# RWANDA

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## Pathway Assumptions

| | | A) CURRENT TRENDS | B) NATIONAL COMMITMENTS | C) GLOBAL SUSTAINABILITY | JUSTIFICATION |
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| **1. Macroeconomics** | **1.1)** GDP per capita | SSP2 | Same as CT | SSP1 | Republic of Rwanda (2022): Country Strategy Paper 2022-2026 |
| | **1.2)** Population | SSP1<br>The current population of more than 12 million people is expected to be approximately 22 million in 2050 with an assumed population growth rate of nearly 2% | Same as CT | Same as CT | Rwanda is among the most densely populated countries in Africa, with<br>nearly 400 inhabitants per km2 overall and more than inhabitants 520 per km2 on agricultural lands.<br>Source: Vision 2050 |
| | **1.3)** Inflation | N/A | N/A | N/A | The annual inflation rate in Rwanda slowed for the second straight month to 22.4% in May 2023 from 28.4% in the previous month. It was the lowest inflation rate since last August, with the food prices rising the least in nine months (39.6% vs 54.6% in April), of which bread & cereals (15.6% vs 35.1%). Prices also increased at a softer pace for transportation (6.0% vs 6.5%). By contrast, prices continued to rise for both housing (3.6% vs 0.7%) and education (13.9% vs 13.8%). On a monthly basis, consumer prices fell by 2.7% in May, the first monthly decline in five months, reversing from a 1.7% rise in April. Source available here |
| | **1.4)** Inequalities | N/A | N/A | N/A | Oxfam Uganda, in the report titled Who is Growing, says that in Rwanda, the gross national |

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| | | | | | income of the richest 10 per cent is 3.2 times more than that of the 40 per cent poorest in the country, compared with Kenya's 2.81, Uganda's 2.33, Tanzania's 1.65 and Burundi's 1.35. Source available here<br>Rwanda's Gini Coefficient Index is 53.9 and was most recently measured in 2019. |
| **2. Land** | **2.1)** Constraints on agricultural expansion / deforestation | Free expansion | Same as CT | Same as CT | The scarce land is predominantly used for agriculture, which dominates Rwanda's employment and contributes with about 55 % of the export earnings. It meets about 80 % of the country's food needs, although there has been a small decline in its contribution to GDP in recent years. The rapid population growth has led to land fragmentation and created severe environmental challenges by causing farmers to push into marginal lands, clear forests, and cultivate steep hillsides without proper soil and water conservation. Source available here |
| | **2.2)** Afforestation, and forest plantations targets | 30.1% of total area is covered by forest (Bonn Challenge). Forest cover of total area will keep on increasing. | Same as CT | Bonn Challenge | Forest Sector Strategic Plan 2018 – 2024 |
| | **2.3)** Urban and settlements area | The rate of informal settlements will be reduced from 62% to 52% by 2024.<br>By 2030 it will be one of the regions' most urbanized in the east African Community | Rwanda aspires to achieve 35% rate of urbanization by 2024 and 70% by 2050.<br>. | UN_Medium | Reducing the percentage of informal settlements, of course, simultaneously requires the prevention of any new informal urban areas through a variety of measures. (Republic of Rwanda, 2018). Source available here<br>Enabling sustainable urban settlements requires adequate urban planning policy and regulations. Rwanda aspires to achieve 35% rate of |

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| | | countries, with an estimated urbanization rate of 30% | | | urbanization by 2024 and 70% by 2050. (Republic of Rwanda, 2022). Source available here Furthermore, In 1990, it was the least urbanized country in the east African Community countries. But by 2030 it will be one of the regions' most urbanized, with an estimated urbanization rate of 30%. Source available here |
| | **2.4)** Protected areas | Expansion of protected areas in the future. | Same as CT | Same as CT | Terrestrial protected areas (% of total land area) in Rwanda was reported at 9.1052 % in 2021, according to the World Bank collection of development indicators, compiled from officially recognized sources. Source available here |
| **3. Productivity and management** | **3.1)** Crop productivity for the key crops | Middle | Same as CT | Same as CT | We assumed crop yield for thirteen years starting by 2018 to 2030, from findings, it shows that comparing to the previous series (1990 - 2017), and the agriculture yield will increase and decrease in general. Banana is the most growing yield with an average rate around 80%, Beans will have the worst growing rate with -48.42%, 38.64%, 64.07%, 11.33% and 52.18% for Cassava, Maize, Potatoes and Rice respectively. We found that in these coming years Beans will have a highest yield ever between 1990 and 2030 with 12885.8hg/ha in 2019, Banana 124098.36hg/ha in 2022 and Rice with 130600hg/ha in 2030; in these coming years, the predictions indicate that Banana and Maize will suffer for least productivity with 24115.31hg/ha in 2018 and 4573.08hg/ha in 2026 respectively. By 2030, the most productive home consumable crop we expect will be Banana with 121096.66hg/ha and least productive will be 8102.53hg/ha.<br>This is due to political stability, use of fertilizers, farmers are trained for amelioration of their work, |

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| | | | | | investors will be welcomed and the sector in general will gain strength from different corners, and all these factors will be resulting to the best change in yield to earned in future.<br>From results we mark a high difference between yield of Tea and Coffee comparing to the previous years (1991 - 2017) because in these coming years for all years the difference of Tea for Coffee will be greater to 4680.5846hg/ha. Two crops will achieve their highest yield in this series of years (1990 – 2030) in this coming period with 18716.789hg/ha for Tea in 2020 and 7735.346hg/ha in 2026 for Coffee, even if the average growth rate for these crop yields will be falling up to -7.44% for Coffee and -3.68% for Tea. Source available here |
| | **3.2)** Cropland under agroecological practices | No change | Cover crop | Organic | In a 2007 effort to increase agricultural productivity and address persistent poverty in the countryside, the Government of Rwanda launched the Crop Intensification Program (CIP) to improve land use with a greater focus on the commercialization of food crops (MINAGRI 2012). Specifically, CIP sought to increase access to productive inputs (improved seeds and fertilizers), water use (improved irrigation), land use intensification, extension services, and postharvest handling and storage services. To achieve its goals, the program incentivized farmers to monocrop fields and to cultivate six particular crops (maize, wheat, rice, white potato, beans, and cassava) that cover the area where they are cultivated. Available at https://www.degruyter.com/document/doi/10.1515/jafio-2021-0010/html?lang=en |

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| | **3.3)** Livestock productivity for the key livestock products | High Growth | Same as CT | Same as CT | Currently, there are about 799 000 crossbreed dairy cattle in Rwanda and it is projected that the number will increase to 1.17 million by 2022 representing an increase of 46 percent, while milk production will grow from 747 million liters of milk produced in 2017 to 2.2 billion liters by 2022, an 18.2 percent boost. The rise in both the number of dairy cattle and milk production will increase the contribution of the dairy value chain to the national gross product to 53 percent. Under the recommended level investment, the increases in red meat production from cattle, sheep and goats from 2017 to 2022 is 32 percent, 33 percent, and 50 percent, respectively. Cattle and goats are the primary sources of red meat in 2022. Total red meat grows from 58 579 tons in 2017 to 79 586 tons in 2022, an increase of 36 percent. The chicken meat and egg production expected to experience substantial increments of 124 percent and 110 percent, would contribute significantly to fulfilling the national meat requirement and would increase per capita egg consumption.<br><br>Rwanda produced about 58 580 metric tons of red meat in 2016/2017, wherein 74 percent is beef, and the remaining 26 percent comes from sheep and goats. The total chicken meat and egg production from the family and commercial specialized systems is expected to increase from 15 715 tons in 2016/17 to 35 170 tons in 2021/22 for meat which constitutes a 124 percent increase over 5 years. The overall target is to raise pig meat production from the current 19 945 tons in 2016/17 to 67 076 tons by 2022, an increase of 239 percent to be achieved through improving the |

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| | | | | | family mixed pig system and expanded commercial specialized piglet fattening. Source available here |
| | **3.4)** Pasture stocking rate | BAUGrowth | The ruminant density stays constant at 2.35 TLU/ha over 2015-2050. | BAUGrowth | No data on national average livestock stocking densities to compare this value with. |
| | **3.5)** Forest management | Well managed | Same as CT | Same as CT | According to a recent assessment by the GoR, 30% of forest area in Rwanda is under forest cover (Rwanda Forest Cover Mapping Report 2019), and is made up of plantations, natural mountain tropical forests, wooded savannah, shrubs and bamboo stands. Recently, Rwanda has partnered with the private sector to ensure the efficient management of the state-owned forests. The Ministry of Environment launched the first Private Forest Management Units in 2019 to safeguard individual forests and boost forest harvesting as a strategy to maintain and manage woodlots effectively. So far, 23,456.15 hectares (equivalent to 38.4% of state forests) are now managed by private investors through long term concession agreements. Source available here |
| **4. Trade** | **4.1)** Share of consumption which is imported for key imported products (%) | Stable imports (I2) | Same as CT | Same as CT | Rwanda's top imported products are oil products (16.8%), unwrought gold (7.6%), medicaments (3.8%), sugar (2.4%) and mobile phones (2.2%), on average from 2015 to 2019. The surge in imported unwrought gold in 2019 may largely be explained by Rwanda's imported gold for processing (World Bank, 2021c). Half of Rwanda's total imports are sourced from five main countries: China, India, UAE, Uganda and Kenya (Sherillyn Raga, 2022). Source available here |

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| | **4.2)** Evolution of exports for key exported products (1000 tons) | Exports are multiplied by 1.5 by 2050 | Same as CT | Same as CT | Agricultural export for traditional commodities in FY 2021/2022 generally increased by 17.96% by observed decrease in pyrethrum compared to previous fiscal year. The quantities exported for coffee was 15,184.5 MT, which is less than target of 23,241MT. Tea quantities exported were 35,404.7 MT against targets of 35,943 MT. The horticulture targets were USD 39 million of which USD 42.8 million were realized while pyrethrum reached USD 6.3 million against the targeted of USD 7million. Source available here |
| **5. Food** | **5.1)** Average dietary composition | NatHealthyDiet | Same as CT | Same as CT | The Rwandan diet is based primarily on staples (starch) and vegetables. The FCS increases with households consuming more pulses (vegetable proteins) and oil (fats). The acceptable weekly food diet in Rwanda is composed of daily consumption of starches, pulses, vegetables, and oil and consumption of meat, milk products and fruits once or twice a week. It was observed that there was no consumption of animal products, fruits, and sugar by households with poor or borderline consumption (World Food Program, 2018). Source available here |
| | **5.2)** Share of food consumption which is wasted at household level | Increased | Same as CT | Reduced | According to the Food Waste Index 2021 from the United Nations Environment program (UNEP), every household in Rwanda wastes 164 kg of food every year while 2,075,405 tons of food is wasted at household level per year. Food waste burdens waste management systems, exacerbates food insecurity, making it a major contributor to the three planetary crises of climate change, nature and biodiversity loss, and pollution and waste. |

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| | | | | | According to Rwanda Smart Food Country Diagnostic report, published by World Bank (2020), Rwanda loses and wastes about 40% of its food supply. Reducing food loss and waste would "increase" food yields from the stock of land and water already under farming. Even if food loss and waste were reduced only by half, it would help with food availability without additional environmental impacts on the food supply chain.<br>Thus, Rwanda has made commitments to reduce food loss and waste at both the global level through the Sustainable Development Goals and their Nationally Determined Contribution under the Paris Climate Agreement, as well as regionally through the Malabo Declaration. Source here |
| **6. Biofuels** | **6.1)** Targets on biofuel and/or other bioenergy use | Same as National Target | Rwanda is targeting to have reduced the firewood for cooking to 42 percent | OECD_AGLINK | Currently, around 83 percent of Rwandans still use firewood for cooking but by 2024, Rwanda is targeting to have reduced the figure to 42 percent. Hakizimana E., Wali U. G. , Sandoval D., Kayibanda V., (2020). Environmental Impacts of Biomass Energy. Energy and Environmental Engineering 7(3): 62-71, 2020. DOI: 10.13189/eee.2020.070302 |
| | **6.2)** Targets on other non-food use | N/A | N/A | N/A | N/A |
| **7. Water** | **7.1)** Irrigated crop area | LowGrowth | In line with the Government's target, the developed irrigated area should reach ~100,000 ha by the end of 2024. The investment plan covers | High Growth | It is assumed that the total irrigated area at the end of 2019 will stand at around 54,000 ha, approximately 4,700 ha higher than in June 2018. Source available here |

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| | | | the period 2020 to 2050 (30 years) with the objective of achieving 220,000 ha under irrigation by 2050, or roughly 50% of the country's potential based on projected renewable resources. | | |