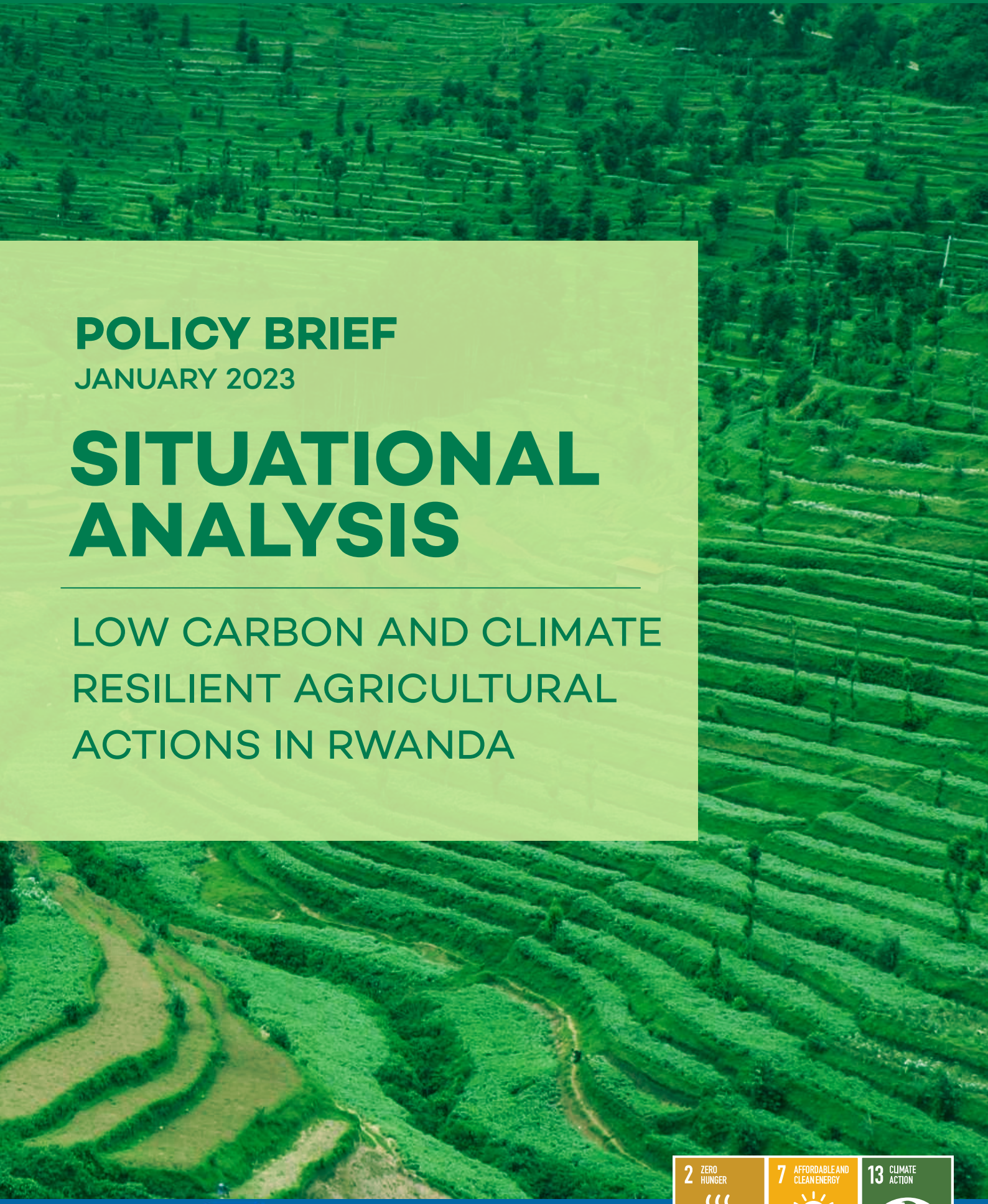

POLICY BRIEF

JANUARY 2023

SITUATIONAL ANALYSIS

LOW CARBON AND CLIMATE RESILIENT AGRICULTURAL ACTIONS IN RWANDA

2 ZERO HUNGER

7 AFFORDABLE AND CLEAN ENERGY

13 CLIMATE ACTION

Republic of Rwanda
Ministry of Agriculture and Animal Resources

UNDP

Deepening efforts to accelerate NDC implementation in Rwanda

@ UNDP

INTRODUCTION

The Government of Rwanda, through the Ministry of Agriculture and Animal Resources (MINAGRI) received financial support from the United Nations Development Programme (UNDP) to undertake a situational analysis and develop an implementation roadmap for the transition to low carbon and climate resilient agriculture in Rwanda. This aligns with Rwanda's priorities for the agriculture sector in the updated Nationally Determined Contribution (NDC) as well as actions in the strategic plan for agriculture transformation 2018-2024 (PSTA4).

This policy brief summarizes the findings from above study in terms of gaps, proposed strategies and gives recommendations.

Agriculture is the dominant sector of the Rwandan economy.

It contributes 26% of national GDP (NISR, 2020) and comprises around 65% of the total workforce (NISR, 2020), of which 60% is youth (FAO, 2020). Over half of total exports are agricultural and agro-processed goods, with a value of 252 million USD (MINAGRI, 2018).

Food crops are the dominant sub-sector accounting for 58% of the sector in terms of GDP contribution (MINAGRI, 2018).

Rwanda's main limiting production factor is land; farm plot sizes are small, and up to 75% of the population own less than 0.7ha meaning that agriculture is still dominated by subsistence farming. To address these challenges, the Government of Rwanda is pursuing a policy of intensification and diversification. The Ministry of Agriculture and Animal Resources coordinates activities across the agriculture sector and leads on planning and strategies.

Agriculture contribute

26%

of national GDP

Agriculture comprises

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Up to

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STATEMENT OF THE PROBLEM

The agriculture sector is currently the largest source of national greenhouse gas emissions,

responsible for 55% of national emissions. These emissions arise from livestock enteric fermentation, manure management, rice cultivation, and mineral nitrogen fertilizer application, although land use activities are major carbon sink. Rwanda's greenhouse gas emissions are extremely low in total and per capita terms but are rising and will increase significantly in future years.

Given these risks, future agriculture development in Rwanda needs to take current and future climate risks into account,

reduce greenhouse gas emissions, and at the same time, increase agricultural production to meet growing food demand in an environmentally sustainable manner. Existing national strategies and policies, including the PSTA4, Green Growth and Climate Resilient Strategy and NST1 recognize the delivery of agricultural growth will require this type of climate resilient and low carbon approach.

ANALYSIS OF THE STATUS OF LOW CARBON AND CLIMATE RESILIENT ACTIONS IN THE AGRICULTURE SECTOR

In the updated NDC, the GOR put the agriculture sector at the forefront and NDC prioritized both options for reducing GHGs and adaptation actions in agriculture sector.

ADAPTATION ACTIONS:

1. **Develop climate resilient crops and promote climate resilient livestock:** The intevention will focus on the development and increase of climate resilient varieties, look at supporting farmers to adopt resilient crop/ varieties, and on the livestock part it will look at increasing the percentage of crossbreed livestock at national herd species
2. **Develop climate resilient post-harvest and value addition facilities and technologies:** Support to install and increase agro processing facilities and build capacities
3. **Strengthen crop management practices** (disease prevention, diagnostic, surveillance control) Support to promote surveillance tool (FAW Database, BXW apps, etc.) among farmers
4. **Develop sustainable land use management practices:** Increase the area under erosion control measures, using radical & progressive terraces, biological soil conservation
5. **Expand irrigation and improve water management:** Increase the number of hectares under irrigation within an IWRM framework
6. **Expand crop and livestock insurance:** Promote crop and livestock insurance, by increasing the number and type of crops and livestock covered by insurance
7. **Development of Agroforestry and sustainable agriculture:** Agroforestry technologies would be mainstreamed within national agriculture intensification programs through increasing tree numbers per hectare on farms and promotion of multipurpose tree species (wood-fodder-stalks-fruits).

Other NDC action of relevance to agriculture is Disaster Preparedness and Emergency Response program, which focuses on establishment of an integrated early warning system, and disaster response.

For mitigation options, NDC includes:

improved livestock husbandry, improved manure management, improved livestock species and population, while for crops and managed soils the following was suggested: crop rotation, improved fertilizers, terracing,multi-cropping, conservation tillage. Additionally, there were other NDC options where agriculture has a role; promotion of on-farm biogas for energy, energy efficiency in agro-processing, and solar pumping for irrigation. There is need to include these mitigation actions in the next strategic plan for agriculture transformation

The NDC also assessed the cost effectiveness of reductions.

It reports that improved fertilizer efficiency and livestock husbandry, followed by soil and water conservation, were the most cost effective, with improved livestock species least cost effective. The stock-take and gap analysis results revealed that most NDC actions for emissions reductions for the agriculture sector, are significantly not on track.

PLANNED ACTIONS AND REMAINING GAPS IN LOW CARBON AND CLIMATE RESILIENT ACTIONS

This study analyzed whether the planned actions by the sector will address the identified gaps by 2030. An important finding of this analysis is that there are three categories of actions

NDC actions with strong PTSA4 alignment. This is because sector strategic plans inspired the revision of NDC. For these such actions, progress on PSTA4 and progress on NDC actions are clearly linked and synergic.

NDC actions that are not in the PSTA4 or other MINAGRI, RAB, or NAEB strategies have no budget or plans to deliver these NDC actions. For these actions, there is a need to discuss their prioritization in the next sector strategic plan.

Additional low carbon and climate resilient actions not in the NDC and these are important in delivering the transition of low carbon and climate resilient agriculture in Rwanda. There is a need to look at them during the next NDC revision.

NDC actions aligned to PSTA4 include actions with adaptation effect:

- Develop climate resilient crops and livestock;
- Develop postharvest facilities and value chain technologies,
- Strengthen crop management;
- Expand irrigation;
- Expand crop and livestock insurance;

and actions with both, mitigation and adaptation effect as:

- Develop agroforestry and sustainable agriculture;
- Develop sustainable land use management (terracing).

NDC actions, which are not in the PSTA-4, include the following mitigation actions:

-Removing local breeds with compensation, Manure management and composting at scale.
- Improved livestock husbandry with fodder
- Deep fertilizer and reduced biomass use in rice,
- Coffee- banana intercropping at scale,
- Solar irrigation

Considering budget constraint, these should be prioritized in the next agriculture sector strategic plan.

Key low carbon action that is in other policies and strategies, including PSTA-4, but not explicitly included in the NDC actions, is :

- Small livestock as potential replacement of cattle where appropriate.

  This provides potential sources of protein with much lower enteric emissions (or in the case of poultry, no enteric emissions). While these were discussed in the NDC, there were no specific actions or indicators.

PROPOSED STRATEGIES AND ACTIONS TO FILL THE GAPS

As with adaptation actions, a SWOT analysis was undertaken for each individual NDC adaptation options to assess the potential strengths, weaknesses, opportunities, and threats. They were given according to their respective areas, some of them are:

- development and strengthening crop management;
- expand irrigation;

  expand crop and livestock insurance

ADAPTATION ACTIONS

Development of climate resilient crop varieties and livestock: This action aims to develop and expand high yielding crop varieties able to produce under climate stress; and higher productivity climate resilient livestock along with holding discussion around future livestock numbers, developing Animal Breeding Strategy, and including these aspects in the next Livestock Master Plan.

Development of postharvest facilities and value chain technologies: Supporting the continuation of current MINAGRI policy, collecting better data on the current baselines on post-harvest facilities, holding discussion around the target levels and indicators, undertaking studies and getting better data on the level of climate shocks in post-harvest losses, and identifying where the priorities for building climate resilient and setting more targeted interventions.

Strengthen crop management practices: improved definitions of the NDC indicator and improved data collection, enhancing surveillance and monitoring of major pests and diseases, strengthening the link of climate resilient seeds, further developing decision making support systems and tools, and many more.

Soil and water conservation / sustainable land management: continuing the current planned approach through core agricultural policy and development and leveraging from potential private sector or community, as well as from climate finance.

Expand irrigation: continuing the current planned approach to increase irrigation area.

Expand crop and livestock insurance continuing the current planned approach for cattle and include further other livestock species.

Also a SWOT analysis was undertaken for each individual NDC mitigation option to assess the potential strengths, weaknesses, opportunities, and threats. They were given according to their respective areas, some of them are:

MITIGATION ACTIONS

Improved livestock husbandry

consists to promote cultivation of improved fodder leading to increased soil carbon and reduced erosion and farmer training on improved husbandry. The targets are to increase the area of improved fodder and to increase the number of cattle fed with it.

Improved livestock species and population:

This action aims to improve the livestock (cattle) population with improved species. The NDC specifically set out a target to replace domestic (local) breeds with improved breeds (cross-breeds and exotics), including through a subsidy programme, though the latter would involve very high costs. This will reduce the total number of cattle and reduce enteric fermentation compared to the baseline. This replacement would also mean to use climate resilient livestock.

Improved manure management:

This action aims to increase the uptake of more efficient manure management systems, including promotion of collective farms (new kraals) and training, reducing manure related emissions. The intervention aims to increase the number of collective farms and the number of improved manure storage systems. GHG emissions are reduced from covering manure during storage, and promotion of slurry systems.

Crop rotation for soil and water conservation:

This action reduces soil erosion and greenhouse gas emissions, with a planned increase in the area of land using this technique.

Improved fertilizers:

This action includes increased use of organic waste as soil fertilizers, delivered through a target to increase the area of land where these are applied, but also the compositing rates in agricultural households. Second, to increase the use of deep fertiliser on rice and decreased use of rice biomass as self-fertilisation. This will reduce fertilizer quantities while delivering similar or improved yields.

Terracing for soil and water conservation:

This action focuses on increasing soil conservation and land protection, particularly with the introduction of radical (bench) terraces, which reduce soil erosion and related GHG emissions. These also have potential resilience benefits.

Multicropping for soil and water conservation:

This option is focused on inter-cropping and is particularly focused on inter-cropping coffee and banana. This reduces soil erosion, increases soil carbon and carbon sequestration, and also has potential climate resilience benefits (for coffee) through shading. The target is, however, very ambitious and would involve inter-cropping the entire coffee production area in Rwanda.

Conventional tillage for soil and water conservation:

is usually defined as animal or mechanical mouldboard ploughing, and can include practices such as zero tillage, strip or zonal tillage, and ridge tillage. Such practices reduce carbon losses, and also sequesters carbon via reduced erosion.

Promotion of on-farm biogas for energy:

This action aims to increase the uptake of on-farm anaerobic digestion of manure for bioenergy (bio-digesters), reducing emissions. This action is the responsibility of MININFRA and NIRDA but has a strong linkage to agricultural planning and exports.

Energy efficiency in agro-processing (tea processing):

Tea factories – which process the green leaf tea from plantations - are heavy users of energy. They use large volumes of wood fuel (from forests) to power the boilers (some of which is from unsustainable sources), as well as significant quantities of electricity (from the grid or diesel generators). This option focuses on a range of energy efficiency measures focused on reducing firewood use in boilers (or improving silviculture in tea wood forests) and electricity consumption in tea factories, to reduce emission. This action is the responsibility of MININFRA and NIRDA but has a strong linkage to agricultural planning and exports.

Solar pumping for irrigation:

This action increases the use of solar water pumping systems for irrigation within agricultural production, to replace diesel pumps, in turn reduced fossil fuel use and associated GHG emissions. This action is the responsibility of MININFRA but has a strong linkage to agricultural irrigation strategy.

ANALYSIS OF NDC COSTS AND CURRENT FINANCING

The total costs of meeting Rwanda's NDC is dominated by agriculture.

The total costs of the NDC for all mitigation actions are estimated at USD 5.7 billion in the period of 2020-2030. Agriculture actions are 45% of these costs. When solar irrigation is added, agriculture actions rise to 52% of costs. Of this approximately 35% is unconditional.

The total costs of the NDC for all adaptation actions are estimated at USD 5.3 billion in the period 2020-2030. Agriculture actions are 55% of these costs. Of this approximately 40% is unconditional.

Overall the total costs of the NDC are estimate at **USD 11 billion.** Of these agriculture actions (mitigation and adaptation) are **USD 5.9 billion (53%)**.

This means that the NDC can only be delivered if financing of actions is on track. Of these agriculture actions, USD 2.0 billion is unconditional, and so should be provided by domestic funding.

RECOMMENDATIONS

This study found that the current policy and delivery are stronger for adaptation actions than for mitigation.

There is a need for more focus on mitigation in the next agriculture plan. The key recommendations of this study are:

It would be useful to have better baseline data and clear targets in all areas. MINAGRI and development partners might also benefit from stronger alignment and tracking of low carbon and climate resilient agriculture activities to provide more integrated development of the sector along a low carbon and climate resilient pathway.

There is a need to better integrate mitigation and adaptation (low carbon and climate resilience) in agriculture sector options, in the NDC, and in sector development plans in the next agriculture sector strategic plan. There are several actions which are both mitigation and adaptation priorities for agriculture and a better integration could help deliver low carbon and climate resilient agriculture.

For example, while increasing the number of crossbreeds could offer important mitigation benefits from lower carbon intensity of milk/beef, these crossbreeds also need to be climate resilient.

Where targets in the NDC align with PSTA4, the focus is to continue the scale-up of these moving into the next agriculture sector strategic plan, while noting the budget constraints likely.

Where there is not good alignment between NDC and PSTA4, there is need to align both the review of NDC and the next strategic plan of agriculture with discussion between MINAGRI, Ministry of Environmment and Ministry of Finance and Economic Planning. This will need to balance the objectives and budget allocations between the NDC versus the objectives of agriculture growth and exports.

Given budget constraints, it would be useful to prioritize a shortlist of mitigation and adaptation actions to focus on. These could include :
a) those actions which can reduce emissions the most and are cost-effective / have the greatest adaptation (resilience) benefits in reducing current risks, and
b) actions which have positive short-term effects and are likely to create jobs (post COVID recovery).

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