



ADAPTATION FUND

AFB/PPRC.32/Inf.2
18 September 2023

Adaptation Fund Board
Project and Programme Review Committee
Thirty-second Meeting
Bonn, Germany, 10-11 October 2023

PROPOSAL FOR RWANDA



ADAPTATION FUND

ADAPTATION FUND BOARD SECRETARIAT TECHNICAL REVIEW OF PROJECT/PROGRAMME PROPOSAL

PROJECT/PROGRAMME CATEGORY: Regular Size Full Proposal

Country/Region: Rwanda

Project Title: Enhancing adaptation through sustainable green settlements and climate-resilient livelihoods in the Volcano Region of Rwanda

Thematic Focal Area:

Implementing Entity: Ministry of Environment

Executing Entities: Rwanda Development Board

AF Project ID: AF00000349

IE Project ID:

Requested Financing from Adaptation Fund (US Dollars): 9,977,555

Reviewer and contact person: Dirk Lamberts

Co-reviewer(s): Mia Callenberg

IE Contact Person: Diane Bucyana

Technical Summary

The project “Enhancing adaptation through sustainable green settlements and climate-resilient livelihoods in the Volcano Region of Rwanda” aims to enhance climate resilience in the northern Rwanda through reducing vulnerability of local people to climate change impacts as well as improve households’ adaptive capacity through sustainable climate-resilient livelihoods. This will be done through the three components below:

Component 1: Resettling households living in high-risk zones to a smart green village (USD UNCLEAR);

Component 2: Transitioning from low to high value agriculture (USD UNCLEAR);

Component 3: Diversification of income generating activities/livelihoods (USD UNCLEAR).

Requested financing overview:

Project/Programme Execution Cost: USD UNCLEAR

Total Project/Programme Cost: USD UNCLEAR

Implementing Fee: USD UNCLEAR

Financing Requested: USD 9,977,555

	<p>The initial technical review raised several issues, such as the lack of adaptation rationale, the risk of maladaptation, and compliance with the ESP and GP, as is discussed in the number of Clarification Requests (CRs) and Corrective Action Requests (CAR) raised in the review.</p> <p>The second technical review found that most issues, such as the lack of adaptation rationale, the significant risk of maladaptation and issues with compliance with the ESP and GP, have not been cleared, and that essential information on the envisaged co-financing has been omitted. The proposal also needs to provide a comprehensive overview of the broader initiative of which it is part, with detailed information for all the parts relevant to the funding application.</p>
Date:	18 August 2023

Review Criteria	Questions	Comments Initial Technical Review	Comments Final Technical Review
Country Eligibility	1. Is the country party to the Kyoto Protocol or the Paris Agreement?	Yes.	-
	2. Is the country a developing country particularly vulnerable to the adverse effects of climate change?	Yes. The key vulnerabilities are related to the country's high population density, small average land holdings and changes to rainfall.	-
Project Eligibility	1. Has the designated government authority for the Adaptation Fund endorsed the project/programme?	Yes. As per the endorsement letter signed by the NDA on record and dated April 28 th , 2023.	-
	2. Does the length of the proposal amount to no more than One hundred (100) pages for the fully-developed project document, and one hundred (100) pages for its annexes?	No. The proposal consists of 111 pages, with a single one-page annex. CAR 1: Please adjust the proposal to comply with the page limitations.	Yes. CAR 1: Cleared.

	<p>3. Does the project / programme support concrete adaptation actions to assist the country in addressing adaptive capacity to the adverse effects of climate change and build in climate resilience?</p>	<p>No.</p> <p>The project's goal is financing the planned resettlement of 402 households as part of a larger resettlement plan related to the expansion of the Volcano National Park (VNP) and the further development of its associated high-end tourism industry. As such, the project does not envisage developing concrete adaptive capacity but to support further development of the tourism industry in a way unrelated to the climate change adaptation needs of the population involved. The claimed climate change adaptation benefits as proposed are marginal, and the climate change causality has not been demonstrated.</p> <p>Furthermore, there is no information suggesting that the project activities will lead to increased climate change adaptation capacity for those resettled. On the contrary, the proposed size of their replacement agriculture plots amounts to a reduction by 85 per cent of their average current holdings, to 0.1 ha (1,000 square meters) per household, thereby requiring a seven-fold increase in productivity and revenue to retain income and</p>	<p>No.</p> <p>CAR 2: Not cleared. The revised proposal does not describe the climate change adaptation needs for the households selected for resettlement as an adaptation measure, nor why resettlement is the only possible or preferred adaptation measure. The number of households envisaged to be resettled has increased to 510.</p>

		<p>sustenance at a comparable level. While currently precarious, the resettled lots will have no potential at all to sustain a household's livelihood. The proposed "Transitioning from low to high-value agriculture" in effect amounts to becoming suppliers of non-essential food ingredients and construction materials (bamboo) to the high-end tourism sector segment. The resulting dependency of this sole market potentially amounts to maladaptation, as the resettlers will have no possibility to resort to the subsistence agriculture-based livelihoods they traditionally practice as their productive lands will all but have gone. Recent shocks to the tourism industry – COVID-19, insecurity, inflation – have further demonstrated the fragility of such a dependency.</p> <p>There is no information that alternative climate change adaptation measures other than resettlement have been considered, or would not be feasible or effective.</p> <p>CAR 2: Please demonstrate the climate change adaptation rationale for the resettlement of the 402 households identified and demonstrate why the only</p>	
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		<p>considered adaptation option of resettlement is the most indicated one.</p>	
	<p>4. Does the project / programme provide economic, social and environmental benefits, particularly to vulnerable communities, including gender considerations, while avoiding or mitigating negative impacts, in compliance with the Environmental and Social Policy and Gender Policy of the Fund?</p>	<p>Unclear.</p> <p>All the benefits that the project intends to generate are directly linked to and dependent on the successful resettlement of the 402 households and the development of alternative livelihoods.</p> <p>The proposal includes no information on the risks or impacts on the stakeholders of the area to which the resettlement will take place. This might involve additional involuntary resettlement as well. Considering the high population density, all available land suitable for human settlement and agriculture must have been occupied. To accommodate over 400 households and their replacement land certainly must affect current land use, ownership and livelihoods.</p> <p>The proposal mentions no environmental or social benefits to the area vacated by the resettled households.</p> <p>Several of the project benefits mentioned are minor or only</p>	<p>Unclear.</p> <p>CR 1: Not cleared. The proposal refers to a resettlement action plan but no specific information is provided. Limited government support is announced for the first year following resettlement.</p> <p>CR 2: Not cleared. The additional information provided does not explain e.g. the benefits to the farmers who will lose (access to) their farming land to accommodate the resettlement. It is unclear how or if they will benefit from the infrastructure that will be built in the resettlement.</p> <p>CAR 3: Not cleared. The proposal includes a summary of a gender assessment that was carried out. However, the outputs considered in that gender assessment differ from those of the proposed project.</p> <p>CR 3: Not cleared. The details provided (p. 46-47) on the gender considerations in the</p>

		<p>marginally or indirectly related to project activities.</p> <p>There is no information on why resettlement would be required to generate the benefits the project intends to deliver. It appears that most of the activities of components 2 and 3 could also be organized in the current location of the 402 households, and some perhaps even more effectively. It is unclear if the alternative livelihoods will be sufficiently successful to provide economic and social benefits to the resettlers. There is no information on support to the resettled households during the period until the alternative livelihoods will have been sustainably established. The proposal seems not to take into account the additional burden and vulnerability that is imposed on those households through the loss of so much of their livelihoods assets as a consequence of the resettlement.</p> <p>CR 1: The proposal should clearly demonstrate how the loss of livelihoods assets due to their resettlement is fully compensated and complemented with greatly improved livelihoods.</p>	<p>project design are not specific to the proposal.</p>
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		<p>CR 2: The proposal should provide a comprehensive overview of the economic, social and environmental benefits that it intends to generate, particularly to vulnerable communities.</p> <p>The proposal includes no references to a gender analysis or gender assessment that would have been carried out during project formulation.</p> <p>CAR 3: Please include at least a summary of the gender assessment that was carried out and provide substantive information as an annex to the proposal.</p> <p>CR 3: Please clarify how gender considerations were integrated in the project design, both from the perspective of not exacerbating risks of gender inequality but also of promoting gender equality and women’s empowerment.</p>	
	<p>5. Is the project / programme cost effective?</p>	<p>Unclear.</p> <p>The demonstration of the cost effectiveness of the project is limited to a statement that the adaptation benefits “<i>are worth the investment</i>” (p. 55). Part II.C provides a discussion on cost effectiveness against no action. No</p>	<p>No.</p> <p>CAR 4: Not cleared. Additional information provided (p. 36) states that the high-end estimate cost of the alternative adaptation measure of terraces rehabilitation is USD 2,227 per ha, which, at an average household</p>

		<p>detailed cost effectiveness analysis, or comparison against other options, has been provided.</p> <p>The high cost per person for the resettlement of households is noted in the proposal. 82% of the AF project cost is proposed for this component, which merits a more elaborate analysis of why this would be the most effective use of AF funding. The cost effectiveness analysis of the resettlement should demonstrate that this is the preferred option over other possible climate adaptation interventions such as drainage improvement.</p> <p>The cost effectiveness arguments presented take into account concrete benefits for 27,000 people, i.e. the entire Kinigi population. This is not a reflection of the proposed activities.</p> <p>CAR 4: Please include a relevant analysis of the cost effectiveness of the proposed interventions.</p>	<p>land holding of 0.7 ha, and at 135 households to be resettled, amounts to USD 210,452, compared to the requested funding of USD 5.67 million for re-housing alone of the 135 households.</p> <p>The cost benefit analysis included provides no information on the underlying assumptions other than on the discount rates.</p> <p>The proposal contains no elements demonstrating cost effectiveness.</p>
	<p>6. Is the project / programme consistent with national or sub-national sustainable development strategies, national or sub-national development plans, poverty reduction strategies, national</p>	<p>Unclear.</p> <p>The project seems aligned with the mentioned national and sub-national strategies, including the Rwanda Green Growth and Climate Resilient Strategy and the Musanze</p>	<p>Yes.</p> <p>CR 4: Cleared.</p>

	<p>communications and adaptation programs of action and other relevant instruments?</p>	<p>district development strategy. However, p. 60: “<i>The management of floods affecting the Volcano Region, as is envisaged under this project, is explicitly mentioned as one of the strategic interventions under the 7th priority area of the [National strategy for Transformation] NST1, entitled Sustainable Management of Natural Resources and Environment to Transition Rwanda towards a Green Economy. The strategic intervention aims at managing water flows from the Volcano Region and other rivers to mitigate related disasters and improve water resources management in the four districts that make up the Volcano Region.</i>” (reviewer’s bold font). This high-level policy aspect that determines flow management for disaster mitigation is entirely absent from this project.</p> <p>CR 4: Please clarify how the project approach aligns with the NST1 “<i>which is a high-level planning policy that frames the country’s subsequent local government and sector plans and includes specific projects or actions along three pillars for economic, social and governance transformation</i>” (p. 59).</p>	
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	<p>7. Does the project / programme meet the relevant national technical standards, where applicable, in compliance with the Environmental and Social Policy of the Fund?</p>	<p>Unclear.</p> <p>The relevant section of the proposal is mostly focused on related policies without relevance to national technical standards. Only a reference to the Building Code provides information on national technical standards. Other relevant standards – such as on food quality, agriculture produce etc. – are lacking.</p> <p>CAR 5: Please clarify which the national technical standards are that apply to any of the project activities and demonstrate how the project will meet these.</p>	<p>Unclear.</p> <p>CAR 5: Not cleared. Compliance with standards relevant to the resettlement and use of fertilizer has been clarified. The livelihoods development activities are not restricted to farming, and the proposal includes no process to ensure that supported livelihoods development activities meet applicable standards not already mentioned.</p>
	<p>8. Is there duplication of project / programme with other funding sources?</p>	<p>Unclear.</p> <p>The proposal does not mention the USD 50 million World Bank/IDA Volcanoes Community Resilience Project (VCRP) investment, similar in geographical and thematic scope to the proposal.</p> <p>CR 5: The proposal should demonstrate that it is not duplicating work under the VCRP project and show how both projects complement each other.</p>	<p>Unclear.</p> <p>CR 5: Not Cleared. The response sheet states (p. 12-13) that “The proposal demonstrate that it is not duplicating work under the VCRP but it is a component of it.” This new information places the whole approach in a different perspective, with broad and unstated implications across this funding proposal. The proposal should provide a full overview of the larger initiative of which it appears to be part – the expansion of the VNP – including sources of financing, parallel activities and</p>

			measures for the management of environmental and social risks.
	<p>9. Does the project / programme have a learning and knowledge management component to capture and feedback lessons?</p>	<p>Yes.</p> <p>However, the lessons learning component is aspecific, and does not identify which lessons are expected to be learned. It is not part of any of the project components, and it is unclear how this aspect will be funded.</p> <p>CR 6: Please clarify the learning and knowledge management component of the project, with relevant funding, outcomes and outputs identified.</p> <p>A main related aspect is the proposed knowledge management database.</p> <p>CR 7: Please clarify how the knowledge management database will operate, how it will link to other, similar projects in Rwanda, who the target audience is, and how it relates to the proposed Village Knowledge hub.</p>	<p>Yes.</p> <p>CR 6: Not cleared. The additional information provided in the relevant section suggests that funding for knowledge management is not included and may be provided as co-financing, possibly as part of the VCRP project of which it is a component.</p> <p>CR 7: Not cleared. The only clarification provided on the database is that the data collection will be coherent with that of the VCRP project.</p>
	<p>10. Has a consultative process taken place, and has it involved all key stakeholders, and vulnerable groups, including gender considerations in compliance with the</p>	<p>Unclear.</p> <p>On p. 72, the proposal states: <i>“Moreover, local communities residing in Nyabigoma Cell to be relocated from precarious</i></p>	<p>CR 8: Not Cleared. Additional information on stakeholders consultations has been included. It remains unclear how wide the scope of the</p>

	<p>Environmental and Social Policy and Gender Policy of the Fund?</p>	<p><i>conditions to a Smart Green Village have been consulted. Research methods such as focus group discussions (FGDs) and a quantitative survey were utilized to assess beneficiaries' economic status, understand their fears and concerns about the project interventions, and their preferences for solutions".</i> Community consultations as reported seem to have been limited to data and information gathering activities rather than actual consultations on the proposed project activities. No information is provided on the outcome of the community consultations and how the project has taken those into consideration.</p> <p>CR 8: Please provide details on the outcomes of the consultations and how stakeholder opinions or feedback were addressed in the project design.</p>	<p>consultations were, and if the most relevant stakeholders were indeed consulted. There is e.g. no information on any consultations of the stakeholders who will lose access to their fields at the resettlement site. The proposal states that not all of the households intended to be resettled have been consulted.</p> <p>The information provided on the comments received suggest that the envisaged resettlement housing may be culturally or customarily inappropriate in a number of ways.</p>
	<p>11. Is the requested financing justified on the basis of full cost of adaptation reasoning?</p>	<p>No.</p> <p>The total project cost is USD 22 million, of which USD 12 million will be co-financing by the Government of Rwanda. There are no provisions for implementation costs in the AF funding requested. Those would come from co-financing. Achieving project objectives critically depends</p>	<p>No.</p> <p>Apart from the government contribution to the project execution costs, all quantitative information on co-financing has been removed from the proposal. The project objectives of resettling 510 households cannot be achieved without co-financing to the</p>

		<p>on co-financing. Without the co-financing by the Government of Rwanda, the project activities taken solely, will not be able to deliver the envisaged outcomes and outputs.</p> <p>Please also see CAR 2.</p> <p>CAR 6: Please justify the requested financing based on the full cost of adaptation reasoning, demonstrating that the project activities are relevant in addressing its adaptation objectives and that, taken solely, without additional funding from other donors, they will help achieve these objectives.</p>	<p>requested AF funding which would support resettlement of only 135 households.</p> <p>CAR 6: Not cleared.</p> <p>To appreciate if the requested financing is justified based on the full cost of adaptation reasoning, information is needed on the climate change adaptation needs of the targeted beneficiaries, and on how the project will meet these adaptation needs without requiring additional financing. From the proposal it is evident that the requested financing is part of a larger initiative but the information provided does not allow an adequate analysis.</p>
	12. Is the project / programme aligned with AF's results framework?	Yes.	-
	13. Has the sustainability of the project / programme outcomes been taken into account when designing the project?	<p>Unclear.</p> <p>The relevant section of the proposal includes a number of arguments such as alignment with national priorities that would ensure sustainability of the project outcomes. However, after the resettlement is carried out, there are no provisions for specific further government involvement with respect to sustaining the project</p>	<p>Unclear.</p> <p>CR 9: Not cleared.</p> <p>The proposal now states that the government will provide USD 120,000 to pilot the development of livelihood options in the first year.</p> <p>CR 10: Not cleared.</p> <p>No additional relevant information has been provided.</p>

		<p>outcomes. The sustainability of the outcomes of components 2 and 3 is ascribed to the use of an analytical tool during project design, without providing any details. The “strong emphasis on monitoring and evaluation” that is mentioned in support of sustainability is not reflected in the project budget, nor in the section on Monitoring and Evaluation Arrangements.</p> <p>CR 9: Please demonstrate the sustainability of the project outcomes, in particular those of components 2 and 3.</p> <p>The resettlement activities of Component 1 are comprehensive in the sense that they are (i) involuntary, (ii) involve physical relocation, (iii) remove the livelihoods base for most of the resettlers, (iv) offer no choice of alternative livelihood, and (v) have no provisions for livelihood guarantees should the activities of Component 2 and 3 not materialize, or not be successful, delayed or otherwise fail. Sustainability of the resettlement is further questionable by the lack of information about fair and adequate compensation for the loss of land and livelihoods. Small and precarious as they may be, current land holdings have long</p>	
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		<p>provided the basis for household food security and subsistence. These livelihoods assets are lost in the proposed resettlement and not replaced; on the contrary, external dependencies on e.g. markets development and tourism revenues are created. The proposal contains no provisions for income and food security guarantees during the transition to the resettlement.</p> <p>CR 10: Please also demonstrate the sustainability of the outcomes of component 1.</p>	
	<p>14. Does the project / programme provide an overview of environmental and social impacts / risks identified, in compliance with the Environmental and Social Policy and Gender Policy of the Fund?</p>	<p>No.</p> <p>The risks identification lacks substantiation for all principles. Where risks are identified, this is often not reflected in the risk identification table based on intended mitigation. For several principles, risks identification is announced but has not been carried out.</p> <p>CAR 7: Please identify environmental and social risks of the project in compliance with the AF ESP and GP.</p> <p>There is nothing in the proposal to suggest that a gender analysis and</p>	<p>No.</p> <p>CAR 7: Not cleared.</p> <p>CR 11: Cleared. However, please see also CAR 3 and CR 3.</p> <p>CAR 8: Not cleared. Projects/ programmes likely to have significant adverse environmental or social impacts that are for example diverse, widespread, and irreversible should be categorized as Category A. This means that the environmental and social assessment should assess all potential environmental and social risks and include a proposed risk management plan.</p>

		<p>a gender assessment were carried out.</p> <p>CR 11: Please provide information on the gender analysis and gender assessment that informed the risks identification.</p> <p>The proposal does not include a categorization for the project as required by the ESP. Considering the high inherent risks it should be not less than A.</p> <p>CAR 8: Please categorize the project in terms of environmental and social risks.</p> <p>Since the co-financed activities are essential for the achievement of the AF-funded outcomes, and both are indistinguishably integrated, the AF ESP and GP applies to all the project activities, including those funded from other sources.</p> <p>CR 12: Please clarify how the co-financed activities will comply with the AF ESP and GP.</p>	<p>CR 12: Not cleared.</p> <p>In addition to the issues raised during the initial review, the proposal should clearly identify the associated environmental and social risks of its activities, and in particular those related to resettlement – of both the beneficiaries and the farmers on whose fields resettlement will take place –, marginalized and vulnerable groups, indigenous peoples, protection of natural habitats, and physical and cultural heritage.</p> <p>The proposal should provide a comprehensive overview of the broader initiative of which it is part, with the identified sources of funding, and with a comprehensive identification of the associated environmental and social risks, and the corresponding management arrangements.</p>
Resource Availability	1. Is the requested project / programme funding within the cap of the country?	Yes.	-
	2. Is the Implementing Entity Management Fee at or below 8.5 per cent of the total	Yes.	Unclear.

	project/programme budget before the fee?	The funding request does not include an IE management fee. It is included as part of the co-financing. Please also see CAR 6.	There are now inconsistencies in the IE fee amount presented in different parts of the proposal.
	3. Are the Project/Programme Execution Costs at or below 9.5 per cent of the total project/programme budget (including the fee)?	<p>Unclear.</p> <p>The execution costs included for AF funding amount to 7.5 per cent of that funding. An equal amount is listed as co-financed execution cost. Proportionally, the execution costs for the AF-funded activities are higher.</p> <p>CR 13: Please clarify the execution costs.</p>	<p>Unclear.</p> <p>There are now inconsistencies in the Execution Costs amount presented in different parts of the proposal.</p> <p>CR 13: Not cleared.</p>
Eligibility of IE	1. Is the project/programme submitted through an eligible Implementing Entity that has been accredited by the Board?	Yes.	-
Implementation Arrangements	1. Is there adequate arrangement for project / programme management, in compliance with the Gender Policy of the Fund?	<p>Unclear.</p> <p>The proposal provides no information on how the IE will carry out its role of providing oversight and ensuring timely and adequate implementation of the project. There are no provisions for the management or coordination of the co-financed activities.</p> <p>The EE is the Rwanda Development Bank (RDB), which according to the proposal has a</p>	<p>Unclear.</p> <p>The initial submission mentioned both the Rwanda Development Bank and the Rwanda Development Board as executing entity. The current submission no longer mentions the Rwanda Development Bank.</p> <p>CR 14: no longer relevant.</p> <p>The proposal still provides no information on how the IE will carry</p>

		<p>remit “to promote economic development through managing, conserving, and improving the integrity of ecosystems so as to active environmental and tourism sustainability in the country. This includes wildlife protected areas – Volcanoes national park, Akagera national park and Nyungwe national park, reserves and sanctuaries lakes, rivers and swamps.” (p. 84). The RDB website does not mention any of these environmental aspects in its mission, vision or areas of intervention, and presents as a regular national development bank (https://www.brd.rw/).</p> <p>CR 14: Please clarify the capabilities and expertise of the RDB with respect to the envisaged role in the execution of the project, as well as the arrangements for execution RDB would set in place.</p> <p>The project steering committee includes only government entities. There are no conservation partners, nor representatives of the direct stakeholders or civil society.</p> <p>CR 15: Please clarify how stakeholders other than government entities will be involved in the strategic management of the project.</p>	<p>out its role of providing oversight and ensuring timely and adequate implementation of the project, which on p. 75 is stated to be the responsibility of the EE. There are no provisions for the management or coordination of the co-financed activities.</p> <p>CR 15: Not cleared. Information on the Steering Committee has been deleted from the proposal altogether.</p>
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	<p>2. Are there measures for financial and project/programme risk management?</p>	<p>Unclear.</p> <p>The relevant section of the proposal discusses risks in generic terms and is in no respect specific to the project.</p> <p>CAR 9: Please include measures for financial and project risk management, clearly outlining the risks specific to the project and how these will be addressed.</p>	<p>Yes.</p> <p>CAR 9: Cleared.</p>
	<p>3. Are there measures in place for the management of for environmental and social risks, in line with the Environmental and Social Policy and Gender Policy of the Fund?</p>	<p>No.</p> <p>The environmental and social risks listed in this section are not aligned with those identified in II.K – problematic as these may be. The “Approach to managing environmental risks” (p. 90) is generic and very concise, and the same applies to the section on social risks (p. 91). The latter is exclusively addressing social risks of resettlement, none other. There is no information relevant to the project on specific measures or procedures for the management of environmental and social risks.</p> <p>All risks related to the resettlement are said to be addressed through the Government’s Resettlement Policy Framework.</p>	<p>No.</p> <p>CAR 10: Not cleared. Please also see CAR 7 and 8 and CR 11 and 12.</p>

		CAR 10: Please include measures for the management of environmental and social risks associated with the project, in line with the AF ESP and GP.	
	4. Is a budget on the Implementing Entity Management Fee use included?	No. CAR 11: Please include a breakdown of the Implementing Entity Management Fee.	No. CAR 11: Not cleared.
	5. Is an explanation and a breakdown of the execution costs included?	Yes. The execution costs include expenses related to monitoring and evaluation, which should be covered by the IE fee. CAR 12: Please adjust the execution and implementation fees.	Yes. CAR 12: Not Cleared. The previous execution and implementation fees have been adjusted, however, the execution costs now are presented for the entire project, including the co-financed parts. Half of that cost has been assigned to AF as execution cost. No justification for this distribution is provided, while the initial submission of the proposal included co-financing of 12 million USD, suggesting a disproportional allocation of execution expenses to the AF. In addition, in case the co-financing does not materialize, or is delayed, this may jeopardize the execution of

			AF-funded activities. Please also see above.
	6. Is a detailed budget including budget notes included?	<p>Yes.</p> <p>The budget figures are only broken down between AF-requested funding and co-financing for the totals for the whole duration of the project. The annual budget is only presented as the total for both sources of financing.</p> <p>CR 16: Please provide annual figures for the requested AF funding in the detailed budget.</p>	<p>No.</p> <p>CR 16: Not Cleared. The annual figures have been provided, however, there are now inconsistencies in the budgets provided, and between the description of the project and its components and the budgets. The detailed budget now includes an component 'Impact monitoring', comprised of the execution and implementation costs. There is no allocation for Component 3, which is included in section II.A of the proposal.</p> <p>Co-financing is no longer presented in the budget.</p> <p>The detailed budget does not include budget notes.</p>
	7. Are arrangements for monitoring and evaluation clearly defined, including budgeted M&E plans and sex-disaggregated data, targets and indicators, in compliance with the Gender Policy of the Fund?	<p>No.</p> <p>Information on monitoring and evaluations arrangements are limited to a single paragraph that is generic and not specific to the project (p. 93).</p> <p>CAR 13: Please include clearly defined arrangements for monitoring and evaluation, including</p>	<p>No.</p> <p>CAR 13: Not cleared. The limited additional information still lacks several essential elements such as baseline data that are reported to exist but that are not presented in the proposal. Please see also CAR 15.</p>

		budgeted M&E plans and sex-disaggregated data, targets and indicators.	
	8. Does the M&E Framework include a break-down of how implementing entity IE fees will be utilized in the supervision of the M&E function?	<p>No.</p> <p>The proposal does not include an M&E framework. The funding request does not include implementing entity fees. These are included in the overall budget to be financed by the Government of Rwanda co-financing.</p> <p>CAR 14: Please include a budgeted M&E Plan with breakdown of IE fees for supervision of M&E function.</p>	<p>No.</p> <p>CAR 14: Not cleared.</p>
	9. Does the project/programme's results framework align with the AF's results framework? Does it include at least one core outcome indicator from the Fund's results framework?	<p>No.</p> <p>The relevant section III.E of the proposal does not include a results framework but a brief description of the project theory of change.</p> <p>Section III.F presents a number of project indicators at different levels but does not include a results framework. One of the three project objectives is aligned with a core outcome indicator of the AF results framework. However, the amount listed includes co-financing, and not just AF funding.</p>	<p>No.</p> <p>CAR 15: not cleared.</p> <p>The targets that have been included are not gender-disaggregated and the core impact indicator "Number of beneficiaries including estimations for direct and indirect beneficiaries" is not included.</p>

		<p>The project result framework does not include the core impact indicator “Number of beneficiaries including estimations for direct and indirect beneficiaries”.</p> <p>CAR 15: Please include a results framework with realistic, quantified expected results with indicators and targets that are gender responsive and disaggregated by sex as appropriate.</p>	
	<p>10. Is a disbursement schedule with time-bound milestones included?</p>	<p>Yes.</p> <p>The proposal includes a disbursement schedule that includes time-bound milestones but it includes an error.</p> <p>CAR 16: Please correct the error in table 29.</p> <p>The disbursement schedule only includes disbursements by the AF. Considering the integrated co-financing, timely and sufficiently synchronized disbursement by the Government is required for efficient project implementation.</p> <p>CR 17: Please include a similar disbursement schedule for the government co-financing and clarify the financial arrangements for adequate and effective</p>	<p>Yes.</p> <p>CAR 16: Cleared.</p> <p>CR 17: Not cleared.</p>

		disbursement of funds from both sources.	
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REQUEST FOR PROJECT/PROGRAMME FUNDING FROM THE ADAPTATION FUND

The annexed form should be completed and transmitted to the Adaptation Fund Board Secretariat by email or fax.

Please type in the responses using the template provided. The instructions attached to the form provide guidance to filling out the template.

Please note that a project/programme must be fully prepared (i.e., fully appraised for feasibility) when the request is submitted. The final project/programme document resulting from the appraisal process should be attached to this request for funding.

Complete documentation should be sent to:

The Adaptation Fund Board Secretariat
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List of Acronyms

Acronym	Description	Acronym	Description
Adf	Adaptation Fund	GoR	Government of Rwanda
AfD	Agence Francaise de Developement	HH	Household
BCC-CSM2-MR	Beijing Climate Center - Climate System Model	HIV - AIDS	Human immunodeficiency virus - `acquired immune deficiency syndrome
CBTEs	Community based tourism enterprise	FONERWA	Fund for environment and natural resources for Rwanda
CC	Climate Change	GBV	Gender Based Violence
CDD	Community Driven Development	GCF	Green Climate Fund
CESM2	Community Earth System Model 2	GDP	Gross domestic product
CMCC-ESM2	Earth System Model 2	GEF	Global Environment Facility
CMIP6	Coupled Model Intercomparison Project Phase 6	GGCRS	Green Growth and Climate Resilient Strategy
DRC	Democratic Republic of Congo	FONERWA	Fund for environment and natural resources for Rwanda
DRS	Decision Review System	GBV	Gender Based Violence
ECD	Early Childhood Development	GCF	Green Climate Fund
EDP	Entrepreneurship Development Policy	GDP	Gross domestic product
EDPRS	Economic Development and Poverty Reduction Strategy	ESIA	Environmental and Social Impact Assessment
EHS	Environmental health and safety	FDA	Food and Drug Authority
EICV	Integrated Household Living Conditions Survey	FEWS	Flood Early Warning System
ENR	Environment and Natural Resources	FGDs	Focus Group Discussion
ENSO	El Niño Southern Oscillation	FMCGs	Fast-moving consumer goods
GHG	Greenhouse Gases		
GIS	Geographic Information System		

PROJECT/PROGRAMME PROPOSAL TO THE ADAPTATION FUND

PART I: PROJECT/PROGRAMME INFORMATION

Project/Programme Category:	Regular project
Country/ies:	Rwanda
Title of Project/Programme:	Enhancing adaptation through sustainable green settlements and climate-resilient livelihoods in the Volcano Region of Rwanda
Type of Implementing Entity:	National Implementing Entity
Implementing Entity:	Ministry of Environment
Executing Entity/ies:	Rwanda Development Board
Amount of Financing Requested:	USD 9,977,555

1 PROJECT BACKGROUND AND CONTEXT

1.1 National Context and Project Rationale

With a population of nearly 13 million and a land size of 26,338 km², Rwanda has one of the highest population densities in the world, at about 493 people/km². Despite land scarcity, rain-fed subsistence agriculture was only recently eclipsed by the services sector as the predominant sector of the economy, contributing about 23% of gross domestic product (GDP). GDP reached USD 1,004 per capita in 2022.¹

The Volcano Region in Rwanda is home to over 1.4 million people spread across 4 districts in the north-west of the country: Burera, Nyabihu, Rubavu and Musanze. It is one of the most climate-sensitive regions in the country due to soil instability, construction in flood prone areas, high rainfall and the steep hills which are a source of heavy runoff. The natural drainage network is composed of a few permanent rivers and intermittent seasonal streams originating from the volcanoes, responsible for most of the floods observed in the area. A combination of the high rainfall and steep topography, as well as the predominance of a volcanic rock formation, leads to a situation whereby almost all rainfall is converted into direct run off due to very limited infiltration capacity of the soil. The high population density in the area implies that there is significant exposure of the local population to flooding events. The region has experienced major floods causing fatalities, infrastructure, and crop damage. The previous loss estimates vary from USD4 million to USD22 million per event in the Volcano Region;

With no improvements in the drainage systems, future climate change is likely to lead to increased risks. The overall amount of precipitation is forecast to increase, and the number of heavy rainfall days, or intensity of rainfall, may increase, raising the potential risks of floods, landslides, and soil erosion. This could mean that current flooding and landslides that occur in the western areas will likely continue and could increase in future. The projected impacts of climate change are potentially undermining food security, health, and economic growth. Climate change scenarios foresee a significant increase in rainfall and the number of rainy days in the north-west highlands, particularly during the two wet seasons, which may make the seasonal streams a

¹ National Institute of Statistics of Rwanda, retrieved online at <https://www.statistics.gov.rw> on 2022-01-13.

constant supply of water. Extreme rainfall events with a significant risk of flooding are expected to see a “robust increase” under the CMIP6 SSP2-4.5 scenario.

Recognizing the urgent need for adaptive interventions, the National Strategy for Transformation (NST1) has prioritized an integrated climate adaptation and economic transformation initiative. The objective of this project is to strengthen climate resilience, reduce the risks of flooding, and improve the management of natural resources and tourism assets in the Volcanoes Region of Rwanda. To mitigate the impacts of future flooding episodes, soil erosion and landslides leading to more destruction in the region, the project will implement interventions in two main areas:

1. Reducing exposure to the climate hazard

Due to the geophysical make-up of the Volcano Region, with steep slopes and friable soils in combination with intense seasonal rainfall, the region is inherently susceptible to environmental disasters. The high population density and extreme poverty in the region imply that the land is intensively cultivated but without due regard for the geophysical risk of disasters, which are predominantly expressed through landslides and flooding. Geophysical disasters lead to economic losses at different levels: damage in infrastructure, crops and livestock; disruption of the economic system in communities where people were displaced; fiscal transfer to disaster response and crowding out of other functions as manpower is concentrated on disaster response rather than productive activities following a disaster. The National Risk Atlas of Rwanda (MIDEMAR, 2015) identified problems as mainly due to the topography of the area, extension of agricultural activities on steep soil that were previously covered by natural vegetation, population growth, and lack of adequate soil erosion control measures. The landslide hazard assessment revealed that about 3.34% of the total population are exposed to a landslide at very high susceptibility with higher likelihood of hazard are mostly located in the Volcano Region. In 2018 in the four districts, 5,000 households (25,000 people) were affected by floods, of which 4,750 people from 950 households were directly affected. With the predicted increase in intense rainfall events as a result of climate change, the intensity of flooding may be expected to increase as well, with its concomitant impacts on the local population.

- **The project will reduce the exposure through relocation of community in high risk zone to integrated climate resilient green settlements with Green homes:** structurally sound seismically safe homes, built with locally sourced materials, with passive ventilation, climate-smart responsive building siting/orientation, following latest Rwanda Building Code standards; **Smart Green infrastructure:** water collection and recycling/reuse in homes and farmland, access to affordable and sustainable electricity such as solar, all units provided with clean water supply, zero-energy waterless composting toilets with waste revalorization with outputs of solid fertilizer as well as Nitrogen-rich liquid fertilizer, promoting waste to resources and a circular economy approach.

2. Reducing the vulnerability of the local population

The rural population in the Volcano Region is among the poorest in the country. The predominant economic activity is subsistence agriculture, particularly when farming is practiced on the steep slopes. The local population is highly vulnerable to climate hazards, given that a single loss of a crop can make a family destitute. More than 86% of interviewed households mentioned that it has been raining more compared to 10 years ago. About 40% expressed that the rainfall variability is much more intense. Most households to be relocated reported that have been negatively impacted by this rainfall variability.

- **To address this challenge, this project will enable relocated households and host communities** to have access to the greenhouse technology to cultivate horticulture products (i.e vegetables, fruit etc) on a large scale and in good conditions, which will

enable them to supply their produce to hotels in the Kinigi sector and beyond. With greenhouse farming, farmers will be able to reduce the effects of unfavorable weather conditions such as high temperature, strong winds, heavy rainfall, hailstorms and as well as pests and diseases on crops, hence leading to increased yield. They will have the ability to grow crops all year round with irrigation instead of depending on the two annual rain seasons.

- **This will be complimented by diversification of income generating activities/livelihoods** : In addition to modernizing the agriculture sector, there is a need to empower communities to have alternative sources of income. Since most people in the Volcano Region have no primary education let alone secondary education and have not received vocational training, the majority is doing work in subsistence agriculture, especially in rural areas. This information highlights the need to build people’s capacity in off-farm skills by creating spaces that enable the population to acquire technical skills that can help them transition to an off-farm economy. The aim will be to create new business opportunities for relocated households and surrounding communities all that is aimed at increasing resilience to economic, social, and climatic shocks.

In combination, these two main lines of intervention are expected to enhance climate resilience in the northern Rwanda through reducing vulnerability of local people to climate change impacts as well as improve households’ adaptative capacity through sustainable climate-resilient livelihoods. The importance of which was recently (5th May 2023) demonstrated by the floods that hit the country leading to the death of 153 people (59 from the volcano region), the loss 2,740 houses (1,984 from the volcano region) and hundreds of acres of agricultural land².

Funding for the above interventions is expected to be sourced from a variety of sources. The government has identified 510 (AF funding 135) households that need to be relocated away from at risk areas and is working with a number of partners (AdF, GCF, and World Bank) to finance this relocation and livelihoods enhancement programme. This proposal to the AdF seeks funding for interventions that would support climate adaptation of 135 households. The Government of Rwanda will contribute both financial resources and in-kind contribution of land on which the green villages are to be located. The Green Climate Fund has been requested to fund infrastructural improvements in the region – especially to reduce the risk of flooding and landslides – as well as improvements in land management.

The Adaptation Fund's support for this project is an investment in sustainable and resilient futures for Rwanda's vulnerable communities, with the potential to provide (i) a blueprint for the wider process; (ii) shape GoR climate adaptation strategies and (iii) inform other regions grappling with similar climate change impacts worldwide. By supporting the pilot phase, the fund will contribute to critical learnings and improvements for the larger project's subsequent phases, influencing national climate adaptation strategies, optimizing outcomes for affected communities, and ensuring the effective utilization of scarce climate resources.

This project is in essence an upscaling of a previously approved project called “**Reducing Vulnerability to Climate Change in North-West Rwanda Through Community-Based Adaptation**”, but now extended to cover all four districts of the Volcano Region. This proposal is informed by the terminal evaluation of the earlier project, and part of a larger effort to reduce risks to investments in the regional hydrology and land use improvements. Overall, the investments

² MINEMA (2023) Disaster Effects Situation Report From 3 To 22 May 2023. Retrieved online at <https://www.minema.gov.rw/publications> on the 10-7-2023

are expected to lead to a significant reduction in the exposure and vulnerability of the local communities to climate change.

This proposal – in contrast to the previously approved project – has benefitted from recent extensive studies³. The interventions of the project are based on climate change forecasts using a multi-model CMIP6 ensemble, the most current generation of climate change forecasts. A very detailed hydrological study of the region, producing detailed maps of flooding risk both under current climatological conditions and with incorporation of climate change forecasts, underpins the selection of households that will be relocated to the green villages that the project will construct.

1.2 The Volcano Region

1.2.1 1.1.1 Location

Rwanda is part of the western arm of the East African Rift System, the Western Rift, also called the Albertine Rift. The Western Rift is border by some of the highest mountains in Africa, including the Virunga Mountains in the Volcano Region. The geology of Rwanda consists of granite, migmatites, gneisses and micaschists of the Paleoproterozoic Ruzizian basement overlain by the Mesoproterozoic Kibaran Belt. The Kibaran, composed of folded and metamorphosed sediments, mainly schists and quartzites intruded by granites, covers most of Rwanda. Cenozoic to Recent volcanic rocks occur in the northwest and southwest. Some of these volcanoes are highly alkaline and are extensions from the Birunga volcanic area of southwestern Uganda (Rutagarama and Uhorakeye, 2010).

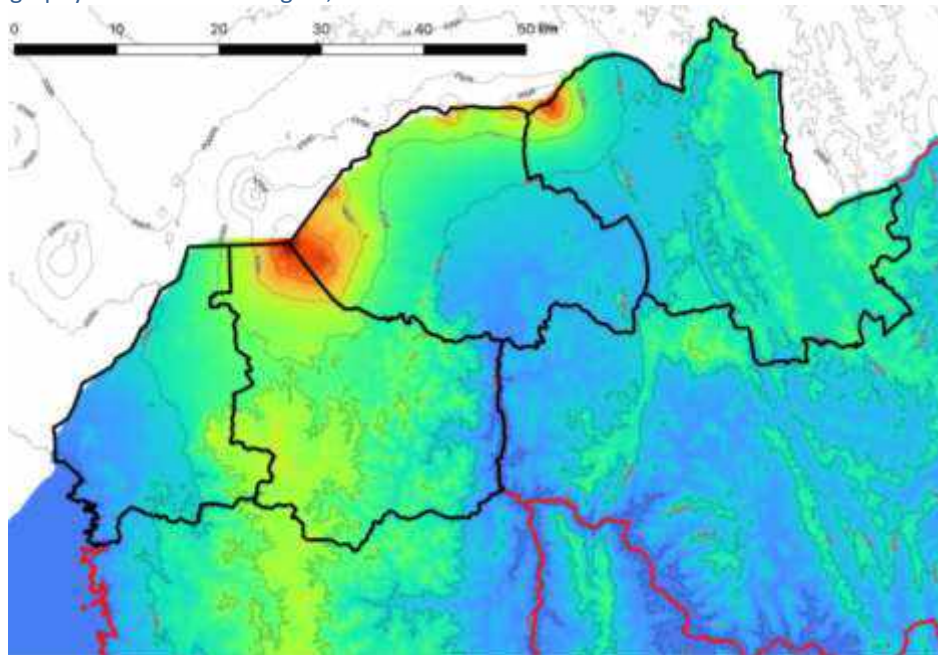
The Volcano Region in Rwanda is home to over 1.4 million people spread across 4 districts in the north-west of the country: Burera, Nyabihu, Rubavu and Musanze. The world-renowned Volcanoes National Park (VNP) is located on the higher reaches of the volcanoes in the region. The VNP is home to many endangered and endemic species, the most iconic of which is the eastern mountain gorilla (*Gorilla beringei beringei*). About 50% of the global population of eastern mountain gorillas live in the VNP, with the species being listed as endangered by IUCN. The VNP is bordering on the Virunga National Park in the DRC and the Mgahinga National Park in Uganda. The Government of Rwanda is planning to extend the VNP with surrounding areas to create a more viable landscape for the survival of endangered species.

The topography of the Volcano Region is dominated by tall volcanoes on the border and otherwise the terrain is mostly hilly (Error! Reference source not found.). The hydrological network in the Volcano Region is not very dense, with only few permanent rivers. There is a denser network of intermittent streams that originate on the volcanoes, and which are responsible for most of the flooding in the lower reaches of the Volcano Region. The main rivers and gullies in the area include: Mutobo, Kinoni River, Rwebeya, Sebeya, Mukungwa. The Volcano Region also contains three lakes: Karago, Burera, and Ruhondo and their respective wetlands. A combination of the high rainfall and steep topography, as well as the predominance of a volcanic rock formation, leads to a situation whereby almost all rainfall is converted into direct runoff due to very limited infiltration capacity of the soil. Climate change scenarios foresee a substantial increase in rainfall and the number of rainy days in the north-west highlands, which may make the seasonal streams a constant supply of water. Furthermore, because of the porous volcanic geology, the slopes of the volcanoes, as well as its surrounding areas, contain a good number of caves that play a key role in the hydrology of the area. There are several small streams that drain

³ in the region on geophysical and socio-economic conditions and trends, as well as from the availability of better quality and more detailed climate studies and climate change forecasts.

their water in caves and others that originate from the outlet of caves further downhill. One of the best-known examples is the Kinoni River that drains its water either in the Nyiragaju caves or in the Mugogo caves.

Figure 1: Topography in the Volcano Region, from SRTM30 data.



1.2.2 Climate sensitivity of the region

It is one of the most climate-sensitive regions in the country due to soil instability, construction in flood prone areas, high rainfall and the steep hills which are a source of heavy runoff. The natural drainage network is composed of a few permanent rivers and intermittent seasonal streams originating from the volcanoes, responsible for most of the floods observed in the area. A combination of the high rainfall and steep topography, as well as the predominance of a volcanic rock formation, leads to a situation whereby almost all rainfall is converted into direct run off due to very limited infiltration capacity of the soil. The high population density in the area implies that there is significant exposure of the local population to flooding events – especially in the downstream densely populated urban areas in the region such as Musanze town.

The region has experienced major floods causing fatalities, infrastructure, and crop damage. The previous loss estimates vary from USD4 million to USD22 million per event in the Volcano Region⁴. With no improvements in the drainage systems, future climate change is likely to lead to increased risks. The overall amount of precipitation is forecast to increase, and the number of heavy rainfall days, or intensity of rainfall, may increase, raising the potential risks of floods, landslides, and soil erosion. This could mean that current flooding and landslides that occur in the western areas will likely continue and could increase in future. The projected impacts of climate change are potentially undermining food security, health, and economic growth. Climate change scenarios foresee a significant increase in rainfall and the number of rainy days in the north-west highlands, particularly during the two wet seasons, which may make the seasonal

⁴ section 1.6 presents official statistics on disasters in several key categories over the past five years in the four districts and for Rwanda overall.

streams a constant supply of water. Extreme rainfall events with a significant risk of flooding are expected to see a “robust increase” under the CMIP6 SSP2-4.5 scenario.

1.2.3 1.1.3 Land use in the volcanoes region

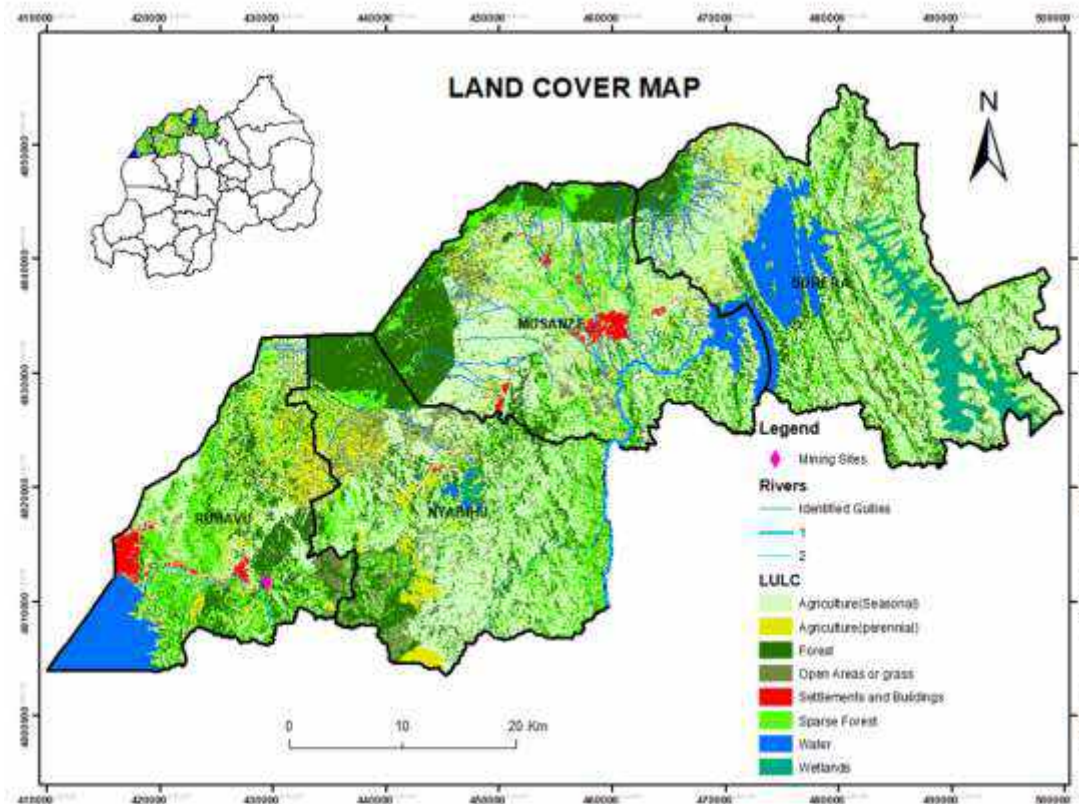
Land use outside of the VNP is dominated by small-scale agricultural operations on the fertile soils of the volcanoes (Figure 2). The main crops grown are potato, banana, beans, maize, and vegetables (Table 1). Animal holdings are small, with dairy cattle being a significant source of income from sale of milk. The average size of land holding per household is approximately 0.7 ha and productivity levels are very low due to a predominance of shallow soils, especially on the slopes, resulting in limited soil moisture holding capacity, the limited use of inputs and mechanization, erosion on steep slopes, a lack of irrigation and post-harvest facilities as well as under-developed agricultural value chains and a lack of private investment. Smallholders often lack the knowledge, inputs, and technology to transition to more climate resilient farming systems that would help them to generate a marketable surplus for income security. They have neither the financial nor physical access to quality feed for livestock and have limited knowledge of improved feeding, fodder establishment and crop-livestock integration approaches. At the same time, extension services lack the technical capacity to effectively mainstream climate concerns into advice services. These two factors result in low crop and milk productivity, and inefficient use of resources.

Table 1: Area of crops grown (ha) in the four districts of the Volcano Region during season B of the year 2021⁵

Crop	Rubavu	Nyabihu	Musanze	Burera
Maize	1,753	3,652	2,833	2,525
Sorghum	439	0	1,076	6,103
Wheat	0	1,326	759	1,416
Cassava	422	293	80	74
Sweet potato	698	2,725	1,319	2,997
Irish potato	6,572	7,605	5,335	4,273
Taro & Yams	191	38	202	133
Banana	2,393	805	1,441	2,182
Cooking banana	835	158	432	982
Dessert banana	254	389	452	211
Banana for beer	1,304	258	557	989
Bean	3,891	2,038	4,470	11,768
Bush bean	447	0	305	692
Climbing bean	3,444	2,038	4,165	11,077
Pea	167	195	289	601
Soybean	135	40	7	0
Vegetables	2,260	862	1,129	333
Fruits	90	455	378	76
Fodder crops	458	526	264	192
Other crops	1,324	766	815	42
Total	20,809	21,325	20,396	32,713

⁵ Source: NISR, 2021.

Figure 2: Land use and land cover map of the Volcano Region⁶



1.3 Current climate

1.3.1 Rwanda

Rwanda is located within the equatorial belt, but its climate is not strictly of the equatorial rainy type. It has a modified humid climate including rainy forest and savannah types. The central and eastern part of the country is generally of semi-arid type owing to its position in the rain shadow of the western highlands. The rainfall characteristics exhibit large temporal and spatial variation due to varied topography and existence of large water bodies in and near the country. Two rainy seasons are distinguished, March – May and October – December. Temporal variability of the rainfall has resulted in extreme events, such as the floods resulting from the 1997 – 1998 El Niño episode, and frequent droughts that have far reaching socio-economic impacts to the country.

Rwanda experiences a bimodal pattern of rainfall, which is driven primarily by the progression of the inter-tropical convergence zone (ITCZ). The ITCZ follows the annual progression of the Sun as it crosses the equator into the northern hemisphere (March – May rainy season), and six months later into the southern hemisphere (October – December rainy season). The maximum rainfall occurs over the March – May and September – December periods.⁷ The warmest annual average temperatures are found in the eastern low-lying areas (20 – 21°C) and

⁶ Source: FONERWA, 2019

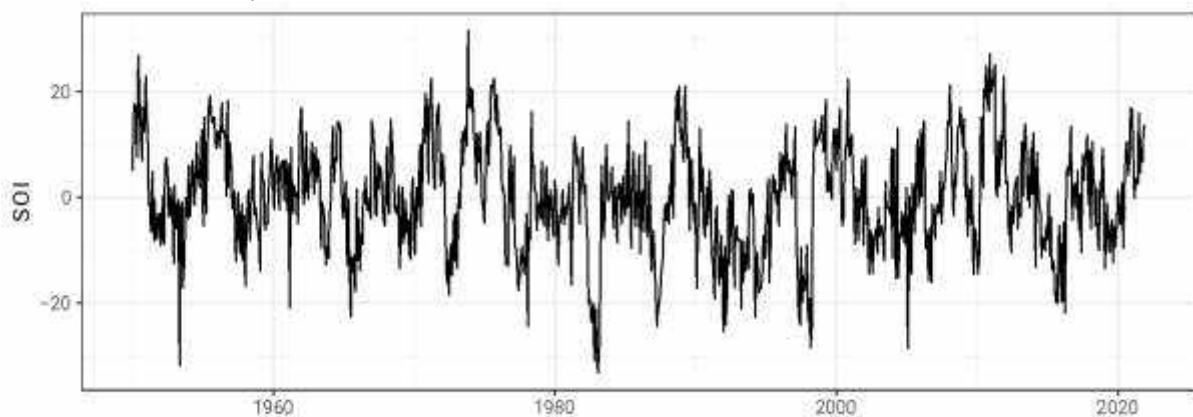
⁷ Rwanda Meteorology Agency, 2021. *Climatology of Rwanda*.

Bugarama Valley (23 – 24°C), and cooler temperatures in higher elevations of the central plateau (17.5 – 19°C) and the highlands (less than 17°C). Temperatures vary little throughout the year.

ENSO events

During an El Niño episode, the climate in Eastern Africa has a substantially increased probability of being unusually wet during the secondary and shorter rainy season of October – December, whereas the region’s primary and longer rainy season, March – May, is largely unaffected. El Niño events were associated with positive rainfall anomalies at the rate of 71.4%, while La Niña events were associated with negative rainfall anomalies at the rate of 72.7% over the period 1935 – 1992 (Muhire et al., 2014). In the second half of 2021 La Niña conditions started to prevail. This suggests that early 2022 will be drier than usual. See Figure 1-3 for ENSO events over the period 1950 – 2021.

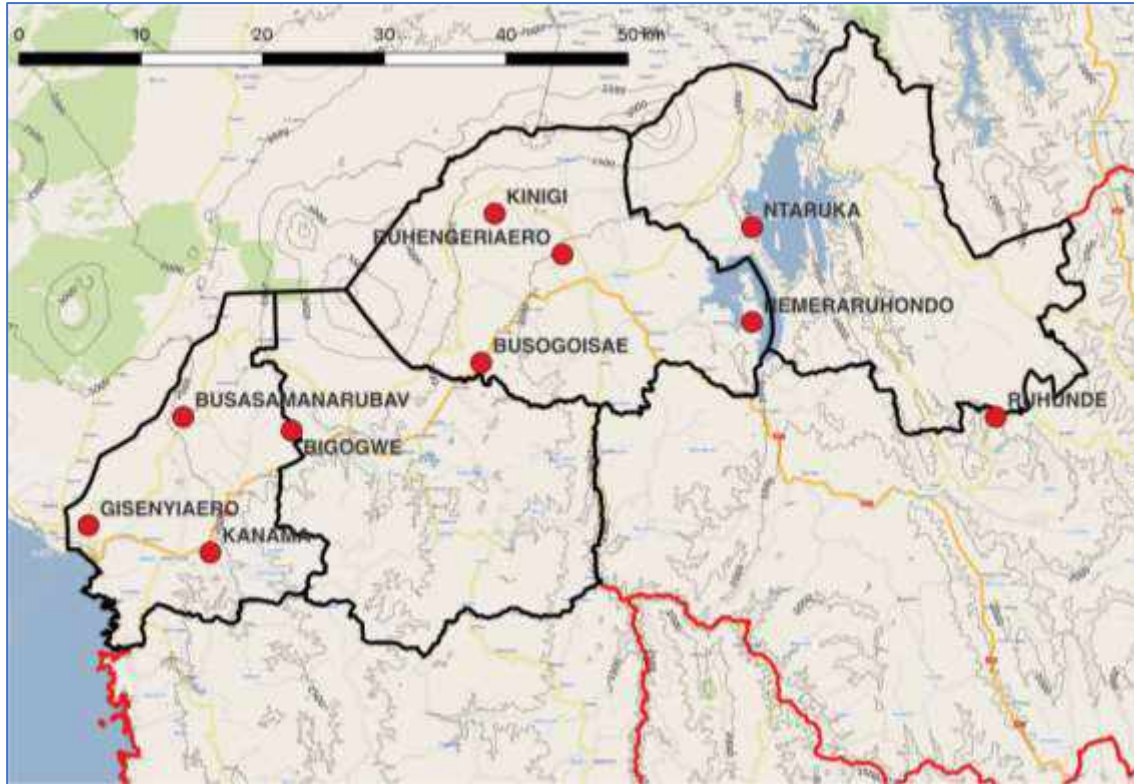
Figure 3: Southern Oscillation Index (SOI) for the period 1950 – 2021. Values above 7 indicate La Niña conditions (khaki coloured, drier than usual), while values below -7 indicate El Niño conditions (light blue, wetter than usual)



1.1.1 Volcano Region

The climate of the Volcano Region is dominated by the high altitude and the presence of tall volcanoes on the north-western range, which forms the national boundary with the Democratic Republic of the Congo (Figure 4). Data from 10 weather stations managed by MeteoRwanda have been identified for the climate description. The weather observation record for these stations is largely complete for the period 1990 – 2021, comprising the current climatological normal period of 1991 – 2020 which is also the baseline for assessment of climate change. Climpact analysis has been performed for key stations. Given the close proximity of the stations and the resulting large correlation between observations, results presented in this section will focus on three representative weather stations for purposes of this project: Bigogwe, Kinigi and Ntaruka.

Figure 4: The four districts of the Volcano Region in the north-west of Rwanda. The red dots indicate the locations for which weather observations are available⁸



1.3.2 Temperature

Temperatures have been steadily increasing throughout the Volcano Region since 1991, at a rate of 0.055, 0.056 and 0.045 °C/yr at Bigogwe, Kinigi and Ntaruka, respectively (Figure 5 and Table 2). The overall temperature increase is also apparent from the decrease in cold days and the increase in hot days (Figure 6 and Table 2).

⁸ Sources: National and district boundaries by the National Institute of Statistics of Rwanda. Base layer by Open Street Map contributors. Map composition by the authors.

Figure 5: Monthly averaged minimum (blue) and maximum (red) temperatures at Bigogwe, Kinigi and Ntaruka over the period 1991 – 2021. The light-blue and pink ranges indicate the maximum range during the month.

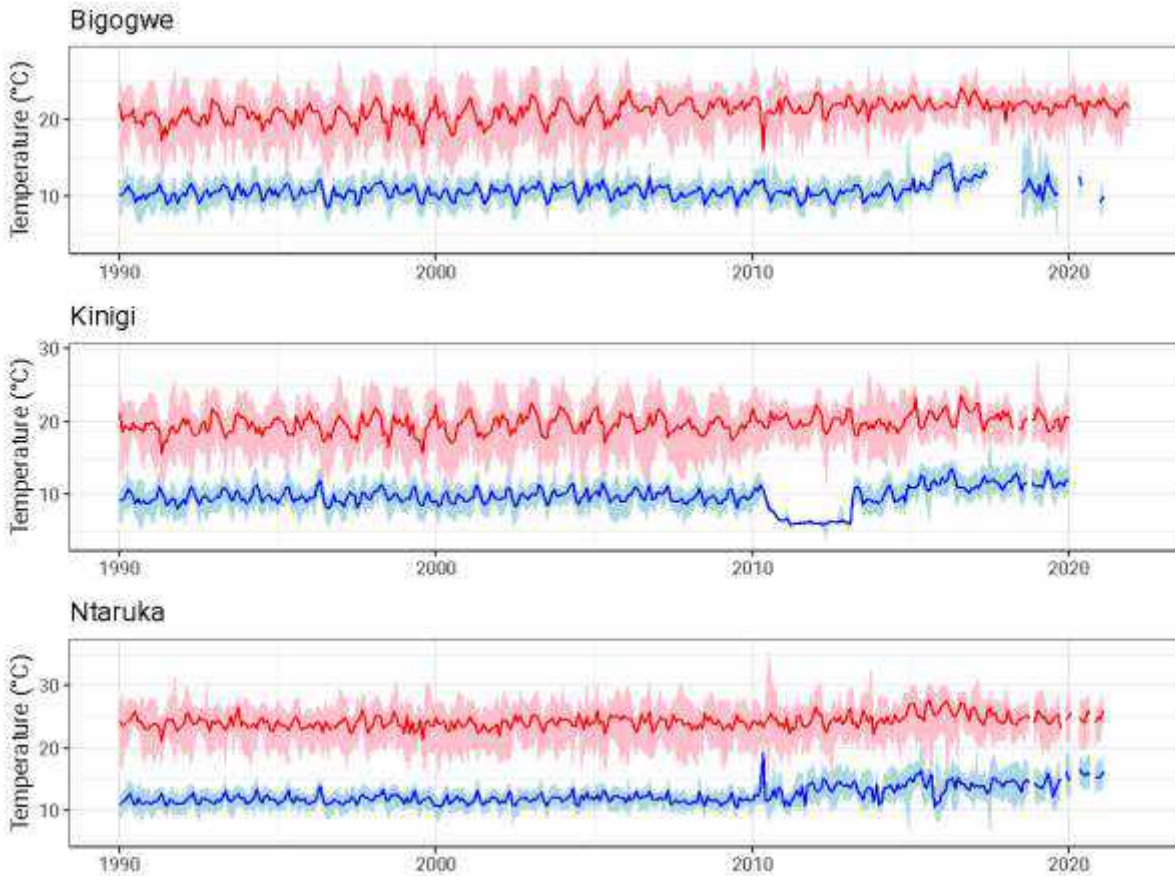


Figure 6: Increase in the number of hot days per year (red; CSDI1 indicator) and decrease in the number of cold days per year (blue; WSDI1 indicator) for Bigogwe (dashed), Kinigi (dotted) and Ntaruka (solid), over the period 1990 – 2021.

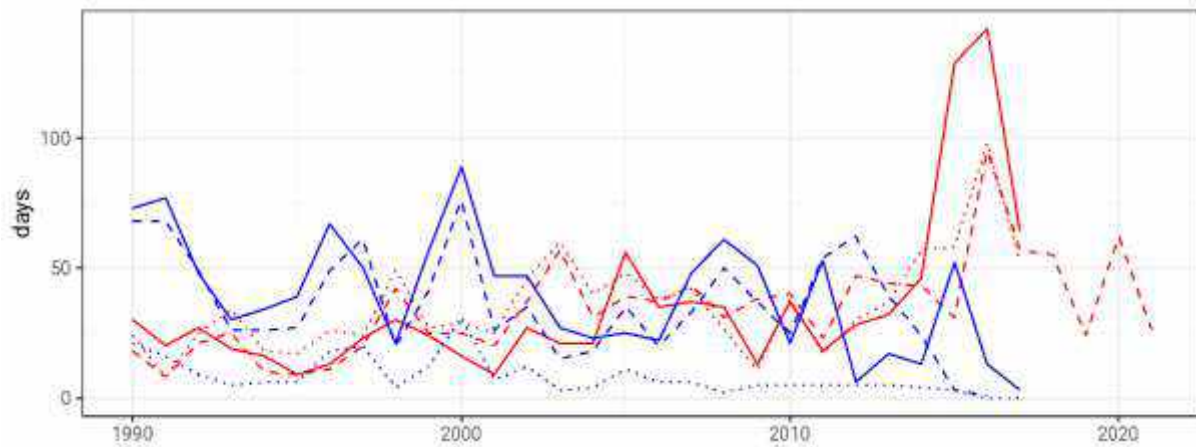
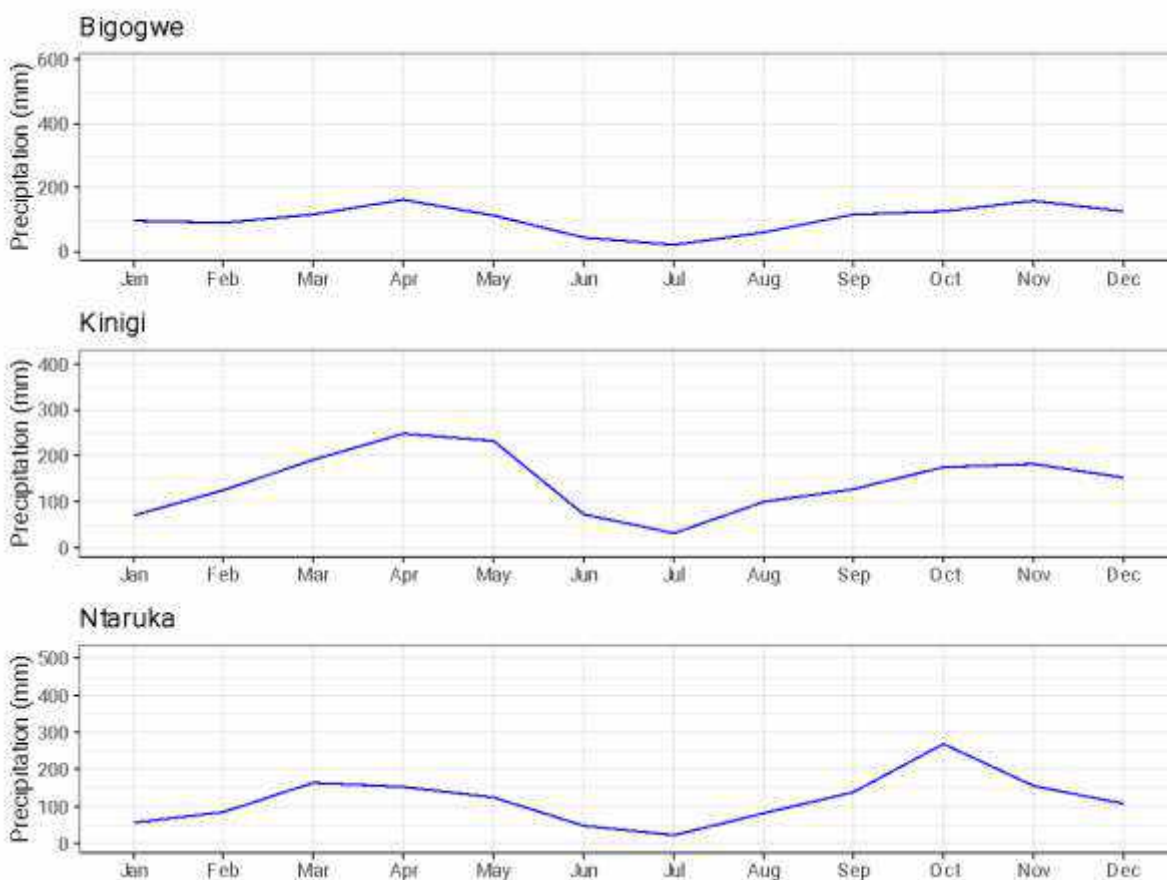


Table 2: Sen's slope for key annual temperature indicators from Climpect analysis at Bigogwe, Kinigi and Ntaruka, over the period 1991 – 2021.

Indicator	Bigogwe	Kinigi	Ntaruka
TXx	-0.011	0.011	0.038
TXn	0.146	0.146	-0.023
TNx	0.038	0.029	0.152
TNn	0.050	0.040	0.011
WSDI1	1.333	1.000	1.137
CSDI1	-1.000	-0.245	-1.341

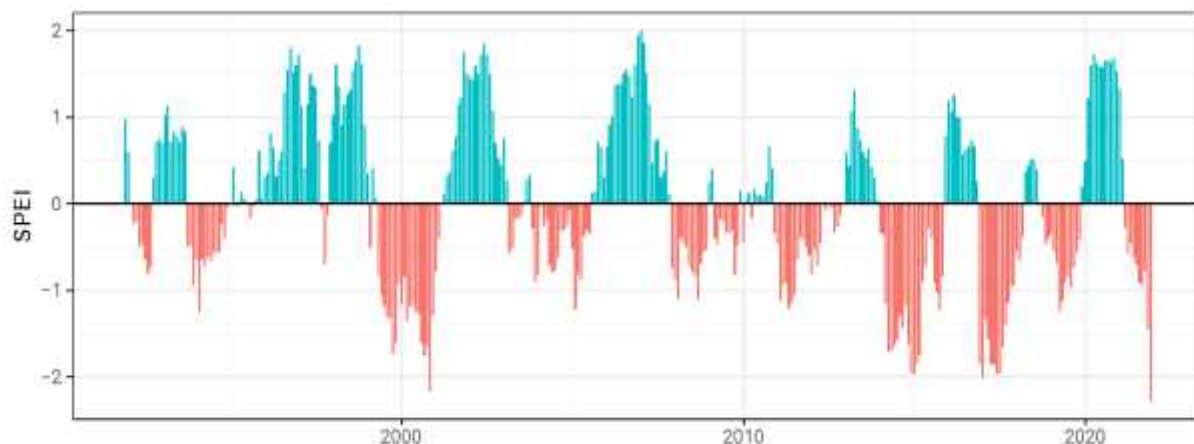
Figure 7: Monthly average precipitation and range over the period 1991 – 2020 at Bigogwe, Kinigi and Ntaruka.



1.3.3 Precipitation

Average annual precipitation ranges from 1,232mm at Bigogwe, 1,714 mm at Kinigi and 1,406 mm at Ntaruka. The bi-modal pattern of precipitation that is predominant in the country is not very pronounced in the Volcano Region; the months of January and February still receive significant amounts of precipitation although less than the two adjoining “wet” seasons (Figure 7). Over the period 1991 – 2020 there has been very minimal change in the amounts of precipitation and its distribution throughout the year, showing no statistically significant trend. This is also obvious from the standardized precipitation-evaporation index (SPEI) over the same period for Kinigi, which shows alternating wet and dry episodes but no significant trends (Figure 8).

Figure 8: Standardized precipitation-evaporation index (12 months) for Kinigi.



1.4 Socio-economic profile of the Volcano Region

People living in the Volcano Region are less affluent and less literate compared to the national population. The Volcano Region has a bigger share of urban population since Musanze and Rubavu are secondary cities that are touristy and are near the DRC/Goma, respectively. Unlike other districts, Rubavu is more affluent compared to the whole country, due to cross-border trade with the DRC and income from tourism. Compared to the rest of the Volcano Region, Burera is less urban, less affluent, and less educated. The populations of Musanze and Rubavu are more prosperous since there are numerous economic activities influenced by the VNP, Lake Kivu, and the Goma border. There is a discrepancy between rural versus urban consumption (incomes), and the gap is wider for Rubavu and Musanze where there is more economic opportunity (Figure 9).

Most people in the Volcano Region are engaged in agriculture. A large proportion is working as independent farmers or as unpaid family workers, both at the national level and in the Volcano Region. A higher proportion of unpaid family farm workers is found in Burera. Nyabihu has more people getting paid for working on the farm. And this is primarily driven by the existence of agro-processing factories such as Mukamira Industry as well as pig production, which could be creating more jobs for the Nyabihu population. People getting paid for non-farm activities are more prevalent in Musanze and Rubavu as the participation of people in services is higher in these two districts. Rubavu has more non-farm entrepreneurs, and Burera has more farm entrepreneurs (Figure 10).

The data clearly shows a current dependency on agriculture in the area, and a planned relocation of communities will affect livelihoods. It is therefore crucial to consider alternative sources of income as well as upgrading the agriculture market systems. These activities may include tourism, furniture, construction materials, agro-processing, agro-services, commercial high-yield agriculture, and others. We will consider opportunities for green transformation. For example, exploring how modernized climate smart agriculture could be a sustainable and environmentally friendly way of improving livelihoods of the people residing in the Volcano Region. Off-farm establishments in the Volcano Region are primarily micro enterprises with 1-3 employees, about 93% of all registered enterprises; this is very comparable to the national profile. Trade is the most dominant sector, followed by accommodation and food service activities. The share of trade is lower in Nyabihu and Burera as the two districts are more rural and agricultural. Overall, there are more enterprises in Musanze and Rubavu (Figure 11).

Figure 9: Brief socio-economic characterization of the four districts making up the Volcano Region

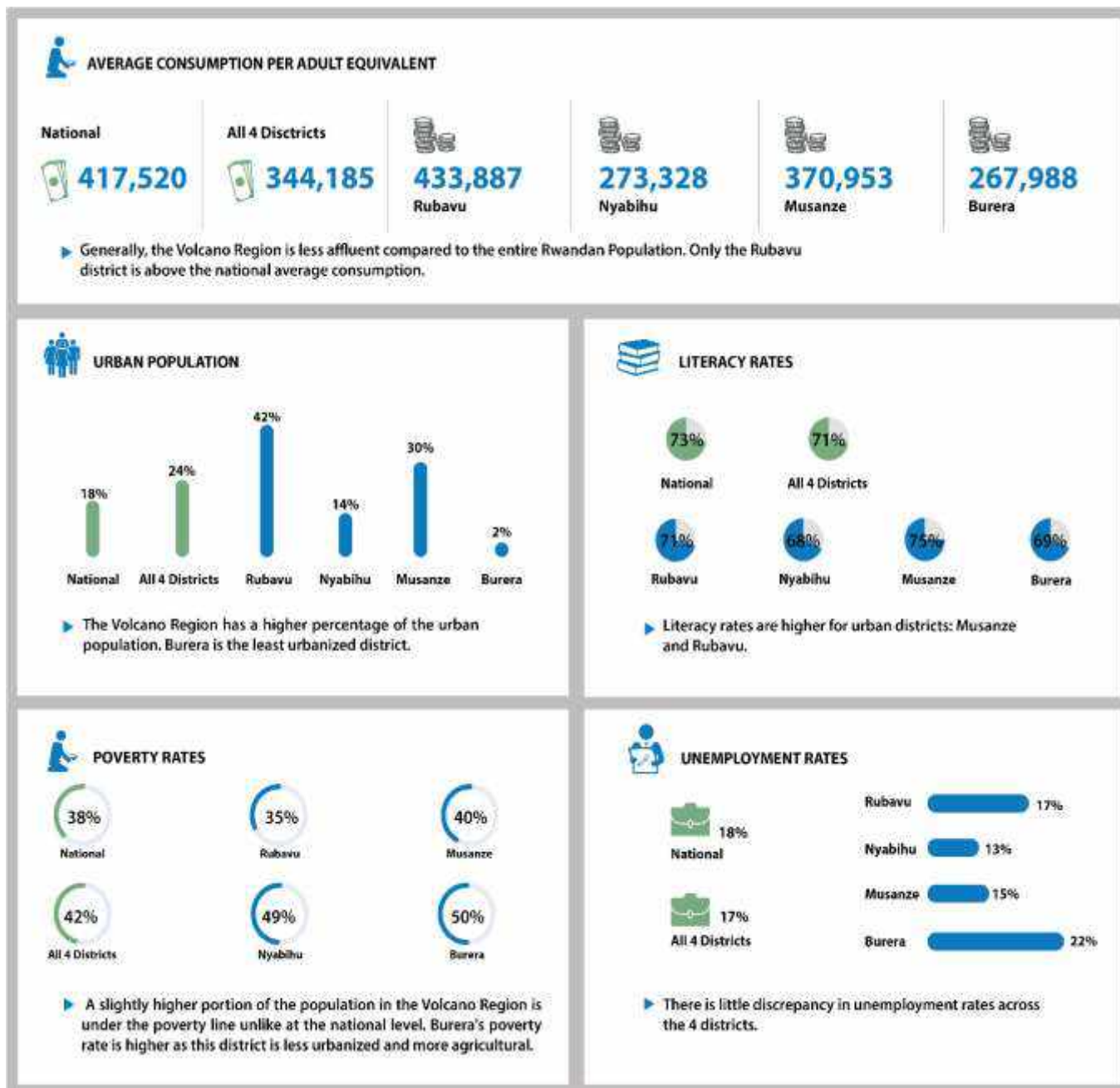


Figure 10: Distribution of labour by type in the Volcano Region.

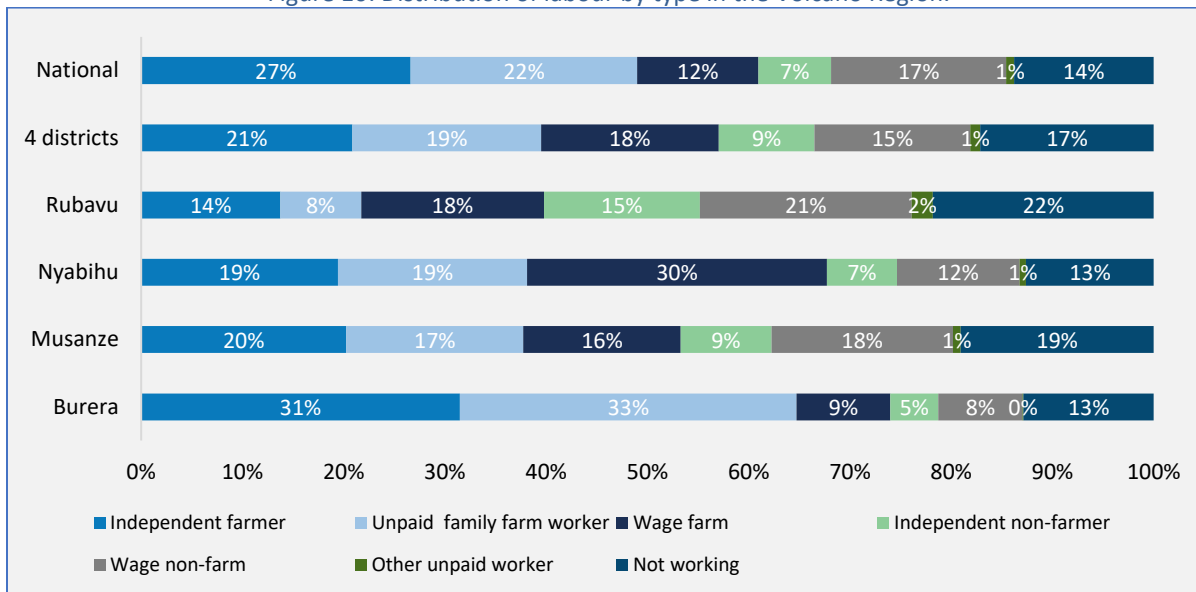
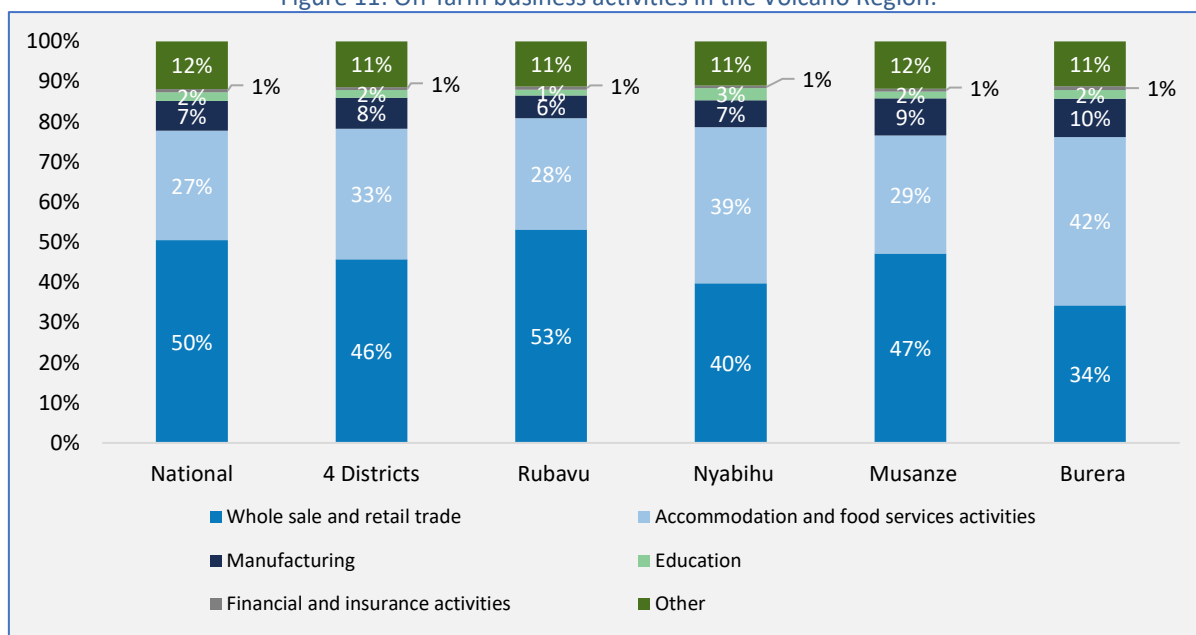


Figure 11: Off-farm business activities in the Volcano Region.



1.5 Demographic and settlement trends

The population of Rwanda has historically been growing fast, at approximately 2.6% per year in 2012 (NISR, 2012). In more recent years, however, the fertility rate has dropped by about 41%, from 6.1 births per woman in the period 2002 – 2005, to 3.6 births per woman in 2022 – (NISR, 2023). The projected total resident population for the year 2024 is 2.3%.

There has been significant unplanned settlement in fragile and sensitive areas. This resulted from the 1994 Genocide against the Tutsi when nearly three million people returned from neighboring states to a war-ravaged countryside where they had to build up a new existence with little outside resources. Rwanda’s Vision 2020 intended that a proportion of at least 70% of households living in rural areas to settle in integrated viable settlements and that these planned settlements offer economic opportunities, favor rational land use and management, and

accelerate servicing with basic social economic and physical infrastructures in rural areas. One of the challenges that the Government intends to overcome is to assist vulnerable communities living in high-risk zones from severe landslides and flooding.⁹

In 2011 the Integrated Development Program was set up as a multi-government institutions program headed by the Ministry of Local Government (MINALOC) Rural Settlements Task Force with a Steering Committee¹⁰ Annual action plans earmark funds for district governments to support making available plots for rural housing as well as basic construction materials for the construction of model villages for vulnerable communities living in high-risk zones. Part of the strategy is to improve the efficiency of the use of land for construction by assisting the layout planning before settling, facilitating the fabrication and use of local construction materials, and constructing “4-in-1-house” and “2-in-1 house” types. The intention of the Rural Settlements Task Force is the upgrading of rural settlements into integrated villages, providing opportunities for improved rural livelihood. Eventually, the locations will form types of mixed-use trading centers and be growth areas as part of the urban network.

1.6 Vulnerabilities and disasters

Due to the geophysical make-up of the Volcano Region, with steep slopes and friable soils in combination with intense seasonal rainfall, land use in the region is inherently susceptible to environmental disasters. The high population density and extreme poverty in the region imply that the land is intensively cultivated but without due regard for the geophysical risk of disasters, which are predominantly expressed through landslides and flooding. Geophysical disasters lead to economic losses at different levels: damage in infrastructure, crops and livestock; disruption of the economic system in communities where people were displaced; fiscal transfer to disaster response and crowding out of other functions as manpower is concentrated on disaster response rather than productive activities following a disaster.

The National Risk Atlas of Rwanda (MIDIMAR, 2015) identified at risk areas. These were mainly due to the (i) topography of the area, (ii) extension of agricultural activities on steep soil that were previously covered by natural vegetation, (iii) population growth, and (iv) lack of adequate soil erosion control measures. *The landslide hazard assessment revealed that about 3.34% of the total population are exposed to a landslide at very high susceptibility with higher likelihood of hazard are mostly located in the Volcano Region.* In 2018 in the four districts, 5,000 households (25,000 people) were affected by floods, of which 4,750 people from 950 households were directly affected. With the predicted increase in intense rainfall events because of climate change, the intensity of flooding may be expected to increase as well, with its concomitant impacts on the local population.

Rwanda sees a significant number of events rooted in environmental vulnerability that led to losses and damages. The Ministry of Emergency Management (MINEMA) is the responsible government agency dealing with disaster preparedness and response and it regularly publishes statistics on disaster events by district (Table 3). While the losses and damages in the Volcano Region are not higher than in other areas of the country, they are still a significant burden on the development of the region into a resilient green economy. Project climate change is likely to exacerbate the situation unless mitigating measures are taken.

⁹ Republic of Rwanda, 2012.

¹⁰ formed by MINALOC, Ministry of Defense, Rwanda Housing Authority, Rwanda Environment Management Authority (REMA), Ministry of Education, Ministry of Natural Resources, Ministry of Commerce and Industry, Ministry of Infrastructure, Ministry of Youth and ICT, and the Rwanda Agricultural Board.

Table 3: Loss and damage in several key categories in recent years¹¹

Year	Burera	Musanze	Nyabihu	Rubavu	Rwanda
Deaths					
2016	9	7	7	9	183
2017	6	2	6	2	82
2018	3	1	6	8	254
2019	2	8	2	1	134
2020	6	8	32	5	298
2021	11	5	3	2	116
2022	11	1	2	7	205
2023 (Ony from 3 to 22 May)	8	6	17	28	135
Persons injured					
2016	10	2	4	8	172
2017	3	8	2	16	151
2018	12	10	0	18	346
2019	5	5	3	4	271
2020	21	10	14	7	414
2021	18	9	4	4	248
2022	12	11	4	11	401
2023 (Ony from 3 to 22 May)	3	8	9	50	111
Houses destroyed or damaged					
2016	48	103	314	191	5,896
2017	44	231	81	301	5,802
2018	435	540	398	1,418	15,910
2019	61	46	42	185	5,691
2020	271	154	311	271	8,098
2021	237	38	67	2134	4808
2022	486	66	57	404	4156
2023 (Ony from 3 to 22 May)	47	123	193	1,621	2,740
Loss of crops (hectares)					
2016	85	0	52	169	7,449
2017	4	266	44	22	5,277
2018	256	835	162	743	13,337
2019	32	24	39	32	10,610
2020	112	20	27	85	4,662
2021	590	5	46	179	3802
2022	31	26	2	323	1917
2023 (Ony from 3 to 22 May)	TBD	TBD	TBD	TBD	TBD
Loss of livestock					
2016	3	3	18	3	932
2017	1	11	9	4	590
2018	5	3	3	648	815
2019	4	2	3	2	113
2020	9	9	36	0	3,497
2021	61	0	11	10	2140

¹¹ Source: MINEMA, 2021.

2022	3	3	0	0	201
2023 (Ony from 3 to 22 May)	TBD	TBD	TBD	TBD	TBD
Roads and bridges damaged					
2016	0	0	0	1	42
2017	0	1	3	2	62
2018	19	1	3	11	96
2019	1	2	1	2	70
2020	9	2	8	5	257
2021	11	0	6	14	87
2022	1	0	6	3	131
2023 (Ony from 3 to 22 May)	TBD	TBD	TBD	TBD	105

1.7 Climate change projections

For the climate change projections, use has been made of a multi-model CMIP6 ensemble with the SSP2-4.5 scenario to determine anomalies over the epoch 2041 – 2060, relative to the current climatological normal period 1991 – 2020. The following CMIP6 models were used to construct the ensemble:¹²

ACCESS-CM2	CanESM5-CanOE	CNRM-ESM2-1	MIROC-ES2L
BCC-CSM2-MR	CESM2	HadGEM3-GC31-LL	MIROC6
CAMS-CSM1-0 (precipitation only)	CMCC-ESM2	IPSL-CM6A-LR	MRI-ESM2-0
	CNRM-CM6-1-HR		

The graphs of multi-model CMIP6 ensemble data in this report indicate the 95% confidence interval of values from the separate models. The temporal horizon is the year 2050, coinciding with the expected lifetime of the investments in the green villages. To obtain more robust estimates, monthly data over the epoch 2041 – 2060 were averaged as representative for the year 2050, separately for each model. The ratio of these epochal averages to the corresponding average values over the current climatological normal period 1991 – 2020 was taken to cancel out model bias. This ratio therefore indicates the rates of change over the period considered, for each model. The individual models were then reassembled into a multi-model ensemble, and summary statistics generated, to arrive at the average of change over the periods considered.

1.7.1 Temperature

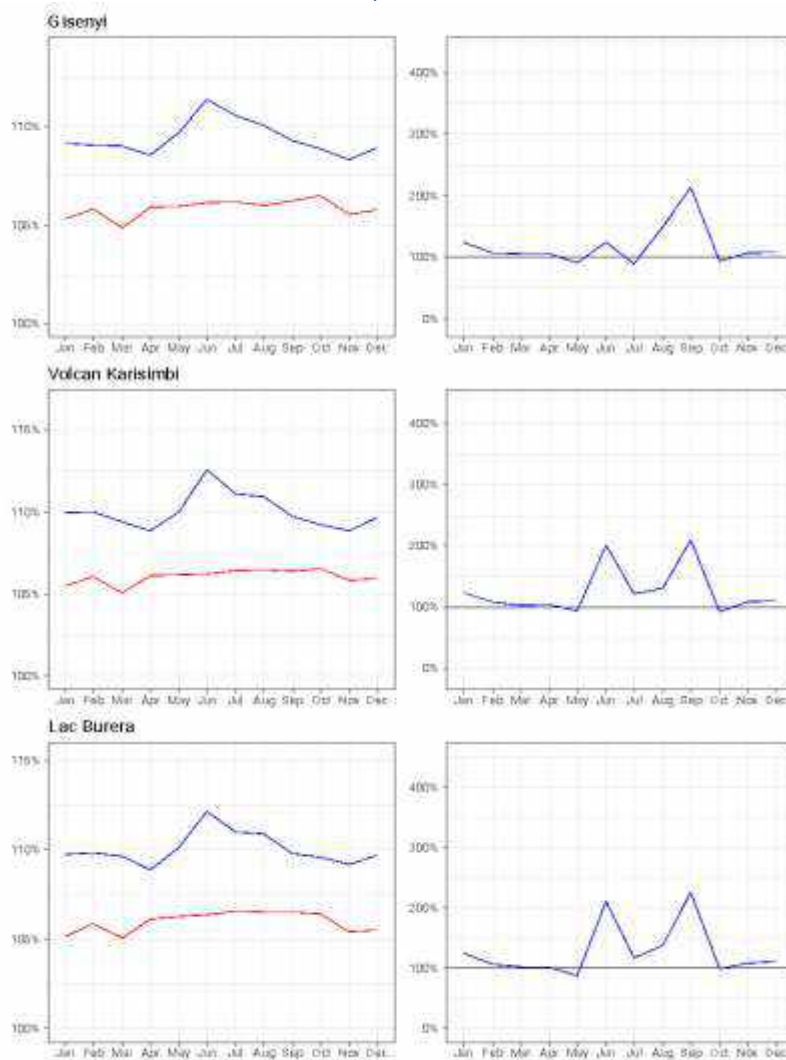
By the 2041 – 2060 epoch the daily maximum temperature is forecast to increase by approximately 1.2°C (+6%) relative to the 1991 – 2020 reference period. The nighttime temperature will increase faster (about +10%), with even larger increases in the June – August period (Figure 12 and Table 4). This implies that the diurnal temperature range will decrease by about 0.4°C.

¹² The authors acknowledge the World Climate Research Programme, which, through its Working Group on Coupled Modelling, coordinated and promoted CMIP6. We thank the climate modelling groups for producing and making available their model output, the Earth System Grid Federation (ESGF) for archiving the data and providing access, and the multiple funding agencies who support CMIP6 and ESGF. The results contain modified Copernicus Climate Change Service information 2021. Neither the European Commission nor ECMWF is responsible for any use that may be made of the Copernicus information or data it contains.

1.7.2 Precipitation

The precipitation is expected to increase during the June – September period, although there is no agreement between the models for the months of June and September (Figure 12). The increase in June precipitation, while large at +24% to +112%, is not very concerning given that the current monthly precipitation is relatively low. The September precipitation increase (+110% to +127%), on the other hand, is of significant concern as it will effectively extend the wet October – December season by an additional month, increasing the likelihood of extreme precipitation events and flooding in the lowlands. According to the WGI report of the Sixth Assessment Report (AR6) of the IPCC, extreme rainfall events with a significant risk of flooding are expected to see a “robust increase” in a +2°C world, consistent with the CMIP6 SSP2-4.5 scenario used in the analyses in this report.¹³

Figure 12: Relative minimum (blue) and maximum (max) temperature increases (left panel) and relative change in precipitation (right panel) at Gisenyi, Volcan Karisimbi and Lac Burera for the epoch 2041 – 2060 relative to the climate normal period 1991 – 2020 from



¹³ The 2021 Sixth Assessment Report of the IPCC, WG I, Technical Summary, states (TS.4.3.2.1) that “increases in heavy precipitation that can lead to pluvial floods (*high confidence*) are projected for most African regions”. For the South Eastern Africa (SEAF) region, table 11.5 of the main WG I report, “CMIP6 models project a robust increase in the intensity and frequency of heavy precipitation” for a +2°C world.

Table 4: Relative change in monthly temperature and precipitation over the epoch 2041 – 2060, relative to the climate normal period 1991 – 2020, using a multi-model CMIP6 ensemble with the SSP2-4.5 scenario.

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Gisenyi												
Tmin	1.09	1.09	1.09	1.09	1.10	1.11	1.11	1.10	1.09	1.09	1.08	1.09
Tmax	1.05	1.06	1.05	1.06	1.06	1.06	1.06	1.06	1.06	1.07	1.06	1.06
Pr	1.23	1.07	1.05	1.05	0.90	1.24	0.89	1.48	2.13	0.93	1.06	1.08
Volcan Karisimbi												
Tmin	1.10	1.10	1.09	1.09	1.10	1.13	1.11	1.11	1.10	1.09	1.09	1.10
Tmax	1.05	1.06	1.05	1.06	1.06	1.06	1.06	1.07	1.06	1.07	1.06	1.06
Pr	1.24	1.08	1.03	1.03	0.93	2.01	1.21	1.30	2.10	0.92	1.08	1.10
Lac Burera												
Tmin	1.10	1.10	1.10	1.09	1.11	1.13	1.11	1.11	1.10	1.10	1.09	1.10
Tmax	1.05	1.06	1.05	1.06	1.06	1.06	1.07	1.07	1.07	1.06	1.05	1.06
Pr	1.24	1.07	1.02	1.02	0.87	2.12	1.17	1.38	2.27	0.99	1.08	1.11

1.8 Climate change risk and impacts in the Volcano Region

The projected climate change in the Volcano Region, particularly the increase in precipitation, is expected to significantly increase the climate risk in the region. The climate hazard will increase due to increased runoff from the volcanoes to the lower areas, increasing the risk of flooding. The flooding is also expected to impact larger areas, leading to increased exposure of the households in the lower areas of the region. The below sections elaborate on the increasing climate hazard and exposure, and implications for reducing the vulnerability to climate risks in the region, based on a detailed analysis of the Volcano Region using the HEC-RAS hydrological modeling software. Analyses have been conducted both for the current situation and the conditions predicted by the CMIP6 multi-model ensemble.

1.8.1 Climate hazard

The Kinigi and Rwankeri station rainfall intensity-duration-frequency (IDF) curves were adjusted for climate change per the relative change in monthly precipitation (Table 4). Due to the location of the stations, the Kinigi station rainfall observations were adjusted using the Volcano Karisimbi factors. For the Rwankeri gage, the observations were adjusted based on the averaged factors from the Volcano Karisimbi and Gisenyi factors. The observed monthly peak rainfall events were adjusted based on these factors and a Log-Pearson Type 3 (LPIII) extreme value analysis was performed to obtain the climate change adjusted rainfall depths for each recurrence interval.

The peak daily rainfall in each month was adjusted with the factors shown in Table 4 (Table 5). As Table 4 shows, some months can be expected to see a slight reduction in peak daily rainfall, where other months could see a significant increase in peak daily rainfall. By applying the monthly adjustments, the annual peak rainfall for a specific year could be the result of an event in a different month than the un-adjusted analysis. Years with had a large rainfall event in September would see a far larger adjustment to the peak rainfall event than for example a year with a small event in September, but the current peak rainfall event occurring in March of that year.

An LPIII analysis was performed on the climate change adjusted data for both the Kinigi and Rwankeri stations. The Kinigi station is representative for Region 1 and the Rwankeri station is representative for Region 2 in the Wagesho & Claire paper on which the IDF curves are based.

Figure 13: Annual peak daily rainfall events based on the current observations (light blue) and for the climate adjusted data (dark blue) for the Kinigi Station.

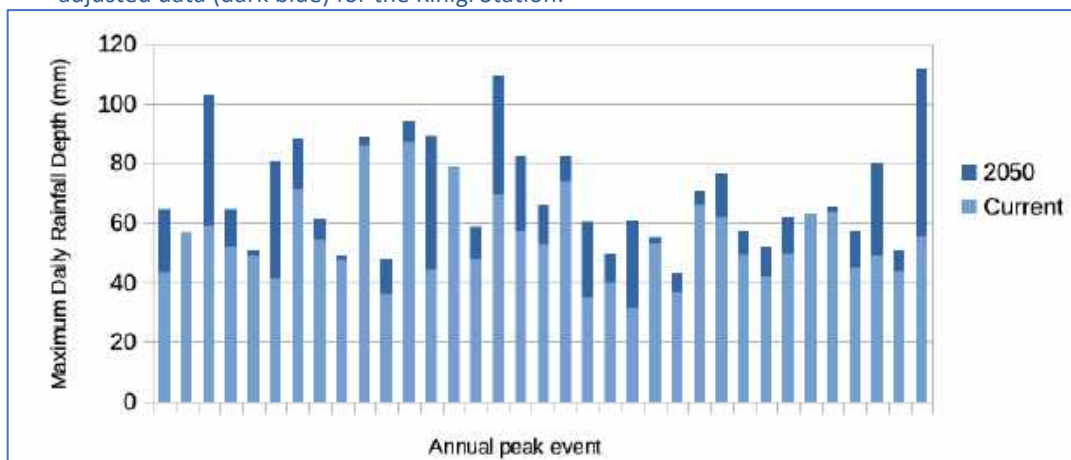


Figure 14: Annual peak daily rainfall events based on the current observations (light blue) and for the climate adjusted data (dark blue) for the Rwankeri Station.

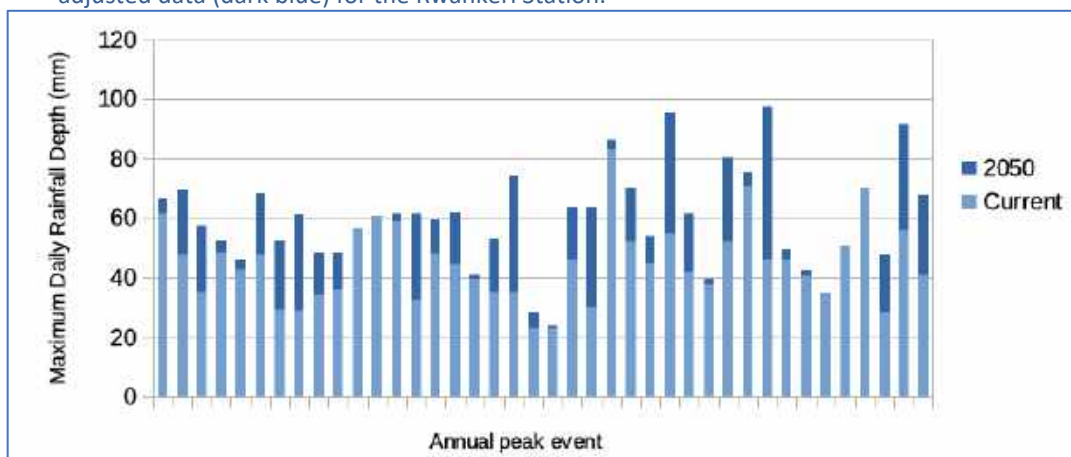


Table 5: Annual peak daily rainfall (mm) for the Kinigi and Rwankeri stations for different recurrence intervals for the observed data and the climate adjusted data

Recurrence interval	Kinigi		Rwankeri	
	Current	2050	Current	2050
2 years	52.1	65.9	43.2	59.0
5 years	64.7	82.2	55.2	73.7
10 years	72.7	93.1	62.6	81.4
25 years	82.5	107.1	71.4	89.3
50 years	89.8	117.7	77.7	94.2
100 years	96.9	128.5	83.7	98.4

In comparing the results presented in Table 5, the increase in peak rainfall intensity is over 30% for some recurrence intervals. Daily rainfall data can be useful in determining in flood risk in large watershed, where the response of the river to a storm event is in the order of days. In much smaller basins, the sub-daily distribution of the rainfall will have an impact on the flooding. For example, if rain falls steadily at 2mm per hour, it is unlikely this will overwhelm the drainage systems (both natural and man-made). However, if this daily total of 48mm would have all fallen in a single hour, significant flooding is likely to occur. Observed rainfall patterns show that during large storms, over half of the daily total rainfall can occur in a single hour. To accurately capture

the flooding potential, the available daily data needs to be disaggregated to sub-daily intervals. The interval should correspond to the size of the basin, with smaller basins requiring smaller intervals. Although small upstream areas of the watershed might respond quicker, the size of the watersheds in the Volcano Region warrant a time step of 1-hour to accurately capture flood risk due to rainfall.

SHER (2021) provided a review of the available methods in Rwanda to process daily data to obtain a higher resolution dataset. This review did not include the process used by FONERWA (2019), but from the provided description the method used was similar to the method used by Deltares for the Kigali area; this method was evaluated in the SHER report. The SHER report concludes that the Wagesho & Claire paper is the best method to use as it provides the proper spatial coverage for the project area and aligned with more detailed methods in areas outside the study area. The Wagesho & Claire results were evaluated against the FONERWA (2019) results and showed to be within 10%, which can be considered very close given the uncertainty inherent to meteorology and data scarcity in the study region. As the SHER report pointed out regarding the Deltares study, even if the latest available sub-daily data would have been included, the sub-daily dataset would still be too small for a robust sub-daily distribution. The same will apply to the FONERWA study, making the Wagesho & Claire paper the preferred approach to determine the current rainfall intensities. The additional benefit of using the Wagesho & Claire paper is that this allows the application of the steps in this report to be easily applied to other regions within Rwanda. The IDF curves in the Wagesho & Claire paper were updated with the adjustment factors, resulting in larger rainfall depth for each recurrence interval, as shown in Figure 15 and Table 6.

Figure 15: Existing (light green and light blue) and climate adjusted IDF (dark green and dark blue) for Region 1 (green) and Region 2 (blue).

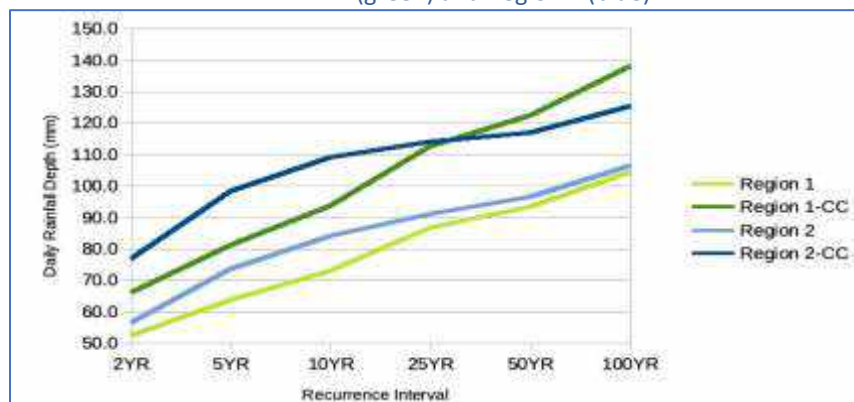


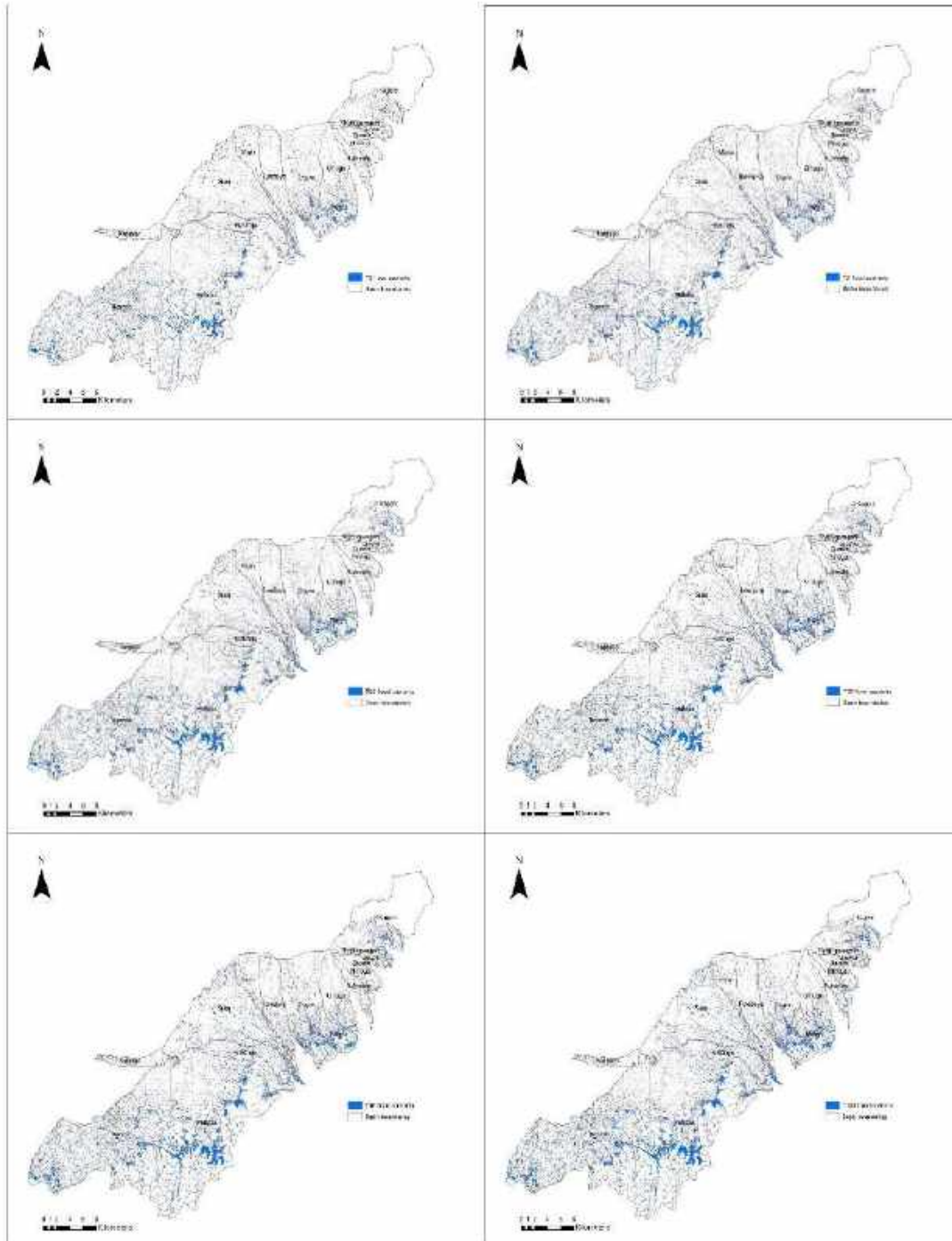
Table 6: Annual peak daily rainfall (mm) for Region 1 and Region 2 in the Wagesho & Claire paper for different recurrence intervals for the published IDF curves and the climate adjusted IDF curves.

Recurrence interval	Kinigi		Rwankeri	
	Current	2050	Current	2050
2 years	52.2	66.1	56.3	76.8
5 years	63.8	81.1	73.7	98.3
10 years	73.0	93.5	84.0	109.2
25 years	86.7	112.5	91.1	113.9
50 years	93.5	122.6	96.5	117.0
100 years	104.3	138.3	106.5	125.3

Based on this analysis, flood risk maps have been developed for the different recurrence intervals. Figure 16 shows areas that will be flooded in at different recurrence intervals, in some of the major catchment areas in the Volcano Region. Considering the above analysis, future

climate change is likely to lead to increased risks. The number of heavy rainfall days, or intensity of rainfall is projected to increase, raising the potential risks of floods, landslides, and soil erosion. This implies that current flooding and landslides that occur in the western areas will likely continue and could increase in future. The projected impacts of climate change are potentially undermining physical safety of households residing in precarious conditions, food security, health, and economic growth.

Figure 16: Flooded areas for 2-, 5-, 10-, 25-, 50-, and 100-year return periods of a rainfall event



1.8.2 Exposure to the climate hazard

Figure 17 indicates that built-up areas are concentrated in Cyuve and Rwebeya (holding Musanze Town in their downstream part) and smaller concentrations in Mwora, Muhe, Mutoba, Nganda, and Susa basins. Similarly, national roads exposed to floods are concentrated in Mutoba, Ngando, Cyuve, and Rwebeya (Figure 18). Additionally, Ngando has a long stretch of national road which will be paved soon, increasing the asset value exposed to flooding value over time.

Figure 17: Exposure of physical assets from flooding in a 25-year event. White areas with a value of 0 are not at risk of flooding, with higher values and deeper colours indicating increased exposure to flooding (1 = forest; 2 = agriculture; 5 = built-up areas and infrastructure)

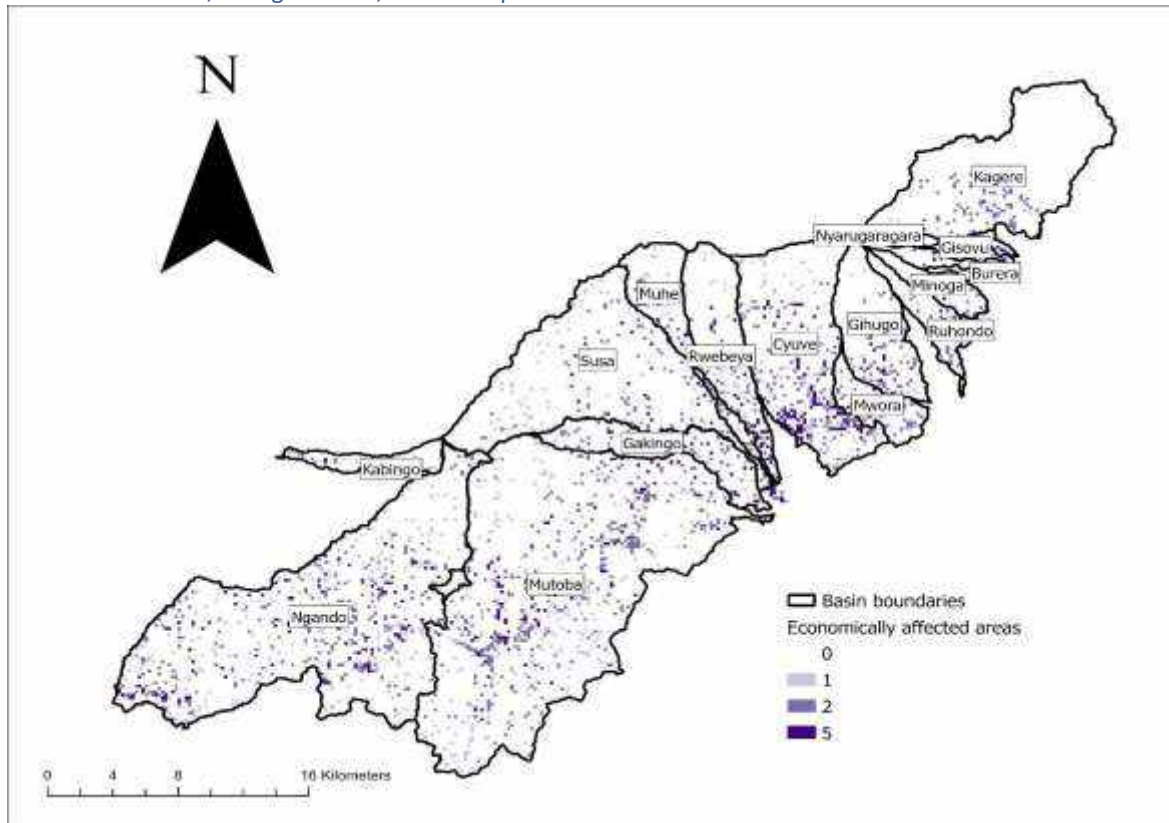
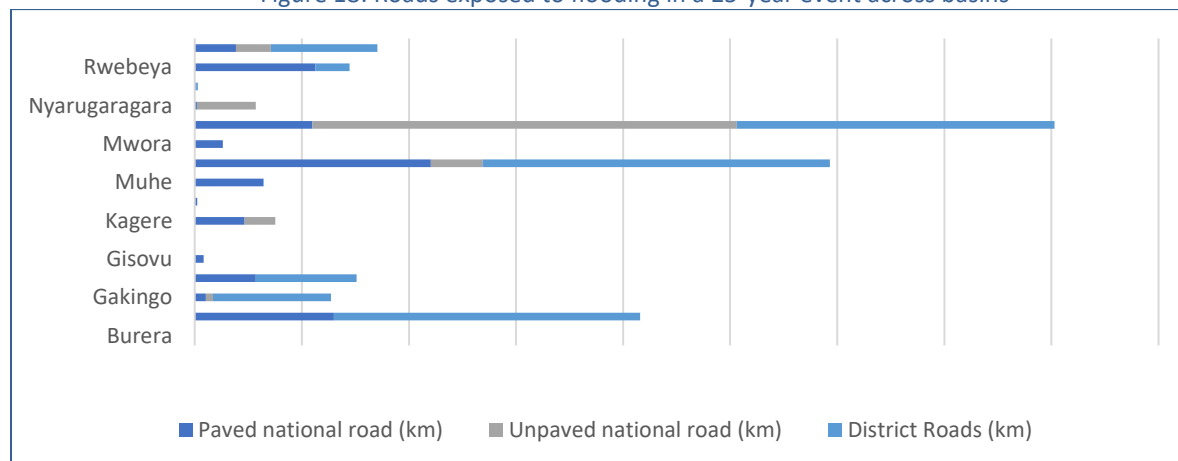


Figure 18: Roads exposed to flooding in a 25-year event across basins



1.8.3 Vulnerability to the climate hazard

Severe weather events, particularly droughts, have historically imposed heavy costs in Rwanda. The projected impacts of climate change may increase the frequency and compound the ramifications of these events, potentially undermining food security, health, and economic growth. Although there is uncertainty associated with the future climate projections, climate change will have significant economic impacts in Rwanda. Given the high levels of uncertainty, it is difficult to accurately determine the economic cost of climate change. However, model estimations indicate that the additional net economic costs (on top of existing climate variability) could be equivalent to a loss of almost 1% of GDP each year by 2030, though this excludes the future effects of floods and other extremes. This estimate is therefore conservative.

There are indications that heavy precipitation – such as the number of heavy rainfall days, or intensity of rainfall – may increase, raising the potential risks of floods, landslides, and soil erosion. This could mean that current flooding and landslides that occur in the western areas will likely continue and could increase in future. Major flood events that occurred in 1997, 2006, 2007, 2008, and 2009 have caused fatalities, as well as infrastructure and crop damage. The impacts of these events are economically significant, with the 2007 flood causing an estimated direct economic cost of USD4 to USD22 million (equivalent to around 0.6% of GDP) for two districts alone. Future climate change could also significantly increase the health burden of malaria in Rwanda. Since malaria prevalence is influenced by temperature, rural populations living at higher altitudes have previously been at lower risk of contraction. Future projections, however, suggest warming of areas at higher altitudes, and the risk of contraction may thus increase by 135% by 2050. The increase in the disease burden is significant and could lead to full economic costs that are over USD50 million/year.

In recent years, higher temperatures, prolonged droughts, and elevated rates of evapotranspiration have led to disturbances in the hydrologic cycle and altered river flows. Climate change-induced temperature increase and precipitation variability may exacerbate negative impacts on lakes, rivers, and other important sources of water. This can have implications on the availability of water for hydropower and for distribution by utilities, such as those serving Kigali, which are already struggling to meet user needs. Other factors, such as the dearth of man-made storage, collection, and catchment systems, and changes in land use and cover associated with population and socio-economic growth, will also play an important role in shaping shifts in water resources.

Climate change is poised to impact all sectors of Rwanda’s economy, and to negate some of the country’s remarkable development gains unless the country builds resilience and adaptivity to climate change¹⁴. Climate impacts of significance for agriculture and food security are likely to be temperature increases and more frequent droughts, with the nature and timing of impacts varying across regions. Climate impacts may alter the extent of areas suitable for agriculture and the length of growing seasons, affecting crop yields as well as hunger and nutrition. In addition, climate change may alter the occurrence and distribution of pests that may harm or ruin crops and livestock.

Households at risk the volcano region hydrological basins

The Volcano region is divided into 16 hydrological drainage basins in the four districts as highlighted table 8. Assessing the number of people affected and their adaptive capacity requires household level data at the basin level. The national household survey, EICV 5, produces

¹⁴ As Rwanda moves up the development ladder, it needs an investment strategy that supports its economic growth and development aspirations – including those in Vision 2020, the Vision 2050 blueprint, and the National Strategy for Transformation (NST) while assuring the continuity and sustainability of such progress in the face of climate change.

data only at district level, so further assumptions are needed. We have used geospatial mapping of the basins to establish the rural and urban populations of each basin. Subsequently, we have used EICV 5 information on rural and urban populations in each of the districts, to estimate poverty rates, literacy rates, dependency of agriculture, and off-farm opportunities in each basin. EICV 5 indicates the number of rural and urban households in each district and how much land each household owns. GIS data indicate the area of agricultural and built-up land in each basin. Combining this information can establish an estimated number of households on respectively a ha of agricultural and built-up land.

On agricultural land, EICV 5 indicates the average landholdings per rural household in each district. This is used to establish number of households per hectare (Table 7). From this, GIS data can establish the total number of rural households in each basin as well as the number of rural households at risk. Similarly, EICV 5 indicates the total number of urban households in each district. The number of urban households per hectare of built-up area can be established with total number of urban households by district and the ha on built up area from GIS.

Table 7: Assumptions used in calculating rural and urban households

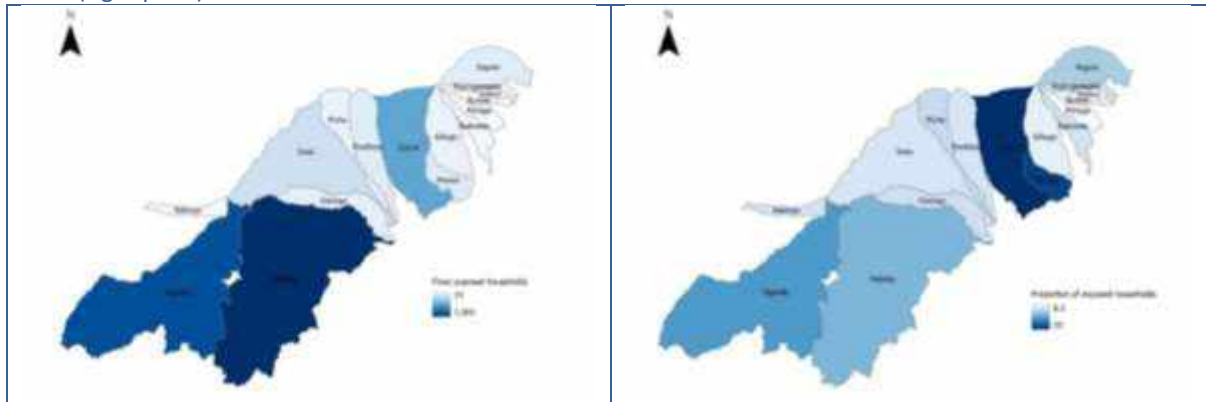
Districts	Farmland per HH (ha)	Rural households (ha ⁻¹ agricultural land)	Urban households (ha ⁻¹ built-up area)
Burera	0.31	3.2	30
Musanze	0.28	3.6	190
Nyabihu	0.24	4.2	30
Rubavu	0.18	5.6	70

Table 8 shows the distribution of households in respectively rural and urban areas and district for each basin. This table is applied to convert EICV 5 data on vulnerability indicators into basin-level estimates on poverty, literacy, and dependency of agriculture and access to off-farm jobs. It is derived from GIS data on landcover combined with the estimated households per rural and urban hectares in Table 7. It is estimated that 25,000 households (100,000 people) are at risk of flooding disasters. Most of these households are found in rural areas. Mutoba, Ngando, and Cyuve have the highest households at risk, and they are the basins with the highest urban households at risk. The households at risk account for 13% of the total households in the region. Figure 19 clearly depicts how Cyuve has the highest share of exposed population compared to other basins.

Table 8: Rural and urban distribution of basins in districts

Basins	Burera		Musanze		Nyabihu		Rubavu	
	Rural	Urban	Rural	Urban	Rural	Urban	Rural	Urban
Burera	99%	1%						
Cyuve	4%	0%	52%	44%				
Gakingo			99%	1%				
Gihugo	73%	1%	26%	0%				
Gisovu	100%	0%						
Kabingo					30%	0%	70%	0%
Kagere	97%	3%						
Minoga	92%	8%						
Muhe			64%	36%				
Mutoba			31%	4%	51%	13%		
Mwora			76%	24%				
Ngando			1%	0%	30%	3%	64%	2%
Nyarugaragara	95%	5%						
Ruhondo	98%	2%						
Rwebeya			52%	48%				
Susa			95%	5%				

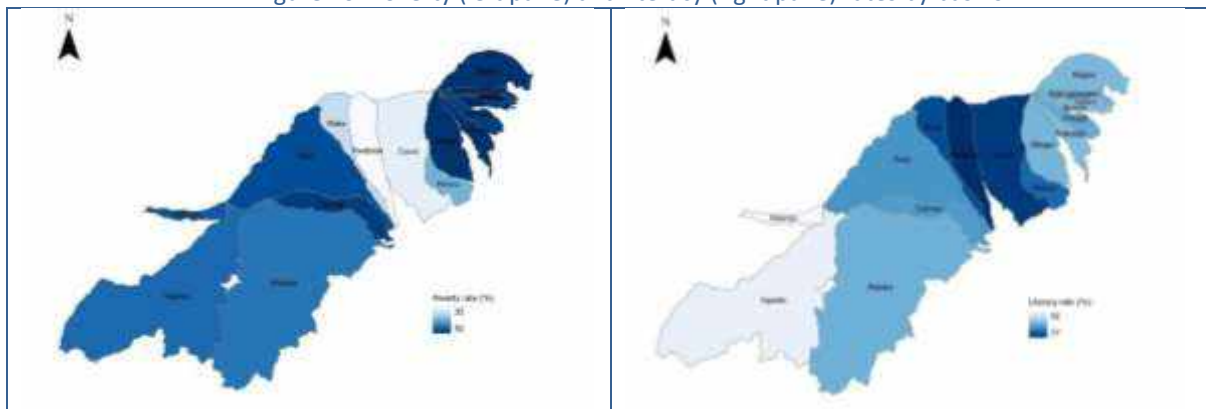
Figure 19: Number of households at risk from flooding in a 25-year event (left pane) and proportion of households at risk (right pane)



Adaptive capacity of the households in the at-risk basins

Overall, 45% of people residing in the selected basins for this study are below the poverty line. Muhe, Rwebeya, and Cyuve are more affluent as most of their parts are found in urban Musanze, which implies that people have higher incomes in these 3 basins. Households in Burera have higher poverty rates as the Burera district is predominantly rural. This sheds light on the existing low adaptive capacity in most basins, which seconds the importance of not only managing floods and mitigating their effects, but also coming up with interventions to lift people out of poverty and boost their adaptive capacity. The literacy rate in the Volcano Region (16 basins) is 69%, versus 73% at the national level. Urban basins such as Rwebeya, Cyuve, and Muhe are the most literate basins, whereas Ngando and Kabingo are the least literate. The largest portion of Ngando and Kabingo are located in rural Rubavu, which has the lowest literacy rates. The high incidence of poverty and low literacy rates can be used as proxy indicators for low adaptive capacity (Figure 20).

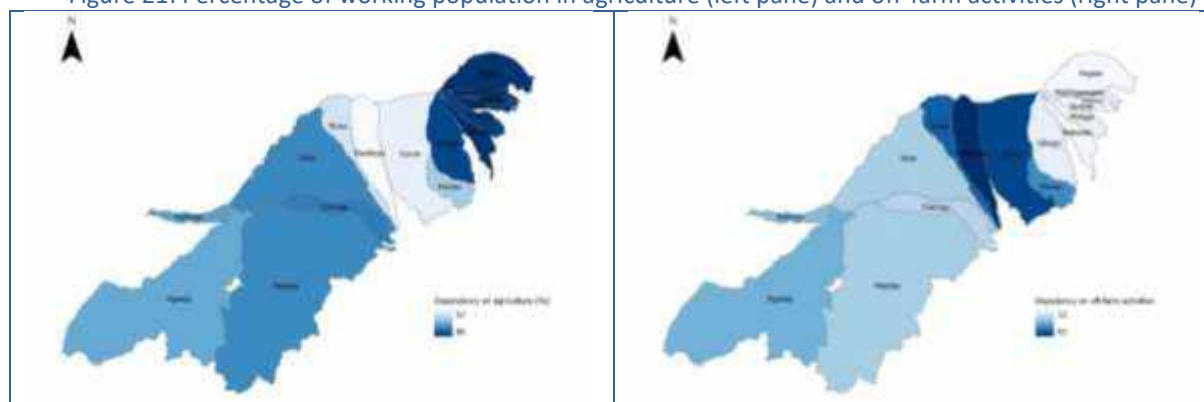
Figure 20: Poverty (left pane) and literacy (right pane) rates by basins



Agriculture and off-farm activities in the

Figure 21 shows that basins with high dependency on agriculture have fewer people working in off-farm economic activities. In the 16 basins, 73% of the working population is employed in agriculture, which is more than the national rate (70%), and the remainder (26%) participate in off-farm activities mainly driven by trade and construction sectors.

Figure 21: Percentage of working population in agriculture (left pane) and off-farm activities (right pane)



These two maps depict how the area is divided into three parts based on economic activities: 1) the northern-eastern part comprising basins that are in Burera district (Burera, Ruhondo, Nyarugagara, Minoga, Kagere) 2) the middle part with basins (Cyuve, Rwebeya, and Muhe) located, of most is in urban Musanze, and 3) the western-southern part with basins found in Nyabihu and Rubavu. The northern-eastern part has the highest share of people doing work in agriculture, of which is subsistence farming. The middle part has the highest dependency on off-farm activities such as tourism and hospitality and trade. And the western-southern region has high dependency on agriculture, but more involvement in off-farm economic activities compared to the northern-eastern part. This information sheds light on how the livelihood options being proposed should not only be implemented in Musanze, but also in other districts where people are still trapped in subsistence farming.

2 Project Objectives

The overall objective of this project is to enhance climate resilience in the northern Rwanda through reducing vulnerability of local people to climate change impacts as well as improve households' adaptative capacity through sustainable climate-resilient livelihoods. The strategy of the project is to increase the ability of communities to cope with risks and effects from recurring floods, landslides and erosion by implementing a programme that blends sustainable settlements and alternative livelihoods in one of the most climate sensitive and vulnerable areas of Rwanda.

3 Project Components and Financing

Table 9: Project components

TOTAL PROJECT COST		\$ 9,977,555
Community in high-risk zone settled in climate resilient green village		\$ 5,672,000
	Housing	\$ 2,767,500
	Site servicing, infrastructure, and landscape	\$ 2,052,000
	Public and Civic Buildings	\$ 852,500
Improved Livelihoods and Economic Resilience		\$ 2,890,000
	Transitioning from low to high value agriculture	\$ 920,000
	Linking communities to the wider macro-economy	\$ 375,000
	Effective relocation and integration of communities	\$ 825,000
Impact monitoring		\$ 1,369,920
	Project Execution Cost	\$ 684,960
	Implementing entity fee	\$ 4,100

4 Projected Calendar

Figure 22: Project timeline



PART II: PROJECT /PROGRAMME JUSTIFICATION

A. Project Components

1. Component 1: Resettling households living in high-risk zones to a smart green village

Following the identification of the high-risk zones and the most effected communities in the Volcanoes region, several climate adaptation options were considered and evaluated.

One option would be to keep the community in place and seek to mitigate the climate risks in situ. This option would be the least disruptive for the community and their livelihoods however it would not eliminate or fully mitigate the climate impacts give the topography and the flood risks associated the heavy rainfall in the region. Some of the proposed mitigation measures are extremely expensive - construction of radical and progressive terraces. In Rwanda, given the topography, terraces have been implemented to address soil erosion and stabilize steep hills to allow for effective cultivation and use of the land. Nevertheless, the cost of implementing radical and progressive terraces is high - estimated at US\$ 2,227 and US\$1,776 for terraces rehabilitation per hectare respectively (Ujeneza et. al. 2018). At this cost, the type of low value farming and land fragmentation would undermine the economic case for the investment in radical or progressive terracing.

The catastrophic flooding and landslides on the 5th of May 2023, highlighted the need to take radical measure to address the significant risks communities living in parts of the volcano region. The various government agencies reviewed the hydrological models and assessments of the region to determine the most at risk areas and communities. The government the prioritized the relocation of these communities under a multi-donor funded project Landscape Approach to Forest Reforestation and Conservation (LAFREC) project, which promoted flood risk relocation in this first phase, additional mitigation interventions would include;

- **Transition from low value low intensity agriculture** to higher value agriculture taking place on small plots of land in the relocation zones. The relocated and host communities would be supported to diversify the crops they plant with the change driven by access to high value markets both in the region and in Kigali. Consolidation would enhance economies of scale which mitigate risks associated with subsistence agriculture. There are examples of this approach in the region where communities in the Kinigi areas that have been relocated are now involved in more intense and high value agriculture that has generated greater returns than previous subsistence activities.
- **Diversify livestock farming systems** – In addition to the transition to higher value agriculture, the affected communities would be encouraged and supported to further diversify their agricultural and livelihood activities to include livestock farming. Increased investments in livestock farming can take place on smaller plots of land with the infrastructure built to withstand the adverse climate impacts – heavy rainfall, flooding, and landslides.
- **Popularize crop and livestock insurance** – to further enhance resilience of the relocated communities, awareness and use of agricultural insurance would be encouraged and expanded as an additional mitigation against climate and other shocks. It is acknowledged the national uptake of agricultural insurance is very low – estimated at 2-3%% (Finscope 2020). Therefore, expanding access to insurance together with the transition from low value agriculture should enhance the resilience of the community to be resettled both in terms of climatic and economic shocks.

1.1. Constructing climate resilient green village with 510 (AF funding135) dwelling units

Under this output, 510 (AF funding 135) households will be relocated from a high-risk zone to a smart green village. AF will finance 135 and GoR 375 dwelling units. with an average 75 square meters per family and plots of 300m² built in a 2-in-1 housing model by beneficiary families under the supervision of a building engineering firm;

- **Green homes:** structurally sound seismically safe homes, built with locally sourced materials, with passive ventilation, climate-smart responsive building siting/orientation, following latest Rwanda Building Code standards such as DRS 484 Adobe Block Specification, Technical Guidelines on Adobe Block Construction in Rwanda. See Chapter 4, Basis of design for the 2-in-1 house, for detailed engineering loadings and standards;
- **Smart Green infrastructure:** water collection and recycling/reuse in homes and farmland, access to affordable and sustainable electricity such as solar, all units provided with clean water supply, zero-energy waterless composting toilets with waste revalorization with outputs of solid fertilizer as well as Nitrogen-rich liquid fertilizer, promoting waste to resources and a circular economy approach.
- **Solid Waste management:** separation of organic waste from non-biodegradable waste providing appropriately designed compost stations at community level for organic waste and a central waste transfer facility at community level for plastic, metal, wood, waste and other recyclable materials also promotes a circular economy and waste to resources approach.
- **Integrated Water Management:** Water conservation and watershed management with Sustainable Drainage Systems, Bioswales, Rain-gardens, and Retention ponds. Stormwater design to naturally treat pollutants, provide erosion control and natural water filtration that prevents valuable soil runoff and provides more clean drinking water;
- **Climate Smart Conservation agriculture:** 0.1ha (1000 m²) of agricultural land per family with increase agricultural productivity practices, with organic and local climate-resilient variety of seeds, and conservation best practices such as agroforestry that support increased biodiversity;
- **Restorative landscape:** Restore landscape and integration of edible landscapes in village fabric along streets and pedestrian paths to maximise food production, provide shade, and sequester carbon.
- **Regenerating Ecosystems:** use of native plants to support biodiversity and ecological health integrated within the village design with natural corridors connecting with wider ecosystems.

The architectural design of the housing units was developed with the following considerations in mind:

- **Sustainability** – reduce the environmental and carbon impact of the building through the selective use of materials
- **Local Fabrication (Lo-fab)** – encourage the use of local materials and crafts in the construction that promotes economic growth and education
- **Innovation** – use appropriate innovative materials and construction techniques that advances the local construction industry
- **Cost efficiency** – meet the projects aspirations with cost effective solutions
- **Safety** – provide structural robustness in the permanent case and ensure the building can be constructed safely
- **Durability** - design and detail the building to be long lasting with minimal maintenance - prolonging the value of the investment
- **Comfort** - provide sufficient ventilation and cooling to ensure occupants are both productive and healthy.

In addition, potential beneficiaries of the Smart Green Village have been consulted prior to the design phase to capture their preferences, which were also considered.

1.2. Constructing community buildings

The Smart Green Village shall also have a Village Hub, ICT Smart Plan, which is an integration of community public and civic buildings that will offer basic health, education services as well as opportunities for new off-farm jobs. These will include a health center, an early childhood center (nursery school), a mini market, a multipurpose hall with Office of local leaders, ICT community room, and Police station. The multipurpose hall will provide space to hold different meetings, events and ceremonies including for increasing community-awareness on climate-change, disaster risk mitigation, ICT Capacity Building and Skill Development, TVs, historical and cultural events. The ICT room will have Irembo services such as tax declaration and driving permit. School students and rural people shall be allowed to use the computer for consulting internet and use of Irembo services free of cost from the ICT community center

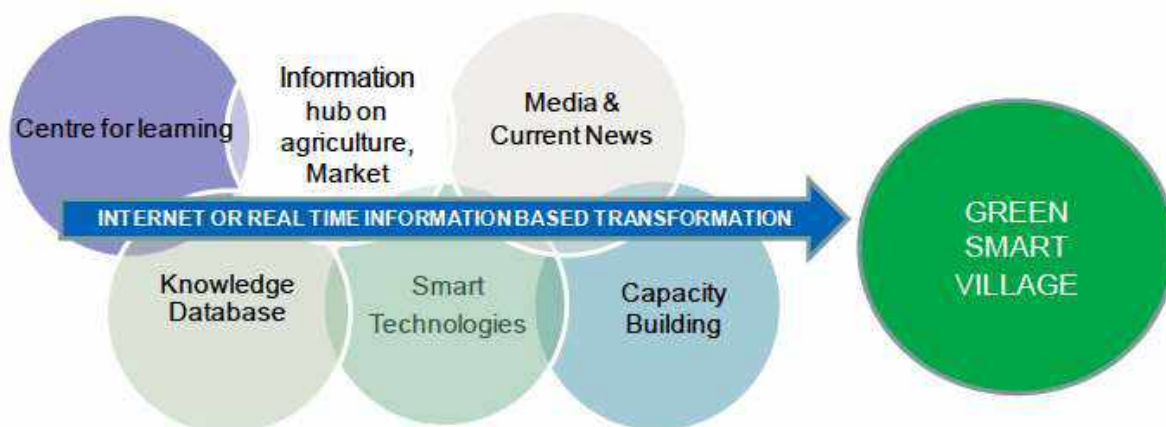
Table 10: Budget breakdown for social amenities

	Area	Unit	Rate	Amount
Health Post	200	m2	\$550.00	\$110,000
Early Childhood Center (Nursery)	200	m2	\$550.00	\$110,000
Mini Market + Post Harvest	500	m2	\$550.00	\$275,000
Multipurpose Hall	400	m2	\$550.00	\$220,000
Office of local leaders	100	m2	\$550.00	\$55,000
ICT Community knowledge centre (Irembo)	50	m2	\$550.00	\$27,500
Police post	100	m2	\$550.00	\$55,000
TOTAL				\$852,500

The aim of the Village Knowledge hub with the provision of the ICT Community knowledge centre in the Multipurpose Hall is to have a SMART Green village which will be part of the following:

- Centre for learning and innovation. Training of farmers in modern farming techniques.
- Information hub will help transform agriculture into a viable market-oriented venture.
- ICT Community knowledge centre complete with computers and internet connection to help farmers get information on markets and integration of Irembo services.
- “Smart technologies” shall create more efficient systems and better-informed communities and village residents.
- Economic development and the creation of jobs.
- Promoting resource efficiency and mitigating climate change.
- Running Green villages more efficiently Supporting communities.

Figure 23: Internet or real time information- based transformation¹⁵



Villagers will be empowered by the presence of a hub delivering ICT and non-ICT products and services on many grounds: by providing an online and physical platform to buy and sell services and products, the Village Knowledge Hub increases the possibilities for businesses to sell and adapt themselves to local demands.¹⁶

- Obtain valuable information through the internet on local or national political issues or on work-related issues, such as agricultural prices.
- Villagers can communicate through access to new communication technologies. They can share news with families and friends, network and share with business partners, develop information and broadcast it on the web, and make their opinion heard at different levels on various online platforms and forums;
- People from rural areas save money and time as products and services, such as administrative documents, are made available via their Village Knowledge Hub (ICT/ telecentre), thus eliminating the need to travel to large towns to access them;
- The Village knowledge hub services can also increase employment opportunities in rural areas:
 - ICT skills enable the local population to apply to more types of jobs as skilled workers. These skills can also support villagers to open new enterprises, or strengthen the management capacities of existing ones.
 - Village Knowledge Hub contributes to the reinforcement and creation of local micro, small and medium enterprises (MSMEs).

1.3. Capacity building of beneficiaries in construction and maintenance of the smart green village

Adaptive use of traditional local materials also allows for more of the labor associated with construction to be performed by residents. Constructing the community buildings can provide a skill building opportunity, helping train residents for construction of their own homes and giving them skills for future non-farm work. During the construction phase of the model village, beneficiaries will first be trained on construction and site preparation. This will be an integral part of creating local ownership of the model village. The training will also empower beneficiaries, especially those who would like to enter the construction sector with skills, which can help them earn a living from construction works. After the village has been set up, households will be trained on the use and maintenance of the houses including rainwater harvesting, waste management systems, how to use and maintain renewable energy infrastructure, cooking places, bathrooms,

¹⁵ A toolkit for the development of Smart Green Villages in Rwanda, REMA, 2015

¹⁶ A toolkit for the development of Smart Green Villages in Rwanda, REMA, 2015

lights, and more. This training will ensure that beneficiaries feel responsible for houses, which will enhance the project's sustainability.

Table 11: Capacity building for green housing sustainability

No	Training topic	Potential beneficiaries	Expected duration per training session
2.1.1	Construction skills (carpentry, electricity, plumbing, masonry)	Beneficiaries of the green model village	4 weeks for each skill
2.1.2	Use of houses and maintenance of different components of the houses	Beneficiaries of the green model village	1 week
2.1.3	Management of renewable energy systems such as biogas	Beneficiaries of the green model village	2 weeks
2.1.4	Management and monetization models of waste	Beneficiaries of the green model village	2 weeks

2. Component 2: Transitioning from low to high value agriculture.

Under this component, the relocated and host communities will be supported to gradually transition to high-value crop and livestock agriculture that targets high-end tourism market in the region and other markets in urban areas like Kigali and Rubavu will be introduced.

Among households to be relocated, farming their crops is the most common source of income with a 51% share in a household income. Although a third of households indicated that they receive income from off-farm activities, this source only accounts for a small proportion of the household income on average. In addition, most households reported to have experienced a negative change in their income in the past 2 years, The decrease in income can be attributed to climate change impacts such as heavy rainfall, shift in the start date of rainy seasons, soil erosion, etc.

Table 12: Preferred sources of income

Preferred sources of income	Adults (respondents)	Male youth	Female youth
Agriculture	70%	68%	64%
Animal raising	15%	6%	
Crafting	3%	10%	2%
Carpentry		2%	1%
Tailoring	1%		27%
Other	11%	14%	7%

This type of subsistence agriculture that is heavily dependent on mono cropping is not viable and continuous leaves communities at risk of all kinds of shocks and in in a vicious cycle of poverty. The population densities of the districts in the VNP region (Rubavu 1,614; Musanze 1,157; Burera 682; and Nyabihu 624) are much higher than the national average of 503 inhabitants per square kilometer. This means there is extreme pressure on land and the natural resources. The small and continually fractured plots of land make it difficult to achieve economies of scale or develop commercial agriculture. low levels of productivity for both crops and livestock due to low input use, poor production techniques and inefficient farming practices further undermine the case for this type of subsistence agriculture. Climate change events such as intense rainfall that leads to floods and soil erosion that impede productivity in this sector. The low and limited use of insurance as a risk mitigation measure means that the community is less resilient to climate and economic shocks. These constraints highlight the need support the 510 (AF funding135) households to use the relocation to gradually transition to more high value

agricultural activities and diversify sources of income to enhance their resilience to climate shocks.

Given the above, for this component we propose the following outputs for component 1 are: i) promote the use of greenhouses at by communities to intensify the growing of high value horticulture destined for the Kinigi high-end tourism hotel, ii) promote the diversification into the cultivation of mushrooms, cherry tomatoes, herbs, garlic, ginger, that are destined for the high-end tourism market in Kinigi and Kigali, iii) develop a sustainable bamboo agro-forestry industry that supplies – construction, food, and FMCG products, and iv) develop community-based poultry industry that supplies meat and eggs to the high-end tourism market in Kinigi and Kigali.

The outcome of this component is **increased household incomes and food security through the adoption of climate smart high value agriculture**

2.1. Promote the use of greenhouses at by communities to intensify the growing of high value horticulture (mushrooms, cherry tomatoes, herbs, garlic, ginger, etc) destined for the Kinigi high-end tourism hotel, Kigali and the regional export market (DRC and Uganda)

Climate change poses a significant threat to farmers, which affects their yields and their ability to tap into local and regional markets and keeps them trapped in extreme poverty. More than 86% of interviewed households mentioned that it has been raining more compared to 10 years ago. About 40% expressed that the rainfall variability is much more intense. Most households to be relocated reported that have been negatively impacted by this rainfall variability. To address this challenge, this project will enable relocated households and host communities to have access to the greenhouse technology to cultivate horticulture products (i.e vegetables, fruit etc) on a large scale and in good conditions, which will enable them to supply their produce to hotels in the Kinigi sector and beyond. With greenhouse farming, farmers will be able to reduce the effects of unfavorable weather conditions such as high temperature, strong winds, heavy rainfall, hailstorms and as well as pests and diseases on crops, hence leading to increased yield. They will have the ability to grow crops all year round with irrigation instead of depending on the two annual rain seasons. Under this output, farmers will be provided with trainings on the cultivation of these crops, and in addition, access to agricultural inputs such as seeds, fertilizers, and pesticides will be subsidized. In addition, farmers will be linked to markets such as hotels and restaurants in Musanze and Kigali. As a livelihood activity in the smart green village, 7 greenhouses will be provided to benefit the 510 (AF funding135) relocated households and their surrounding communities.

2.2. Promote the diversification into livestock production targeting for the high-end tourism market in Musanze, Kigali and the export market.

Livestock farming of cattle, sheep, chickens, goats, and pigs is mainly a household level activity in the VNP landscape. However, during field visits, we have seen a few commercial level livestock farming of chicken and pigs in Bugeshi sector where the target market is eastern DRC. There are also bees keeping in Burera district's sectors of Cyanika and Rugarama where the honey is processed, packaged and exported through NAEB. Livestock populations in Rwanda are growing, but productivity levels are low, primarily due to a lack of quality concentrated feeds and their high cost.

In Rwanda, poultry farming is prevalently rural and family-based (extensive / traditional), with 69% of all poultry farmers rearing one to two chickens. The number of chickens reared in Rwanda varies between 5 and 7 million, of which only one million is part of the commercial production system¹⁷. Although the local, indigenous chicken now constitutes 75% of the chicken population, only 32% of the chicken meat and 34% of the eggs are produced in the village chicken systems.

¹⁷ Ibid

Overtime, the sector has started to attract entrepreneurs that set up medium to large-scale farms, initiating the development of the commercial poultry system (intensive) in Rwanda.

In the region, poultry farming has been identified as the best option for small holder farmers to engage in the livestock value chain. The cost of entry is low, and the running costs are affordable given the income levels for farmers in the region. Rwanda is a net importer of poultry products mainly due to low levels of productivity in both eggs and meat. This output aims to support relocated households in poultry farming. In the Smart Green Village, a 600 m² poultry farm will be constructed to house 6,000 chickens that can produce 1,200,000 eggs a year, which can generate revenue of USD 100,000 a year. This poultry farm will create full time jobs for relocated households and surrounding communities. In addition, the farm will help address malnutrition issues among children.

2.3. Develop a sustainable bamboo agro-forestry industry that supplies – construction and FMCG products

Given the restricted access that is linked to wood/timber through Rwanda’s “sustainable forests and agroforestry” strategy, it is essential to find alternative materials in the construction sector that are climate resilient and sustainable. Houses in Rwanda currently use resources that are not produced by rural communities – steel roofing sheets, cement, trusses, doors, flooring, etc. The exception is bricks, but substantial energy mainly derived from firewood is used in their production. This exacerbates deforestation, soil erosion and loss of fertility. Eventually, their production could lead to an increase in land degradation, to such a point that it would no longer be cultivable since all the clayey topsoil would have been removed. Reducing usage of conventional materials such as wood/timber considerably reduces the degradation of forests and land in the country.

This output entails bamboo forest farming with the goal to replace wood usage in construction and in the production of fast-moving consumer goods (FMCGs). Bamboo can be rapidly proliferated as a construction material as it is highly renewable and a good substitute for traditional wood/timber inputs. Under this output, 24,000 bamboo plants will be planted on a 50-hectare land - 5 ha will be in the smart green village and 45 ha in surrounding villages. Bamboo farming will create jobs from plantation to harvesting.

3. Component 3: Diversification of income generating activities/livelihoods

In addition to modernizing the agriculture sector, there is a need to empower communities to have alternative sources of income. Since most people in the Volcano Region have no primary education let alone secondary education and have not received vocational training, the majority is doing work in subsistence agriculture, especially in rural areas. This information highlights the need to build people’s capacity in off-farm skills by creating spaces that enable the population to acquire technical skills that can help them transition to an off-farm economy.

This component aims at creating new business opportunities for relocated households and surrounding communities all that is aimed at increasing resilience to economic, social, and climatic shocks. The component has the following outputs: i) develop cottage industries making unique community handicrafts targeted at the tourism market, ii) create a cultural art village that generates awareness of and promotes the local culture in Kinigi, iii) establishing a bamboo fast-moving consumer good production unit, iv) enhance TVET infrastructure and skills that would link the community into the services and construction sectors, v) establishing a cooking pellet processing unit. The tourism and manufacturing sector will be strengthened as a result. The outcome of component 3 is **increased incomes through diversified livelihoods, enhanced technical skills, and community tourism.**

3.1. Develop cottage industries making unique community handicrafts targeted at the tourism market

Among interviewed households, 10% of their male youth would like to have crafting as their source of income while 27% of female youth have tailoring as their source of income. Musanze district is one of the most important touristic sites in Rwanda due to Volcano National Park that hosts the rare mountain gorillas. Around 15,000 gorilla permits are sold every year. This growing tourism sector in the Region creates opportunities for local people to be part of visitor experience through unique and durable handicrafts.

Under this output, relocated households and surrounding communities will be trained in handicrafts and offered raw materials to start producing crafts. Extensive range of handicrafts that will be made include wooden products; ceramics and pottery; hand textiles and hand-loomed products; embroidery and woven products; basketry and mats. The Volcano Region offers vast access to raw materials needed for handcrafting: wood, bamboo, reeds, banana fiber, clay, stones, etc. Producers of these crafts will get a chance to exhibit their crafts in the cultural art village described in the next output.

3.2. Create a cultural art village that generates awareness of and promotes the local culture in Kinigi

The government of Rwanda through the Tourism Board has positioned the country into one of the leading Tourist destinations in Africa – And this is despite her small size and fewer natural resources compared to her neighbors. Creative arts in which people in the community share their heritage treasures that show their ways of living to visitors have become an important aspect of tourism in Rwanda. Creative arts is a livelihood option that can reduce dependency on forest resources, which promotes conservation.

Under this output, a cultural art village will be set up where exhibiting the region's unique culture through arts will take place. The village provide space for artists to showcase their arts such as dances, poems, handicrafts, etc. to visitors who potentially come to visit the VNP. In addition, the cultural village shall have a coffee shop where visitors will be able to get coffee, tea, beverages, and light meals. The cultural art village shall also have rooms for accommodation where visitors of the Volcano region will come and stay while knowing that they are supporting local communities.

3.3. Establishing a bamboo fast-moving consumer good production unit

Bamboo is an eco-friendly and sustainable material than the conventional wood. Bamboo grows faster with little need of fertilizer and pesticides and releases 35% more oxygen than a regular tree of the same size. Bamboo products are durable and moisture resistant. This output aims to develop a new value-added bamboo industry to link bamboo plantations with a bamboo product market that will provide various kinds of products for daily use to meet higher demands for livelihood in rural areas and to improve living in urban areas. The FMCG products that will be produced include chicken utensils, household items such as curtains, mats, toothbrushes, and more. This production unit will create job opportunities for local people.

3.4. Enhance technical and vocational skills that would link the community into the services and construction sectors

In the Volcano Region, only 7% of the population above 16 years of age have a TVET education. Low TVET education implies that society has fewer technical skills which are essential for creating self-employment opportunities. Among beneficiaries of the Smart Green Village, 11% of households interviewed have members who received off-farm trainings such as culinary art and tailoring. Other training included health-related training for community health workers, conflict resolution, and more. This low penetration of off-farm training depicts the current skill gaps among beneficiaries and the surrounding communities. This justifies one of the

aspects of livelihood improvement, which is to focus on skills development.

Table 13: Off-farm training

Off-farm trainings	Percentage
Tailoring	1.0%
Carpentry	0.7%
Welding	0.0%
Painting	0.3%
Food processing	0.7%
Culinary art	2.3%
Other	6.3%

This output entails empowering 1000 residents of Kinigi including those relocated to the smart green village to take short term TVET courses up to 6 months. This will provide participants with a range of technical skills such as carpentry, welding, tailoring, culinary art, and more. The funds will be used to finance course fees for 1000 people. This output will equip the community with practical skills to help them have diversified livelihoods that will better their standards of living. While output 1.3 will focus on beneficiaries of the smart green village and the trainings will be short, this output will also support people from surrounding communities.

3.5. Establishing a cooking pellet processing unit

Cooking fuel such as firewood and charcoal present significant challenges in Rwanda such as carbon emissions, deforestation, and indoor air pollution. In fact, 80% of households use firewood and 17% use charcoal in the country. This affects women and children who spend time collecting firewood. Under this output, a processing unit to produce green cooking pellets from human and animal waste will be established in the smart green village. These pellets are environmentally friendly solution because they do not emit much smoke and reduces the risk of contracting respiratory infections. These pellets will be an alternative source of energy for relocated households and surrounding communities.

B. Environmental, Social, and Economic Benefits

Benefits for community, country, and international practice

The relocation of the 510 (AF funding135) households will positively impact communities in the region in several ways. The expansion of the VNP will involve reforestation in the vacated lands which in turn will help mitigate downstream flooding and soil erosion. The transition to more sustainable and higher value livelihoods would ensure sustainable agriculture that reduces soil erosion and degradation and further land fragmentation. The diversification of livelihoods to include livestock and other services linked to agriculture and tourism will provide a template on how to progressively transition farming communities to more commercial economic opportunities that deliver greater resilience against economic and climate shocks. The relocation is also expected to pilot sustainable and equitable relocation as model for climate mitigation that would then inform both Rwandan, regional, and international climate mitigation strategies.

Benefits for host communities in the relocation sites

The land allocated for resettlement is owned by the government and has mainly been used for agriculture. The allocated land does not have any dwellings or communities on it at present. In all the proposed interventions, we refer to the host community in the area as a beneficiary of the relocation given that these communities are adjacent to or near the relocation site. The host communities will benefit from the upgrading of social and economic infrastructure that is part of the relocation of the 510 (AF funding135) households. These infrastructure upgrades include



education and health facilities; roads, electricity, water, mobile telephone and internet access etc.

Benefits for the community being relocated.

The activities outlined in components 2 & 3 cannot feasibly be organized in the current location. The current location is very susceptible to negative climate related impacts such as flooding and landslides. Similarly, given the proximity to the VNP there have been cases of human wildlife conflict – with wildlife straying into farms of the communities that are to be relocated. Nevertheless, it is acknowledged that the relocation will lead to the disruption of livelihoods for those involved. Compensation has been offered to help minimize the cost of the disruption. GoR has put in place a package of funding that will be used to fund the compensation. A Relocation action plan has been developed and it has articulated the size and nature of the compensation - (i) land; and (ii) livelihoods; and (iii) disruption to their lives. From the RAP, each household will be have entitlement to Compensation for the structure at full replacement cost, 5% Disturbance allowance replacement cost, and other benefits. Additionally, GOR will implement a one-year transition support package (\$120k for the transition over 1 year working with NGO to pilot the livelihood options) is currently being developed. This is expected to address the transition related livelihood risk.

Approach to equitable beneficitation – Gender assessment

At the start of the project, a gender assessment was undertaken to help guide its design¹⁸. This assessment was designed to inform the design of both the GCF and the AfD funding proposals. The assessment provides a methodology to ensure that gender mainstreaming was embedded in the design and implementation of the project. The table 14 provides a summary of the issues raised and how they were expected to be addressed to ensure women and other marginalized groups have active and equitable beneficitation from the implementation of this project.

Table 14: Gender considerations for project implementation

Project outcomes outputs	Gender considerations at design	Situation after intervention
Outcome 1: Flooding leading to significant damage and loss of life has a return period of at least 50 years.		
Output 1.1: Soil and water conservation measures on hill sides implemented.	Participation of local female and male farmers in training to increase their knowledge on soil conservation technics and provide manual labour on and around their farms	Improved practices for soil conservation by female and male farmers Freeing more time for women to participate in income generating activities
Output 1.2: Flood control measures in gullies, streams and rivers constructed.	Consultation with community members to identify and address any potential safety issues for women and children.	Improved safety for women and children
Output 1.3: Water management committees operational	Improved participation and representation of women in Water Resources Management Committees (WRMCs) and Water Users Associations (WUAs)	Accountability of local government on the promotion of gender equality and women’s empowerment strengthened. Improved access to services and information to women and men for their empowerment
Outcome 2: Local communities are more resilient to the impacts of climate change due to improved housing and expanded economic base.		
Output 2.1: Establishment of green housing in Rural Development Hubs	Avoidance of sexual violence in the construction sites	Housing conditions and affordability: Support to vulnerable households including female-headed households living in risk zones

¹⁸ Vanguard Economics (2022) Gender Assessment - Consultancy to Prepare Project Proposals For Climate Adaptation In The Volcano Region Of Rwanda

	Establishment of Grievance Redress Committees to prevent sexual harassment through community mobilization and identify and address cases of gender-based violence	
Output 2.2: Small business development supported in Rural Development Hubs	Bridging skills gaps between women and men through entrepreneurship and skills training and business support	Improved and sustainable livelihood for vulnerable women and men new settlers of green village Improved participation of women in the local economy
Outcome 3: Governance in the four districts is strengthened.		
Output 3.1: Institutional capacity strengthened	Capacity building initiatives will include skills for gender mainstreaming and analysis and awareness of available national tools.	Improved gender competencies for civil servants
Output 3.2: Knowledge management and learning materials prepared and disseminated	Ensure women's and youth's voices are heard, the language is gender sensitive and the dissemination uses different channels to ensure women and other vulnerable groups are reached.	Improved knowledge base on gender in ENR&CC

Specific gender assessment of the programme beneficiaries

From the ESIA and the RAP 32% households were led by women. Therefore, it is critical to ensure that there is equitable and fair access relocation compensation and the livelihood support interventions. The various components of the programme have been designed to address the gender assessment that was included in the ESIA. We surveyed 304 of the 510 (AF funding 135) households to be relocated and gathered data that informed the specific socioeconomic gender assessment of the programme beneficiaries¹⁹. Some of the key insights in the community to be relocated are below:

- Women respondents have a higher percentage of the illiteracy compared to men. Hence it would be important that any interventions include focused capacity building and awareness targeted at female led households. All material will need to be in Kinyarwanda to ensure active participation of women.
- Women-headed households earn less (compared to male counterparts) from off-farm activities and earn relatively more from remittances/charity²⁰. The programme would need to ensure that specific targets are set for active recruitment of women into the economic and livelihood activities outlined in the programme.
- Married women farmers have expressed issues around income management in the HH. They are required to hand over all their earnings to their husbands, who have complete control over financial decisions. Consequently, these women are left with less than 10% of the income they generate in their agricultural activities. The programme would need to ensure that power dynamics at HH level is addressed through education and campaigns.

1. Environmental Benefits

The flood risk model developed at the time of the project proposal development has been proven to be accurate given the most recent flooding that hit the area – 5th May 2023. A total of 4 districts in western province were affected – Musanze, Nyabihu, Rubavu, and Burera. Over 130 lives were lost and over 1,000 homes washed away in the flooding and landslides. Given the above, it's clear that these communities living adjacent to the VNP and the slopes of

¹⁹ Vanguard Economics (2022) Socio economic assessment of beneficiaries - Consultancy to Prepare Project Proposals For Climate Adaptation In The Volcano Region Of Rwanda

²⁰ B. Socio economic assessment of beneficiaries

the volcanoes will need to be relocated to mitigate against further loss of life and livelihoods for the 510 (AF funding135) households.

The project brings significant environmental benefits through sustainable land and water management practices. The implementation of integrated water management measures, including sustainable drainage systems, bioswales, rain gardens, and retention ponds, reduces the risk of floods, soil erosion, and water pollution. These practices contribute to the preservation of valuable soil, improve water quality, and safeguard the local ecosystems. The project also promotes water conservation and the efficient use of resources through water collection and recycling systems, reducing the strain on freshwater sources. The incorporation of regenerative landscapes, native plants, and edible landscapes enhances biodiversity, sequesters carbon, and supports ecosystem health. These environmental benefits contribute to the conservation and protection of natural resources, promoting ecological sustainability and resilience in the Volcano Region.

The project's focus on sustainable construction practices, such as the use of locally sourced materials and climate-responsive building siting/orientation, reduces the carbon footprint associated with traditional construction methods. The cultivation of bamboo for construction purposes offers an eco-friendly alternative to conventional wood/timber, reducing deforestation and promoting sustainable land use practices. The project's emphasis on a circular economy approach, including zero-energy waterless composting toilets and waste revalorization, minimizes waste generation and promotes resource efficiency. These environmental benefits contribute to climate change mitigation, reduction of environmental degradation, and the preservation of natural resources for future generations.

Overall, the project's economic benefits enhance income generation and economic resilience, social benefits improve living conditions and promote social inclusion, and environmental benefits contribute to sustainable land and resource management, mitigating climate change impacts and promoting ecological sustainability.

2. Social Benefits

Social benefits of the project include improved living conditions and enhanced access to basic services for vulnerable communities. The settlement of the community in a climate-resilient green village ensures that families have safe and structurally sound housing units built with locally sourced materials. This promotes community cohesion and a sense of ownership. The provision of clean water supply, improved sanitation facilities, and access to sustainable electricity through solar energy enhances the well-being and quality of life for community members. The establishment of public and civic buildings, including health centers and early childhood centers, ensures access to essential healthcare and education services, particularly for vulnerable groups such as women and children. These social benefits contribute to improved health outcomes, increased educational opportunities, and enhanced social cohesion within the communities.

The project emphasizes gender considerations and social inclusivity. By promoting the cultivation of high-value crops, cottage industries, and cultural art villages, the project creates income-generating opportunities for women, empowering them economically and socially. The project's focus on TVET skills development ensures equal access to technical training for both men and women, enabling them to acquire diverse skill sets and engage in various sectors of the economy. The project's emphasis on cultural preservation and heritage showcases the unique identity of the communities and fosters cultural pride. These social benefits promote gender equality, social inclusion, and community resilience, creating a supportive and empowered environment for all community members.

3. Economic benefits

Economic benefits of the project include increased income opportunities and improved livelihoods for vulnerable communities. By settling the community in a climate-resilient green village, the project promotes economic development through various activities. The construction of green homes creates employment opportunities and stimulates the local economy by using locally sourced materials. The integration of smart green infrastructure, such as water collection and recycling systems, provides cost-effective and sustainable access to water and electricity, reducing household expenses. Additionally, the adoption of greenhouse technology and the cultivation of high-value crops for the tourism market enhance agricultural productivity and create new income streams for farmers. The establishment of cottage industries, cultural art villages, and a bamboo FMCG production unit generates entrepreneurial opportunities, promotes local craftsmanship, and boosts income diversification. These economic benefits contribute to poverty reduction and the overall economic resilience of the communities.

The project also supports the development of sustainable tourism, which has significant economic benefits. By promoting the cultural heritage of the communities and offering unique handicrafts, the project attracts visitors and enhances the tourism experience in the region. This creates income opportunities for the local population through tourism-related businesses, such as bed and breakfast facilities, cultural facilities, and tour guide services. Additionally, the project's focus on agro-processing and agro-logistics stimulates value addition and market-oriented farming, providing a pathway for farmers to access higher-value markets and increase their incomes. The cultivation of bamboo for construction and fast-moving consumer goods further contributes to economic growth and job creation. Overall, these economic benefits foster income generation, improve living standards, and enhance the economic resilience of the most vulnerable communities in the Volcano Region.

Summary of the benefits

The project's components will benefit the 510 (AF funding135) households with spillover effects for communities adjacent to the planned model village. The Smart Green Village will decrease households' vulnerability to the effects of climate events such as landslides and floods. It will also enable them to have access to public infrastructure such as electricity and water. In addition, relocated households and the surrounding communities (Kinigi sector) will benefit from diversified and climate-resilient livelihoods that will empower them to rely less on unsustainable exploitation of natural resources.

Table 15: Summation of the benefits

Type of benefit	Benefit	Beneficiaries
Environmental	Reduced flooding risk	All communities in the Volcano region and specifically the 510 (AF funding135) households earmarked for relocation
	Reduced soil erosion	All farming communities in the region would benefit
	Reduced siltation of watersheds	All communities in the region and those dependent on rivers that flow beyond the region
	Reforestation	The Rwandan natural habitat, the conservation community, communities in the region would benefit
Economic	Improved economic infrastructure provision - roads, electricity, water, markets, Telecons etc	The 510 (AF funding135) households and the host community; The communities in the volcano region following GpR investments
	Shift to higher value agriculture activities	The 510 (AF funding135) households and the host community. If successful there will be a demonstration effect that would benefit other communities in the region and beyond
	Diversified incomes	The 510 (AF funding135) households and the host community who will have been supported by the programme
	Improved access to markets	The 510 (AF funding135) households and the host community

	Higher incomes	The 510 (AF funding135) households and the host community; will be spill over effects for the wider community in the area
	Increased resilience to economic shocks	The 510 (AF funding135) households and the host community through the diversification and linkages to the tourism and other sectors of the national economy
	Improved access to skills development services	The 510 (AF funding135) households and the host community; will be spill over effects for the wider community in the area
Social	Improved access to social services – health, education, social protection, security, religion	The 510 (AF funding135) households and the host community; will be spill over effects for the wider community in the area
	Improved and resilient housing accommodation	The 510 (AF funding135) households that would move into the model green village. There would opportunities for good practice to be replicated to other relocation sites and in other areas of Rwanda
	Improved proximity to political power	The 510 (AF funding135) households will have improved access to leaders in the region and province who will be closely monitoring its implementation and success.
	Improved social cohesion	Less time wasted on fetching water or firewood that is then spend with the family of the 510 (AF funding135) households

C. Cost-effectiveness of the Proposed Project

The project activities are designed to obtain optimum results that will benefit direct and indirect beneficiaries in tangible ways.

- **Focus on Climate Resilience:** The project aims to address climate change impacts, such as floods, landslides, and soil erosion, which pose significant risks to the communities in the Volcano Region. By implementing climate-resilient infrastructure, promoting sustainable agriculture, and enhancing adaptive capacity, the project seeks to reduce vulnerability and enhance resilience. Investing in climate resilience measures can be cost-effective in the long run as it mitigates potential damages and losses caused by climate-related events, reducing the need for costly post-disaster response and recovery efforts.
- **Synergistic Approach:** The project adopts a multi-component approach that integrates various activities, such as relocation, infrastructure development, agriculture diversification, and skills training. This holistic approach allows for synergies and interlinkages between different components, maximizing the impact and cost-effectiveness of the interventions. For example, the integration of smart green infrastructure in the housing units not only enhances climate resilience but also promotes resource efficiency and reduces long-term operational costs.
- **Income Generation and Economic Resilience:** The project emphasizes the diversification of income-generating activities and the promotion of sustainable livelihoods. By supporting the transition from subsistence agriculture to high-value crops, promoting cottage industries, and developing tourism-related businesses, the project aims to improve income opportunities for the vulnerable communities. Economic resilience, coupled with diversified income streams, can contribute to poverty reduction, decrease dependency on external assistance, and generate positive economic spillover effects within the communities.
- **Long-term Environmental Benefits:** The project's focus on sustainable land and water management practices, including the use of locally sourced materials, green infrastructure, and regenerative landscapes, offers long-term environmental benefits. These measures contribute to the preservation of natural resources, reduction of environmental degradation, and promotion of ecological sustainability. While the immediate costs of implementing these measures may be incurred, the long-term benefits,

such as reduced ecosystem restoration costs and improved environmental quality, can outweigh the initial investments.

Cost benefits analysis of the green settlement

Type of costs	Inventory of project cost
Initial investment cost	<ul style="list-style-type: none"> Public and civic buildings, including a health center and early childhood center, provide essential health and education services. Enterprise zone comprising tourism reception, bed and breakfast facilities, cultural facilities, and a guide hub. Market-oriented agriculture focuses on high-value crops and livestock such as mushroom farming and poultry. Agro-logistics area for agro processing and transport support. The orchard area supplies permanent trees and shrub crops to high-end hotels and lodges. Agro-forestry initiatives, including nursery tree production for reforestation and planting of tree corridors as buffers. Access roads within the smart green village. Integration of edible landscapes along streets and pedestrian paths to maximize food production and provide shade. Use of native plants to support biodiversity and ecological health within the village design. Regenerative landscape approach aligning with national development plans and emphasizing the interconnectedness of human, animal, and plant health
Operating costs	<ul style="list-style-type: none"> Maintenance of the green houses Maintenance of houses Maintenance of the water harvesting system and reservoirs Maintenance of school and operating of the school (teachers wages and education material) Maintenance and operating (in-kind contribution by the beneficiaries) of the digester and biogas delivery system Project monitoring and capacity building

Inventory of project's benefits

Categories	Benefits
Farming	<p>Additional value added compared to the situation without the project due to :</p> <ul style="list-style-type: none"> Lower loss due to the use of greenhouse technology Higher yield due to the use of high value crops
Water & sanitation	<p>The increase the daily availability and quality of water compared to the situation without the project generates :</p> <ul style="list-style-type: none"> Additional income from the selling of water Health and economic benefit (lower health cost, gain of working and education days) due to the lower prevalence of waterborne related diseases for the habitants of the village and the surroundings Time saving due to the lower distance to fetch for water for the habitants of the village and the surroundings
Energy and forest	<p>The use of biogas for cooking compared to the situation without the project leads to:</p> <ul style="list-style-type: none"> Health and economic benefit (lower health cost, gain of working and education days) due to the better indoor air quality (the use of wood or charcoal for cooking generates smoke and particle matter) Time gain related to the lower necessity to collect wood Lower pressure on the forest ecosystem. Reduction of greenhouse gases (GHG) emissions by the use of biogas (without the project, GHG emission resulting from the decomposition of organic waste would have happened anyway. Furthermore, GHG emissions from the burning of wood would have happened)

Education	The availability of education services nearby compared to the situation without the project generates <ul style="list-style-type: none"> Higher rate of school attendance by the children living in the region increase the economic rate of return of education (higher productivity of labour) The proximity of the school generates time saving for the children
Better housing	The availability of more secured, better quality and larger houses compared to the situation without the project generates a gain of welfare (better quality of life) for the beneficiaries.
Exposure to natural disaster	The displacement of the beneficiaries to areas with less steep slopes and that are more secure reduces their exposure to natural disasters especially flooding due to excessive rainfall. Compared to the situation before the project, this led to a lower amount of degradation and economic loss (crops production, livestock, houses).
Social cohesion	The people belong to a community that shares some risks and opportunities. The community has a great importance to the beneficiaries. They declare they feel more secure, better integrated in society and more confident for the future.

All major costs and benefits have been included in the CBA except the benefits of social cohesion since no methodology is available for estimating the value of such social benefit at the moment.

The results of the CBA (table below) indicate that the project is efficient when 6% and 3% discount rates are considered, over 15, 20 and 30-year periods. The project is also close to efficiency using a 10% discount rate over 30 years. Considering the highest values for each parameter (i.e. a 6% discount rate and 20 and 30-year periods), the project efficiency is high, leading to benefits surpassing the costs by 15% to 35%. The rate of return also appears to be high (20% and 47%), way higher than any return rate one could obtain through private banking. The internal rate of return over a 30-year period stands at 8.9%, above the 7.7% rate of the 20-year span. Finally, the payback period is of close to 15 years with a 6% discount rate.

All these results prove the project efficiency is high if a sustainable, social and long-term perspective is adopted.

Table 16: results (based on central estimates)

	Discount rates	15 years	20 years	30 years
NPV (in USD)	3%	145'368	370'879	733'398
	6%	-9'679	125'161	301'311
	10%	-154'671	-85'055	-14'949
	13%	-232'438	-189'297	-153'152
B/C	3%	1.17	1.41	1.76
	6%	0.99	1.15	1.35
	10%	0.80	0.89	0.98
	13%	0.69	0.75	0.80
RoR	3%	23%	58%	115%
	6%	-2%	20%	47%
	10%	-24%	-13%	-2%
	13%	-36%	-30%	-24%
IRR		5.8%	7.7%	8.9%
Payback	3%	12-13 years		
	6%	15-16 years		

period	10%	30-31 years
	13%	>31 years

The sensitivity test overall confirms these conclusions. The project has generated more benefits than costs (considering a 6% discount rate over 30 years). Applying 20% margins of error on the costs or benefits does not modify the previous conclusion. Furthermore, no monetary estimate of the benefits of social cohesion, which are described as important by the beneficiary, could be determined. Therefore, the previous results might even underestimate the efficiency of the project. **These results provide thus reliable, decisive and strong arguments in favour of the project's extension and replication.**

D. Consistency with National or Sub-National Development Strategies

The project is aligned with several national strategies that foster climate resilience and sustainable development. Table 17 below provides a summary of the alignment of the project to various government policies.

Table 17:Regulatory framework

Policy / Strategy	Alignment and relevance
National level	
Rwanda Vision 2050	<p>Vision 2050 speaks to specifically the following overarching goals that are aligned with the objectives of this proposal</p> <p>Growth and development will follow a sustainable path in terms of use and management of natural resources while building resilience to cope with climate change impacts.</p> <p>Rwandans aspiration for high quality of life will be further appreciated through the quality of the environment, both natural and built.</p> <p>Mindset and developmental transformation in Rwandan society that is necessary to achieve the desired carbon-neutral and climate resilient economy.</p> <p>Efficient use of land across sectors will be guided by the National Land Use and Development Master Plan (2020-2050).</p>
National strategy for Transformation (NST1)	<p>Under the economic development pillar, a key priority area relevant for this proposal is the need to “Promote sustainable management of the environment and natural resources to transition Rwanda towards a Green Economy”. Specifically, in relation to this project alignment with the NST is demonstrated by;</p> <p>Priority 41 - Scale up the production of high-value crops including: horticulture (flowers, vegetables, fruits), among others</p> <p>Priority 46 - The area covered by forest will be increased and sustained at 30% till 2024 from 29.6% in 2017 through forest landscape restoration.</p> <p>Priority 48 - Develop a project to manage water flows from the volcano region and other rivers to mitigate related disasters and improve water resource management.</p> <p>Priority 73 - Develop and facilitate decent settlement of Rwandans including relocation of those living in high-risk zones. 10,209 Households will be relocated from high-risk zones and 205,488 households will be mobilized and facilitated to relocate from scattered settlements to integrated planned settlements.</p> <p>Priority 78 - Continue to improve mechanisms for disaster preparedness response and mitigation in different sectors with priority to big sectors such as; agriculture, infrastructure, education, urbanization, ICT, health, environment and natural resources</p>
Revised Green Growth and Climate Resilience Strategy of Rwanda (GGCRS) 2021	<p>Thematic Area 2: Green Urban Transition and integration consolidates programmes of action that support the agglomeration of people into cities, towns, and rural settlements, linking them to green economic opportunities and climate resilient services.</p> <p>Thematic Area 3: Sustainable Land Use and Natural Resource Management consolidates programmes of action that drive appropriate spatial development of land use considering natural resources availability and constraints, and disaster risk reduction.</p>

	Thematic Area 4: Vibrant, Resilient, Green Rural Livelihoods consolidates programmes of action that build green opportunities in the rural economy, and climate resilience through off-grid services specifically targeted to rural inhabitants.
NDC	Rwanda's Nationally Determined Contribution serves as a blueprint for advancing targeted and measurable climate action in key sectors. It serves to guide coordinated responses for both government agencies as well as international organizations, NGOs, civil society, and community-based organizations.
National Biodiversity Strategy and Action Plan (NBSAP)	Provides a framework for conservation, sustainable use, and equitable sharing of benefits from biodiversity use and ecosystem services of the country. It also provides a framework for maintaining the necessary environmental conditions to reduce poverty, ensure sustainable development and food security in the country.
Sector level	
Private sector development and youth employment strategy (PSDYES)	<p>Commercialise agriculture - Invest in production, value addition and agro-processing to create quality jobs through sectoral linkages as articulated in the crop intensification programme.</p> <p>Entrepreneurship - Provide opportunities for greater involvement of youth in entrepreneurship and job creation, including optimization of the empowering role of information technology.</p> <p>Value addition - Diversify the economy by reducing dependence on the agricultural sector and enhancing value-addition</p> <p>Infrastructure for growth - Address the infrastructure limitations that hamper economic productivity and growth of the private sector</p>
EDP 2019	<p>Entrepreneurship— provides the necessary environment for creation and growth of vibrant and competitive enterprises across all sectors of the economy</p> <p>Capacity building- Improve access to skills and know-how for existing and potential entrepreneurs and workforce</p> <p>Markets and value chains- expanding access to domestic and export market opportunities</p>
PSTA4	<p>Transition to high-value agriculture- Raise profits per hectare by increasing agricultural yields and switching to higher-value agricultural commodities, such as horticulture, vegetable, poultry, pork, and fisheries.</p> <p>Agriculture transformation- introducing new crop varieties, disease mitigation, etc. – as well as farmers' knowledge and skills to support specialization, intensification, diversification, and value addition</p> <p>Food security and nutrition- Enhanced nutrition and household food security</p> <p>Markets and value chain- Establishing stronger linkages between market-oriented production systems and efficient end markets.</p> <p>Climate change- emphasises alternative land management practices with comprehensive climate-smart soil and integrated watershed management.</p>
Sub sector level	
National Tourism Policy	<p>Communities and MSMEs – Provide support to MSMEs, ensuring that they have the capabilities and capacities to enter the tourism value chain, while also ensuring that communities contribute to and benefit from the tourism industry.</p> <p>Environmental sustainability – Ensure that the tourism sector is planned and developed to the benefit of future generations of Rwandans, in terms of the sustainability of resource use, the protection of wildlife and the environment.</p>
Community based tourism enterprise (CBTEs)	<p>By developing CBTEs, communities gain income-generating opportunities and better job prospects. At the same time, CBT helps communities to manage and preserve their knowledge and cultural resources. Essentially CBTEs should ensure that;</p> <ul style="list-style-type: none"> - Adherence to responsible tourism practices such as environmental social, economic, and cultural sustainability are considered.

guidelines ²¹	
District level	
Musanze district development strategy	<p>Agriculture – Productivity increased, and resilience strengthened by use of improved inputs, effective and efficient irrigation, and soil conservation</p> <p>Tourism- Improving touristic destinations and the service sector</p> <p>Construction sectors- development of industries for local construction materials to support the growth of the construction sector and the affordable and low-cost housing program</p> <p>Conservation- Improved land use and management of water resources and switching to clean energy to reduce households depending on firewood.</p> <p>Nutrition- Village-based ECDs used as entry points for education and provision of health services as well as raising awareness on nutrition</p> <p>Capacity building- Employment promoted through skills development, entrepreneurship, and regulation</p> <p>Inclusive</p> <p>Housing- upgrade current informal settlements</p>

1. Environment and disaster reduction

Rwanda has recently revised the 2011 Green Growth and Climate Resilience Strategy (GGCRS). It remains setting out the country's actions and priorities on climate change relating to both mitigation and adaptation and to how these will be mainstreamed within economic planning. The revised GGCRS is also embedded in the NST1 in alignment with Rwanda's 7-year Government Program. The NST1 is a high-level planning policy that frames the country's subsequent local government and sector plans and includes specific projects or actions along three pillars for economic, social and governance transformation. The revised GGCRS provides a vision for how Rwanda can tackle climate change through become a climate resilient and low carbon economy, and projects actions to be undertaken to inform Rwanda's vision for economic development, Vision 2050. The actions set out in the revised GGCRS provide the basis for the development of the NDC, as well as other key national guiding documents informing the country's low carbon development like the National Environment and Climate Change Policy enacted in 2019 with the goal of achieving a climate resilient nation with a clean and healthy environment.

The GoR has prioritized adaptation and mitigation to climate change impacts in its national policies and strategies. Below is a snapshot of national policies and strategies that show how this project aligns with government priorities:

1. **Revised Green Growth & Climate Resilience Strategy (GGCRS):** The Strategy aims to guide national policy and planning in an integrated way and mainstream climate change into all sectors of the economy. GGCRS promotes green business and growth as cross-cutting issue for Rwanda's sustainable development.
2. **Strategic Programme for Climate Resilience (SPCR):** A detailed SPCR was undertaken and published in 2017. This was centred on four investment programmes, one of which was agriculture driven prosperity. This included costed actions for climate smart agriculture.
3. **National Land Policy:** Among the objectives of land policy, one is to promote good practices that are favourable to environmental protection and good land management, and to promote conservation and sustainable use of wetlands.

²¹ CBTEs are primarily small businesses that have been developed around major Destination Management Areas (DMAs) like the Volcanoes National Park, Akagera National Park, Karongi, Rubavu, Nyungwe National Park, Muhazi, the Heritage Corridor and Kigali Central Hub.

4. **Environmental and Climate Change Policy** (2019) seeks to provide strategic direction on environment and climate change in Rwanda, bearing in mind its linkages with socio-economic development.

The management of floods affecting the Volcano Region, as is envisaged under this project, aims to manage water flows from the Volcano Region and other rivers to mitigate related disasters and improve water resources management in the four districts that make up the Volcano Region.

2. Economic development

Rwanda has embarked on a journey to transform the economy and the society by promoting economic transformation built on the private sector, knowledge, and natural resources. Vision 2050 aims to promote economic growth and prosperity and improve quality of life for Rwandans. The implementation of Vision 2050 is driven by existing policies such as the NIST1 which focuses on job creation, urbanization, knowledge-based economy, industrialization, adoption of financial services, modernization of agriculture, and sustainable use of natural resources. The execution of the NIST1 is driven by other national economic development strategies such as the Strategic Plan for Agricultural Transformation (PSTA4), the Private Sector Development and Youth Employment, and the Entrepreneurship Development Policy.

Priorities in these national policies are aligned with pillars of the livelihood improvement component in this project. With this component, the project will enable communities to transition from low to high value agriculture, diversify income generating activities that are centered around cottage industries, tourism, and value addition, be linked to wider macro-economy such as high-end tourism, services, and construction sectors. All of these will be made possible by creating an enabling environment that relies less on non-renewable sources and that allows communities to access public economic and social infrastructure.

The Vision 2050 has overarching goals of promoting economic growth and prosperity and high quality of life for Rwandans and is anchored around five pillars:

1. Human development

The Rwandan population is projected to increase by more than 50% to 17.6 million by 2035 and to double to about 22.1 million people by 2050. During this period, the share of the working age population is expected to grow from around 61% of the population in 2017 to 65.7% in 2050. Reaping the economic benefits from this “demographic dividend” will be realized only through an integrated approach that ensures that decline in fertility is backed up by essential investments in human capital development and economic reforms so that the country has a healthy, well educated, and highly skilled labour force that is gainfully employed.

2. Competitiveness and integration

Rwanda’s ambition to become a developed country hinges on its ability to enhance competitiveness at various levels. Key aspects to consider include economic competitiveness underpinned by modern technology, innovation, research, quality infrastructure, favourable cost of doing business and micro factors such as increased firm and labour productivity.

3. Agriculture for wealth creation

Agriculture has and will continue to play a prominent role in both economic growth and poverty reduction as it has important implications for food security, nutrition, exports, and has backward and forward linkages to both industry and services sectors. Going into 2050, the agriculture sector is expected to be totally transformed with professional farmers and commercialized value chains.

4. Urbanization and agglomeration

Urbanization in Rwanda is rapidly evolving and presents many opportunities for increased access to markets, skills, and employment among others. The new focus will be on identifying and creating synergies between the critical elements of urbanization that create agglomeration and enhance the socioeconomic benefits of urbanization.

5. Accountable and capable State institutions

Rwanda's strong track record is underpinned by effective institutions which in turn facilitate economic growth and development over the long term. To fulfil the Vision 2050 aspirations, Rwanda's institutions and governance will need to adapt to the changing environment, become modern, innovative, accountable to citizens, and rooted in the rule of law. Building on the achievements of Vision 2020 in citizen participation, good governance, rule of law, peace and stability, Rwanda will go into the next phase of long-term development aiming to consolidate gains made and continue citizen-centred reforms enshrined in local innovations and homegrown solutions.

Vision 2050 is currently entering its implementation phase. A mid-term review is envisaged in 2035 and regular reviews planned every 5 years to inform necessary policy improvements. The indicators and targets of Vision 2050 are presented in Table 4-1.

3. Rural settlements

In the area of human settlements, the National Human Settlement Policy of 2004 lays out the basis for planning resettlement of populations for improved service provision, particularly for people from the mountainous areas. The policy outlines the importance of orderly population settlement in Rwanda, spelling out the benefits of improvement of access to social services where people live closer to each. This will ease planning for the provision of services including health care, education, water and sanitation, electricity, and other infrastructure thus enhancing the possibility of improved quality of life and meeting the Vision 2020 and EDPRS targets and MDGs. The Population Resettlement Law of 2008 defines the settlement procedures and lays out the obligations of the central and local government for smooth resettlement of populations.

E. Compliance with National Technical Standards

1. Integrated Development Program Model Villages

Rwanda's Vision 2020 intends that a proportion of at least 70 % of households living in rural areas to settle in integrated viable settlements and that these planned settlements offer economic opportunities, favor rational land use and management, and accelerate servicing with basic social economic and physical infrastructures in rural areas. One of the challenges that the Government intends to overcome is to assist vulnerable communities living in high-risk zones from severe landslides and flooding.

In 2011 the Integrated Development Program was set up as a multi-government institutions program. Annual action plans earmark funds for District governments to support making available plots for rural housing as well as basic construction materials for the construction of Model Villages for vulnerable communities living in high-risk zones. Part of the strategy is to improve the efficiency of the use of land for construction by assisting the layout planning before settling, facilitating the fabrication and use of local construction materials, and constructing "4-in-1-house" and "2-in-1 house" types.

The intention of the Rural Settlements Task Force is the upgrading of rural settlements into integrated villages, providing opportunities for improved rural livelihood. Eventually, the locations will form types of mixed-use trading centers and be growth areas as part of the urban network. The Urbanisation and Rural Settlement Sector - Strategic plan 2012/13-17/18, sets the goals for the IDP Model Villages to incorporate green building principles such as the use of local

materials, rainwater harvesting, and improved sanitation. Priority 3 of the strategic plan is to develop urban and rural settlements around economic activities and to have interlinking scales of spatial hierarchy at neighborhood, village, district, and city level.

Figure 24: National Land Use Master Plan Urbanization Hierarchy 2050

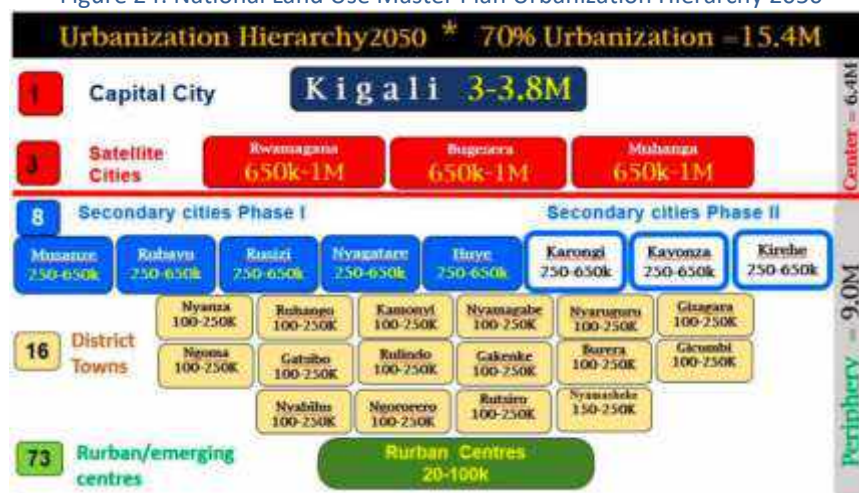


Table 18: alignment of the project to GoR IDP Pillars

IDP Pillars	Pillar Description	AfD project alignment
Land Productivity	to increase agricultural and livestock productivity;	Strongly Aligned
Post-Harvest Processing and Marketing	to assure food security and promote trade of agriculture products in internal and export sales;	Strongly aligned
Cooperative Development	to increase economic value and reinforce unity through joined capital and promotion of savings;	Aligned
Off-Farm Employment	to diversify and modernize Rwandan economy through creation and enhancement of sustainable off-farm employment;	Strongly aligned
Promotion of Micro-finance and Insurance	to increase inputs for economic expansion and protect entrepreneurs against business risks;	Aligned
Resettlement	to voluntarily settle citizens for efficient service delivery and land consolidation;	Strongly aligned
Rehabilitating Ecosystems	to ensure optimal utilization and sustainable management of natural resource base;	Strongly aligned
Social Protection	to provide effective and sustainable social protection and release productive capacities of the vulnerable;	Strongly aligned
Infrastructure development	to improve access to affordable electricity and transport infrastructure as support to economic transformation and access to other forms of energy (peat, biogas, solar) for improved welfare and environmental protection;	Strongly aligned
Promotion of ICT	to improve access to market information and technology innovations for production	Aligned
Leadership Development	to build a large cohort of community leaders who will catalyze social cohesion and an economic revolution.	Aligned

Rwanda Housing Authority has set the following criteria for the selection of the settlement sites:

1. The site must be in a remote rural area;
2. The site should be not fertile soil where possible;
3. The site should be accessible (access to the existing road)
4. The site should be near existing infrastructure (School, market);

5. The site should not be in high-risk areas to disasters (Less than 20% of slope where possible).

2. The National Land Use and Development Master Plan for the period 2020-2050

The NLUDMP 2020-2050 is a revision of the 2011 NLUDMP to ensure its alignment with the 7 Years Government Programme: National Strategy for Transformation (NST 1), 2017 – 2024 and Vision 2050, which aspires to take Rwanda to high living standards by the middle of the 21st century and high quality livelihoods. The main goal of the NLUDMP is to find the best land-use balance sheet based on spatial and economic analysis and is the primary document regulating urban and rural development in Rwanda. Key NLUDMP measures and goals relevant to this project are:

- Consolidate total number of Imidugudu from 14,000 to 3,000
- The size target of new residence lots should be 300m² per HH for dwelling and kitchen garden, sites to be developed in a semi-detached typology or similar to promote density.
- The proportion between the housing lots and the entire area of a neighborhood should be 2.0-2.5, ensuring enough space for roads, public amenities and services such as schools, health, administration, cultural, market, infrastructure utilities, sports and recreational facilities, urban farming, urban forestry, landscaping, and open green spaces.
- Water and sanitation: Household connections within premises will be increased from the current 9% (Estimate 2017) to 95 by 2035 and 100% by 2050. Access to sanitation will be scaled up to all from 86% (Est. 2016) to 100% and waste management systems. Efforts shall be directed towards increasing household onsite access to sanitation services from 2% to 80% by 2035 and 100 by 2050.
- Solid waste management: Have a robust Solid Waste management system for all development that is based on reuse hierarchy and promote zero waste generation.

Agricultural land in Rwanda plays a dual role in creating income and foreign currency through the export of agricultural products (mainly coffee and tea) and in producing food for the local population.

- The existing agricultural land would be protected against scattered housing and degradation due to soil erosion and improper management along the period of 2020-2050.
- The arable land per rural settlement will be around 420 Ha on average.
- Climate-resilient options should be implemented, such as improved bench terraces, agroforestry, improved seeds, drainage, irrigation on the hillside, and marshlands.
- Individual farming in small holdings of around 0.4Ha will have to stop, and different kinds of economic cooperations will be organized instead to reach 1.5Ha per HH in the future.
- Yields improvements will be achieved dramatically due to the agglomeration of plots.

Health Facilities in rural settlements by 2050:

- Community health will be organized in clustered rural settlements sites.
- Health posts (0,06ha each): 3000 for future proposed Cell (496 in 2019)

Primary education in rural settlements by 2050:

- Average class size: 35 pupils/class (77 pupils/class in 2018)
- Average school size: 840 pupils (861 pupils in 2018)
- Classrooms: 90,135 (32,548 pupils in 2018)
- Schools: 3,756 schools (2,909 schools in 2018)
- Required size for a nursery school: 0.5Ha
- Required size for a primary school: 1Ha

Green development principles. To enhance environmental sustainability in urban and rural

settlements development under the PUSH programs. The following key elements are recommended:

- All Population, Urbanization, Settlements, and Housing (Push) programs must be streamlined and have in place use of green planning, and technology approaches use in the urban development programs, i.e., enhance the green city and green neighbourhood concepts in the developments;
- Urbanization approach where city's development takes into account environmental aspects, especially through land-use and spatial development planning to achieve low carbon growth overall and build resilience to climate change, i.e., ensuring that all urban development processes incorporate climate risk and low-emission strategies into on all the proposed activities;
- All urban development should promote climate-resilient human settlements as this will lead to halting the proliferation of informal settlements in urban areas.
- All green infrastructure projects should be designed to complement gray infrastructure systems performing a combination of volume management, water quality improvement, and flood control;

Summary of NLUDMP spatial guidelines for rural agriculture

The arable land per rural settlement will be around 420 Ha on average.

Cooperative model for farming should be adopted to have a minimum of 1.5Ha per HH.

In average five production units of 110 HH and about 84 Ha will be established in each settlement

Summary of NLUDMP spatial guidelines for rural settlements

Average size of Umudugudu: 550 Households and 41.4 Ha.

Residence lots should be 300m² per HH for residence and kitchen garden

Housing to be developed in a "4-in-1" or "2-in-1" type to promote densification.

Proportion between the housing lots and the entire area of a neighborhood should be 2.0-2.5 to accommodate for infrastructure, facilities, urban farming and green spaces.

Water household connections within premises increased to 95% by 2030 and 100% by 2050.

Access to sanitation increased to 80% by 2035 and 100 by 2050.

Provision of public facilities:

1 Health posts (0,06 Ha)

1 Nursery school (0.5 Ha)

3. Rwanda One Health Strategic Plan II (2019-2024)

The Government of Rwanda is recognized as an example of good practice in economic growth, sustainability, and environmental policies. To realise its full potential and drive towards this goal, Rwanda continues to grow its commitment in creating a clean, healthy and climate resilient environment that supports a high quality of life for its citizens. This has generated considerable institutional transformations to address these needs and priorities, creating new governmental organizations and policies. Rwanda's Vision 2050 is one such policy that targets these objectives by bringing high-quality livelihoods and living standards through environmental considerations. Building on that, the updated Rwanda One Health Strategic Plan II (2019-2024) was released, serving as a guiding document for a collaborative, holistic and multi-sectoral approach to address complex public health (human, animal and ecosystem interface) challenges in Rwanda.

4. Alignment with National standards

Table 19 provides a summarized assessment of the alignment of the project component to national standards.

Table 19: alignment of the project component to national standards.

Project component	National standard/s	Alignment
Component 1 – Construction of the green village	Rwanda building code with a particular emphasis on promotion of use of local construction materials, Point 2.6.5.1.3. of the RBC says: “Specifically, the use of adobe bricks is accepted for all buildings in category two as provided in the Ministerial Order categorizing the buildings.” This is for detached or attached dwellings of an area not bigger than 200m2.	Project aims to use Adobe (rukarakara) blocks with the goal to reduce the embodied energy required in construction and to promote construction systems that are in balance with natural ecosystems
	Rwanda Housing Authority (RHA) DRS 484 Adobe Block Specification and Technical Guidelines on Adobe Block Construction in Rwanda. Specification details best practice for fabricating adobe blocks, including soil classification, addition of fibers, manufacturing process, curing process and performance criteria.	These guidelines will inform policy and are intended to have a systemic impact on housing across Rwanda. In this project they will ensure the construction of safer, durable, comfortable and more resilient buildings, with lower costs and lower carbon footprint than traditional brick homes.
Component 2 - Livelihood diversification and income generation activities	Rwanda Standards Board developed DRS 279 – a standard developed to promote safe use of organic fertilizers, promote fair trade practices and ensure safety of consumers.	Farmers education is embedded in the interventions where farm activities would require the use of fertilizer. Farmers will be educated on the best way to use fertilizer achieve productivity gains while limiting environmental impact
	Food and Drug Authority (FDA) which is responsible for enforcing food standards and regulations. Specifically, the Presidential order Presidential Order N° 67/01 of 20/10/2009 Establishing Food Supplements Regulation	Capacity building will be provided to the community to ensure compliance with food safety standards on the value addition or processing of their agricultural outputs

5. Duplication of Project with other Funding Sources

Table 19 below provides a mapping of climate related interventions that are active in the volcano region. The Adaptation Fund therefore adds significant value and comes at the right moment to reinforce the national efforts towards addressing climate change issues in the vulnerable North-Western region of Rwanda. It is important that this programme is aligned and supportive of the interventions outlined in the table below to reduce the risk of duplication. There is a need for effective coordination of the programmes to ensure and enhance synergistic and complementary national efforts to addressing vulnerability of the communities in the area to climate change impacts.

Table 20: Key initiatives and programmes that are relevant for this project

Project	Description	Timing and Geographical coverage	Potential synergies
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<p>Reducing vulnerability to climate change in Northwest Rwanda through community-based adaptation</p>	<p>In 2014, the GoR received USD10 million funding from the Adaptation Fund to support the adaptive capacity of natural systems and rural communities exposed to climate change. Targeted communities resided in the Musanze and Nyabihu district. The project aimed at addressing factors intensified by heavy rainfalls that led to floods and landslides. The project introduced flood and erosion control measures such as de-silting the caves, rehabilitation of gullies in the watershed, rehabilitation of waterways, digging terraces and afforestation and helped people to be relocated to a model green village from high-risk zones</p>	<p>2013-2018 Musanze and Nyabihu</p>	<p>This completed project has elements such as resettlement and livelihood activities that have been utilized to this proposal. Lessons learned from this project will be applied to the current design and implementation arrangements, including project management</p>
<p>Building resilience to climate change hazards in the Volcano Region of Rwanda</p>	<p>The Green Climate Fund has been requested to fund infrastructural improvements and watershed restoration measures in the region – specially to reduce the risk of flooding and landslides – as well as improvements in land management.</p>	<p>Pipeline Musanze, Rubavu, Burera, and Nyabihu</p>	<p>This GCF project will implement climate mitigation and adaptation measures in 12 basins in the four districts. While this proposal being developed is focused on Musanze and only considering resettlement and livelihood options, soil and water conservation measures will be implemented by GCF.</p>
<p>Strengthening climate resilience of rural communities in Northern Rwanda</p>	<p>The proposed project area is adjacent to the “Strengthening climate resilience of rural communities in Northern Rwanda” project in the Gicumbi district, which is directly to the east of Burera district and was funded by the Green Climate Fund. FONERWA is the Executing Entity of that project as well. Some elements of that project are applied in the current proposal, such as relocating households from high-risk zones.</p>	<p>Ongoing in Gicumbi</p>	<p>At the time of writing of this proposal, this Gicumbi project is undergoing its mid-term evaluation, the results of which will inform the implementation of this project. Lessons learned from this project will be applied to the current design and implementation arrangements, including on project management</p>
<p>Integrated Development Program (IDP)</p>	<p>In 2011 the Integrated Development Program was set up as a multi-government institutions program headed by the Ministry of Local Government (MINALOC) Rural Settlements Task Force with a Steering Committee formed by MINALOC, Ministry of Defense, Rwanda Housing Authority, Rwanda Environment Management Authority, Ministry of Education, Ministry of Natural resources, Ministry of Commerce and Industry, Ministry of Infrastructure (REG, RTDA, WASAC), Ministry of Youth and ICT, Rwanda Agricultural Board. Annual action plans earmark funds for District governments to support making available plots for rural housing as well as basic construction materials for the construction of Model Villages for vulnerable communities living in high-risk zones. Part of the strategy is to improve the efficiency of the use of land for construction by assisting the layout planning before settling, facilitating the fabrication and use of local construction materials, and constructing “4-in-1-house” and “2-in-1 house” types</p>	<p>Ongoing</p>	<p>The 510 (AF funding135) households resettled from high-risk areas will benefit from the alternative livelihood support provided under Component 2 and Component 2. The proposed project will also benefit from the on-going resettlement efforts (as it will contribute to reducing over-cultivation marginal lands) and will complement them by directly financing resettled communities with job creation, skills training, and provision of initial capital for alternative livelihoods.</p>

<p>National and district land use master plans</p>	<p>An ongoing national programme by MINIRENA to develop a national land use master plan and local land use plans.</p>	<p>Ongoing</p>	<p>District land use maps are now available for the project area and will guide the land zoning process in the improved land/water management interventions. These land use plans will also include an assessment of soil suitability for different crops to guide planting regimes and fertiliser application so will feed into the project's adaptation planning and promotion of climate resilient crop and livestock production systems.</p>
<p>Lake Victoria Environmental Management Project (LVEMP)</p>	<p>LVEMP II is a five year East African Community project under implementation in the five countries that share the Lake Victoria Basin: Burundi, Kenya, Rwanda, Tanzania and Uganda. It is funded through a US\$ 15 million IDA loan from the World bank. There are four components:</p> <ol style="list-style-type: none"> 1. Strengthening institutional capacity for managing shared water and fisheries resources; 2. Point source pollution control and prevention; 3. Watershed management with two sub-components: (i) Natural resource conservation and livelihoods improvement; and (ii) Community capacity building and participation; and 4. Project coordination and management. <p>In the Goma area, around 100 ha of radical terracing have been completed and 70ha of land planted with trees. The project also disburses small grants through SACCO branches to cooperatives through its Community Driven Development (CDD) sub- project initiative. This approach enables local communities to access project funds for sustainable enterprise development.</p>	<p>2012-2017</p> <p>So far the project has launched activities in two districts but is planning to roll out to a further 7 districts this year.</p>	<p>Under component 3 (watershed management), the project promotes similar interventions as those proposed in the new project design, hence there is good scope to learn from this project as it progresses. These include: rehabilitation of riparian buffer zones, sustainable land management, IPM, Farmer Field Schools and watershed management, training and awareness building on the Environmental Organic Law.</p>
<p>Landscape Approach to Forest Restoration and Conservation (LAFREC)</p>	<p>In 2014, the Global Environment Facility (GEF) approved funding for a project to implement forest-friendly and climate-resilient restoration practices in Gishwati-Mukura landscape located in western Rwanda.</p>	<p>2014-2019</p>	<p>One of the subcomponents in the programme supported demand-driven income-generating activities in order to increase the breadth of the economic options and security of the livelihoods base of the population within the Gishwati-Mukura landscape, thereby improving climate resilience. Lessons learned from this project will be applied to the current design and implementation arrangements, including project management.</p>

6. Learning and Knowledge Management

Relocation as a climate change mitigation solution is novel and this project will provide numerous learning opportunities that would benefit the immediate beneficiaries, the communities in the region, the government of Rwanda and climate mitigation efforts in other countries. For this project we propose the following approach to learning and knowledge management;

- **Develop an efficient and effective repository of project data** that would be accessible to those that need it for decision making and or learning lessons on what has worked and what has not.
- **Create conditions for effective knowledge sharing** between the various stakeholders involved in the implementation and or oversight of the project. It's important that information flows freely between implementing actors and well as with the project beneficiaries.
- **Use the project data and lessons to raise the profile / educate** those interested on the effectiveness of this approach to climate mitigation.

Capturing lessons from the project

Lessons will be captured primarily through the Monitoring and Evaluation system which will provide regular monitoring of project indicators, as well as progress against the key milestones. The project will promote Participatory Monitoring and Evaluation System so that, as much as possible, the results of climate adaptation approaches will be measured, processed and evaluated by the communities involved. As well as enabling project participants to use the information to modify approaches as they go, this approach will also build the capacity of local communities to adapt to future climate trends and shocks.

In addition to the routine monitoring of indicators, the project will also collect case studies under each component to drill down into specific innovations and practices that arise due to project interventions. A lesson learning exercise will also be included at the mid-term of project implementation and at project completion. During this process significant new understandings will be catalogued and used to build the knowledge base of best practices as well as document where project implementation has resulted in unexpected impacts or investigate approaches that have not worked and why. Lessons learned will include detailed, specific information about behaviors, attitudes, approaches, that will inform project implementation and other interventions.

The project will also compile its lessons learned in a knowledge management database.

This information will be used to prepare training materials, information brochures and other communication materials to disseminate experiences with other stakeholders, including women and members of socially disadvantaged groups. The database will be linked to the much larger world bank funded VCRP project to ensure coherence of data being collected. Upon closure of the project, the knowledge management database will be maintained by the Ministry of Environment and remain available for use in other districts. Activities under learning and knowledge management will include the compilation of lessons learned in a knowledge management database, the preparation of communication materials for different stakeholder groups, with specific reference to women and disadvantaged groups, and holding workshops and other events to disseminate lessons learned from the project.

The village knowledge hub will capture lessons learned by the community in their relocation and transition to more sustainable and viable economic livelihoods. The hub will be accessible not only to the smart gree village community but will shared with other communities in Rwanda who would like to learn from the successes the programme has been able to achieve. Funding for the

knowledge management is currently being negotiated with GoR agencies. There is an ongoing discussion that the funding could be sourced from the VCRP programme (currently under development).

7. Consultative Process

The stakeholder engagement agenda generally followed this structure:

- Project introduction- This included introducing; the Project objectives, Components proposed project interventions and areas of influence.
- Issues faced by the stakeholders consulted were then presented.
- Opinions on proposed project interventions for each component.
- Suggestions on their expectations of the project intervention areas
- Benefits expected from the project.
- Risks and adverse impacts from project activities
- Proposed mitigation measures or adaptation measures to the adverse impacts.
- Understanding of the socio-economic baseline of the Local Sector of project intervention

Opinions, questions and concerns from the stakeholders were recorded and where necessary responses given to questions raised. Follow up on those questions that were not answered was also included. A summary of the expected benefits and issues raised by stakeholders is presented in the table below along with the mitigation measures proposed by stakeholders during the consultation.

Benefits and Issue recorded	Stakeholders that participated	Suggested mitigation measures by stakeholders, where mentioned
Benefits expected		
1. Beneficiaries expect diverse employment opportunities with the emerging construction of the smart green village compared to the current common jobs that are only agriculture based. From employment, they anticipate increased household income.	Beneficiaries in FGDs	However, they were concerned that migrating workers could take up such jobs thereby denying them such opportunities. In this regard, participants proposed the project considers a first preference approach for Beneficiaries in job opportunities.
2. Beneficiaries anticipated that replacement houses shall be better than the ones currently owned by Beneficiaries. They expect that these houses will be better in structure requiring less or no regular renovation works compared to their current houses. All 49 Beneficiaries participating in the FGDs indicated that they anticipate the house design, structure, size and conditions shall be good (16 participants) or very good (33 participants) compared to their original houses. They appreciate that their single storied houses, more reliable building material, with more than one room compared to the kind of houses they currently possess which have no room partitions.	Beneficiaries during FGDs	

<p>3. Beneficiaries showed appreciation towards the proposed zoning plan for the smart green village. (i.e. with kitchen gardens, farming, market, enterprise zone for tourist reception, agroforestry, etc). All 49 Beneficiaries participating in the FGDs indicated that they anticipate the zoning plan shall be good (5 participants) or very good(44participants).</p>	<p>Beneficiaries during FGDs</p>	<p>To enhance the zoning plan, participants requested for an area allocated to small livestock farming.</p>
<p>4. Beneficiaries expect that with the project comes access to better and improved health and education services, infrastructure (roads, electricity, water connectivity) and businesses. All 49 Beneficiaries participating in the FGDs indicated that they anticipate the basic services shall be good (4 participants) or very good (45participants) compared to their original houses. They were happy to know the green village comes with connectivity to water, rainwater harvesting tanks, solar electricity, close proximity to Kinigi health centre and schools, close proximity to access roads, close to the market, and agro logistics included in the village plans.</p>	<p>Beneficiaries during FGDs</p>	<p>To enhance better access to basic services, participants suggested that each household its own water billing meter to avoid conflicts arising from shared water bills.</p>
<p>5. Beneficiaries anticipate that with relocation to a single community settlement, there are opportunities to large masses to sell to different merchandises, provide paid for services, hence a potential market.</p>	<p>Beneficiaries during FGDs</p>	
<p>6. Beneficiaries expect that because the site will be close to the VNP, it still keeps them close to tourists with opportunities of visiting the green village and the residents benefitting from them through job opportunities and other forms of income. e.g. through the hospitality opportunities at the green village and beyond.</p>	<p>Beneficiaries during FGDs</p>	
<p>7. Beneficiaries mentioned that the project could benefit from construction material locally available on site and in reasonable distance which could lower e.g. construction cost of the green village, for instance, volcanic rocks are in abundance on site, timber is available in and around the site (within 1km of the site), Burnt brick available at local kilns in Rwaza and Gacaca sectors (5-10km from site), sand can be got from Giciye(about 25km from the site), cement from Prime cement in Musanze (about 10km).</p>	<p>Beneficiaries during FGDs</p>	
<p>8. Beneficiaries also indicated that they would maintain residential stability since most of the same community HH shall be relocated to resettle together in the smart</p>	<p>Beneficiaries during FGDs</p>	

green village, thereby maintaining the same social cohesion.		
Issues raised	Stakeholders that participated	Suggested mitigation measures by stakeholders and/or responses from relevant authorities
Issues raised during public consultation meetings		
1. Beneficiaries mentioned issues observed from the completed Kinigi model village near the relocation site, for instance, families were given houses but when they hosted informal events of about 30 visitors, they failed to fit them in their homes, sometimes becoming an inconvenience to the neighbours.	Beneficiaries	It was proposed that in the design of the relocation site, common rooms, meeting halls are included where formidable number of people can meet to avoid social inconveniences.
2. A question was raised on households with sizable household members (more than 5) who might not be able to fit in the proposed relocation house, will be handled.	Beneficiaries	Response given at the time was that house for house replacement involved 3 house typologies of 2,3,4 bedrooms respectively in addition to living rooms, kitchen and toilets, which shall be provided to families depending on the size of the Household.
3. They were concerns that migrating workers could take up jobs from the green village project activities thereby denying them such opportunities.	Beneficiaries	For this, the local communities were assured of such affirmative prioritisation in job allocation. They were also informed that as part of the current proposed Livelihood improvement plan, a component of skills development for local communities had been proposed to eventually match the skills required during the project activities.
Issues raised during Key Informant Interviews (KIIs)	Stakeholders that participated	Suggested mitigation measures by stakeholders and/or responses from relevant authorities
4. Regarding livelihood of Project beneficiaries	RDB Park wardens	A suggestion was made to plan for a tourism school within the vicinity of the project area as part of the livelihood improvement , since the main source of income could be related to touristic attraction of the VNP. In addition, a proposal to develop skills, a school or some form of training and provide opportunities on off-farm activities since most of those that will be relocated are on-farm dependent livelihoods and by then land will have been reduced from project displacement. This was noted and would be reviewed in preparing the Livelihood restoration plan. Information was shared that there is a school training skills initiatives currently proposed in the Livelihood Implementation Plan (LIP). To avoid duplication and proximity of schools at the existing Kinigi model village education facilities, the LIP proposes a technical school to complement it by introducing skills training in application of local material for construction as was done for at the Ellen de Generes campus.
5. Communication of Project objectives and activity.	Conservation NGOs	It was also advised that a clear communication strategy needed to be developed of how information will be disseminated on project objectives, benefits, progress to the public to avoid miscommunication on the project. This would involve how to manage social media or other forms of communication. As for the communication strategy, this was planned as part of the knowledge management component of the project

6. Cultural shock of change in housing by Beneficiaries, which could make it difficult to adapt to the new housing in the proposed smart green village. For instance, new knowledge that the house requires daily cleaning, indoor kitchen compared to it being separate from the house is the case in their current houses, cooking on energy saving stoves from current use of the 3 stone open stoves, how to use a waterless composite toilet from currently using an outside dry latrine, etc.	Coordinator of Kinigi model village	Advice was given that the project considers initiation trainings to Beneficiaries on how to live and take care of the new houses before they relocate into them, as was done for the Kinigi model village, which is about 5km from the relocation site. It was also proposed to assign an estate coordinator who can support all residents in the relocation site to adapt to living in their houses as was done for the Kinigi model village.
Issues raised during Focus Group Discussions (FGDs)	Stakeholders that participated	Suggested mitigation measures by stakeholders and/or responses from relevant authorities
7. Concerns that the project could delay in giving beneficiary allocated houses in the green village ownership documents, which could affect willingness in maintenance and repair of their houses.	Beneficiaries during FGDs	Beneficiaries were informed they would be given house ownership titles for the replacement houses.
8. Concerns that replacement houses could have contracts that do not allow them to sell them before a certain period.	Beneficiaries during FGDs	
9. Participants anticipate that due to the semi-detached 2-in-1 housing, conflicts amongst neighbours over noise, poor hygiene both of the house and toilets, choking smoke from cooking with charcoal or firewood, drunken neighbours.	Beneficiaries during FGDs	Just like in Kinigi model village, the smart green village should have a coordinator to mitigate such tensions before they happen or manage them when they happen. Furthermore, they have already elected representatives, who are there to manage such grievances.
10. Participants indicated that there is a potential of thefts amongst semi-detached houses if walls are not built beyond the ceiling to touch the roof.	Beneficiaries during FGDs	Suggestions were made to consider in design and construction to raise the wall between the 2 houses in the semi-detached 2-in-1 house to avoid thefts and for purposes of privacy.

Category	Location	Nature of Activities	Male	Female	Total
ABISHYZEHAMWE	Nyarusizi	Handcraft	3	10	13
Elected community representatives	Nyarusizi	Representation of community interests	5	4	9
KAIKI cooperative	Nyakigina	Store House & Irish potatoes	1	3	4
ABABUNGABUNGA INGAGI&IBYIWACU cooperative	Nyakigina	Community & Cultural Tourism	2	2	4
TUZAMURANE	Nyakigina	Store house for Irish potatoes	2	1	3
Community from relocation side	Rurembo	Farmers	6	4	16
Kinigi model village residents	Kampanga	Farmers	3	3	6
ABAKUNDINZUKI Cooperative	Nyakigina	Beekeeping (beehives)	4	4	8
ABASERUKANASUKA	Nyakigina	Pyrethrum Plantation	5	2	7
Total			31	33	64
Percentage%			48.4	51.6	100

S/No	Stakeholder consulted
1.	Vice Mayor Musanze Economic Development
2.	Executive secretary Kinigi sector
3.	Executive secretary Nyabigoma cell
4.	Executive secretary Kaguhu cell

S/No	Stakeholder consulted
5.	Socio-economic development officer Nyabigoma cell
6.	Socio-economic development officer Kaguhu cell
7.	Socio-economic development officer Kampanga cell
8.	Village leaders (<i>chef w'umudugudu</i>) for 8 villages
9.	Rwanda Development Board (RDB) representatives
10.	African Wildlife Foundation (AWF) Country representatives
11.	Ministry of Environment (MoE) representatives
12.	Rwanda Environment Management Authority (REMA) representatives
13.	Conservation NGOs in Musanze District
14.	Local NGOs in Musanze in Musanze District
15.	COPORWA- Local NGO for the Community of Potters of Rwanda

8. Justification for Funding Requested

Funding of this project is justified on the basis of the following

- Addressing Multi-faceted Challenges:** The project tackles multi-faceted challenges related to climate change adaptation, including reducing exposure to climate hazards, enhancing community resilience, and promoting sustainable livelihoods. These challenges require a holistic and integrated approach, involving various interventions such as infrastructure development, agriculture diversification, and capacity building. The funding requested covers the full cost of implementing these multi-component activities, ensuring a comprehensive response to the complex climate change impacts faced by the vulnerable communities in the Volcano Region.
- Long-term Cost Savings:** Investing in climate change adaptation measures upfront can result in significant long-term cost savings. By implementing interventions that reduce exposure to climate hazards, such as relocation to climate-resilient green villages and the integration of smart green infrastructure, the project aims to mitigate potential damages and losses caused by future climate-related events. This proactive approach reduces the need for costly post-disaster response and recovery efforts, ultimately saving resources in the long run.
- Enhancing Sustainable Development:** The requested funding supports sustainable development in the target region. By promoting sustainable agriculture practices, economic diversification, and the use of renewable energy sources like solar power, the project fosters long-term resilience and reduces dependency on external resources. This contributes to the economic, social, and environmental well-being of the communities, fostering their self-sufficiency and reducing vulnerabilities to future climate impacts.
- Leveraging Co-benefits:** The proposed project not only addresses climate change adaptation but also generates co-benefits across various sectors. For instance, the integration of green infrastructure and sustainable land management practices contributes to environmental conservation and biodiversity preservation. The promotion of high-value agriculture and cottage industries enhances income generation and job creation, promoting economic growth and poverty reduction. These co-benefits amplify the overall impact of the project and justify the funding requested by extending the reach of adaptation efforts beyond climate resilience alone.
- Ensuring Long-term Resilience:** The full cost of adaptation reasoning takes into account the long-term resilience of the communities. By implementing a comprehensive set of interventions, including capacity building, knowledge management, and monitoring systems, the project ensures the sustainability of the adaptation measures beyond the project's lifespan. This long-term perspective strengthens the case for the requested

funding as it emphasizes the importance of investing in comprehensive and lasting solutions to climate change impacts.

A. Component 1: Resettling households living in high-risk zones to a smart green village

Baseline without AF funding: Without the AF funding, it is likely that communities living in high-risk zones will continue to experience the adverse effects of climate change. Future climate change is likely to lead to increased risks. The overall amount of precipitation is forecast to increase, and the number of heavy rainfall days, or intensity of rainfall, may increase, raising the potential risks of floods, landslides, and soil erosion. This could mean that current flooding and landslides that occur in the western areas will likely continue and could increase in future. As climate events are exacerbated, so will fatalities, loss of property, crops, and livelihood be intensified leading to impoverished communities.

Interventions with AF funding: The proposed programme will reduce vulnerability of the relocated households to climate change impacts as they will be living in a smart green village located in a less prone area. The village will be constructed with durable materials that will resist future climatic changes, which is different for the less resistant houses that these families currently reside in. In addition, this component will enable relocated households to have access to economic and public infrastructure and utilities which will improve their standards of living. In addition, beneficiary families will be trained and then provide manual labour build their new home under supervision of the building engineer to reduce cost and to create ownership, understanding and autonomous long-term maintenance. This will ensure the sustainability of the village and provide construction skills that households may use in their daily livelihoods.

B. Component 2: Transitioning from low to high value agriculture

Baseline without AF funding: It is likely that people will continue to be trapped in poverty if the transition from low to high-value agriculture is not promoted in the region. 66% of the population in Musanze where project components will be implemented are involved in subsistence farming. Farmers face significant challenges including low productivity caused by the low levels of on farm mechanization and post-harvest value addition, cultivating climate-vulnerable crops, low access to finance, weak forward and backward linkages with other sectors, and more. These challenges are further exacerbated by climate change disasters caused by intense rainfall. If no interventions are implemented, communities will continue to use less climate-resilient agricultural practices using more land, which will not improve their livelihoods.

Interventions with AF funding: Component 2 will introduce high-value and eco-friendly value chains that target high-end tourism markets in the region. In this component, greenhouse farming will enable farmers to reduce the effects of unfavorable weather conditions such as high temperature, strong winds, heavy rainfall, hailstorms and as well as pests and diseases on crops, hence leading to increased yields. Increased yields will increase household income, which will enable them to move out of poverty. The high-value crops such as mushrooms and other vegetables will empower communities to increase their incomes while using less land. The bamboo agroforestry will create job opportunities from nurseries, planting, maintenance, and harvesting. In addition, bamboo will contribute to the overall conservation in the area.

C. Component 3: Diversification of income generating activities/livelihoods

Baseline without AF funding: Most people in the Volcano Region have no primary education let alone secondary education and have not received vocational training, the majority is doing work in subsistence agriculture, especially in rural areas. As farmers have small plots of land and face other challenges like climate change, high costs of inputs that limit their productivity, this makes 40% of the population in Musanze be below the poverty line. The poor penetration of alternative sources of income is justified by low technical and cognitive skills that communities have acquired. In addition, communities heavily depend on exploitation of natural resources especially when it comes cooking energy. Without any intervention, people will continue to depend

on subsistence agriculture as a source of income as they won't have acquired skills to help them transition to off-farm economy. In addition, deforestation will continue to rise as people will continue to cut down trees for cooking energy.

Interventions with AF funding: This component aims at creating new business opportunities for relocated households and surrounding communities all that is aimed at increasing resilience to economic, social, and climatic shocks as well as at enhancing skills development that help people acquire technical skills to boost employment in the construction, manufacturing, tourism sector, etc. With AF funding, people will be equipped with tools and skills to make handicrafts and use their creative arts to attract more visitors in their communities. In addition, two producing units (one for bamboo FMCG and another for cooking pellets) will be established, which lead to more jobs created and a clean environment. In addition, the TVET center will boost skills level of community members in technical vocations such as welding, carpentry, tailoring, and more, which will indeed help in fighting against joblessness. When people have sustainable sources of income, they become more resilient to any shocks including climatic shocks.

9. Project Sustainability

Project sustainability of based on the following

- **Participatory Approach:** The project design includes a participatory approach, involving the local communities, stakeholders, and relevant institutions throughout the project cycle. By actively engaging the community in decision-making processes, their ownership and commitment to the project outcomes are fostered, increasing the likelihood of sustained efforts beyond the project duration.
- **Capacity Building:** Capacity building activities are integrated into the project to enhance the skills and knowledge of the community members. By providing training on climate-smart agriculture, sustainable livelihoods, and other relevant topics, the project equips the communities with the necessary tools to continue implementing and maintaining the project outcomes independently.
- **Institutional Strengthening:** The project recognizes the importance of institutional strengthening to support the sustainability of the outcomes. Collaboration with local authorities, government agencies, and relevant institutions is prioritized to ensure the integration of project activities into existing policies, plans, and programs. This promotes institutional ownership and the incorporation of project outcomes into long-term development strategies.
- **Economic Viability:** The project aims to enhance economic viability for the communities by promoting market-oriented farming, enterprise development, and income diversification. By focusing on high-value crops, cottage industries, and sustainable business models, the project creates economic opportunities that can generate income and support the ongoing maintenance and replication of the project outcomes.
- **Knowledge Management:** The project includes a robust knowledge management component to capture, document, and disseminate lessons learned and best practices. This ensures that the knowledge and experiences gained during the project are shared with relevant stakeholders, enabling the replication of successful approaches and facilitating the sustainability of the outcomes beyond the project lifespan.

Sustainability under component 1

The establishment of a smart green village under component 1 will enhance planned urban settlements, which are more sustainable than informal settlements. The green attributes of the village such as waste and water management, renewable energy, etc. will contribute to village's sustainability. Architectural designs have been done with an aspect of sustainability in mind so that the environmental and carbon impact of the building be minimal using selective building materials such as volcanic stone, adobe blocks, and timber. In addition, beneficiaries of the green village will be trained on maintenance of aspects of their housing units, which will ensure ownership of the households. Also, the fact that relocated households will also be given agricultural land which they will use in high-value agriculture will ensure that these households adapt easily as they are mostly agricultural. Community buildings such as healthcare and education facilities will ensure ease integration of households in the new community as they will be able to access these services easier compared to their previous settlements. In addition, relocated households will be encouraged to form loan and savings groups to increase their access to finance.

Sustainability of components 2 and 3

To ensure sustainability for components 2 and 3, a market systems development (MSD) analytical tool was deployed to fully capture the constraint, opportunities, market failures etc. within the value chain for each livelihood option proposed. Market Systems Development (MSD) also known as Making Markets Work for the Poor (M4P) – 'seek to reduce poverty by making markets function more effectively, sustainably and beneficially for poor people'. The approach recognizes the poor as active market participants – as workers, producers and/or consumers – and seeks to address a variety of market failures that disadvantage them. For example, the poor often lack the inputs, services, skills, and information they need to be competitive and to adapt to the challenges and opportunities presented by markets. Unfavorable policy and regulatory environments and informal norms can also reduce their ability to benefit from market participation. In addition, engaging the financial sector to increase access to finance in communities, engaging the private sector, linking communities to markets will also contribute to the project's sustainability.

The GoR has set aside \$120,000 over one year to pilot the livelihood option outlined in component 2 and 3. This would allow the community to be able to transition to new livelihoods with the comfort that they have a government programme provide both financial and technical assistance to address the risks and develop their capacity to take on the new economic opportunities. In addition, a strong emphasis on monitoring and evaluation (including the use of participatory systems) will provide for continuous feedback on impacts and results at the community level. Moreover, the knowledge management database will support the mainstreaming and replication of successful approaches through key national and regional agencies as well as lesson learning and sharing of best practices.

10. Environmental and Social Impacts and Risks

In the table 22 below we assess the project compliance with AF ESP and GP risk principles.

Table 21: project compliance with AF ESP and GP risk principles

Risks principles of the AF ESP	How the project aligns
Compliance with the Law	Reference to the project's ESIA, The Proposed project will generate several activities that would have to comply with various national laws and regulations such as labor, land management, conservation laws, etc. ²²
Access and Equity	Risks that rise from the inability to ensure and monitor equitable access to everyone will be identified through further stakeholder assessments and extensive risk analyses. Out of this, the project will put in place measures to prevent any inequity during project implementation.
Marginalized and Vulnerable Groups	Conducting the ESIA, The team ensured that the concerns of women and vulnerable groups ²³ were adequately captured and factored into all key stages of project planning and implementation. The engagement process was adapted as needed to consider their situations and ensure they have a role in decision making. Also the entitlement matrix in the RAP has prioritized giving housing units to vulnerable groups even when they do not own a house in the project area, assisting them to more, priority in government sponsored social protection programs, sponsored vocational trainings, as well as priority for non-skills labour in the project.
Human Rights	The project shall not violate any human rights from design to implementation phase because the project will adhere to both national and international human rights. In further stakeholder engagements, human rights will be part of consultations.
Gender Equality and Women's Empowerment	Reference to the ESIA, there is a potential risk that gender inequality, might be perpetuated during project construction through unequal distribution of work, discrimination against women, and unequal pay for women, among others. To mitigate that, the services to be provided by the project should be delivered in a gender inclusive manner while also empowers women.
Core Labour Rights	As the project has components on job creation, there could be a risk of involving children under age. The project will ensure that national working standards are met such as working age, minimum wage, and occupational health are all respected.
Indigenous Peoples	The ESIA has reported that Rwanda is a country with a single tribe, single language with single culture with no indigenous people.
Involuntary Resettlement	The relocation aspect could have a risk of involuntarily resettling people. However, prior stakeholder consultations have been conducted and the majority of households expressed that they would voluntarily move if they were given compensation equivalent to their possessions. A reasonable compensation matrix has been developed in the RAP.
Protection of Natural Habitats	The land spaces to be used in implementing activities are lands that are already used in agricultural productions. Therefore, there is no risk of destruction of natural habitats.
Conservation of Biological Diversity	The project intends to comply with Law on Environment No. 48/2018 of 13/08/2018 . The purpose of the law is to determine modalities for protecting, conserving and promoting the environment. The project will do that in the following ways: <ul style="list-style-type: none"> • During the implementation and operations of the climate resilient green village, the developer shall consider the list of protected species as a measure to avoid negatively affecting protected species; avoid introduction of alien species to the site; and take all action to protect and conserve the biological diversity in the project's area of influence. • Project activities will entail clearance of natural vegetation or affect any of the listed protected animals and plant species as listed in the Ministerial Order No 007/2008.
Climate Change	The project will comply with policies and laws that tackle climate change. Some of those are: <ul style="list-style-type: none"> • Forest law determining the management and utilization of forests in Rwanda. The project contractors will record the number of trees to be cut for use as timber or in the project activity area and get an approval from the district. Trees cut will be planted (only native or fruit trees not exotic species), upon completion of civil works, in urban areas and on roadsides for protection and beautification purposes.

²² Draft 5 ESIA Report for Smart green village

²³ Vulnerable or "at-risk" groups include people who, by virtue of gender, ethnicity, age, physical or mental disability, economic disadvantage or social status may be more diversely affected by displacement than others and who may be limited in their ability to claim or take advantage of resettlement assistance and related development benefits. This group also includes include people living below the poverty line, the landless, the elderly, women- and children-headed households, Indigenous Peoples, ethnic minorities, natural resource dependent communities or other displaced persons who may not be protected through national land compensation or land titling legislation.

	<ul style="list-style-type: none"> • The smart green village will also have less carbon footprint
Pollution Prevention and Resource Efficiency	<ul style="list-style-type: none"> • Limits contained within the Air Quality Specification of the Eastern African Standard Guideline are to be considered in all project activities. • Construction activities will not leave debris such as plastic waste behind. Cleaning measures will be applied after to ensure that the environment is not polluted.
Public Health	Measures to halt the spread of COVID-19 such as vaccination, handwashing, and facemasks as well as other health risks will be adhered to.
Physical and Cultural Heritage	The project will be executed in one of the most touristic sites with a rich physical and cultural heritage. Local leaders have been consulted throughout the ESIA to understand more about these sites ²⁴ . Measures like a chance find procedure should developed along with displaced and host communities for use throughout the project life cycle, for any cultural heritage that might be found during construction or operation of the site.
Lands and Soil Conservation	Land and soil conservation is one of the areas where Rwanda law on the environment points out. Measures to increase water retention and conserve soil such as cut and fill during construction activities, revegetation of areas where excavation works have been completed, planting grass and trees near constructed units will be taken.

Table 22: List of environment and social principles

Checklist of environmental and social principles	No further assessment required for compliance	Potential impacts and risks – further assessment and management required for compliance
<i>Compliance with the Law</i>	X	
<i>Access and Equity</i>	X	
<i>Marginalized and Vulnerable Groups</i>	X	
<i>Human Rights</i>	X	
<i>Gender Equality and Women's Empowerment</i>	X	
<i>Core Labour Rights</i>	X	
<i>Indigenous Peoples</i>	X	
<i>Involuntary Resettlement</i>	X	
<i>Protection of Natural Habitats</i>	X	
<i>Conservation of Biological Diversity</i>	X	
<i>Climate Change</i>	X	
<i>Pollution Prevention and Resource Efficiency</i>	X	
<i>Public Health</i>	X	
<i>Physical and Cultural Heritage</i>	X	
<i>Lands and Soil Conservation</i>	X	

PART III: IMPLEMENTATION ARRANGEMENTS

A. Project Implementation Arrangements

National Implementing Entity: The Ministry of Environment (MoE) is the National Implementing Entity that will endorse the proposed Adaptation Fund Project. MoE is the Ministry responsible for ensuring sustainable development of the environment and management and rational use of natural resources. It is responsible for the development of policies, strategies, and programmes as well as the formulation of regulations and mobilizing resources for the development of the sector. The Ministry is also responsible for the monitoring and evaluation of the implementation of environment, climate change and natural resources management at the national level. MoE will be responsible for the overall management of the Project and financial, monitoring the achievement of the project outcomes/outputs, and reporting and supervision of the project with AF.

²⁴ Ibid

Executing Entity: The Rwanda Development Board (RDB) will execute the Project. RDB was established in 2009 to promote economic development through managing, conserving, and improving the integrity of ecosystems to active environmental and tourism sustainability in the country. This includes wildlife protected areas – Volcanoes national park, Akagera national park and Nyungwe national park, reserves and sanctuaries lakes, rivers and swamps. RDB is also in charge of overseeing protected areas and resources as well as develop Rwanda’s tourism industry benefiting and boosting private companies to protect and benefit the people of Rwanda.

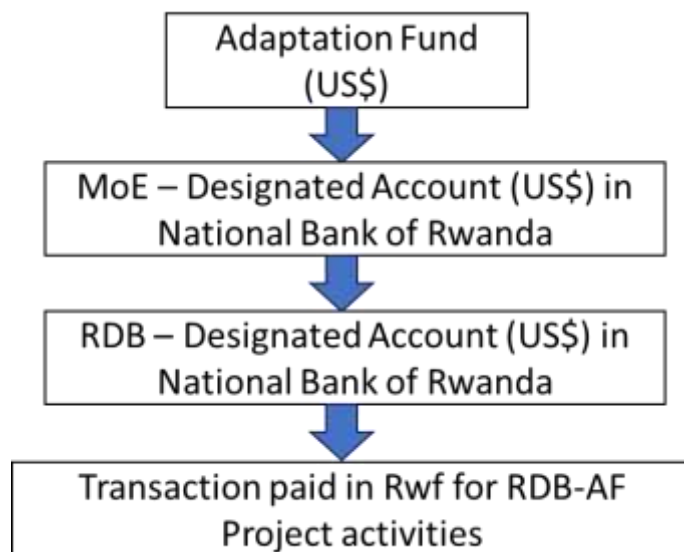
RDB will be responsible for implementing the project and will be ultimately responsible for the timely delivery of inputs and outputs and for coordination of all other responsible parties including other line ministries, relevant agencies, and local government authorities. The EE is proposed based on its extensive experience in the volcano’s region, whose both economic and environmental situation is very much influenced by the VNP. As a result, RDB has been working closely with the communities in flood risk zones (that could be associated with the park) under the tourism revenue sharing programme. Under the supervision of the MoE, RDB will appoint a Project Coordinator who will be based in Musanze and will manage a Project Implementation Unit. RDB will also appoint a high-level official (Coordinator of the Single Project Implementation Unit) who will serve as the Project Director (PD). The PD will be a member of the Steering Committee and will provide oversight and guidance to an existing Single Project Implementation Unit (SPIU) within RDB.

Overview of financial and project / programme risk management arrangements

RDB has a comprehensive Project Financial Management System in place, with operational procedures and processes. This has been operational since 2013.

For the flow of funds that flow from MOE to RDB, the financial staff in RDB’s Finance Department will be responsible for the financial management of the Adaptation fund proceeds at RDB level. RDB will use the Integrated Financial Management Information System (IFMIS) for recording financial data and reporting. This information will be subsequently passed up to MoE to meet AF financial reporting requirements.

Figure 25:Proposed Flow of Funds.



- RDB has the responsibility to ensure that all received funds are used for their intended and specified purpose. To this end, all funds are administered and supervised in accordance with due diligence to economy, efficiency and effectiveness, and compliance with the Adaptation Fund's and GoR's financial management policy and guidelines.
- RDB will open a new Designated Account denominated in US Dollars at the National Bank of Rwanda to receive Adaptation fund's proceeds from Ministry of Environment as an accredited entity of AF.
- Disbursement of Adaptation fund's proceeds to the Designated Account of MOE and later alone transferred by MOE to RDB designated bank account will be Transaction-Based through the use of statement of expenditures (SOE), Projected expenditures for the upcoming periods derived from the approved work plan and corresponding periodic budgets in line with acceptable financial reporting templates and requirements of Adaptation fund and confirming to the International Public Sector Accounting Standards (IPSAS). Project Funds will then be transferred by RDB to implementation partners in Rwf in line with sub-grant agreements signed between two parties and will detail the implementation modalities and reporting arrangements.

Budgeting Arrangements

In line with the Government of Rwanda's planning and budgeting procedures, RDB prepares an annual budget that is submitted to the ministry of Finance (MINECOFIN) which will include AF budgeted activities. The annual AF funding plan and budget will be submitted as part of RDB's overall budget. RDB will also prepare an annual budget, work plan and cash flow forecast specifically for the AF funding for the necessary approvals as per the grant agreement. In addition, RDB will submit quarterly financial reports to BoDs as part of the required reporting to stakeholders including donors. These reports will include variance analysis including reasons for any variance that may have occurred during a given quarter.

Reporting arrangements

RDB is responsible for the financial management of each funding and ensures that: a) all important business and financial processes are adhered to; b) adequate internal controls and procedures are in place; c) interim un-audited Financial Reports (IFRs) are prepared in a timely manner; d) financial statements are prepared in a timely manner and in accordance with International Accounting Standards (IAS) and international financial reporting standards (IFRS) or International Public Sector Accounting Standards (IPSAS); and f) an external audit is completed on time and audit findings and recommendations are implemented expeditiously. Normally, RDB monthly financial statements are submitted to MINECOFIN on 15th every subsequent month following the reporting period and this is by the Law. For donor's funds, it depends on each donor as stipulated in financing agreements and operational manual or any documents signed between beneficiary and donors. Mostly, it is 45 days after the ended quarter or semi-annually. Each donor has his separate books of accounts and some items are extracted in consolidated financial statements from throughout IFIMS

Financial Management and Auditing Arrangements

To effectively ensure project accounting and budget monitoring, the project will be equipped with suitable management tools (Procedures Manual, accounting software configured for this project, etc). Accounts will be kept in separate ledgers clearly showing all operations. The books and accounts will be incorporated into a computerized accounting management system suitable for producing financial statements that comply with international

standards. The annual financial statements, the special account and the functioning of the internal systems will be audited on an annual basis by the State finance General Auditor or a private auditing firm appointed by the General Auditor and fulfilling the Adaptation Fund's requirements. The auditor will be responsible for a posteriori evaluation and review of supporting documents. In addition, the Executing Entity, Rwanda Development Board (RDB), will prepare interim financial statements to be included in project quarterly progress reports. Overall, this administrative and financial arrangement will reduce the fiduciary risk and ensure the efficient, effective and economic use of resources.

All audit exercises are conducted according to international auditing standards.

Internal Control

All relevant internal control procedures, payment processes and the overall control environment including the relevant lines of communication will be in line with procedures set out in RDB's manuals, MINECOFIN and others donors documents. This will ensure that there is adequate segregation of duties. Responsibilities that reconciliations are done on a monthly basis, authorization is required for each transaction, cash thresholds are set, and clear communication lines are in place.

Staffing Arrangements.

RDB is staffed with required staff with experiences in fund management and other user departments. All staff have good and relevant profiles. The core values such as, teamwork transparency, accountability, confidentiality, professional skills and due care and professional behavior are drivers of RDB

Contractual arrangements/Procurement Procedures and Processes

Procurement responsibilities are clearly stated in the Procurement Law, Manual and Procedures and are all in line with Government of Rwanda procurement rules, in adherence to MoE's procurement policy and procedures. This is consistent with Government of Rwanda procurement processes and policies. The procurement process flow is as follows: - initiated by user department → Procurement unit → Procurement Officer → Tender Committee → approval of Chief Budget Manager. The Chief Budget Manager is mandated to approve contract awards. Other methods that are commonly used include (a) Restricted Tendering; and (b) Request for Quotations;

All procurement of goods works and services will be undertaken in accordance with National Implementing Entity's Rules of Procedure for the Procurement of Goods and Works (Law N°68/2018 of 25/08/2018 on public procurement, Ministerial order No 002/20/10TC of 19/05/2020 on the new procurement ceilings according to the level of the institution, Ministerial order No 002/20/10TC of 19/05/2020 establishing regulations on public procurement and standard bidding documents). MoE will submit to the secretariat, on an annual basis, a procurement audit report issued by the Auditor General's Office, or an independent auditor, on the Adaptation Fund project/s under implementation in relation to the effectiveness of its procurement systems and practice, as well as continuous availability of qualified resources in project cycle management. The report will correlate recommendations identified by the internal auditor of MoE and any relevant review by the Ministry of Economy and Finance (MINECOFIN), taking also into account any issues raised by stakeholders.

E-procurement

The E-Procurement System has been introduced and all public institutions are required to procure goods, services and works through the system. The use of online procurement by all public institutions started on 1st July 2017. The e-procurement system automates the public procurement process and enables the interactions of Government to business services (G2B).

Through the online system, the Government purchases goods, works, services and non-consultancy services to help the Government to ensure efficiency of public procurement with the standardization of electronic documents, supplier registration, goods and services information and to streamline public procurement transactions for efficient government service delivery.

Control System under procurement

An annual audit of RDB is conducted by the Auditor General Office. RDB has also an Internal Auditor who advises the FUND and manages risk on a day-to-day basis. The Internal Auditor is independent and reports directly to the Board of Directors for independence purposes. In addition, sometimes, RPPA conducts procurement review as they are no more involved in procurement operations since 2011.

The Fund has safeguards to meet high standards of due diligence. These include policies and processes in six areas: safeguarding, human resources, whistleblowing, risk management, codes of conduct and governance. RDB undertakes different types of due diligence, including internal and external audits, spot checks and closing audits to assess the fiduciary risk of project implementers (PIs).

Project technical coordination Committee

Overall Project coordination will remain the responsibility of MoE/PCU, given its institutional mandate for policy and coordination, oversight responsibility on its implementing agency. The technical coordination committee (TCC) is in charge of ensuring technical guidance to both the project execution team and the project steering committee. The TCC will be engaged in providing technical support on an on-going basis to facilitate effective implementation and mainstreaming of project interventions beyond the life of the project. Thus, the members of the TCC will bring expertise from their respective institutions to make technical contributions to the project implementation. The TCC will be formed and comprised of Department Heads, Division Managers and Project Coordinators from relevant Ministries and Institutions as follows: MININFRA, MINALOC, MoE, MINEMA, MINAGRI, RHA, RTDA, LODA, REMA, National Land Authority, RDB. The TCC will provide technical advisory support to project contractors and consultants (through the Implementing Agency), review implementation progress and handle day-to-day project coordination. The TCC will be chaired by the Program Manager of MoE-SPIU and will meet on quarterly basis; and anytime if need arises. It will review progress on Project activities, discuss issues and operational aspects of the project along with providing technical advisory support to project contractors and consultants through the implementing agencies. It will also prepare a monitoring and evaluation capacity building plan which will be reported to the PSC. Table 24 provides a classification of the project stakeholders

Table 23: classification of the project stakeholders

Type of stakeholder	Stakeholder
Government ministries	Ministry of Finance and Economic Planning (MINECOFIN),
	Ministry of Agriculture and Animal Resources (MINAGRI),
	Ministry of Infrastructure (MININFRA),
	Ministry of Trade and Industry (MINICOM),
	Ministry of Emergency Management (MINEMA),
Local government	Northern Province Office
	Musanze District office
	Kinigi Sector office
	Cell executive secretaries

	Village leaders
Government agencies	FONERWA, Rwanda Development Board (RDB),
	Rwanda Housing Authority (RHA),
	Rwanda Land Management and Use Authority (RLMUA),
	Rwanda Agriculture Board (RAB),
	Rwanda Environment Management Authority (REMA), Workforce Development Authority (WDA).
Donors and Multilateral agencies	World Bank
	Adaptation Fund
	Green Climate Fund
Private sector	Bisate Lodge
	One & Only Gorilla Nest
	Gorilla guardians
	Zamura Feeds
	Hollanda Fair Foods
	Uzima Chicken
	Kigali Farms
	Mukamira Dairy
Non-governmental organisations	Africa Wildlife Fund
	One Acre Fund
	International Gorilla Conservation Program (IGCP)
	USAID ORORA WIHAZE
	HEIFER International Dian Fossey Gorilla Foundation

Implementation At Community Level

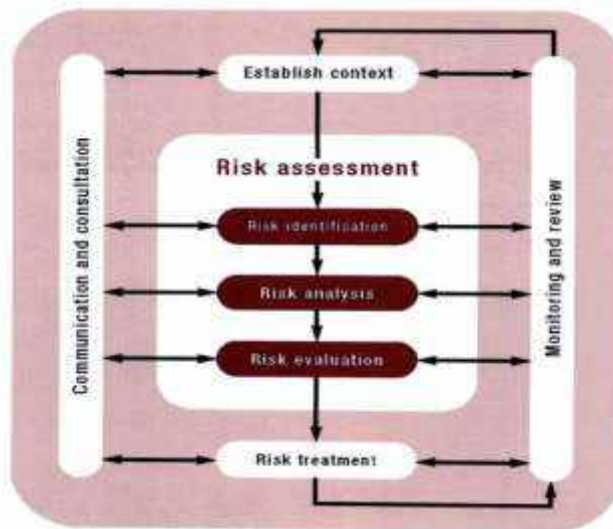
Decentralized entities will identify, prepare, and/or supervise activities supported by and compatible with the project. Many activities supported by the project will require full engagement with communities, and community members will be provided with employment opportunities and training. The communities will be heavily involved in the selection and oversight of activity execution. Community-based organizations will also be involved in monitoring and evaluation of project activities, in line with the philosophy of the project to promote participatory M&E and engaging the direct beneficiaries to ensure, for example, that Youth, women, persons with disabilities (PwDs) and other vulnerable people have an equal opportunity to benefit from livelihood activities. It is therefore expected that the specialists in the Project Implementation Unit will equitably engage extensively at the community level. In order to ensure that there are multiple ways for the communities to engage with the project sector-specific Community Consultation Committee (CCC) is proposed in each sector where the project is being implemented. The CCC will provide a platform for sector and community leaders to engage with farmers and other community members for each site. Gender and social inclusion (GESI) shall be considered across all livelihood interventions.

GoR approach to risk management

The project will be implemented by the Government of Rwanda through several its Ministries and agencies. Rwanda has a robust financial and project risk management framework that governs the activities of all government institutions. The Ministry of Finance and Economic Planning has published a set of Risk Management Guidelines to be followed by all government institutions and agencies. GoR recognizes that management of risk, is an important strategy for the achievement of NST 1, the Organic Law No. 12/2013/0L of 12/09/2013 on State Finances and Property requires every public institution to put in place risk management mechanisms to manage uncertainties that could impede achievement of institution's objectives. Figure 1 below provides visualization of the GoR risk management process that is applied to all projects under its

implementation. For this project, the following risk matrix has been drawn up to based on an identification of the risk and how the risks will be managed and or mitigated- Table 24.

Figure 26: GoR risk management process



Source: Ministry of Finance and Economic Planning - Risk Management Guidelines, 2019

Table 24: Identified project risks and mitigation strategy

Type of risk	Description	Approach to mitigation
Strategic	GoRs ministries, agencies, and other stakeholders may not demonstrate the level of commitment needed to ensure the success of the project	Continuous communication and visibility, advocacy, and engagement with key stakeholders during the implementation of the project to secure and maintain political buy in.
		Consulting fully with the stakeholders so that the project remains relevant to their needs.
		Networking and establishing meaningful partnerships in support of delivery of the project
Financial	GoR implementing agencies lack the capacity to manage and track the project funds.	GoR through Minecofin has a system of annual assessments that ensure that projects are on track and that funds are spent on activities that had been agreed upon. An assessment of fund utilization will be done both annually and in the project evaluations.
		GoR internal audit function led by the Auditor general will ensure that all financial controls are in place and are being followed.
Economic	Some households and communities may benefit more than others from the implementation of the LIAP	Implementation of each intervention should include an inclusion assessment that guides the targeting of beneficiaries. Data should be collected on who in the targeted beneficiaries has or has not benefited from the project as designed.
		Continuous M&E of the project will help guide the implementation process and ensure that it is equitable.
Developmental	Some segments of the targeted population are left out of the beneficitation of the project – youth, women, and PWDs. The project fails to deliver on its climate, environment, and conservation objectives	Implementation of the plan should mainstream youth, gender and PWDs across all interventions. Each intervention should include an audit on the how climate, environment, and conservation objectives will be impacted, or negative effects will be mitigated and or eliminated.

Operational	GoR is unable to raise enough funding to implement the project	GoR needs to draw up a funding strategy that will help raise financial support and commitment to support implementation at both the local and national government levels.
	Poor visibility of the impacts and benefits of the project	Proactive, timely and planned communication and visibility actions throughout the duration of the project
Technical	Delayed progress in the implementation of the project that could impact on its usefulness to the affected communities.	Effective coordination at all levels – community, local and national government and with implementing partners (NGOs or private sector) to ensure the agreed interventions are delivered in a timely manner
Political	A poorly managed land acquisition and compensation programmes generates negative public opinions and distrust among the affected communities	GoRs agencies handling the relocation need to abide by the national and international guidelines on relocation and resettlement of communities.

B. Environmental and Social Risk Management

Environmental risks

The potential for economic growth in Rwanda is closely linked with development of its natural resources including land, water, biodiversity, and minerals. Exploitation of these natural resources may generate large economic benefits in the short to medium term. However, in the long-term unsustainable use of these natural resources increases not only environmental degradation, but decreases economic growth, increases social tensions, and decreases livelihood opportunities.

Climate change, land degradation, pollution to soils, water and air, lack of access to water, and reoccurring natural disasters pose significant risks to Rwanda and its possibility to attain sustainable development. In addition, driving forces such as extremely high urbanisation rates, the population’s aspirations for higher living standards, and economic growth put additional pressures on the country’s natural resources and environmental quality. However, rightly managed, economic growth also constitutes an opportunity to reduce environmental pressures and social tensions, and a source of financing for environmental investments.

Approach to managing environmental risks

For this project, the following environmental risks have been identified throughout the ESIA– see Table 25 below;

Table 25: Identification and mitigation of environmental risks

Impact/ risk	Mitigation/enhancement measures	Cost (Rwf)
Land acquisition and involuntary resettlement	A RAP for the entire VNP expansion including the green village host community has been prepared which shall be used to compensate PAPs at full replacement cost before any project construction can commence.	1,804,774,343.56Rwf referenced from the RAP
Soil Erosion	Measures like stormwater drainage plan, soil excavation and stock piling plan, drainage diversions, cut and fill during construction activities, and vegetation replacement are required during the project activities	Cost to be determined by the Project detailed design.
Loss of vegetation and habitat	RAP compensation matrix shows that <ul style="list-style-type: none"> Farmers growing crops within the project site will be fully compensated for perennial crops and trees and allowed growth time for crops to be harvested. The conceptual design for the smart green village proposes to have a restorative landscape in which agroforestry is practiced with a special focus on the indigenous trees. During site clearing and excavation works, clear vegetation in phases so that only those areas required for immediate development are cleared. 	Cost to be determined by the Project detailed design.

	<ul style="list-style-type: none"> Grass vegetation cover should be maintained as much as possible. Biodiversity management plans shall be developed specific to each the different sub-components of the VCRP 	
Pollution (Air, Noise, land, etc.)	<ul style="list-style-type: none"> Air quality monitoring program will be implemented by the Contractor and Engineer to ensure compliance to ambient air emission standards. Emissions from construction equipment such as stone crushers, diesel generators, haul trucks, pavers, graders, and rollers will be managed through regulatory compliance to emission standards and proper operation and maintenance. Utilize low noise machinery for the construction to the extent possible and where required inform the neighbouring communities of any unusual construction activities The contractor shall present a waste management plan upon contractor signature and before commencement which will guide the manner in which waste is handled on site 	<p>Water spraying cost is 11,250,000Rwf²⁵</p> <p>Air quality monitoring cost is 13,200,000Rwf²⁶.</p> <p>Machine inspection lumpsum cost is 1,000,000Rwf Cost for noise level monitoring is 3,750,000Rwf²⁷</p>
Public Health (accidents and hazards, communicable diseases, etc.)	<ul style="list-style-type: none"> Environmental health and safety (EHS) Plan will be developed before the start of project activities The contractor along with local authorities at the sector level shall scale up HIV-AIDS awareness campaigns for workers and neighbouring communities since improved human mobility and income from the project especially go in tandem with increased HIV transmission. 	<p>Cost to be determined by the Project detailed design.</p>

Social risks

Communities to be relocated currently reside in Kinigi sector in Nyabigoma cell in 9 villages. This cell has a population of 5,632 residents living in 1,353 households. Not all households are going to be relocated. The programme is aiming to relocate 510 (AF funding135) households. The recent socioeconomic baseline survey conducted for a 304-household sample highlighted the following about the community to be relocated.

- Poverty - 56% of these households were classified in Ubudehe category 3, 33% in category 2, and 11% in category 1²⁸. Education – 94% have primary level education (the majority between 1-4 years); 1% of respondents have a diploma or university degree and 5% have only completed secondary school or received a vocational training education²⁹. There are no gender differences in educational attainments across the surveyed population. The proportion of households with primary school graduates is higher compared to households with members that possess advanced degrees.
- Literacy - Most respondents are literate in Kinyarwanda and have not completed primary school. Women respondents have a higher percentage of the illiteracy compared to men.

The survey was also used to assess sources of income and the types of crops that households in the community were cultivating.

- Farming is the most common source of income to many households in Nyabigoma cell. Households primarily cultivate Irish potatoes and pyrethrum. Beans and maize are also cultivated but not substantially.

²⁵ Cost derived from calculation of 30,000Rwf per trip for climate resilient green village, for 5 dry season months, each month of 30 days, spraying once every two days.

²⁶ 6,600,000Rwf per ambient air quality monitoring and analysis referred from the cost during an environmental audit of CIMERWA. This for two years of construction work.

²⁷ Noise monitoring cost referred from the cost during an environmental audit of CIMERWA.

²⁸ ibid

²⁹ ibid

- In addition to their own farming, households also earn a living from providing labour on other farms. More than half of households earn income from livestock. On average, farming own crops has a 51% share in a household income³⁰. Although a third of households indicated that they receive income from off-farm activities, this source only accounts for a small proportion of the household income on average.

Access to health care and social protection programmes is an important consideration for the communities to be relocated. From the survey the following are worth noting.

- Access to health services in Nyabigoma cell is more improved than the access in Musanze even at the national level. Ninety nine percent of households that we interviewed had insurance schemes, and the majority was mutual health insurance³¹. On average, households walk for 63 minutes to reach the nearest health center.
- Social protection programs in Nyabigoma cell include Vision 2020 Umurenge Programs (VUP) and one cow per family policy (Girinka). Eighteen percent of households are enrolled in the Girinka program and 6% are in the VUP³².

Approach to managing social risks

The main social impacts in this project emanate from the relocation of communities that will be affected by the expansion of the VNP. The Government has developed various law, policies and strategies that related to humane and equitable relocation of communities affected either by natural disasters, development, urbanization etc. that are in line with international standards. The Government's Resettlement Policy Framework (RPF) of 2016 outlined guidelines and process to be followed in assessing the social impact of project like the VNP park expansion, and specifically how to manage the displacement and resettlement of the affected persons in lieu of the anticipated involuntary displacement.

RPF seeks to ensure that any possible adverse impacts of proposed project activities to people's livelihoods are addressed through appropriate mitigation measures against potential impoverishment risks. These risks will be minimized by:

- Avoiding displacement of people as much as possible;
- In the event that displacement is inevitable, having a well-designed compensation and relocation process in place;
- Minimizing the number of project affected persons (PAPs), to the extent possible;
- Compensating for losses incurred and displaced incomes and livelihoods; and
- Ensuring resettlement assistance or rehabilitation, as needed, to address impacts on PAPs and their well-being and restore livelihoods.

Table 26: Identification and mitigation of social risks

Impact/ risk	Mitigation/enhancement measures	Cost (Rwf)
Loss of income and disturbance of livelihood	The project implementation is required to initiate the proposed livelihood restoration activities right after compensation, acquiring the land and during the project implementation. Also, The affected parties will be the first beneficiary of project employment to ensure minimum disturbance of the livelihood and a way of providing an alternative source of income.	30,509,290,000Rwf referenced from the RAP.
Risk of impact on cultural heritage	A Chance find procedure should developed along with displaced and host communities for use throughout the project life cycle, for any cultural heritage that might be found.	Cost relocating the cultural heritage shall be determined at the time of occurrence. A definite cost cannot be determined now

³⁰ Vanguard Economics, quantitative survey of sampled households in Nyabigoma cell, 2021

³¹ ibid

³² ibid

<p>Cultural shock to new housing and conflict among neighbours</p>	<ul style="list-style-type: none"> • To consider initiation trainings to PAPs on how to live and take care of the new houses before they relocate into them as well as to assign an estate coordinator who can support them to adapt to the houses • Lessons learned from the Kinigi model village, the smart green village should have a coordinator to mitigate conflicts/ tensions before they happen or manage them when they happen. Furthermore, PAPs have already elected representatives who are there to manage such grievances as part of the grievance redress mechanism. 	<p>Cost to be determined by the Project detailed design.</p>
<p>Gender based violence (GBV) and Sexual exploitation and abuse (SEA) impacts</p>	<ul style="list-style-type: none"> • To consider at minimum, in conformance with 2018 local labour law and customs, equal opportunity for employment. 	<p>Cost to be determined by the Project detailed design.</p>
<p>Employment labour issues</p>	<ul style="list-style-type: none"> • Engaging the local skilled and unskilled labour within the project. • Ensure that the local communities are given priority in relation to employment. • Ensure that the hired workforce during the construction period is screened and of eligible age to work based on their National Identification ID. • Ensure that all workers have and understand their contracts with terms and conditions that are consistent with national labour laws and policies. 	<p>Cost to be determined by the Project detailed design.</p>

C. Monitoring and Evaluation Arrangements

Measuring the performance of this project is critical to helping assess its impact on (1) community being relocated, (2) host community and wider Kinigi communities, (3) GoR policy on relocation as a climate mitigation measure for at risk communities.

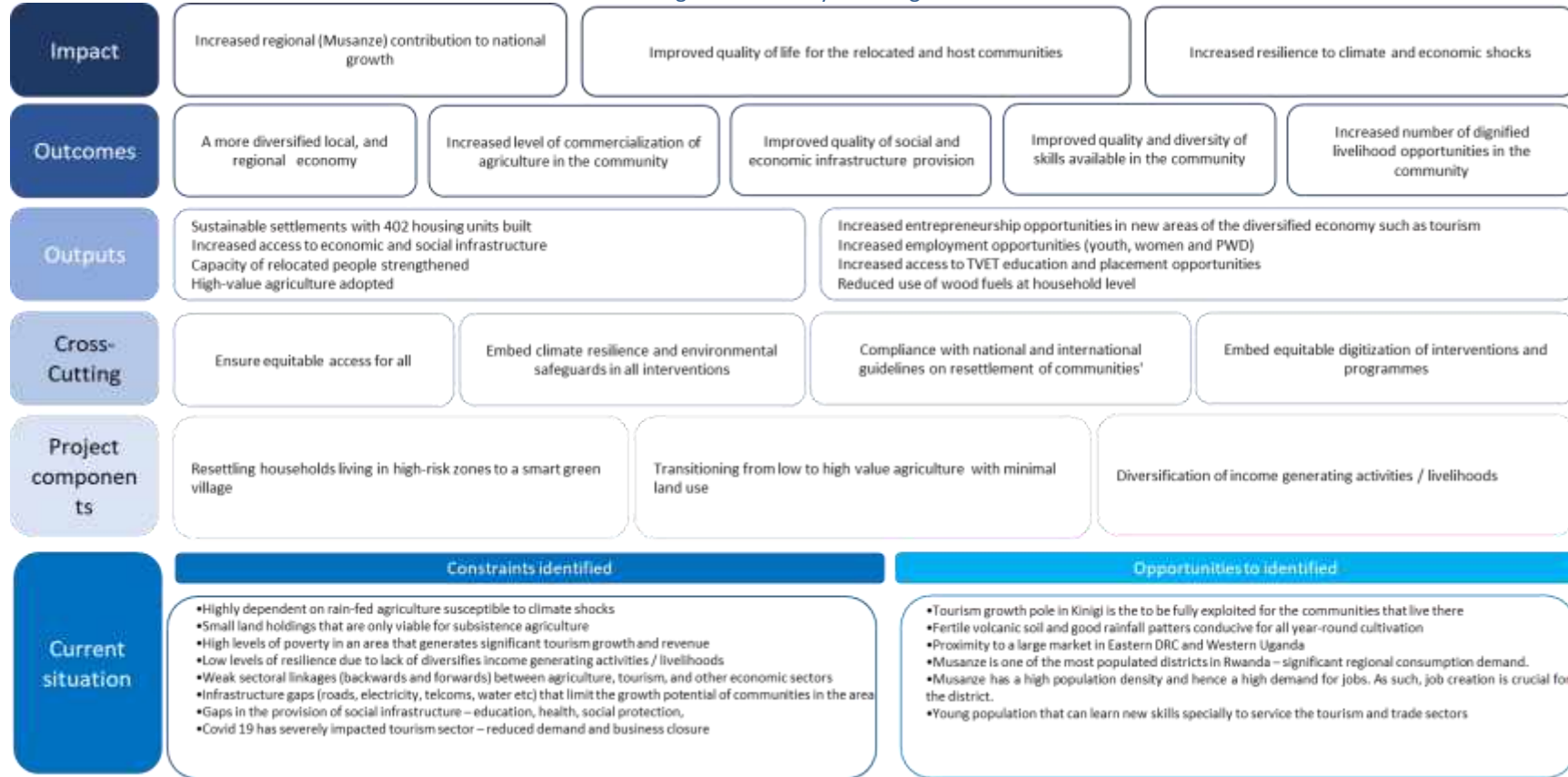
- **Monitoring the implementation progress** – The IE - MoE- will monitor the project implementation on an annual basis using the results framework (See table 28). For effective results, a baseline study will be required before implementation of the project commences. Several studies of the community and wider community of Kinigi have been conducted to inform the design of this project. These studies provide adequate information that would inform a baseline from which the project result framework would be designed. Data on gender inclusion and data disaggregation has been considered through the two-gender assessment undertaken on the project.
- **Evaluation of the project** –The project will be evaluated on an annual basis using the MoE annual project reporting framework. Additionally, a mid-term and terminal evaluation of the project are planned. The mid-term evaluation will be done two years into the project and will be commissioned by the project steering committee. Both mid-term and terminal evaluation will use the OECD DAC evaluation criteria. Lessons and impact stories will be captured and shared with relevant stakeholders following the completion of each evaluation cycle – Annual, mid-term, and terminal.

D. Results Framework

Table 27: Result framework

<i>Impact level</i>	<i>How it will be measured</i>	<i>Data sources</i>
Increased regional (Musanze) contribution to national growth	GDP growth in Agric, Tourism, Services and Construction	National Accounts
<i>Outcome level</i>		
A more diversified and resilient regional economy	New sustainable income generating activities in the region	Survey data
Increased level of commercialization of agriculture in the community	No of commercial operations recorded in the sector No of business linked to commercial off takers	Survey data
<i>Impact level</i>	<i>How it will be measured</i>	<i>Data sources</i>
Improved quality of life for the relocated and host communities	Income, health, and education, measures for the district	Survey data
<i>Outcome level</i>		
Improved quality and provision of social and economic infrastructure	No of roads, schools, health centers, TVET etc that have been built or upgraded to support the project	Musanze district, Kinigi sector
Improved quality and diversity of skills available in the community	No people trained in a range of TVET skills	Labour Force Survey
Increased number of dignified livelihood opportunities in the community	No of people employed or business started in the Kahugu cell of Kinigi sector	Survey data of establishments in project area
<i>Impact level</i>	<i>How it will be measured</i>	<i>Data sources</i>
Increased resilience to climate and economic shocks	Income, climate events impact	Survey data
<i>Outcome level</i>		
More reliable mechanism of dealing with climatic shock	<i>No of climate impact events and damages</i>	MINEMA

Figure 27: Theory of change



1. The Theory of Change (ToC)

The dynamics of implementing this project requires an understanding of the challenges and opportunities that currently communities in the Kinigi sector face due to climate change impacts. As indicated previously, these challenges and opportunities have been identified through the collection and analysis of primary and secondary data, especially in-depth consultations with stakeholders at the local, regional, and national levels. The ToC presented in figure below attempts to explain how these challenges can be addressed and opportunities exploited to deliver the type of impact that was envisioned under this project /programme.

2. Project components

Based on the extensive consultations with stakeholders on the constraints and opportunities related to the relocation, the following areas of intervention have been proposed in this action plan.

- **Resettling households living in high-risk zones to a smart green village:** The village shall have climate-resilient settlements as well as improved public economic and social infrastructure.
- **Transitioning from low to high value agriculture** - By introducing high-value crops that target high-end tourism market in the region.
- **Diversification of income generating activities/livelihoods** – by increasing the level of agriculture value addition, creating new business opportunities in conservation all aimed at increasing resilience to economic, social, and climatic shocks.

3. Levels of intervention

Interventions in this project will be implemented at various levels based on type of activity and the targeted beneficiaries

- **Micro economy** – At this level the focus is on activities undertaken at the individual level that would enhance the incomes and resilience of the participating household. Examples include raising livestock or construction jobs in the green village etc
- **Meso economy** – At this level the focus is on activities that the community undertake as a group and or services delivered to them that would improve the economic and social standing of the community. Examples of these activities include a community-based poultry business, development of the tree nurseries, or the provision of a health facility.
- **Macro economy** – At this level the objective is to support both households and communities strengthen their linkages into the macro-economy - regional and national. Examples of this include provision of value-added services and goods to the tourism and construction industries.

4. Cross cutting themes

In implementing the project, it's imperative that several cross-cutting issues are embedded and or considered in the design of the interventions. These include the following

- **Maximize gender, youth and PWD participation** – At all levels an inclusion lens needs to be applied to ensure equitable access and participation by all. This means a careful understanding of the factors that may exclude the participation of some sections of society and how these would be addressed. Additionally, the M&E data collected on the impact of the project should be disaggregated to understand how different groups have benefited or been affected by the implementation of the plan.
- **Climate, environment, and conservation safeguards** – Imperative that all interventions are assessed on how they reduce and mitigate climate and environmental impacts while enhancing or complementing VNP conservation efforts.
- **Compliance with international standards** – It is critical that implementation of the plan and its interventions follows international and national standards on (i) resettlement of communities; (ii) conservation and biodiversity standards, principles, and practices.
- **Embedding digital solutions** – Where relevant digital solutions should be explored to simply process and to aid data collection and analysis. In doing so, it's important for these

solutions to be tailored to be inclusive so as not to exclude some sections of the society that may not be digitally literate or have the infrastructure and tools to participate on these platforms.

5. Assumptions underlying the ToC

There are several assumptions underlying the ToC. The assumptions are the conditions that need to be in place for this project to deliver on the outputs, outcomes and impacts outlined in the ToC. The assumptions explain the logic behind the project and the causal links attributed to the climate, conservation, economic and social impacts that the plan is expected to deliver to the targeted communities (relocated and host). The following assumptions are proposed;

- GoR's application to AdF is successful and is fully funded
- GoR raises sufficient funding to implement its compensation and relocation programme
- GoR raises additional funding for the non-AdF components of the project
- GoR and global efforts to contain the covid 19 pandemic are successful in limiting its impact on the international, regional, national, and local economies.

E. Alignments with AF's Results Framework

A. Outputs and indicators

Table 28 presents the output indicators and how they will be measured. The outputs and indicators outlined are not conclusive and can be further refined at the start and during the implementation of the project.

Table 28: Output indicators and their measurement

	Output indicator	How it will be measured	End of project target	Source of data
Output 1	Sustainable settlements with 510 (AF funding 135) housing units built	No of households relocated	510 (AF funding 135)	RDB
Output 2	Increased access to economic and social infrastructure	No of schools, ECD, health centres, recreational areas, roads, electricity connections etc built or upgraded	TBD	RDB
Output 3	Capacity of relocated people strengthened	No of relocated people who received construction training disaggregated by skills, age, and gender	200	Survey data
Output 4	High-value agriculture adopted	No of households that have transitioned to high-value agriculture	135	RDB
Output 5	Increased entrepreneurship opportunities in new areas of the diversified economy	No of new business operating in non-traditional sectors (gender and age disaggregation)	50	Musanze District, Kinigi sector Or establishment census 2023
Output 6	Increased employment opportunities (youth, women and PWD)	No of jobs created disaggregated by gender age and disability	60	Labour Force Survey
Output 7	Increased access to TVET education and placement opportunities	No of people trained by TVET or other training centers – disaggregated by gender and age	135	Labour Force Survey

		No of people trained with placement opportunities		
Output 8	Reduced use of wood fuels at household level	No of households in the smart village using pellets as cooking energy	300	Integrated Household Living Conditions Survey

B. Outcome statements and indicators

The following outcome statements are indicative and would be further refined in the validation of the project by various stakeholders – see Table 29. They are expected to provide an indication of the medium-term results achieved following the effective implementation of the project.

Table 29: Outcome indicators and their measurement

	Outcome indicator	How it will be measured	End of programme target	Source of data
Outcome 1	A more diversified and resilient regional economy	New sustainable income generating activities in the region	10	Survey data
Outcome 2	Increased level of commercialization of agriculture in the community	No of commercial operations recorded in the sector No of business linked to commercial off takers	20 30	Survey data
Outcome 3	Improved quality and provision of social and economic infrastructure	No of roads, schools, health centers, TVET etc that have been built or upgraded to support the project	TBD	Musanze district, Kinigi sector
Outcome 4	Improved quality and diversity of skills available in the community	No people trained in a range of TVET skills	300	Labour Force Survey
Outcome 5	Increased number of dignified livelihood opportunities in the community	No of people employed or business started in the Kahugu cell of Kinigi sector	130	Survey data of establishments in project area
Outcome 6	More reliable mechanism of dealing with climatic shock	No of climate impact events and damages	2	MINEMA

C. Impact statements and indicators

The vision and objectives of the project speak of the important role of the VNP expansion project will play in catalyzing green growth and contributing to improving the welfare and livelihoods of the communities impacted by the project. As such, the impact statements (Table 30) are designed to provide a framework from which the effective implementation of the project can be assessed.

Table 30: Measurement of the project impact indicators

	Impact indicator	How it will be measured	End of project target	Source of data
Impact 1	Increased regional (Musanze) contribution to national growth	GDP growth in Agric, Tourism, Services and	0.2% for agric;	National Accounts

		Construction	1.2% for tourism and 2% for services	
Impact 2	Improved quality of life for the relocated and host communities	Income, health, and education, measures for the district	TBD	Survey data
Impact 3	Increased resilience to climate and economic shocks	Income, climate events impacts	TBD	Survey data

D. Alignment with Adaptation Fund result framework

Table 31: Alignment of result frameworks

Project Objective(s) ¹	Project Objective Indicator(s)	Fund Outcome	Fund Outcome Indicator	Grant Amount (USD)
Impact 2 - Improved quality of life for the relocated and host communities	Income, health, and education, measures for the district	Outcome 6: Diversified and strengthened livelihoods and sources of income for vulnerable people in targeted areas	6.1 Percentage of households and communities having more secure access to livelihood assets	1,830,000
			6.2. Percentage of targeted population with sustained climate-resilient alternative livelihoods	
Impact 3 - Increased resilience to climate and economic shocks	Income, climate events impacts	Output 1.2: Targeted population groups covered by adequate risk reduction systems	1.2.1. Percentage of target population covered by adequate risk-reduction systems	6,757,585
Outcome 3 - Improved quality and provision of social and economic infrastructure	No of roads, schools, health centers, TVET etc that have been built or upgraded to support the project	Output 4: Vulnerable development sector services and infrastructure assets strengthened in response to climate change impacts, including variability	4.1.2. No. of physical assets strengthened or constructed to withstand conditions resulting from climate variability and change (by sector and scale)	640,000

F. Detailed Budget

The overall requested funding is US\$ 9,977,555 over 5 years.

Component 1- Resettling households living in high-risk zones to smart green villages- will cost US\$ 5,672,000 which is equivalent to 135 housing units with their infrastructure and public buildings.

Component 2- Improved livelihoods and economic resilience – will cost US\$ 2,890,000 for the activities under this component.

Component 3 – Impact monitoring

- **Project execution cost-** will be US\$ 770,580. Its breakdown in in table 34
- **Implementation Entity fee –** will be US\$ 644,975.

Annex 5 to OPG Amended in October 2017

Table 32: Budget for implementation of proposed project

Budget												
Outcome	Outputs	Activity	Inputs Description	Unit	Qty	Rate	Cost	Year 1	Year 2	Year 3	Year 4	Year 5
Total Budget							9,977,555	3,120,991	5,263,240	757,840	404,840	430,644
Reduced Exposure to Climate Hazards							8,562,000	2,825,100	4,990,700	485,300	132,300	128,600
Community in high-risk zone settled in climate resilient green village							5,672,000	1,911,600	3,760,400	0	0	0
Housing							2,767,500	1,277,100	1,490,400	0	0	0
Preliminaries				HH	135	2,100	283,500	283,500	0	0	0	0
Substructure				HH	135	3,500	472,500	189,000	283,500	0	0	0
Superstructure				HH	135	3,300	445,500	178,200	267,300	0	0	0
Wall finishes (plastering and paint)				HH	135	1,500	202,500	81,000	121,500	0	0	0
Roof structure and covering				HH	135	1,200	162,000	64,800	97,200	0	0	0
Doors & Windows				HH	135	1,000	135,000	54,000	81,000	0	0	0
Ceiling and Insulation				HH	135	4,000	540,000	216,000	324,000	0	0	0
Tiling				HH	135	800	108,000	43,200	64,800	0	0	0
Plumbing and electrical				HH	135	1,300	175,500	70,200	105,300	0	0	0
High-efficiency solid fuel cook stove				HH	135	40	5,400	2,160	3,240	0	0	0
Sanitary and kitchen fixtures and equipment				HH	135	1,460	197,100	78,840	118,260	0	0	0
House equipment				HH	135	300	40,500	16,200	24,300	0	0	0
Site servicing, infrastructure and landscape							2,052,000	634,500	1,417,500	0	0	0
Earth works / Landscaping				HH	135	1,700	229,500	229,500	0	0	0	0
Roads servicing				HH	135	3,000	405,000	405,000	0	0	0	0
Improved stormwater management and slopes stabilization				HH	135	1,000	135,000	0	135,000	0	0	0
Power supply				HH	135	1,100	148,500	0	148,500	0	0	0
Water supply				HH	135	1,500	202,500	0	202,500	0	0	0

Annex 5 to OPG Amended in October 2017

		Rainwater harvesting	HH	135	2,300	310,500	0	310,500	0	0	0
		Composting toilet	HH	135	1,800	243,000	0	243,000	0	0	0
		Composting facility	HH	135	100	13,500	0	13,500	0	0	0
		Urban agriculture	HH	135	900	121,500	0	121,500	0	0	0
		Solar Street lighting and public facilities solar lighting	HH	135	1,200	162,000	0	162,000	0	0	0
		Kitchen gardens	HH	135	600	81,000	0	81,000	0	0	0
		Public and Civic Buildings				852,500	0	852,500	0	0	0
		Health Post	SQM	200	550	110,000	0	110,000	0	0	0
		Early Childhood Center (Nursery)	SQM	200	550	110,000	0	110,000	0	0	0
		Mini Market + Post Harvest	SQM	500	550	275,000	0	275,000	0	0	0
		Multipurpose Hall	SQM	400	550	220,000	0	220,000	0	0	0
		Office of local leaders	SQM	100	550	55,000	0	55,000	0	0	0
		ICT Room (Irembo)	SQM	50	550	27,500	0	27,500	0	0	0
		Police post	SQM	100	550	55,000	0	55,000	0	0	0
Improved Livelihoods and Economic Resilience						2,890,000	913,500	1,230,300	485,300	132,300	128,600
		Transitioning from low to high value agriculture				920,000	384,500	187,300	117,300	117,300	113,600
		Promote the use of greenhouses at by communities to intensify the growing of high value horticulture destined for the Kinigi high-end tourism hotels	Units	2	120,000	240,000	72,000	88,800	28,800	28,800	21,600
		Promote the diversification into the cultivation of mushrooms, cherry tomatoes, herbs, garlic, ginger and other vegetables that destined for the high-end tourism market in Kinigi and Kigali	Units	2	100,000	200,000	140,000	15,000	15,000	15,000	15,000
		Develop a sustainable bamboo agro-forestry industry that supplies – construction, food, and FMCG products	Processing units	1	350,000	350,000	52,500	73,500	73,500	73,500	77,000
		Develop community-based poultry industry that supplies meat and eggs to the high-end tourism market in Kinigi and Kigali	Units	1	100,000	100,000	90,000	10,000	0	0	0
		Develop a rabbit meat industry to supply a growing local and export market	HH	600	50	30,000	30,000	0	0	0	0
		Diversification of income generating activities/livelihoods				770,000	404,000	308,000	58,000	0	0
		Develop affordable accommodation facilities within the model green village	Lodge	1	400,000	400,000	160,000	240,000	0	0	0
		Develop cottage industries making unique community handicrafts targeted at the tourism market	Units	1	100,000	100,000	44,000	28,000	28,000	0	0

Annex 5 to OPG Amended in October 2017

		Create a cultural art village that generates awareness of and promotes the local culture in Kinigi	Units	1	200,000	200,000	200,000	0	0	0	0
		Develop rural agro-logistics capacity and platforms that serve the local and wider Musanze community.	Units	1	10,000	10,000	0	10,000	0	0	0
		Intensify zero grazing of small livestock production and value addition within the green village	HH	600	100	60,000	0	30,000	30,000	0	0
		Linking communities to the wider macro-economy				375,000	10,000	195,000	170,000	0	0
		Develop CBT that showcases Rwanda culture, local stories, music, dances etc to be marketed to the high-end tourism market in Kinigi	CBT	1	50,000	50,000	0	25,000	25,000	0	0
		Enable the community to diversify into the delivery of digital financial services	Agents	5	5,000	25,000	0	25,000	0	0	0
		Tourism capacity building of relocated and host communities that enables them to get employment in the tourism sector in Musanze	Trainee	50	1,000	50,000	10,000	20,000	20,000	0	0
		Enhance TVET infrastructure and skills that would link the community into the services and construction sectors	TVET School	1	250,000	250,000	0	125,000	125,000	0	0
		Effective relocation and integration of communities				825,000	115,000	540,000	140,000	15,000	15,000
		Business incubation program	Plan	1	250,000	250,000	0	125,000	125,000	0	0
		Technical assistance to relocated community	Groups	10	50,000	500,000	100,000	400,000	0	0	0
		Capacity building	HH	150	500	75,000	15,000	15,000	15,000	15,000	15,000
Impact monitoring						1,415,555	295,891	272,540	272,540	272,540	302,044
		Project Execution Cost (9%)				770,580	199,145	143,545	143,545	143,545	140,800
		Implementing entity fee (7.5%)				644,975	96,746	128,995	128,995	128,995	161,244

Annex 5 to OPG Amended in October 2017

A breakdown of the project execution costs is shown in Table 28. The costs comprise of 9 staff within the project implementation unit. These costs amount to USD 1,500,000. Half of the financing will come from the AF and the rest from GoR co-finance option.

Table 33: Project execution costs

Project output/activity	Year 1	Year 2	Year 3	Year 4	Year 5	Total, USD	AdF	
<i>Project execution costs (< 9.5% of the total budget requested, before the implementing entity fees)</i>								
Project manager gross salary	57,960	57,960	57,960	57,960	57,960	289,800	144,900	1
Financial and administrative assistant	24,840	24,840	24,840	24,840	24,840	124,200	62,100	2
Monitoring and evaluation officer gross salary	18,492	19,872	19,872	19,872	19,872	97,980	48,990	3
Agronomist gross salary	11,000	13,248	13,248	13,248	13,248	63,992	31,996	4
Community development officer gross salary	11,000	13,248	13,248	13,248	13,248	63,992	31,996	5
Enterprise development officer gross salary	11,000	13,248	13,248	13,248	13,248	63,992	31,996	6
Communications officer gross salary	15,180	16,560	16,560	16,560	16,560	81,420	40,710	7
Community animators	19,000	19,000	19,000	19,000	19,000	95,000	47,500	8
Driver	6,072	6,624	6,624	6,624	6,624	32,568	16,284	9
Project vehicle	58,600	0	0	0	0	58,600	29,300	10
Motorcycles	28,700	0	0	0	0	28,700	14,350	11
Bicycles for community animators	5,755	0	0	0	0	5,755	2,878	12
Vehicle maintenance, insurance, tax, etc.	11,720	11,720	11,720	11,720	11,720	58,600	29,300	
Fuel for vehicle and generator	20,850	20,850	20,850	20,850	20,850	104,250	52,125	
Security	7,500	7,500	7,500	7,500	7,500	37,500	18,750	
Accommodation and per diems	3,500	3,500	3,500	3,500	3,500	17,500	8,750	
Office rent	3,000	3,000	3,000	3,000	3,000	15,000	7,500	
Office furniture	10,000	0	0	0	0	10,000	5,000	
Computers and IT equipment	15,000	0	0	0	0	15,000	7,500	
Internet connection	2,500	2,500	2,500	2,500	2,500	12,500	6,250	
Mobile phones (for 9 staff and 20 community animators)	1,000	0	0	0	0	1,000	500	13
Solar lamps with phone chargers	1,000	0	0	0	0	1,000	500	14
PPE for community animators	1,200	0	0	0	0	1,200	600	15
Project engineer for construction works	33,120	33,120	33,120	33,120	33,120	165,600	82,800	16
Stationery and supplies	3,650	3,650	3,650	3,650	2,314	16,914	8,457	
Management meetings	8,150	8,150	8,150	8,150	3,996	36,596	18,298	

Annex 5 to ODC Amended in October 2017

Inception workshop and annual workshops	8,500	8,500	8,500	8,500	8,500	42,500	21,250
Subtotal	398,289	287,090	287,090	287,090	281,600	1,541,159	770,580
<i>Percent expenditure per year</i>	<i>26%</i>	<i>19%</i>	<i>19%</i>	<i>19%</i>	<i>18%</i>		

Budget Notes:

No.	Budget Notes
1	Hired at project inception
2	Hired at project inception
3	Hired 1 month after project inception to enable PM to participate in recruitment
4	Hired 1 month after project inception to enable PM to participate in recruitment
5	Hired 1 month after project inception to enable PM to participate in recruitment
6	Hired 1 month after project inception to enable PM to participate in recruitment
7	Hired 1 month after project inception to enable PM to participate in recruitment
8	20 community animators - phone cards, per diems, and accommodation for training, refreshments
9	Hired at project inception
10	Toyota brand vehicle with up to 8 seats for mobility
11	To ensure mobility to the fields by staff
12	For faster mobility of community animators
13	Mobile phones for 8 staff and 20 community animators
14	Solar lamps with phone chargers for the community animators
15	Personal protective equipment for community animators when on field
16	Permanent staff hired at project inception

G. Disbursement Schedule

Disbursement arrangements:

Adaptation Fund resources will be disbursed in accordance with National Implementing Entity's Rules of Procedure and Operational Procedures. The following two disbursement methods will be used: (i) the direct payment method for works, goods and services contracts; (ii) the special account or revolving fund (RF) method for goods and services contracts and for operating costs, project staff allowances and sundry management costs.

Adaptation Fund resources will be deposited into the special account opened by the project Executing Entity (RDB) in a local bank deemed acceptable to the Adaptation Fund.

The provisions set forth in the Adaptation Fund's Disbursement Manual will apply. Disbursements from the special account will be made as an advance, based on an annual work programme and budget approved. Every request for an advance will be submitted to the NIE for approval and will cover a maximum period of six months of operations. The special account will be replenished based on requests by RDB, backed by supporting documents for the use of at least 100% of the advance previously received.

MoE will also provide effective co-ordination with other climate change projects in Rwanda creating linkages where necessary. MoE will appoint a Programme Officer in Kigali to ensure the efficient disbursement and use of donor funds and timely delivery of project inputs and outputs. S(he) will also coordinate all other responsible parties for the purposes of forming the Steering Committee and Technical Advisory Group (see below) as well as support project implementation by assisting in recruiting and contracting of project personnel and consultant services, sub-contracting and procuring equipment in accordance with Government guidance and procedures (see above). Table 35 provides the proposed disbursement schedule outlining how GoR and AdF funds will be drawn down

Table 34: Disbursement schedule

	On signing agreement	Year 1	Year 2	Year 3	Year 4	Total
Date	2024	Dec-25	Dec-26	Dec-27	Dec-28	
Project Funds from AdF in USD	3,120,991	5,263,240	757,840	404,840	430,644	9,977,555

PART IV: ENDORSEMENT BY GOVERNMENT AND CERTIFICATION BY THE IMPLEMENTING ENTITY

A. Record of Endorsement on Behalf of the Government

Provide the name and position of the government official and indicate date of endorsement. The endorsement letter should be attached as an annex to the project proposal. Please attach the endorsement letter with this template:

<i>(Enter Name, Position, Ministry)</i>	<i>Date: (Month, day, year)</i>
---	---------------------------------

B. Implementing Entity Certification

Provide the name and signature of the Implementing Entity

<p>I certify that this proposal has been prepared in accordance with guidelines provided by the Adaptation Fund Board, and prevailing National Development and Adaptation Plans (.....list here.....) and subject to the approval by the Adaptation Fund Board, <u>commit to implementing the project/programme in compliance with the Environmental and Social Policy and the Gender Policy of the Adaptation Fund</u> and on the understanding that the Implementing Entity will be fully (legally and financially) responsible for the implementation of this project/programme.</p>

Coordinator and the date of signature. Provide also the project contact person's name, telephone number and email address

⁶ Each Party shall designate and communicate to the secretariat the authority that will endorse on behalf of the national government the projects and programmes proposed by the implementing entit

<i>Name & Signature</i>	
Implementing Entity Coordinator	
<i>Date: (Month, Day, Year)</i>	Tel. and email:
Project Contact Person:	
Tel. And Email:	

B. Implementing Entity Certification

Provide the name and signature of the Implementing Entity Coordinator and the date of signature. Provide also the project contact person's name, telephone number and email address

I certify that this proposal has been prepared in accordance with guidelines provided by the Adaptation Fund Board, and prevailing National Development and Adaptation Plans Updated NDC, Revised Green Growth & Climate Resilience Strategy, NST1) and subject to the approval by the Adaptation Fund Board, commit to implementing the project/programme in compliance with the Environmental and Social Policy and the Gender Policy of the Adaptation Fund and on the understanding that the Implementing Entity will be fully (legally and financially) responsible for the implementation of this project/programme.

⁶ Each Party shall designate and communicate to the secretariat the authority that will endorse on behalf of the national government the projects and programmes proposed by the implementing entities.

<i>Name & Signature</i>	
Patrick KARERA Permanent Secretary Implementing Entity Coordinator	
Date: <i>(Month, Day, Year)</i> April, 28, 2023	Tel. and email: +250789414092 pkarera@environment.gov.rw
Project Contact Person: Diane BUCYANA	
Tel. And Email: +250788887939 & diannabucyana@environment.gov.rw	



ADAPTATION FUND

Letter of Endorsement by Government

Government of Rwanda

28th April 2023

**To: The Adaptation Fund Board
c/o Adaptation Fund Board Secretariat
Email: Secretariat@Adaptation-Fund.org
Fax: 202 522 3240/5**

Subject: Endorsement for Enhancing adaptation through sustainable green settlements and climate-resilient livelihoods in the Volcano Region of Rwanda

In my capacity as designated authority for the Adaptation Fund in Rwanda, I confirm that the above national grant proposal is in accordance with the government's national priorities in implementing adaptation activities to reduce adverse impacts of, and risks, posed by climate change in the country.

Accordingly, I am pleased to endorse the above grant proposal with support from the Adaptation Fund. If approved, the project will be implemented by the Ministry of Environment (MoE) and executed by Rwanda Development Board (RDB).

Sincerely,

Patrick KARERA

**Permanent Secretary of MoE &
DA of Adaptation Fund in Rwanda**

