sectors and, from there, at the national level and beyond).

Based on these characteristics, VRCs can be used, in conjunction with other appropriate output metrics, as a tool to inform national activities in terms of monitoring, reporting, and evaluating adaptation at scale. In this respect, we seek to test if a project framework can be developed that can use the VRC as the “nucleus” of a set of bottom-up metrics to inform the top-down metrics used at the national level (Figure 7, left arrow). The National System and VRCPF would also be linked through the dual-use of VRCs as a metric of project activity and results and a financial credit for project activity (Figure 7, bottom arrow).

Design and implementation of a VRC Registry will be required to support secure and transparent information management and sharing with HGF, relevant ministries, projects, the VRCPF and underlying funders, and international stakeholders (e.g., the GCF, UNFCCC, etc.). Decisions on the information held by the registry, and its overall structure need to be analyzed prior to implementation in Phase 2.

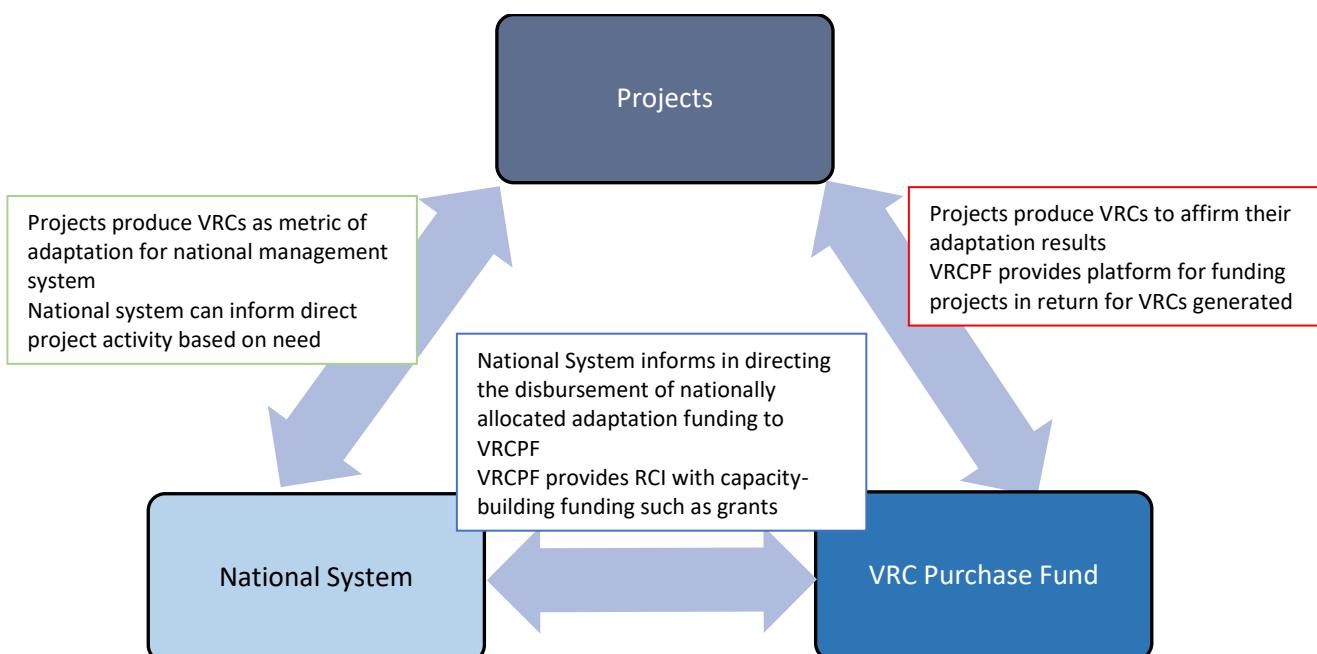


Figure 10 - Use of VRCs in a national adaptation mechanism.

D. VRCs for national planning gaps analysis

There remain a number of gaps---relating to factors such as data, metrics definition, and understanding of institutional structures and purposes---that will need to be addressed in order to fully evaluate the potential of the VRC mechanism to inform the RCI's national planning system:

- Data: It will be necessary to define at least the characteristics and functionalities of the “additional” metrics to be used in conjunction with VRCs to benchmark and inform adaptation planning (see discussion point C.2). It is understood that additional metrics would be necessary,^{lix} but there is a lack of guidance in the literature on how these would be determined and even the degree to which they would vary depending on project.
- Understanding how the system would benefit from VRCs: Although existing reports provide strong guidance as to its possible structure, and we believe that either a MINEDD or an office of the Prime Minister-housed structure would be compatible with our anticipated framework, the proposed national adaptation agency has not been fully designed and chartered yet. As such, we do not yet understand the scope of its activities and authority, which in turn will guide the configuration and scope of a potential National Management System and the capacities, both within and without the government, needed to implement it.

VI. Conclusions, recommendations, and next steps

This study describes the issues and opportunities for the effective deployment of VRCs in Côte d'Ivoire for projects, funding, and national management and communications. It poses more questions than it answers, as it is by design aimed to highlight the challenges so that a pilot project, and direct work on formation of a VRC Purchase Facility with funders and projects and a national management system.

A. Gaps and questions

A summary of the gaps and questions relative to the three pillars evaluated in this study is shown in Table VIII.

Although the process and therefore tools needed for generically implementing an “adaptation project” are well understood, particularly in this context, the particulars of the VRC process indicate the need to build new capacities and methodologies. In addition, as noted copiously in this paper, the availability and usability of data is a significant potential barrier, and the contingent evolving state of the climate system makes understanding how well we understand the degree to which adaptations can faithfully track the future climate state essentially unknowable (but, we hope to demonstrate, manageable with the right tools).

As discussed in Section IV, the VRCPF can be modeled to a certain extent following existing structures, as in fact the VRC mechanism is, to a certain extent, designed to extend the functionality of “carbon” credits for mitigation to the domain of adaptation. However, it will represent a prototype and methodological clarification and capacity building will be required to build it and then integrate it into a potential national finance structure. As VRCs will eventually be operating within what will be a market, a significant effort will be needed to obtain data related to what are currently latent demand and supply volumes.

The National Management System will also need to be defined to organizationally conform to what is still a proposed system—the National Adaptation Agency—and corresponding capacity needs to be built. This component will also be heavily influenced by the final form attained by relevant laws and international contributions such as the NAP and NDC as well as the degree to which various standards such as Sendai and SDGs are adhered to.

Table VIII - Côte d'Ivoire Climate Vulnerability Reduction Credit Feasibility and Pilot Design Gaps

	Data	Organizational structure is inadequate/immature	Capacity needs to be built	Methodological clarification required	Known unknowns
VRC Pilot Project	x		x	x	Ability of system to track evolving climate state
VRC Fund	x	x	x		-Precise investor demand volume for VRCs -Supply potential of VRCS in real-world conditions
VRCs in National Adaptation Planning and Management		x	x		NAP, NDCs, etc. processes and climate agency configuration

B. Recommendations and roadmap

While there are many unknowns in our understanding of the implementation feasibility, we have found from our engagements with experts, officials, funders, and farmers that there is both interest in and capacity to pilot VRCs for Côte d'Ivoire. It is only through pilot work, that many of the unknowns will become knowns at the project, funding, and national management levels.

Therefore, we recommend that HGF works together with the national government, funders, and experts to formulate a practical, costed project, in a "Phase 2." This project will demand considerable funding and expertise, in which over a three-year period the Higher Ground Foundation and a team of experts in agricultural climate adaptation, community engagement, finance, national climate monitoring, reporting, and verification, and administrative systems shall work in a coordinated manner to establish how VRCs may be deployed to realize a more climate resilient, less vulnerable Côte d'Ivoire through better application of metrics, governance, and financial provision for climate adaptation projects.

The figures below offer a first perspective on the specific Phase 2 project activities, their timing, how the different project pillars (project, funding, national management) fit together, and the expertise and level of effort that may be required. More detailed versions of these can be found in Annex III.

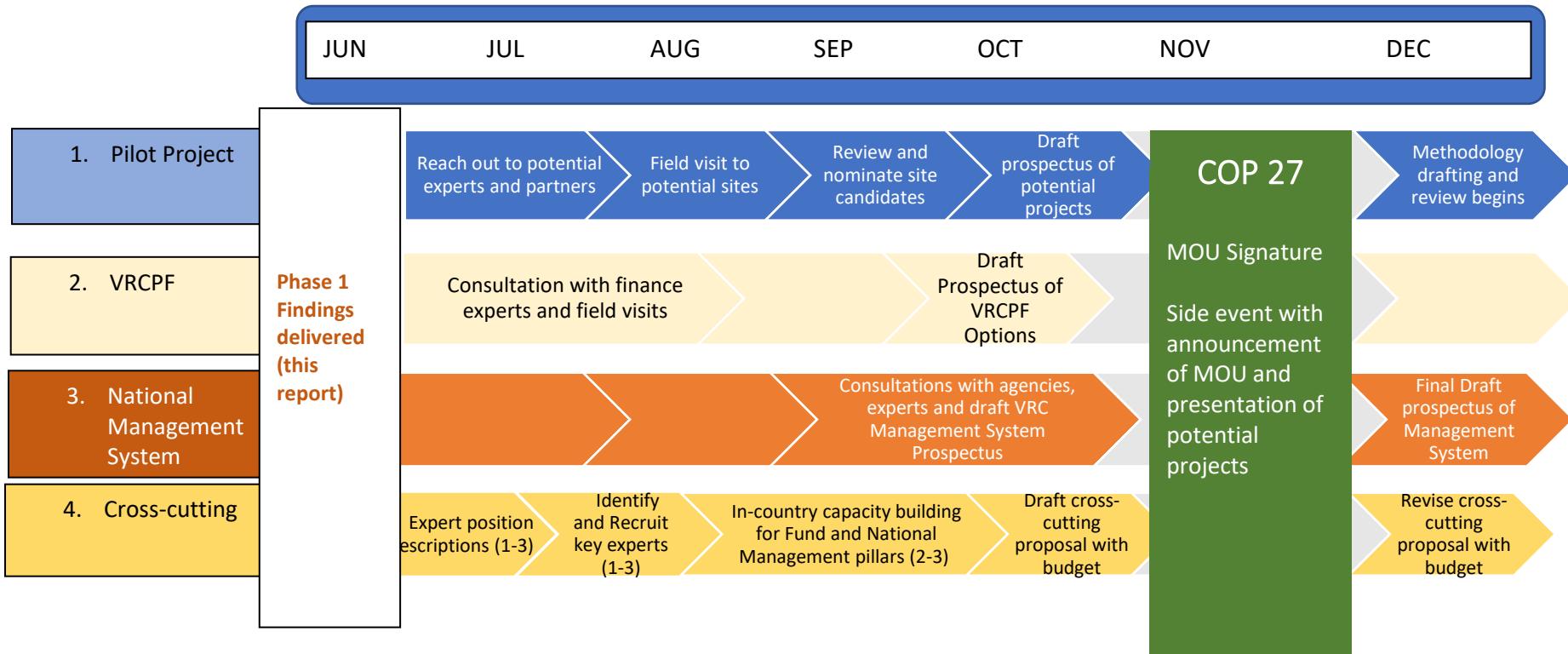


Figure 11 – 2022 Roadmap

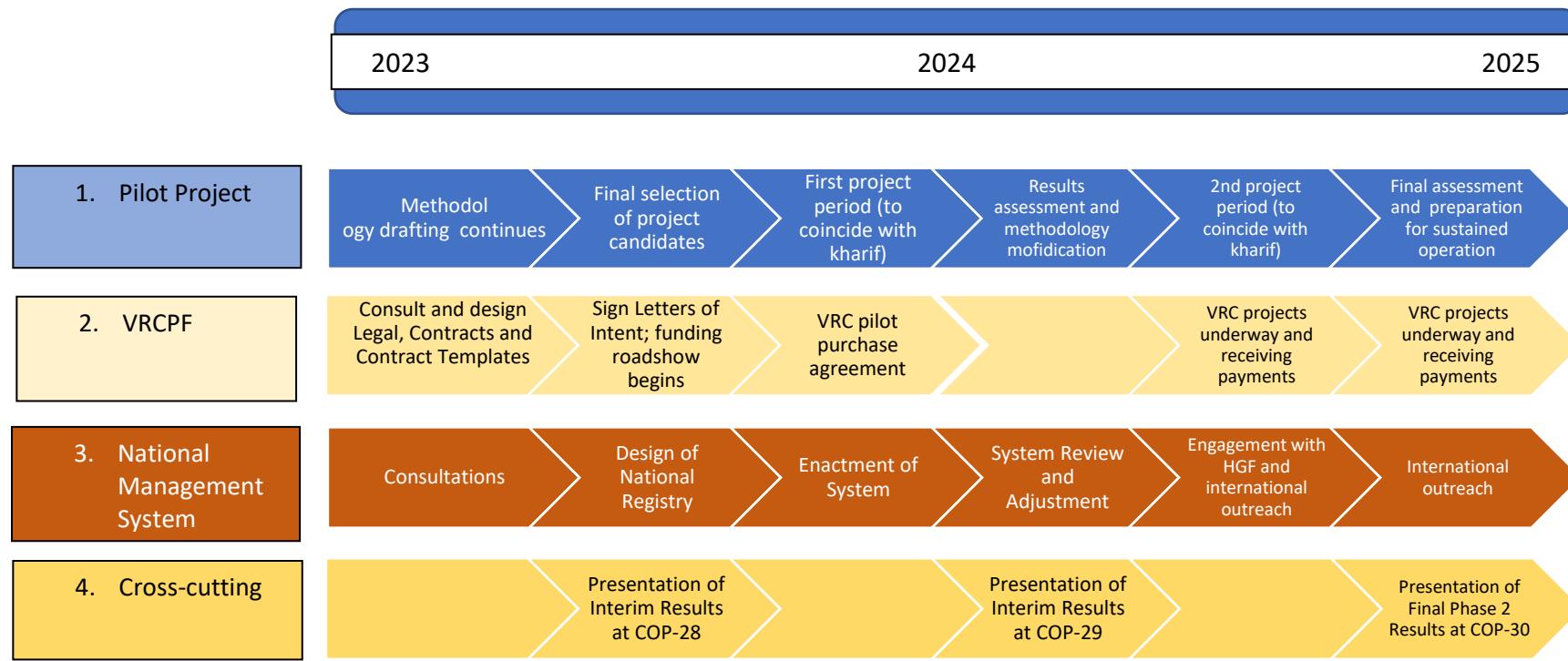


Figure 12 – Phase 2 Roadmap 2023-25

Prior to commencement of this Phase 2, the period from July – December of 2022 will be an opportunity to share this study with relevant potential stakeholders and partners, secure feedback and improve the Phase 2 project concept. This entails further validation of the data and analytical environment, recruitment of key experts to further refine the project design, and engagement with funders and Ivorian government officials. It also includes discussions with the UNDP and Green Climate Fund to get valuable feedback on how the project will serve to meet funder objectives, especially as they relate to improved attribution of adaptation results, project sourcing, and scaling of adaptation finance, along with how the pilot project may serve as a replicable model for other countries with their own unique contexts.

The findings of this study, and the formation of prospectuses, will be presented at the upcoming UNFCCC Conference of Parties 27 in Sharm el Sheik, Egypt this November. It will also be an opportunity for MINNED and the Higher Ground Foundation to sign a Memorandum of Understanding that strengthens the mutual commitment to making “VRCs for Côte d’Ivoire” a positive reality.

Annex I - Higher Ground Foundation field visit, workshop summary and findings

Higher Ground Foundation's Executive Chairman, Karl Schultz, and Technical Manager, Linus Adler, visited Côte d'Ivoire from 27 February to 11 March. The purpose of the visit was to validate their preliminary desk research and findings, learn more about agricultural impacts of climate change and adaptation options, and understand better the government, private sector, and community contexts for climate adaptation projects, finance, and national management. A key element of many of the meetings was understanding the capacity for establishing VRC methodologies, project documents, and monitoring. This included understanding both the data and analytical inputs needed, and the where and how these could be improved for a pilot VRC project.



Figure 13 - Opening of Workshop on VRCs. Jean Douglas Anaman, PNCC, (center): Abidjan, 10 March 2022.

The visits were with a variety of different agencies (Environment and Sustainable Development, Agriculture and Rural Development, Planning, Meteorology) private companies in the natural resource/agriculture sector, farmers cooperatives (rice and cacao), national financing institution (CDC-CI), international development/climate donors, and experts and NGOs working on climate adaptation in different capacities. A list of all the meetings and their summary findings is shown as Table XI.

The mission included a field trip to two regions to explore the climate vulnerability, growing conditions, current adaptation project activities, and capacities for future, VRC-generating projects. This included a visit the Belier region around Yamoussoukro in the center of the country and Soubré and Meagui in the southwest. In Belier attention was paid to existing project activities related to enhancing agricultural resilience (2PAI and PIDACC) and a visit to a rice farmers cooperative and neighboring fields. In Soubré area the focus was on existing projects to enhance cacao production, in particular through encouraging agroforestry (ICRAF, COCAO PROMISE's 'Green Project') and a visit to a cacao farmers cooperative and fields.

Some of the most fundamental of the daily questions and discussion points encountered during the visit revolved around the understanding of data in terms of, e.g., how to analytically understand climate impacts, the potential for reducing these impacts through adaptation measures, and the capacity in Côte d'Ivoire to undertake the required project design and implementation (including VRC project monitoring). Questions related to adaptation projects revolved around the level of understanding of what adaptation needs exist and how these needs are currently met.

Other questions related to how donors (and recipients) view the existing approaches to, and funding of adaptation projects, and how these may be improved with VRCs. A final primary question related to how the national government could improve its management and monitoring, reporting and verification (MRV) of adaptation and how VRCs could enhance these systems.

A workshop that brought together most of the key players (see annex materials including attendee list) focussed on a number of presentations that discussed the context for this project, national priorities, a session on capacity building on the VRC approach, a presentation on the data challenges, and interactive discussions.

Key findings from the mission, that have been further refined in post-mission communications and analysis, are the following:

- *Interest in VRCs by agricultural sector participants, climate policy and program managers, and funders is substantial* and linked to interest in improved resourcing and management of adaptation policies, plans, projects, and communications.
- *Data and analytical outputs* (e.g., climate projections, projected effects of adaptation projects in reducing climate impacts) required for VRC calculations *are insufficient*, or not apparently available, for the studied agronomical adaptation project options.

A pilot project will need to identify ways to overcome these data and analytical gaps, considering ways data may possibly be generated at the local level. Further identification of the expertise that may develop these, and the further capacity building required will be integrated into the project design.

- Climate adaptation priorities by sector have been articulated, based on relatively high-level climate impacts studies, but a lack of specific understanding regarding the efficacy of different adaptation interventions (see above bullet) hinders adaptation program direction and pathways to funding. Specific pilots are underway and will

improve these understandings but are not thoroughly based on a coherent theory of change framework. Although it is technically not possible to assign VRCs to all project interventions, application of VRCs for projects, funding, and national management, where feasible, may serve to lend clarity to priorities and understanding of adaptation impacts.

- The international demand for VRCs is not firmly established, and interest in VRCs remains largely theoretical. Concrete financial offerings – project opportunities and money on the table – is needed, and a pilot project may accelerate interest if the projects and structures are credible.
- Capacity for VRC pilot projects, formation of a VRCPF, and national management system is high in terms of available technical expertise and the existing program of work underway by MINNED (especially PNCC), SODEXAM. Plans for integration of VRCs are largely in line with existing work, although further investigation has to be undertaken and capacity building and changes in the data and analytical outputs management culture are essential.

Table IX – Meetings held during Field Visit.

Organization	In attendance	Title	Summary
28-Feb			
Programme National sur le Changement Climatique (PNCC)/ Ministry Of The Environment And Sustainable Development (MINEDD)	Marcel Fodjo	Assistant Technique	Discussed baseline setting by PNCC as well as integration of VRCs into national adaptation process and seeking private financing for VRC projects.
	Ishmael Kone		
United Nations Development Programme/ MINEDD	Jean Douglas Anaman	NAP-GCF project coordinator	Engaged with UNDP focal point and MINEDD project partner to scope and plan country visit; debriefing on trip and further steps occurred on 11 March.
MINEDD Green Climate Fund (GCF) Focal Point	Marcelle Yao	Advisor to the Minister of the Environment of Côte d'Ivoire/Focal Point of the Green Climate Fund Côte d'Ivoire	Mr. Yao provided overview of the process of setting up National Climate Fund, which he is overseeing; we discussed integration of VRCs into Fund; we were provided with a report on the Fund used as a source in this study.
01-Mar			
Ministère de l'Agriculture et du Développement Rural (MINADER)	Mme Ziedi	Subdirector	Discussed how crop production data are obtained and aggregated nationally; agreed to provide us with national crop data series on a by-request basis.
PLAN-ADAPT; Ministry of Planning	Dr. Loukou	Sub-director of planning for Min. of Planification and Development	Discussed elements of planning law and operations encompassing adaptation and potential sourcing of demographic data from their work.

Organization	In attendance	Title	Summary
LOCAGRI	Jean Paul AKA	Director General	LOCAGRI markets rice ("locariz") from 700 small producers and work with cacao industry; Mr. Aka noted the difficulties in obtaining specific cacao data; we further discussed the potential market for VRCs in RCI and he expressed interest in playing a role in VRC projects.
Universite Felix Houphouët-Boigny, West and Central Africa Capacity Building Programme	Dr. Narcisse Gahi	Research Scientist and Lecturer	Discussed project opportunities including in north of RCI, including cotton agriculture adaptation.
IMPACTUM	Binate Ismaila	Assistant Evaluation and Communication	Discussed work on developing cacao-enhancing techniques and tools, including "Connexion" mobile app (see Figures) and GIZ study on cacao plantation health (potentially obtainable by Q1 2023).
02-Mar			
LONO	Kombo Ekra Noel N'Guessan	Director of Operations and R&D	Discussed potential for project cooperation using their agroforestry technologies.
	Louise Bidleveld		
SODEXAM	Dje Kouakou Bernard	Chief of Climatology and Applications	Discussed availability and spatiotemporal coverage of weather station data; they noted the anticipated availability of downscaled data sets covering all of RCI starting in 2023; agreed to provide selected weather station data series on a by-request basis.
	YA Koukou	Chief of Weather Observation	
03-Mar			
Global Environment Fund (GEF) Focal Point for Cote d'Ivoire	Mme. Alimata B. KONE	Chief, GEF Focal Point for Cote d'Ivoire	Mme. KONE described the role of the GEF focal point in recommending implementing agencies to project proponents and the various funding pools available to projects within RCI as a lesser-developed country; other avenues include SCCF and Abidjan Legacy Programme (presidential)

Organization	In attendance	Title	Summary
European Commission (EC)	Gbedji Jean DOUZO	In charge of Section Cooperation	Discussed their role in cooperating with RCI and mentioned the need to integrate an adaptation metric framework into the national system to supplement key performance indicators.
	Luca FERRONI	Team Leader, Sustainable Investment	
04-Mar			
2PAIB	Mamadou Kigbafory COULIBALY	Director of Technical Operations	Discussed the “problem of data,” impacts of changes in rainfall on crops in the Belier region, and the successful use by the National Agricultural Research Center (CNRA) of the System of Rice Intensification (SRI) approach
	R.I. Kalemon	Agribusiness expert	
05-Mar			
CORPRORIZ rice cooperative	Msr. Abernaty	Belier Riz Coop Chief	Met with key personnel and farmer to discuss organizational setup and production profile of rice cooperative as well as perceived climate stressors to production; shared production figures from 2014 with us.
	N'dah Clement	Technical Director Belier Riz Coop	
	Ms. Conucteur	Farmer/machine driver	
World Agroforestry Centre (ICRAF)	Amana Kouassi		Discussed role in partnering with ABM to develop ABM cacao methodology and the role of agroforestry in protecting and enhancing cacao plantations.
	Christopher Konan		
07-Mar			
COASI cacao cooperative	N'da Venance	Coop Director	Met with key personnel to discuss organizational setup and production profile of cacao cooperative, including close cooperation with multinational buyers; gave information on data collection carried out by buyer organization on behalf of coop members.
	Mr Adieu	Assistant to coop director	
08-Mar			
Global Green Growth Institute (GGGI)	Ndeye Coumba Diop	Readiness Programme Senior Assistant	GGGI is advising RCI on its NAP adaptation process and was interested in how we thought the VRC could be used in the process; mentioned their interest in
	J.A. Nicaise AMAN	Readiness Programme Senior Associate	

Organization	In attendance	Title	Summary
	Alain Serges Koaudio	Green Growth Programme Officer	finding ways to collaborate and in systems that foster “inclusive adaptation”
	Viera Olala		
09-Mar			
Caisse Des Dépôts et Consignations de Côte d'Ivoire (CDC-CI)	Pierre Ange Désiré Danho	Secretary General	CDC-CI finances priority national development projects including with the private sector, is familiar with climate impacts and could play a role in VRC linked finance.
11-Mar			
Agence Francaise de Developpement (AFD)	Dr. Philippe ROUDIER	Head of Mission, Agriculture and Biodiversity	They described issues pertaining to project development in general, including significant security complications in northern part of country; we provided a breakdown of this project and the VRC approach.
Food and Agriculture Organisation (FAO)	Sammy Gaiji	FAO Cote d'Ivoire Representative	Discussed FAO's overall assessment of national situation, incl. forest cover in RCI (declining rapidly) and movement of cacao cultivation region to southwest. FAO provided guidance on additional services, e.g., sourcing of weather station data (ICRAF studies).
	David Alejandro Solano Grima	Resource Mobilisation Expert	

Field Visit Photos



Sites visited during trip.



Project team meeting with LOCAGRI company



SODEXAM meeting



Rice processing near COPRO RIZ cooperative in Belier region near Yamoussoukro



Project team meeting with COPRO RIZ rice cooperative representatives and farmer



COPRO RIZ rice farmer cooperative offices near Yamoussoukro



Rice farm



Rice farm



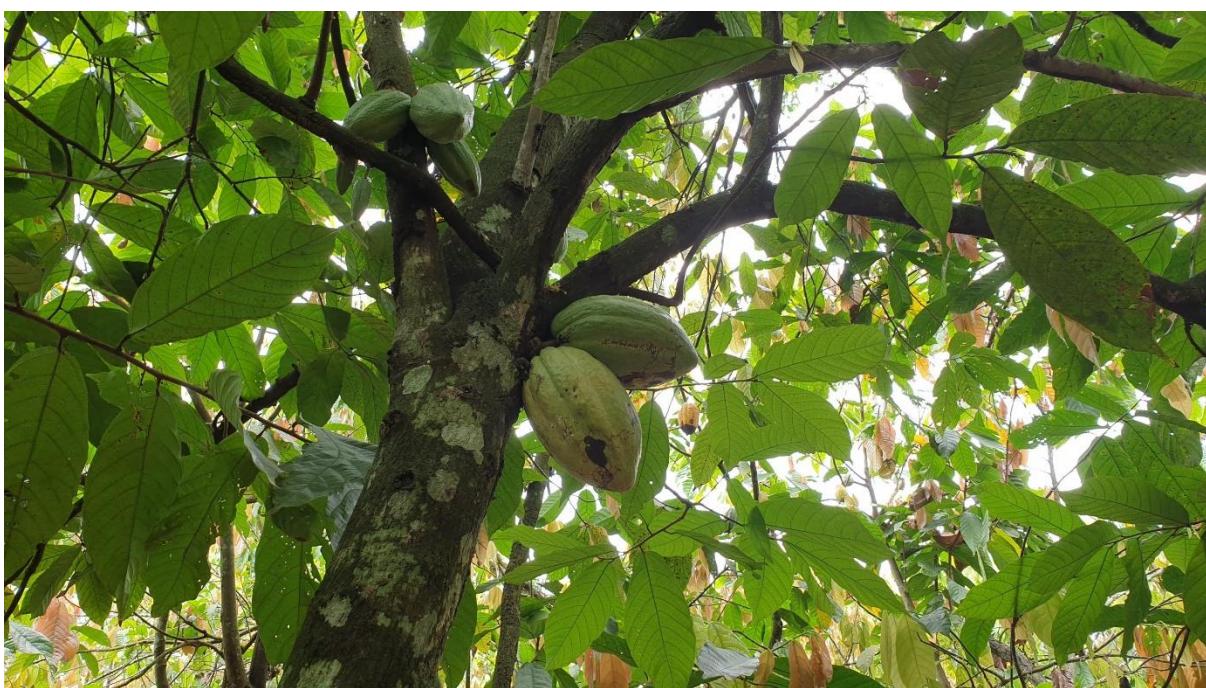
Warehouse and offices of cacao farmer cooperative COOP-CA COASI in Meagui



Office of cacao farmer cooperative COOP-CA COASI



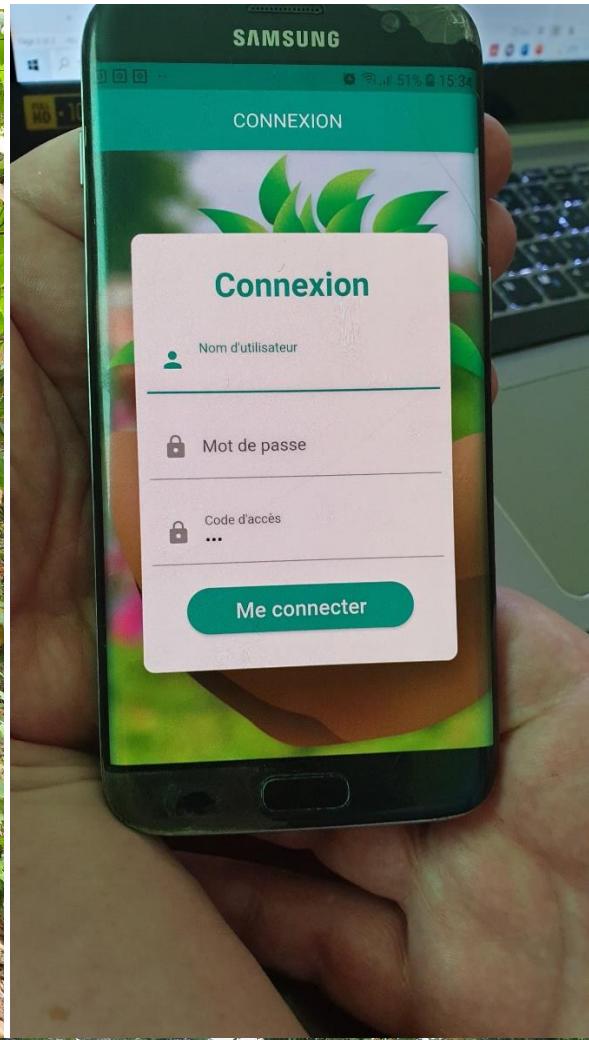
Cacao storage at COOP CA-COASI warehouse



Cacao tree near Meagui



Shade tree planted in cacao plantation near Meagui



Phone application for CARGILL/IMPACTUM cacao project



Cacao drying



Opening of Workshop on VRCs, Jean Douglas Anaman, PNCC, Abidjan, 10 March 2022



Context setting presentation, Workshop on VRCs, by Jean Douglas Anaman, PNCC, Abidjan, 10 March 2022



Presentation on Higher Ground Foundation and VRCs, Karl Schultz, Workshop on VRCs, Abidjan, 10 March 2022



Project team meeting with Jean Douglas Anaman, Programme National Changements Climatiques (PNCC)

Annex II – Table of Experts for Phase II Pilot Project

The below table comprises a preliminary set of propose expertise associated with the various project activities for Phase 2: pilot design of project, VRC Purchase Facility, and integration of VRCs into the RCI National Management System, and further work integrating these three project aspects, along with project management. Expertise is further divided into “national” and “international” to reflect the need for both deep understanding of the local context under which the VRC projects will be undertaken, along with enlisting world-class expertise in specific scientific, technical, financial, and management areas.

Further consideration of expertise required and corresponding level of effort shall be undertaken following completion of this preliminary study.

VRC for RCI Phase 2 Expertise Requirements			
Pilot Project			
Title	Expertise/remit	Person months	National/ International
Pilot Project Manager	Overall management of pilot project design, with expertise in VRC standard framework and application. Also performs analysis of replicability of pilot to other crops, sectors, and international contexts.	36	International
Social and economic consultation/survey expert	Engage with farmers and local community to assess existing practices, challenges to uptake, income levels, and gender and inclusion issues. Guide overall community consultation in conjunction with national consultation workers.	12	International
Community consultation worker(s)	Undertake required surveys and consultations.	36	National
Climate Impact Agronomist	Specific expertise in climate impacts, adaptations for chosen crop	12	International
National Agronomist	General expertise in RCI context, desirable to have expertise in subject crop	12	National
Statistician/Data Procurement and Management Expert	Expertise in physical and economic data procurement and statistical approaches to analyze data and confidence levels	3	International
Agricultural Economist/ Financial Analyst	Estimate VRCs generation and economic impact of project, consider economic impact of national replication program	3	International
Third Party Audit Expert	Design monitoring regime and formulate process/procedures and pilot validation and verification	3	International
Third Party Auditor	Undertake 3 rd Party Audits (validation and verifications)	3	Domestic
Monitoring and Evaluation Expert	Prepare project M&E plan and undertake M&E	2	International

VRC Methodology and Oversight Panel Experts (6)	Multi-disciplinary group to oversee and approve methodology, project design document, and VRC verifications	6	International
Various expertise subcontracted	Multiple focussed efforts (e.g., greenhouse gas emission estimation, agricultural science and technical, gender and inclusion concerns, metrics identification, etc.)	12	Both
Higher Ground Foundation VRC Reviews/Approvals	<u>Note:</u> This is not direct project support, but payment for VRC methodology review, project document, and credit issuance	12	International

VRC Purchase Facility

Title	Expertise/remit	Person months	National/ International
Financial instruments expert	Specialized expertise in structuring financial instruments, including in developing country/natural resources, and for climate adaptation.	4	International
National financial expert	Expertise in structuring financial arrangements in RCI	4	National
International financial structure lawyer	Draw up template contracts with national finance lawyer, assess and mitigate legal liabilities associated with financial transactions. Evaluate and define legal nature of VRCs in pilot and subsequent phases.	1	International
National finance lawyer	Draw up template contracts with international lawyer, assess and mitigate national legal liabilities and status of VRCs in national legal context	1	National
VRC Purchase Facility Business Developer	Outreach to potential purchasers of VRCs (domestic and international) to secure letters of intent to support Facility	4	International
National VRC Capacity Expert	Outreach to local communities, project developers, and financial institutions to assess demand/supply and enhance capacity related to VRC transactions	4	National
VRC Originator	Identify VRC projects, sign purchase agreements, support and monitor projects	4	National

VRCs Integration into National Management System

Title	Expertise/remit	Person months	National/ International
Institutional Development Expert	Specialized expertise in the development of new institutions; experience in developing country settings needed, adaptation experience a bonus.	4	International
National Public Management Expert	Specialized experience working with or within the government of RCI in developing facilities/systems for management; adaptation experience a bonus.	4	National
Registry Architect (data)	Design the database and communications architecture for a registry of VRCs and VRC projects to be housed within the National Management System.	6	International
National environmental lawyer	Assess liabilities and obligations of the National Management System relating to the operation of a potential National Adaptation Agency.	1	National

Integration and Project Management			
Title	Expertise/remit	Person months	National/ International
Chief of Party	Overall program management and strategy	36	International
Deputy Chief of Party	Executes and manages in-country elements	36	National
Administrative and Finance Manager	Oversees funds, material, budget, travel, and indirect elements.	36	National
Interpreter(s)	English/French needed; local languages desirable	36	National
Research Assistant	Preferably an undergraduate or graduate student or recently graduate with sectoral experience/interest to support the IPM team	36	National

Annex III – Detailed roadmaps

Table X- 2022 Roadmap

Project Pillars	Jun	Jul	Aug	Sept	Oct	Nov		Dec
Pilot Project (1)	Phase 1 Findings delivered (this report)	Background review and reach out to potential partners and hosts	Further reach-out effort; field visit by Sept. to potential project sites	Review sites with relevant experts and develop short list of candidates	Draft prospectus of potential projects	COP27: • MOU Signature • Side event with announcement of MOU and presentation of potential projects	<ul style="list-style-type: none"> -Methodology drafting and review -Final draft of project prospectus 	
VRC Fund (2)		Consultations with finance experts/funders	Further consultations, field visit and discussions with funders		Draft prospectus of VRCPF Options and Opportunities			
National Management System (3)				Consultations with agencies, experts	Draft prospectus of VRC Management System			
Crosscutting (for pillars 1, 2, 3)		Expert position descriptions (1-3)	Identify and Recruit key experts (1-3)	Recruit key experts (1-3)	Final selection of key experts; develop work plan to manage individual and cross-cutting work streams			
			In-country capacity building for Fund and National Management (2-3)		Draft cross-cutting proposal with budget		Revise cross-cutting proposal with budget	

Table XI – 2023-2025 Roadmap

	2023				2024			2025	
Project Pillars	Q1	Q2	Q3	Q4	H1	H2	H1	H2	
Pilot Project	Methodology drafting and review		Final draft of project prospectus including PDs, full methodologies, VRC expectations, and MRV plans	MINEDD, UNDP select and approve final project candidates			Interim report on 1 st planting results	Synthes is report on initial planting and cultivation results	
				Awarding of final project(s); Project training		1 st planting and cultivation (kharif)-VRCs generated via project activity		2 nd planting and cultivation (kharif)-VRCs generated via project activity	
				VRC Purchase Agreement Signed					
	Formulate Project Methodology	Finalize methodologies, project documents, Validation (final approval)				Verification of VRCs and	Project design modific	Verification of VRCs for 2 nd planting;	

	2023				2024			2025			
Project Pillars	Q1	Q2	Q3	Q4	H1	H2		H1	H2		
	e(s) and Prepare Project Document	of project design including anticipated VRC generation)				assessment of project, monitoring design	ation based on assessment;				
VRCPF								Validation of 2 nd planting VRC plan	Pilot project prepared for sustainable operation (Phase 3)		
	Consultations Regarding Structural Options and Counterparties	Design and Legal, Contracts and Contract Templates		Sign Letters of Intent (funding, management, etc.)							
				VRC Pilot Purchase Agreement Signed (see above)							
		Funding Roadshow, Training and Identifying, Signing Project VRC Purchase Agreements, Supporting Project Design						VRC Projects Underway, Payments for VRCs			
National Management System	Consultations, workshop, and draft white paper	Legal and administrative due diligence	Design of national registry	Enact system (subject to administrative consent)							

Project Pillars	2023				2024		2025		
	Q1	Q2	Q3	Q4	H1	H2	H1	H2	
Strategic Expansion	on structural options			Annual review, evaluation, and recommended adjustments					
				Engagement with HGF and international outreach					
				Review and proposals for bilateral and multi-lateral global expansion of VRC management system					
Cross Cutting				Presentation of Interim Results at COP-28		Presentation of Interim Results at COP-29		Presentation of Interim Results at COP-29	

Annex III – COP26 Trip Report: “Lessons Learned”

Originally submitted 26 November 2021

Summary

We met with a number of individuals and organizations in the governmental, private, NGO, and other spheres at the COP26 in November 2021 to obtain guidance on the requirements for planning the fundamental components of a National Adaptation Management Framework for Côte d’Ivoire. This framework will help support the country in meeting its climate adaptation goals by informing its reporting under the National Adaptation Plan and Nationally Determined Contribution transparency requirements and securing project funding using the Vulnerability Reduction Credit (VRC) mechanism.

Our outreach efforts revealed considerable energy and a renewed commitment to improving funding and providing adequate adaptation assistance and funding, particularly on the part of governments, institutions, and individuals within vulnerable developing nations.

At the same time, we found multiple barriers to achieving the funding activity volume and the parity with mitigation prescribed under the Paris Agreement. Conceptually, these can be characterized as follows:

- There is a lack of intercontextual communication or cooperation (i.e., “siloing” between institutions, governments, and various components of civil society), and;
- There is poor articulation of project goals and outputs, which has exacerbated the inability of multilateral and other donors to efficiently evaluate and approve projects for funding.^{lx}

Although our findings indicate the magnitude of the challenge to successfully implementing a national adaptation management system and central finance structure for Côte d’Ivoire, we believe that there is no lack of potential stakeholders and advisors for this effort. If it is possible to successfully articulate a suitable platform for aggregating adaptation outputs, finance, and data, we can provide through a credible blueprint for bringing together countries, communities, experts, and finance in bridging the adaptation gap.

Purpose and Context of the Study

Project and Report In Brief

- The project is an initial assessment of the feasibility of developing a National Adaptation Management System for Côte D'Ivoire incorporating the use of metrics to translate adaptation information from the project to the national level and project financing based on the Vulnerability Reduction Credit (VRC) mechanism.
- This document reports on our outreach and stakeholder engagement at COP26 in November.

The objective of the project is to carry out an initial analysis and feasibility assessment that will help to guide the Ministre de l'Environnement et du Développement Durable, Côte D'Ivoire (MINEDD) and partners in the successful development of VRC projects and a registry that will enable the Republic of Côte d'Ivoire (RCI) to more effectively identify, support, and implement adaptations to climate change in accordance with its National Adaptation Plan (NAP) under the 2015 Paris Agreement and the framework that has been developed with the Green Climate Fund (GCF) as well as implementing a proposed Memorandum of Understanding between CMW and MINEDD. Specifically, the study will develop preliminary designs and recommendations for implementing three key projects contributory to meeting the above goals:

Vulnerability Reduction Credits (VRCs)

- A VRC™ is the monetized cost of the estimated impact of climate change, adjusted for the income level of the community, that will be avoided as a result of the project.
- In brief, it is a credit for work done to avoid damages or losses owing to climate change - a vulnerability reduction credit.
- A VRC is €50 worth of income adjusted avoided impact costs.
- The VRC may serve as a finance instrument and as a metric that, alone or in conjunction with other metrics, can translate information on results at the project level to the national level to enhance reporting and management under Côte D'Ivoire's Paris Agreement transparency

- **Pilot Project:** A prefeasibility study for a pilot VRC climate adaptation project will be carried out. As part of the scope of this work, the technologies, practices, and financial instruments needed by communities in RCI and elsewhere to adapt to specific vulnerabilities to climate change will be defined. Based on these requirements, CMW will work together with MINEDD to identify one or more agricultural projects in RCI, either existing or proposed, that might be feasible as a pilot project for VRC project registration and subsequent VRC certificate issuances. The selection of the agriculture as a project focus reflects the importance of the sector in the Ivorian domestic and export economy, reflects the priorities of the country's National Adaptation Plan (NAP) under development, and will enable us

to leverage previous research and project work undertaken by donors and partner ministries.

- **VRC Fund:** The scope and purpose of a certification instrument-based fund for leveraging investment in adaptation projects and the potential trading of adaptation credits will be defined. The fund is to be managed within the country of Côte D'Ivoire by and/or on behalf of the Government of RCI as part of its development and implementation of the country's National Adaptation Plan (NAP). The contemplated Fund would constitute a potential mechanism to deploy GCF and other resources to support results-based adaptation projects by entering into agreements to purchase VRCs.
- **Management System:** The scope of a National Adaptation Management System for more effectively identifying, supporting, and implementing climate adaptations in RCI will be defined. In addition to providing a registry for VRC issuance and tracking through which all VRCs produced by adaptation projects in RCI would be uniquely and transparently identified and tracked, the contemplated Management System would serve as a platform for managing, financing, and growing the VRC fund and provide linkage to external national and international finance and reporting systems.

As a key part of the project strategy for partnership development and information gathering, Karl Schultz and Linus Adler of Higher Ground Foundation¹, attended the 2021 UNFCCC Conference of Parties in Glasgow, Scotland (COP-26) from 8-11 November 2021.

Overview: Adaptation and Metrics at the COP26

The 26th United Nations Climate Change Conference of Parties took place against a background of climate urgency, as conveyed by the publication earlier in the year of the 6th Assessment Report on the Physical Science Basis,^{lxii} and a sense of dissatisfaction at both the civic and political levels with the overall pace of progress in meeting mitigation and adaptation goals. In particular, representatives of the more vulnerable developing countries, including African countries, expressed disappointment at the sub-par finance and turnaround for adaptation project funding to date.

In this context, the Conference Parties would have to be considered at least somewhat successful in reaching a set of agreements on mitigation that, if fulfilled, are estimated to be compatible with a pathway to 1.8 degrees of atmospheric warming by the end of the century. This activity was reflected on the adaptation side in the form of new pledges during the Conference for adaptation funding totaling more than \$760 million.^{lxiii} Given, however, the recognized difficulty of meeting the agreed-upon reductions and extending them to meet the damage-limiting goal of 1.5 degrees set under the Paris Agreement in 2016, coupled with the failure so far to meet \$100 billion goal for adaptation finance set under the Paris Framework, there has been an

¹ The Higher Ground Foundation (HGF) is a fully-owned initiative of CMW and, herein, all activities undertaken by CMW personnel are mentioned under the rubric of HGF.

understandable push on the part of vulnerable developing countries for a redoubled focus on adaptation funding.

In response to this push, the package of official aspirations and goals signed off on by the summit negotiators on the final Saturday of the Conference under the Glasgow Climate Pact expressed a commitment to “doubling adaptation finance and requesting countries to present more ambitious climate pledges next year.”^{lxiii}

Glasgow-Sharm el-Sheikh Work Programme

Although the final Glasgow Climate Pact expresses enhanced aspirations for emissions cuts and adaptation cooperation and funding, many specific agreements were put off until the Conference of Parties 27, which is to be held in Egypt next year. Based on this acknowledged need for “additional work” to “help countries measure and track adaptation,” the “Glasgow-Sharm el-Sheikh work programme on the global goal on adaptation” was adopted as the governing bridging framework to help “parties...provide submissions with metrics to assess how far they have come. [these] will be assembled into synthesis reports to measure progress against the global goal.”^{lxiv}

We suggest that this framework can provide an important platform for promotion of the framework developed as a result of this project as a replicable tool for organizing national adaptation management in countries in Africa and beyond that are in the process of developing or revising their NAPs and NDCs. In particular, the call for the use of metrics to assess progress provides space for promulgating and replicating our goal of using the VRC as a metric or part of a set of metrics in a full-scale national adaptation program.

Event at Ivorian Pavilion



At an event convened at the Ivorian Pavilion and facilitated by our in-country consultant, Amon Auguste, we presented an abbreviated version of our slide deck outlining the climate challenge and the key features and expected products of the feasibility study and then asked the

audience if our outline was clear to them and what questions/suggestions they had. The audience included several ministry department heads and experts who will be vital stakeholders and partners in scoping and proposing a pilot project. A complete listing of attendees is included in Annex B, and Mr. Auguste has followed up with several of them via in-person meetings upon returning to Côte D'Ivoire.

Among the most pertinent responses were the following:

- Mr. N'Guessan Koffie Rodrigue, Director General, Department of Rural Development and Water Control in the Agriculture Sector, asked what the “pilot project definition” would look like. We explained the indicative data categories that would need to be populated (crop types, regional distribution, vulnerability, and exposure, etc.). We agreed and noted that Mr. Auguste was performing the initial category research on vulnerability by crop type, region, and exposure.
- Dr. Andre Kouame Fry, Director of Legal Affairs, Litigation, and International Cooperation, requested that we send them a “template” for our methodology before a January visit. To this end, we have translated and forwarded our existing “Request for Project Concept Notes,” which we will revise and refine for this project and forward to all event attendees prior to our trip in January.
- DJE Kouakou Bernard, Head of the Climate Department, National Company of Meteorology (SODEXAM,) noted that the agriculture and meteorological agencies will be working together to obtain project and climate data from different ministries. Each of these individuals is a key potential stakeholder in project development and we will follow up with them closely leading up to and at the capacity-building event to take place in Côte D'Ivoire early next year.

Key Takeaways

- Based on our meetings with Ivorian officials at the COP, we are confident that we have identified important stakeholders and consultants for selecting project criteria and vetting project candidates. More work needs to be done, however, in precisely identifying climate impacts and methodologies through our desk research.
- We obtained/are obtaining input on the requirements for and potential structure of a VRC-based Adaptation Fund from a number of experts. We have reached out with a baseline list of desired and necessary attributes with the goal of reengaging with these experts by the end of 2021.
- We met with several experts and a high-level official at GCF, all of whom expressed the need for capacity enhancement in national adaptation planning through improved sharing of information and the use of adaptation metrics to better transmit information between different levels of adaptation activity. We met the Director of Division of Country Programming of the Green Climate Fund, who provided a very high-level and frank view

VRC Pilot Project

Our key interaction with respect to the pilot project component was the session we conducted for Ivorian ministry officials and civil servants on 11 November; summaries of our discussions with these individuals can be found in “Event at Ivorian Pavilion” above and in Annex B. At the discussion following the presentation, these individuals expressed a definite interest in the overall approach and, with respect to informing the pilot project component, provided general agreements to cooperate further ahead of

and at our in-country visit during the 2022 phase of the project. Notably, it was apparent that personnel in key agencies—particularly agriculture and meteorology—are willing work with each other to help source needed data and projections on climate impacting factors that could be combined with observations on impacts with the goal of developing a robust model of avoided impact.

Nevertheless, there remains a good deal of work to be done in identifying a candidate site or sites and a suitable, robust set of methodologies to address identified vulnerabilities. It also remains to be seen how good the available data are and how we can ensure that our approach can be tailored to a project system “on the ground” while retaining a required level of confidence in our projection-based valuation. However, the desk research being finalized as of this writing should provide more certainty as to the availability and accuracy of the existing data and appropriate avenues for methodology framing, which will be reflected in more detail in our interim report

VRC Fund

Our key interactions in terms of scoping the VRC fund were the interviews with **Pa Ousman Jarju, Director, Division of Country Programming , Green Climate Fund, Joumana Asso of Clima Capital, and Jeffrey Johnson of Temasek Holdings**; further details on our interactions with these individuals can be found in Annex B.

Of the three components this feasibility discovery project, we feel that the Fund remains the most challenging in terms of the number of decisions that will have to be made in defining its structure (for instance, should the Fund be simply a purchase fund or a vehicle for securing debt/equity, etc., investments). Given the track record Ms. Asso and her company have in structuring carbon funds, as well as the nature of the VRC as a carbon credit-inspired instrument, we tentatively framed the VRC Fund as a counterpart in the adaptation space to carbon funds. Ms. Asso was intrigued by the idea, albeit concerned by the lack of a track record in this approach. To better conceptualize the leap between credit- and carbon-based financing, she stated that she felt that she needed more specifics on the planned Fund, which we agreed to provide.

We have since followed up via email with Ms. Asso with the hope that she can vet and address the set of specifications and requirements developed in our scoping process to date; given her schedule, no response is expected until December. If possible, we plan to incorporate the additional findings into the interim report; otherwise, these will be included in the synthesis report. We will also follow up with the African Development Bank, proponents of the Adaptation Benefit Mechanism, with whom we were unable to meet at the COP.

National Adaptation Management System

In our meeting with Mr. Jarju, of the Green Climate Fund (GCF, which is the organization that is funding our study), he provided a high-level and frank view of the problems the GCF has faced in improving adaptation project approval speed and volume, which he attributed in part to an informational “siloing” effect between countries, institutions, and government and civil society. As mentioned in the Summary, this problem is exacerbated by holdups in the funding process of GCF, which has had difficulty in assessing proposed outputs of candidate adaptation projects in terms of suitable metrics, leading to a low rate of approval and long turnaround times in the approval process. We had briefed him on the national

management system component of the project, and he agreed that the framework could, if successfully replicated in other countries working with GCF, help to mitigate the siloing effect.

The problem with information siloing was also expressed by **Mr. Charles Touni of the African Centre for Technology Studies Africa Research and Impact Network (ARIN)**, who described their current work on overcoming barriers that isolate climate data and finance.

We also met with **Mikaela Rambali, Policy Analyst at the OECD**. Ms. Rambali stated that she felt that the use of well-defined metrics to convey information from the project/local/regional level was compatible with her thinking and that of other consultants at OECD, although she expressed doubt that a single metric such as the VRC could effectively do so in isolation.

As a further step, she asked us to follow up after the conference for additional background information regarding relevant OECD research papers and information on possible national management system development or scoping in Zambia (note that Zambia is in the process of finalizing its National Adaptation Plan, which is scheduled to be published in the first part of 2022).

Details of each of these discussions can be found in Appendix B. Mr. Jarju suggested that we might share the findings of the synthesis report at the next GCF regional workshop for Direct Access Entities in Africa in 2022. We have also followed up via email, for additional information from Ms. Rambali, which we plan to incorporate the additional findings into the interim report or, if necessary, the synthesis report.

Conclusions from Our Involvement and Next Steps

Next Steps

- **Review of desk research**
 - Analysis of material into findings compatible with *project, finance, and/or national management* categories.
 - Synthesis of these findings with COP findings into relevant sections of interim draft.
- **Follow-up interviews with contacts who were unable to provide full information at time of initial outreach (i.e., Ms. Asso, Ms. Rambali, Mr. Johnson)**
- **Draft Interim Report**
 - To be delivered in December
 - Draft outline attached as Annex C
- **Other issues**
 - Final identification of candidate projects
 - Develop plan for in-country activities in 2022, including field visits and structure of stakeholder meetings
 - Secure funding assurance for 2022 activities and delivery of Synthesis report.

As outlined in our overview, the COP26 possibly marked the point at which the urgency of the adaptation challenge, relative to that of mitigation, was officially “taken on board” by the Parties, who now need to come up with results that can address the need. This

will require enhanced multilateral and bilateral funding, which is forthcoming or at least pledged, as well as more attention to and rethinking of what effective adaptation entails in terms of activities, modalities, and, significantly, how results are measured.

Along these lines, the findings from our specific outreach indicate that much work will need to be done by our national client to, with our consultation, implement and integrate the components of an adaptation system spanning project design, funding, and aggregated national reporting and stocktaking. Although our interviews and expert consultations indicated awareness of the challenges and action on all three fronts, there remain significant institutional and informational barriers to achieving this novel goal.

On the other hand, we note that significant impetus toward addressing adaptation under these summits has often come when the Conference has been hosted by an African country (the last African COP---COP22, held in Morocco---is considered to be the first in which adaptation was tabled in a serious manner and also gave rise to the International Panel on Adaptation Metrics). As such, we are encouraged by the adoption of the Glasgow-Sharm el-Sheik Work Programme and should use it to leverage support for and participation in the development of a Côte D'Ivoire national management and VRC funding system and, upon successful validation, the promulgation of similar frameworks continent-wide and beyond.

Our next steps in this project will be to assess the results of the desk research and in-country outreach conducted by our Ivorian expert immediately following the COP and to use this information, in conjunction with the information and observations gathered at the COP, to draft an interim synthesis report by the end of the year (see our draft outline in Annex C). Our follow-up visit to Côte D'Ivoire early next year will allow us to fill in more gaps through field visits and engagement with stakeholders, including the national experts and ministers we met with at COP26 who agreed to continue to be a part of the scoping process. The ultimate output of this process will be the set of final recommendations with respect to implementing a pilot project, adaptation fund, and national management system by the end of the first quarter of 2022 that are informed by the needs and expertise of our clients and best-available research findings with respect to climatic, programmatic, and financial considerations. We consider our experience at COP26 to be invaluable in that we were able to gain insight from some of the most appropriate experts and stakeholders regarding each of the three components of the scoping study.

Annex A: List of Individuals and Groups

Surname	First name	Association/ title	Date met or attended	Key Points
Anaman	Jean Douglas	MINEDD, Côte d'Ivoire	9 November	Point of Contact/chief partner for project
Auguste	Amon	CMW consultant	9, 11 November	In-country consultant (attached to CMW for project)
N'GUESSAN	Koffi Rodrigue	Directeur of Agriculture (DGDRME), Ministry of Agriculture (MINADER)	11 November	Ivorian Stakeholder Participants in Project Presentation Discussion at Ivorian Pavilion (see Key Stakeholder Interaction)
Kouakou	Bernard, DJE	Responsible of Climate Dept, National Company of Meteorology (SODEXAM)	11 November	
KONATE	Daouda	CEO of SODEXAM, National Company of Meteorology (SODEXAM)	11 November	
KOUAME	Kanga Daniel	Director of Energy, Ministry of Mines, Oil and Energy	11 November	
FRY	Kouamé André	Director of Legal Dept (DAJCCI), Ministry of Agriculture (MINADER)	11 November	
KOUADIO	Kouacou Fidèle	Director of Environment Dpt, Interprofessional Fund for Agricultural Research and Advice (FIRCA)	11 November	
KADIO	Jean Jaures	Director of Projects, Regional Council of Gontougo	11 November	
AHA	Eboua yhacynthe	Director of Human Development, Regional Council of Gontougo	11 November	
Jarju	Pa Ousman	Director, Division of Country Programming, Green Climate Fund	11 November	Interviewed as representative of project funder for outlook on project need and goals (see Key Stakeholder Interaction)
Johnson	Jeffrey	Managing Director, Sustainable Investing, Temasek Holdings	17 November (post-COP call) Interviewed them to obtain insight into funding challenges and opportunities from the large private investor perspective (see Key Stakeholder Interaction)	
Scranton	Pierce	Managing Director, Temasek		
Blaumeier	Jan	Analyst, Temasek		
Asso	Joumana	Managing Director, Clima Capital	18 November (post-COP call)	Interviewed her for insights on VRC fund planning and development from based on carbon market experience (see Key Stakeholder Interaction)
Rambali	Mikaela	Policy Analyst, OECD	9 November	Interviewed for viewpoints on planning and creation of national adaptation management system
Touni	Charles	African Centre for Technology Studies/ Africa Research and Impact Network (ARIN)	11 November	Discussed problem of information and capacity "siloing" and the facilitation of networks to overcome these
Thompson	Amy	London School of Hygiene and Tropical Medicine	8 November	Discussed approaches currently being implemented in Côte d'Ivoire to disease prevention as potential project methodologies
Ijeoma	Stanley	Director, Schrodinger Greentech Limited	10 November	Discussed Nigerian rice cultivation project as potential source of methodologies and pilot project
Race to Resilience			12 November	[]
Adaptation Research Alliance			9 November	Attended side event on launch of IPAM partner organization; potential source

				of later-phase expertise on project technical methodologies
International Platform on Adaptation Management (IPAM)			9, 10 November	Attended and took part in events hosted by Higher Ground Foundation (CMW) key partner. Presented “pitch” on VRC project at organizational meeting on 10 November. Launch of Adaptation Metric Mapping and Evaluation (AMME) framework by principal Karl Schultz.
Green Climate Fund-Global Environment Facility			8 November	Side event on “Adaptation: From Readiness to transformational programmes - GCF delivering action on climate change”
Chomitz	Ken		9 November	Chief Analytics Officer of Global Innovation Fund; discussed their motivation and targets of interest for investment and the potential fit of VRC projects
Adaptation Gap			9 November	Discussed company’s approach to “filling” metrics gaps
Project Developers Forum			27 October (pre-cop call)	Potential stakeholders and partners; briefly presented project details at PD Forum meeting to generate interest and solicit suggestions

Annex B: Key Stakeholder Interactions and Notes

8 November

Amy Thompson, London School of Tropical Hygiene and Medicine

We met briefly with Ms. Thompson in the Green Zone, where we described project to her and she mentioned that she has colleagues in Cote d'Ivoire and might be able to provide innovative methodologies for disease prevention.

9 November

Mikaela Rambali, OECD

Mikaela Rambali is a policy analyst with OECD who was present at the COP to take part in a panel discussion on adaptation metrics hosted by the International Panel on Adaptation Metrics (IPAM). Prior to the discussion, we engaged with her to brief her on the project, provide background materials and context, and solicit her views and expertise on what has been done to date in terms of designing and implementing programmatic systems to manage and plan adaptation efforts at the national level within the reporting and transparency framework of the Paris agreement (under respective NAPs, NDCs, etc.) .

10 November

Ken Chomitz, Chief Analytics Officer of Global Innovation Fund

We presented the VRC concept to him. His company finances high-risk concepts that can potentially leverage hundreds of millions in enhanced human resilience. He expressed concern over the potential for “double counting” in adaptation and the need to disaggregate adaptation benefits from ordinary developmental benefits. We will meet with him in London in December to further discuss the VRC concept and potential synergies with GIF.

Stanley Ijeoma, Schrodinger Greentech Limited

We met briefly with Stanley Ijeoma regarding his project in Nigeria to adapt rainfed rice crop to reduced water availability through the installation of paddy berms and the seeding of paddies with nitrogen fixing catalysts. Said adaptation benefits could be easily quantified and compatible with VRC generation.

11 November

Mr. Charles Tonui, African Centre for Technology Studies, also Africa Research and Impact Network (ARIN)

Mr. Tonui discussed ARIN as a network for sharing adaptation research siloed within think tanks and ministries between the national, regional, and local levels and across country and Anglophone/Francophone boundaries. He noted the difficulties in obtaining information from highly centralized governments, and ARIN is being developed as a framework to adding regional and sub-national open knowledge hubs. Discussion primarily revolved around discussion of knowledge and institutional synergies with IPAM.

Action Items: Nothing specific for project; further work will proceed between ARIN, IPAM, and AMME. Should monitor to see if this facilitates enhanced data exchange for pilot project.

Pa Ousman Jarju, Director, Division of Country Programming , Green Climate Fund

We met with Mr. Jarju as our last engagement of the COP with the goal of connecting with an important representative of the agency that is funding our work and to solicit his views as to how the proposed national management system and use of VRCs as a finance mechanism/metric could help his organization address issues such as long turnaround time for project approval and lack of balance between adaptation and mitigation spend.

Mr. Jarju first focused on his agreement that there is a need for “different approaches” to the development and use of metrics, stating his belief that metrics quality is dependent on the quality of information that underpins it. In this vein, he echoed the sentiment of those we had previously talked in stating that (in Africa specifically) the relevant data and statistics tend to be siloed institutionally and nationally, leading, for example to problems obtaining basic information combining agricultural (e.g., crop output) and meteorological research. Other noted constraints include financial limitations and the lack of connection between government and “private finance and civil society.”

Overall, he appeared to express a good deal of interest in the project and agreed to receive interim and synthesis findings. As a post-study outreach, he indicated that it would be possible for us to receive an invitation to present at the next GCF regional workshop for Direct Access Entities in Africa to take place sometime in 2022.

Post COP meetings/calls

Jeff Johnson, Pierce Scranton, and Jan Blaumeier, Temasek Holdings

Mr. Johnson, Director of Sustainable Investment, and colleagues Pierce Scranton (Managing Director) and Jan Blaumeier (Analyst) provided background on Temasek, a Singapore-based holding company with 280 billion USD in investments that is a global investor in investment opportunities, portfolios, and communities in Asia, North America, and elsewhere. Recently, they have partnered with Blackrock through “Decarbonization Partners” to “invest in next-generation private companies that provide solutions and technologies which accelerate global efforts to achieve a net zero global economy by 2050”

(<https://www.blackrock.com/corporate/newsroom/press-releases/article/corporate-one/press-releases/temasek-and-blackrock-launch-decarbonization-investment-partnership>).

Mr. Johnson said that they were talking to us as part of an information gathering effort to “think through implications of climate change...reach out to practitioners to find risks and opportunities.” More specifically, they mentioned that they were interested in how “a company” look at its risks, asked us what we thought were the leading markets, specifically “where are we going to be in 10 years” in terms of corporate adaptation.

We asked if they could provide feedback on practices and designs for designing an adaptation fund. They replied that the answer might be contained in various parts of the company, e.g., the impact investor team in Africa and the carbon innovation desk in Singapore.

Temasek Consultation Suggestions

(Partly directly from the discussion and from reflection afterward)

The adaptation ‘market’:

- *There is a realization now of the importance of adaptation by corporates and finance, but this is relatively new. TCFD may be precipitating some interest. Still, focus is still on mitigation and ‘physical climate risk’ – less of a focus on what to do about this risk.*
- *More players in the policy and sustainability/ESG space – especially service providers/analytics – on the next level: what do you do (adaptation) and then the notion emerges: we need to figure out how to measure this, we need metrics, we need enabling frameworks!*

- *Focus on increased adaptation finance (esp. public) now, big push with success to increase climate finance from developed countries to developing countries.*

But...the market as a market is not mature. Temesek is good to think about adaptation now, we don’t see a mad rush of peers yet.

Market opps:

- *Near every sector – but the focus will be on certain geographies, unlikely to be ‘universally’ affecting each industry and sector.*
- *Specific areas to watch out for:*
- *climate service providers*
- *ICTs specifically – digital monitors/conveyance, data and data processing and modelling*
- *Opportunities in developing countries: public money available, poorly articulated projects/investments, however.*

Joumana Asso, Clima Capital

Shortly after the COP, we conducted a conference call interview with Ms. Asso, the Managing Director of Clima Capital Partners, a Washington, D.C.-based consultancy that structures investment funds, financing facilities, and project financing in the climate mitigation space. We sought out Ms. Asso based on her interest in the VRC concept and for her expertise in carbon credit funding to solicit her opinion and advice on how the financing structures in the carbon space could be extended to adaptation finance (or how advisable this might be), with specific attention to the goal of funding and structuring a Côte d'Ivoire VRC Fund.

Annex IV – External Documents and Files

- File: Data request forms and data provided by ministries and cooperatives
- Terms of Reference for 11 March Atelier, including attendee list
- Survey on Finance Mechanism (in English and French)
- Survey responses

All available upon request

Endnotes

ⁱ UNFCCC. (2017). *Paris Agreement*. UNFCCC.

ⁱⁱ Yao, M., and Daubrey, M. (2019), “Feasibility study on the establishment of a national climate agency coupled with a national climate fund in Côte d’Ivoire.”

ⁱⁱⁱ Green Climate Fund (2018), “Readiness and Preparatory Support Proposal for Côte d’Ivoire.”

^{iv} Higher Ground Foundation and Makerere University Centre for Climate Change Research and Innovations (MUCCRI) (2018), Proposal to International Development Research Centre for Cultivate Africa’s Future Fund (CultiAF) grant.

^v This was highlighted, for example, at the GCF-GEF Side Event at COP26: “Adaptation: From Readiness to transformational programmes – The Green Climate Fund delivering action on climate change” (8 November 2021)

^{vi} Côte d’Ivoire National Development Plan 2021-25 (website):

https://www.gouv.ci/_grandossier.php?recordID=263

^{vii} “NDC Côte d’Ivoire submission” (2022): https://unfccc.int/sites/default/files/NDC/2022-06/CDN_CIV_2022.pdf

^{viii} Ibid., pg. 20.

^{ix} Ibid. pp 21-22.

^x YAO.N.R, Oule.A.F, Kouadio.N.B (2013). “Study of the vulnerability of the agricultural sector to climate change in Côte d’Ivoire.”

^{xi} World Bank (2019), “Climate-Smart Agriculture Investment Plan in Côte d’Ivoire”

^{xii} Ibid.

^{xiii} World Bank. “So Tomorrow Never Dies.” (2018). URL: <https://www.worldbank.org/en/country/cotedivoire/publication/cote-d-ivoire-economic-update-so-tomorrow-never-dies-key-messages>

^{xiv} Ministere de l’Environnement, de la Salubrité Urbaine et du Développement Durable, Direction Générale De L’environnement, Programme National Changement Climatique (PNCC). Page 32.

^{xv} See, for example, NAP Global Network poster (2018). “Côte d’Ivoire National Adaptation Plan (NAP) Vision” <https://napglobalnetwork.org/wp-content/uploads/2018/02/napgn-en-2019-cote-divoire-nap-process-poster.pdf>

^{xvi} Ibid.

^{xvii} See for example Higher Ground Foundation (2019): “Constructing a contingent valuation database for climate adaptation cost-benefit purposes”

https://www.thehighergroundfoundation.org/_files/ugd/d5a514_32a559380748482b914412f09e6daab5.pdf

^{xviii} World Bank database (2022): <https://data.worldbank.org/country/CI>

^{xix} MINAGRI Communication (2014): “Climate-Smart Agriculture in Côte d’Ivoire: inventory and support needs to better integrate Climate-Smart Agriculture (CSA) into the National Agricultural Investment Program (PNIA)”

^{xx} Louis-Dreyfus Foundation (2021), “Developing sustainable rice value chain in Côte d’Ivoire”:

<https://www.louisdreyfusfoundation.org/news/developing-sustainable-rice-value-chain-cote-divoire#:~:text=Although%20rice%20is%20a%20staple,of%20competitiveness%20against%20imported%20rice>

^{xxi} Pepijn A. J. van Oort and Sander J. Zwart (2018), “Impacts of climate change on rice production in Africa and causes of simulated yield changes,” *Global Change Biology* 24(3): 1029–1045.

^{xxii} World Bank (2019), “Climate-Smart Agriculture Investment Plan in Côte d’Ivoire”

^{xxiii} Ibid.

^{xxiv} FAO (2017), “The impact of climate change on rice production in Ivory Coast, a challenge faced by smallholder farmers” (issued under *Adapting irrigation to climate change (AICCA)*), <https://www.fao.org/in-action/aicca/news/detail-events/en/c/878311/>

^{xxv} See notes from CORPORIZ meeting of 5 Mar 2022: Factors reported as contributing loss were “high temperatures, poorness of soil, price of fertilizer increasing, new insects eating crops, new birds eating crops, lack of water.” lack

^{xxvi} Brou YT, N’Goran JAK, Bigot S, Servat E (2003). “Climate risk and agricultural production in Côte d’Ivoire: effect of rainfall variations on cocoa production”. In: *Proceedings of the 14th international conference on cocoa research*. Accra, Ghana, October 18-23, 2003, p. 259-267.

^{xxvii} Boni Dian (1978). *Geographical aspects of the coffee and cocoa binomial in the Ivorian economy*, Abidjan: Nouvelles éditions africaines.

^{xxviii} Koissy, Yao Vianney Auriol, and N’Zué, Felix Fofana. (2020), “Climate Change and Cocoa Production in Côte d’Ivoire: Should we Worry? In: *Journal of Economics and Business*, Vol.3, No.2, 965-979.

^{xxix} Refer to notes on the 11 March 2022 discussion with FAO and the 7 March meeting with COASI for details

^{xxx} Refer to notes on 11 March 2022 discussion with FAO

^{xxxi} For details, refer to notes on 5 March meeting with ICRAF and 7 March 2022 meeting with COASI

^{xxxii}

^{xxxiii}

^{xxxiv}

^{xxxv} For a discussion of the concept of universal metrics (or “indicators”) in adaptation and their applicability and limitations, see UNEP DTE (2019). “Adaptation metrics: current landscape and evolving practices.”

^{xxxvi} Vulnerability Reduction Credits (VRCs) Standard Framework:

https://www.thehighergroundfoundation.org/_files/ugd/d5a514_047c98f8ca7f47d4a34dad26964c4d42.pdf

^{xxxvii} For the full templates, refer to Annexes I and J (“VRC Methodology Template” and “VRC Project Template”) of *Vulnerability Reduction Credits (VRCs) Standard Framework*

^{xxxviii} For further information, see the section “Event at the Ivorian Pavilion” in the interim report *COP26: Lessons Learned*, which is included as Annex III to this report.

^{xxxix} See Section 4.7 “Confidence in Avoided Impact Calculation Validity,” *Vulnerability Reduction Credits (VRCs) Standard Framework*, March 2018

^{x^l} See, for example, Schultz and Adler (2017), “Addressing Climate Change Impacts in the Sahel Using Vulnerability Reduction Credits,” in *Green Energy and Technology*.

^{x^li} Ibid.: For the modelled project in a sub-Saharan lesser developed country (pg. 18), this was estimated to be as low as 1.82 EUR/VRC.

^{x^lii} PNCC, 2014. National Climate Change Strategy Document (2015-2020)

^{x^liii} Marcel and Daubrey.

^{x^liv} Ibid., p. 23.

^I IPCC 2007

^{x^lv} https://ms-my.facebook.com/AfDBGGroup/videos/cop26-introduction-to-the-abm-and-presentation-of-the-2021-annual-report-of-the-/639473083720858/?__so__=permalink&__rv__=related_videos

^{x^lvi} World Bank. 2021. State and Trends of Carbon Pricing 2021. Washington, DC: World Bank. © World Bank.

<https://openknowledge.worldbank.org/handle/10986/35620> License: CC BY 3.0 IGO.

^{x^lvii} <https://www.reuters.com/article/us-europe-carbon-idUSKBN29W1HR>

^{x^lviii} Climate Policy Initiative. 2021. Global Landscape of Climate Finance 2021.

^{x^lix} See <https://www.gcca.eu/programmes/bangladesh-climate-change-resilience-fund-bccrf>

^{II} <https://www.thehighergroundfoundation.org/partners>

^{III} The survey questions (English) can be found at <https://us14.listmanage.com/survey?u=5fce351ce0583fad77c189776&id=adaf11c720&attribution=false>; a French version was also made available. Survey responses were limited (1 respondent) and available upon request.

^{III^l} Global Support Programme webpage, “Supporting Ivory Coast To Advance Their NAP Process”:

<https://www.globalsupportprogramme.org/projects/supporting-ivory-coast-advance-their-nap-process>

^{IV} UNDP (2020), “Rôles et responsabilités des acteurs concernés ou impliqués dans l’adaptation aux changements climatiques en Côte d’Ivoire” (Roles And Responsibilities Of All Actors Concerned Or Involved In Climate Change Adaptation (CCA) In Cote D’Ivoire).

^{IV^l} Marcel and Daubrey.

^{IVⁱⁱ} Ibid., p. 37.

^{IV^{vi}} UNDP (2020): adapted by the authors from Table VI.

^{IV^{viii}} Ibid., p. 39.

^{IV^{ix}} For further information on the limitations of single-metric adaptation MRV, see OECD (2021), “Monitoring, evaluation and learning for climate risk management,” *Development Cooperation Working Papers* (92).

^{IV^x} As acknowledged in particular by the GCF itself; see in particular Andreas Reumann, whose 8 November presentation at the GCF-GEF Pavilion outlined the bottlenecks in the approval process:

https://www.youtube.com/watch?v=rF_oA7rRm5w&ab_channel=GreenClimateFund

^{IV^{xi}} BBC News website, 9 August 2021: ‘Climate change: IPCC report is ‘code red for humanity’, <https://www.bbc.co.uk/news/science-environment-58130705>, accessed 23 November 2021.

^{IV^{xii}} See, for instance, “Adaptation Fund Raises Record US\$ 356 Million in New Pledges at COP26 for its Concrete Actions to Most Vulnerable,” at <https://www.adaptation-fund.org/adaptation-fund-raises-record-us-356-million-in-new-pledges-at-cop26-for-its-concrete-actions-to-most-vulnerable/> and “Donors pledge \$413 million to help most vulnerable cope with climate crisis” at <https://www.thegef.org/news/donors-pledge-413-million-help-most-vulnerable-cope-climate-crisis>, both accessed 23 November 2021.

^{lxiii} Carbon Brief: <https://www.carbonbrief.org/cop26-key-outcomes-agreed-at-the-un-climate-talks-in-glasgow>
accessed 17 November 2021

^{lxiv} Ibid.