Accelerating Rwanda's Food Systems Transformation

Diagnostic and Landscaping Analysis by the Food System Transformative Integrated Policy (FS-TIP) Initiative

AUGUST 2021

Need for Food Systems Transformative Integrate Policy

Goal: Sustainable healthy diets for all

A future state in which every human being has consistent access to a nutritious, high-quality diet that promotes human and planetary health, supports child development, prevents disease, and conserves biosphere resources.

- FS-TIP supports governments in Africa that demonstrate robust integrative leadership and capacity in the **development and implementation of an ambitious policy agenda** aimed at achieving sustainable, healthy diets for all their citizens
- Support by FS-TIP includes **building a fact base foundation** that is user-centric in its design, developing a tailored food system transformation strategy, and providing implementation support
- FS-TIP works with stakeholders to develop policies that are **transformative**, resulting in a step change in food systems performance, and **integrated**, factoring in the dependencies and trade-offs across food systems
- FS-TIP has a **long-term, inter-generational perspective**, building on momentum of the Food Systems Summit, but has its focus beyond, building a durable platform for transformation, policy development, capacity building, innovation and investment in support of the SDGs

Rwanda | Diagnostic and Landscaping Analysis

Executive Summary| Rwanda's Food System (I/III)

There are substantial opportunities to advance Rwanda's food system in terms of provision of sustainable and healthy diets for all while also strengthening livelihoods. These efforts would build on Rwanda's global and regional commitments, utilize a multi-sectoral stakeholder approach and engage with the development community for support

- Rwanda has demonstrated **strong commitment** to its agricultural transformation targets. The country has been recognized globally for its progress towards meeting the targets outlined in CAADP/Malabo goals and for its alignment with the Sustainable Development Goals
- Rwanda has held extensive **Food System Summit Dialogues** led by a multi-sectoral Steering Committee which has engaged diverse stakeholders including government ministries, UN agencies, development partners, CSOs, private sector players, women and youth to help identify Rwanda's main food system challenges and potential pathways to address them
- The **leadership vision** for a more productive, responsive, resilient food system that meets the needs of Rwandans and the **momentum around the UN Food Systems Summit (FSS)** have pointed towards collaborative opportunities in the Food System and highlighted the need for systems-based approaches
- Stakeholders are increasingly calling **for post-summit** planning, implementation acceleration, monitoring of food systems' policies and related outcomes

Rwanda's Food Systems, which are a hybrid of rural/traditional and informal/expanding archetypes[1], play a critical role in the national economy. They also face various challenges. The diagnostic analysis (FS-TIP Research, Food Systems Summit Dialogues and stakeholder engagements) shows:

- In 2020, agriculture contributed **26% to GDP** and **engaged 67% of the active workforce**. Between 2001 and 2011, the agricultural sector was estimated to account for a third of overall poverty reduction[2]. However, **food supply chains do not yet meet the population's needs for a healthy diet**, due to:
  - **Insufficient production and low crop yields** (crop production remains at ~45% of potential yield)[2] due to small land-holdings, limited use of agricultural inputs and mechanization as well as constrained access to finance
  - **Limited diversity in production** with a focus on priority, staple crops (e.g., maize, potatoes) and cash-crops (e.g., coffee, tea), resulting in low production, affordability and availability of nutrient-rich foods (e.g., vegetables, fruits)
  - **Under-developed supply chains** with limited private sector investment, leading to accessibility issues and low value addition
  - **Poor infrastructure for transportation, storage, and distribution** leading to high food losses (9.7% vegetables[3], 11% fruits[3], 6.9% cereal[4])
  - Infrastructure development beyond the farmgate has been limited, making it harder to consistently supply produce to markets and consumers at affordable prices and with minimal food loss
- Rwanda's food environment and consumer behavior have shaped the country's unique consumption patterns:
  - Highest bean consumption in the world (~29kg/person/year)[5]. Beans and sweet potatoes make the largest contribution to calories consumed[5]
  - Limited presence of street-food vendors and informal eateries, partly attributable to a culture of "not eating in public" which is seen as impolite

1. Food Systems Dashboard: "In rural and traditional food systems, farming is mainly done by smallholders, and agricultural yields are typically low. Supply chains are short due to smaller urban populations. Food is mainly sold in informal market outlets. In informal and expanding food systems, agricultural productivity is higher on average than in rural and traditional food systems. The use of inputs (e.g., seeds and fertilizer) is greater. Medium and some large-scale farms are beginning to emerge.) 2. MAMO Panel Report 2021 3. FAO Food Balance Sheets, 2018 4. FAO Food Balance Sheets, 2017 5. CGIAR, 2014

Executive Summary| Rwanda's Food System (II/III)

- **External drivers** slow the development of the food system. Rwanda is highly vulnerable to the effects of climate change and natural disasters (land-slides, floods, droughts) as ~70% of land nationally is on hillsides[6] with limited terracing and low levels of irrigation (~1.6% agricultural operators have invested in irrigation[7])
- **Challenges in the food system result in poor nutritional, livelihood and environmental outcomes**
  - **High levels of undernourishment, leading to negative health outcomes** such as stunting (33% of children under-five)[8], driven by challenges in the food systems such as limited availability, access and affordability of nutritious foods. While the rates of wasting and stunting among children under-five has steadily decreased since the early 2000s, undernourishment in the general population has risen from 22.2% in 2012 to 35.6% in 2020[2]
  - **Limited income and income growth** for a large share of the population that depends on agriculture for their livelihoods (67% of the active workforce). Part of this population depends on social protection programs from the government to survive and few can make their way out of poverty

Rwanda has developed many strategies and policies (e.g., NST1[9], PSTA 4[10], National Environment and Climate Change Policy). The country has also committed to Global and Regional declarations, which cover many of the food system components, however some gaps remain:

- The **informal food system**, the role of **consumer demand and behavior**, as well as the role of **science & technology** are under-represented in policies
- Malabo Declaration and related CAADP indicators also show **gaps in processing, infrastructure and health outcomes such as obesity and non-communicable diseases (NCDs)**
- At the national level, the main gaps include policies on **food production, retail, marketing and distribution** as well as **affordability of diverse and nutrient rich foods**

Existing policies are not always designed in an integrated manner resulting in conflicting objectives and/or approaches with other policies e.g.:

- **Production intensification vs. nutritional needs of the population:** Efforts have been made to improve agricultural productivity to increase food availability nationally (e.g., Crop Intensification Program). However, without a robust trade system to supplement production, this focus on productivity can also contribute to lower crop diversity and availability of nutrient rich foods, an outcome that is not in line with efforts to improve dietary diversity
- **Improving production levels with inputs vs. utilizing environmentally sustainable production methods:** While policies of MINAGRI have focused on increasing agriculture production (PSTA 4) to meet the needs of the population, e.g., through increased use of agricultural inputs such as fertilizer, the Ministry of Environment is trying to limit the harmful impacts of farming on the environment

6. MINAGRI, 2017 7. National Agricultural Policy, 2017 8. DHS 2019-20 9. National Strategy for Transformation(NST1) 10. Strategic Plan for Agriculture Transformation

Executive Summary| Rwanda's Food System (III/III)

In addition to designing policies in a more integrated way, a focus on implementation is key to ensure progress is monitored and results are achieved

- **Policies are not always geography-specific at the sub-national level,** while targeted interventions are required to address some of the more stubborn problems such as household food insecurity, stunting in food-basket provinces and biodiversity loss
- Performance-based contracts (imihigos) sometimes have **divergent incentives** (e.g., emphases on high performance, risk-aversion, competition between districts, need for visible outputs, over-reporting, etc.) which can lead to policy makers and implementors selecting easier-to-achieve targets
- **Limited use of monitoring and evaluation** beyond the objectives assessed within the performance contracts mentioned above. This translates into different stages of the causal chain receiving varied levels of attention instead of the adequate, systematic focus and resourcing required to meet national objectives
- There is **insufficient access to private and public capital** to scale up existing programs

Policy implementation is decentralized, and some challenges exist in prioritizing and coordinating among implementing partners

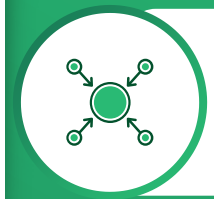
- **Prioritization of programs** and their execution may be influenced by projects which demonstrate immediate impact and visible progress at the expense of longer-term projects with potential for greater impact
- **Human capacity constraints at district level** limit the ability to effectively implement plans (e.g., in gender mainstreaming), coordinate with stakeholders and conduct monitoring and evaluation. Overlapping and siloed activities may result in duplication of efforts as well as gaps in coverage

Diagnostic analysis is guided by 7 principles…

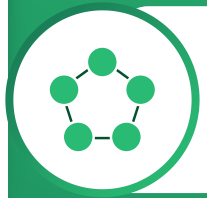
1. Designed with the policy-maker in mind: Presenting an interface that is concise, compelling and intuitive
2. Outcome-oriented: Linking indicators that reflect food system outcomes to the drivers that policy-makers can influence to realize transformation
3. Anchored in existing structures: Building on existing resources and structures with strong buy-in, such as the CAADP biennial review report, and adding new elements only where required
4. Aligned to existing food systems frameworks: Connecting to UN FSS Action Tracks for its outcome-orientation, and covering all components of the food system (as per HLPE framework)
5. Enabling more detailed views in future: Structuring analyses to be able to show disaggregated views of indicators in future phases
6. Tailored to Africa and country context: Adapting indicators to the countries' context, leveraging local data sources and reflecting local ambitions (co-developing where non-existent)
7. Built upon a strong data-foundation: Leveraging the best data (quantitative) and insights (qualitative) available and identifying gaps where they exist

… with an aim to:

Share a comprehensive, concise, and compelling diagnosis of the current food system in Rwanda



Contribute and inform the FSS in-country dialogues



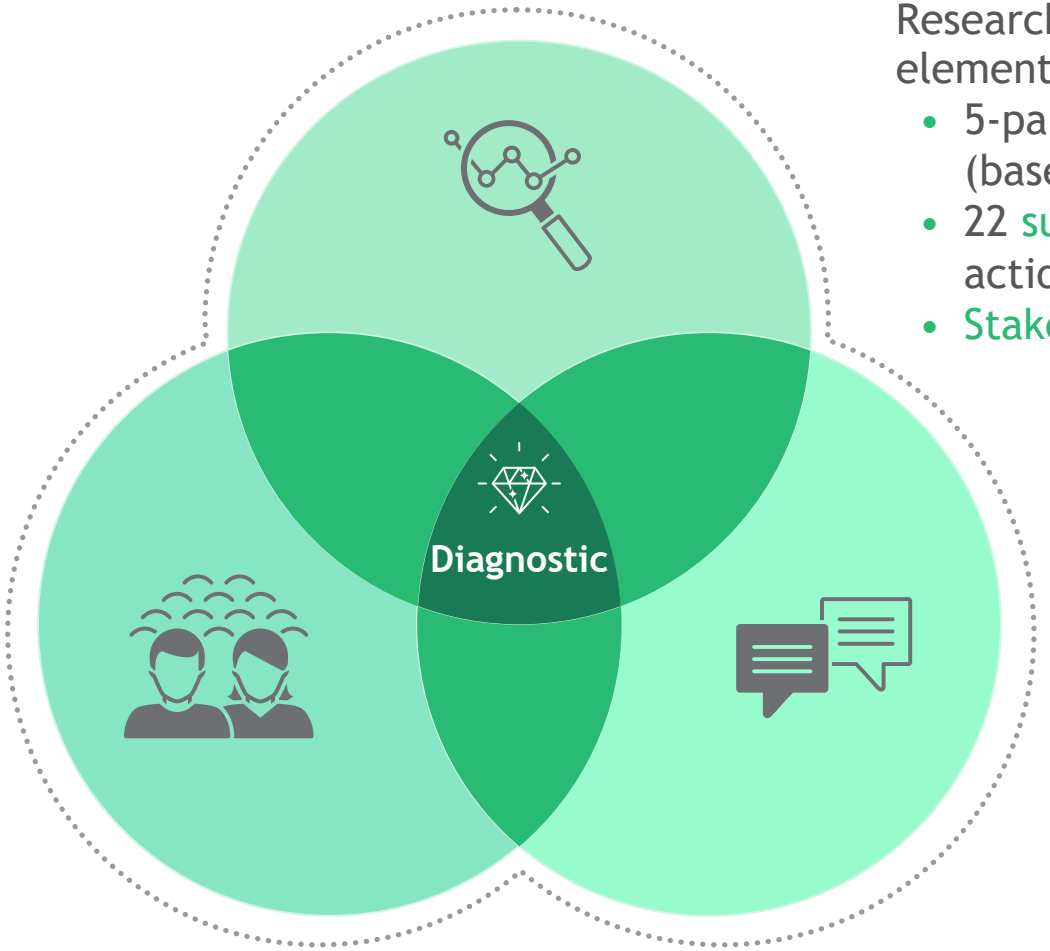
Create an ongoing diagnostic and monitoring approach to inform policy making and food systems transformation

Get feedback from food system stakeholders to improve this diagnostic

This diagnostic analysis is informed by extensive research and feedback from key stakeholders in Rwanda's food systems

Research on Rwanda's key food system elements:

- 5-part framework on food systems (based on the HLPE framework)
- 22 supra-indicators across the 5 UN FSS action tracks and 50+ key indicators
- Stakeholder and Policy landscaping



Feedback from various local experts and stakeholders across Rwanda's food system e.g. Ministry of Agriculture, Ministry of Health, Development Partners, etc.

Emerging insights from the national, regional and district Food Systems Summit Dialogues to articulate food systems transformation gaps and potential ways to address them

Note: See appendix for institutions engaged and please reach out to authors of this document for a detailed list of experts and stakeholders

We want to thank the following people and organizations for their feedback and contributions

Country Experts, Team

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Sounding Board with individual contributors from

1. Ministry of Agriculture and Animal Resources
2. Ministry of Environment
3. Chamber of Deputies
4. Ministry of Local Government
5. National Child Development Agency
6. World Food Programme
7. FCDO (Rwanda)
8. IFPRI
9. SUN Civil Society Alliance
10. ACORD Rwanda
11. Inyange
12. FAO
13. One Acre Fund
14. University of Rwanda
15. SAIC Agribusiness Incubator
16. Africa Development Promise
17. ADECOR
18. Rwanda Agriculture Board

Extensive list of people and organizations is provided in the appendix

Global Expert Panel

1. Jef Leroy
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6. David Spielman
7. Mutinta Hambayi
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9. Jemimah Njuki
10. Sheryl Hendricks
11. Robynne Anderson
12. Amos Laar
13. Jeroen Candel

Identification of main food systems challenges and potential game changing solutions | An iterative process with stakeholders and experts

- Country's performance on supra- and key indicators and review of existing policies
- Insights from UN FSS Dialogues and potential game changers identified
- Input from in-country experts on challenges and potential game changing solution
- Interviews with stakeholders on challenges and potential game changing solutions

Initial selection of main food systems challenges and potential game changing solutions

Validation with in-country stakeholders *(ongoing)*

Validated selection of main food systems challenges and potential game changing solutions

current status

Detailed analyses and modelling of potential game changing solutions & alignment with stakeholders *(phase 2)*

Prioritized food systems challenges as the basis of policy and program design post UN FS Summit

Note: List of potential games changing interventions non-exhaustive

Rwanda | Initial synthesis of main FS challenges and potential game changers

	Diet quality and Nutrition Security	Livelihoods equity	Environmental resilience	Agricultural productivity	Infrastructure capacity	Financing and investment
Priority challenges	Limited production diversity to meet population's nutritional needs; some trade required to supplement locally available foods to deliver healthy diets for all	Limited income and income growth for farmers making agriculture unattractive and increasing urban migration	High vulnerability to climate change and growing challenges from crop disease, insects, and changing biodiversity profile will lead to lower productivity and food availability	Production levels and yields are too low and inefficient production and processing will result in the inability to deliver sufficient food for the population	Under-developed supply chains due to weak logistics infrastructure and limited private sector investment leading to high wastage and lower food quality	Too little financing channeled towards food production and agro-processing due to perceptions of risk leading to low processing capacity
Potential game changing interventions	• Strengthen end-to-end planning for nutrition-sensitive production (incl. seeds, input subsidies, price ceilings) • Strengthen market linkages for trade • Launch consumer-focused campaigns to improve diets	• Mainstream gender in accountability mechanisms • Drive access to finance and skill development with innovation hubs • Develop land leasing markets to promote credit access and scaling • Do micro-irrigation	• Develop and promote climate-resilient crops • Restore degraded systems for sustainable food production • Develop early warning systems, to improve forecasting and monitoring	• Intensify production in a sustainable way (incl. land lease, targeted fertilizer blends, extension services, research on varieties, agroecology) • Reduce food loss at each step of supply chain	• Map district, national and international food flows, link to infrastructure development for key value chains • Support scale up of digital innovations • Invest in cold storage at points of accumulation	• Design PPPs for investment in value chains, and distribution • Improve access to insurance by strengthening the reinsurance market to transfer risks, digitalization to lower sales costs& claim handling

Diet Quality and Nutrition Security | Key challenges and how they can be addressed

Why should this be a priority for Rwanda?

Description of the priority area

- Rwanda has made important strides to increase **food security** from 48% (2006) to 81% (2018) and reduce **stunting** from 38% (2015) to 33% (2020)
- Yet ~25% of the country has poor or borderline **dietary diversity** (1). Net food supply is not enough yet to meet needs of a healthy diet, with households reaching barely half of the **recommended intake of micronutrients e.g., iron, zinc, Vit A, B12** (2)
- A healthy diet is unaffordable for ~90% of people (6) and requires price-lowering strategies to be in place
- Focus has been on **raising productivity of staple crops**, additional steps needed to strengthen **markets and grow demand** for more nutrient-rich foods

Benefits of addressing the challenge

By ensuring access to adequate, diverse diets, Rwanda can progress towards its 2024 goal to reduce stunting to 19% (and even beyond) to **improve children's quality of life and learning outcomes** and increase overall **health, wellbeing and productivity** of its population

(1) Number of the associated supra-indicator

What challenges need to be overcome to address this?

Trade-offs to consider

- More production of nutrient-rich foods for local consumption can reduce land available for cash crops for regional or export markets and reduce incomes
- Mixed and inter-cropping can produce diverse offer of foods, but reduces surpluses for individual farmers that help increase bargaining power and prices
- Animal source foods can fill micro-nutrient gaps but generate more emissions

Policy opportunities

Current policies focus on priority staple crops (mostly carbohydrates) while production of and access to a more diverse set of nutrient-rich foods has received less attention

Implementation challenges

- Small land parcels at household level
- Need to raise supply and demand for healthy food concurrently
- Growing population with changing diets and changing food preferences

How and by whom can this be done?

Need end-to-end planning for nutrition-sensitive agriculture

- Select high-nutrient seed varieties e.g., iron-rich beans
- Boost production of fruits and vegetables via input subsidies
- Promote household consumption of animal proteins from owned-sources e.g., poultry, pigs

Leverage trade to boost flows of healthy foods across districts

- MINAGRI & MININFRA to strengthen market linkages, infrastructure e.g., cold chain to boost food-flows among districts

Strategize for better consumption

- NCDA to research intra-household food distribution and MINALOC to promote village nutrition role models (male)
- MINALOC to use procurement to deliver healthy food in schools, ECDs and other institutions

Livelihoods Equity| Key challenges and how they can be addressed

Why should this be a priority for Rwanda?

Description of the priority area

- Rwanda's Vision 2050, NST1 emphasize **agriculture as a channel for wealth creation**
- Majority of Rwandans are employed within low-productivity, low value-add production systems (14) **Low profitability constrains income, makes healthy diets unaffordable and** raises livelihood vulnerability
- Women are concentrated in less lucrative parts of the value chain, with fewer off-farm jobs (16), and larger care responsibilities for dependents
- While a few financing instruments e.g., Women Guarantee Fund, exist, **limited awareness, low financial literacy and limited control** over decision-making hamper uptake

Benefits of addressing the challenge

Rwanda's Vision 2050 aims for inequality (as measured by GINI coefficient) to reduce to 0.3, from a baseline of 0.43 in 2017. Addressing inequality by growing income can reduce rural households' dependency on social protection programs for their sustainability (19) and increase the ability of food systems to reduce poverty

(1)Number of the associated supra-indicator

What challenges need to be overcome to address this?

Trade-offs to consider

- Increased incomes can increase cost of labor, affecting production cost
- Increasing agro-processing in rural areas provides jobs but also raises need for waste management infrastructure

Policy opportunities

- Need to clarify graduation mechanisms from social protection, improve coordination to limit dependency

Implementation challenges

- No incentives to attract agro-processors to rural areas with limited skilled labor, infrastructure and market linkages
- Limited access to finance for micro-entrepreneurs and vulnerable groups
- Constrained capacity in implementor to drive gender-responsive programing
- While some households might be best supported to commercialize farming activities, others might require continued social protection programs; government needs to distinguish groups

How and by whom can this be done?

- All: Mainstream gender in accountability mechanisms e.g., imihigo, public hearings to drive ownership
- MINAGRI, MIGEPROF, MINALOC, MYCULTURE to accelerate participation of women and youth in short-cycle value chains e.g., fruits, vegetables
- MINAGRI, MIGEPROF, MYCULTURE to drive access to finance, skill development through innovation hubs
- Rwanda Land Management and Use Authority to enable development of land leasing markets to promote credit access, maintain ownership and enable commercial scale
- MINALOC, MINAGRI to develop micro-irrigation (dry seasons) to enable smallholders move beyond rain-fed agriculture

Environmental Resilience | Key challenges and how they can be addressed

Why should this be a priority for Rwanda?

Description of the priority area

- Given agriculture's economic importance, Rwanda's **high vulnerability** to the effects of climate change and pests (e.g., fall armyworm) is troubling. This vulnerability will negatively impact production and contribute to food shortages and food price volatility
- Models predict possible shifts in timing of seasons and **uncertain rainfall patterns**, increased occurrence of floods and droughts (20). In 2015, agriculture contributed 55% of GHG emissions, followed by energy (31%), waste (12%) and industrial processes and product use (2%) (10) To reverse the **impact of deforestation**, Rwanda promotes planting of 3 fruit trees per family (11)

Benefits of addressing the challenge

Rwanda has a legal, policy, and strategic framework to respond to climate change induced risks and economic losses. Promoting resilience, mitigation and adaptation to climate change contributes to achievement of Rwanda's Nationally Determined Contributions (NDCs), protects life and livelihoods and preserves biodiversity.

(1) Number of the associated supra-indicator

What challenges need to be overcome to address this?

Trade-offs to consider

- Cultivating hill sides and fragile marshlands increases production, but raises costs to limit erosion and protect ecosystems

Policy opportunities

- Inadequate resources to limit erosion on hills from increased farming activities

Implementation challenges

- Dense and rapidly growing population
- Forests are a primary energy source
- Gap in evidence for contextualization and application of climate-smart agriculture practices and technologies
- Limited access to information on early warning systems, particularly among vulnerable and isolated communities in an accessible and low-cost manner
- Financial limitations that add gaps in technical and technological capacity
- Skepticism of insurance products

How and by whom can this be done?

- RAB to accelerate development and promotion of climate-resilient crops and livestock
- MINAGRI, Min. Environment to jointly track indicators, share data on climate resilience
- MINAGRI, Min. Environment to restore degraded systems for sustainable food production
- Min. Environment and MINEMA to develop early warning systems, to improve forecasting, monitoring and assessment of risk vulnerability and share timely information
- Min. Environment to explore private sector-led forest protection models
- MINAGRI, Insurance players to integrate with extension, give timely payments for crop loss

Agricultural Productivity | Key challenges and how they can be addressed

Why should this be a priority for Rwanda?

Description of the priority area

- Rwanda's **actualized yields** for major crops and livestock are **much lower than potential yield**
- Rwanda's **low-productivity and low-profitability production systems** add to the need for more land to cultivate (11) and more inputs (e.g., seed, fertilizer and effective extension services)
- Low production of animal source foods due to high cost and limited availability of quality animal feed, improved breeds and vaccines
- **Need for professional post-harvest services, affordable food preservation and processing capacity** to reduce post-harvest loss and costs, especially for perishable produce (12)

Benefits of addressing the challenge

Sustainably improving yield and profitability of production systems ensures that Rwanda can nourish a fast-growing population, provide incomes, and protect biodiversity (13) for future generations. High quality production can also improve Rwanda's trade balance by reducing reliance on food and input imports, especially in the agro-processing sector

(1) Number of the associated supra-indicator

What challenges need to be overcome to address this?

Trade-offs to consider

- Increasing fertilizer usage can raise productivity but can raise costs and environmental impact (e.g., run off)
- Centralized selection of focus crops, seed varieties and livestock breeds raises yields and surpluses, but can limit biodiversity and inhibit competitive market systems

Policy opportunities

- Existing policies need to articulate further how food production can be better linked with markets (district, national and global)
- Need to articulate clear roadmap to 2030 emission reduction targets in the context of increasing livestock and fertilizer use

Implementation challenges

- Rapidly urbanizing population puts pressure on limited arable land
- Diverging assumptions on role and impact of agrochemicals
- Low uptake of modern technology, skill and knowledge gap among farmers especially on fertilizer and pesticides use

How and by whom can this be done?

Prevent food loss

- MINAGRI, MINICOM, MININFRA to enable higher levels of private sector engagement to fill value chain gaps: marketing (bulking, collecting, transport and retail)

Intensify production sustainably

- RLMUA to strengthen use of the land rental/lease models
- MINAGRI to accelerate soil and crop-specific fertilizer blends
- MINAGRI & MINALOC to enhance extension services to improve skills of farmers in balancing chemical and organic fertilizer
- RAB to continue research on high-profit potential varieties
- Min. Environment, MINAGRI to mainstream agroecology practices, track joint indicators
- MINAGRI and Private Sector to offer competitive insurance through groups of cooperatives

Infrastructure Capacity | Key challenges and how they can be addressed

Why should this be a priority for Rwanda?

Description of the priority area

- Rwanda progressed in **upgrading infrastructure** e.g., 13,350 km of feeder roads in good/passable conditions (2017), with targets to develop ~30,000 km of feeder roads by 2027
- Food loss and waste levels (12) are being researched, estimates ranging 10-40% for different value chains
- Need for stronger **postharvest handling capacity** (including drying grounds, silos and cold chain) and skill to reduce losses (e.g., from aflatoxin, pests)
- Shortage of **food processing, manufacturing** capacity highlighted by COVID-19 pandemic
- Timely **access to accurate information** and right type of innovation and tech are critical enablers

Benefits of addressing the challenge

Better infrastructure minimizes losses & maintains quality of food and reduces the need for food processors to import raw inputs. Because of safety and quality concerns, ~80% of premium maize is imported, depriving local farmers from income and driving up import-reliance. Minimizing loss and waste lowers environmental impact of production and avails more food for domestic consumption.

(1) Number of the associated supra-indicator

What challenges need to be overcome to address this?

Trade-offs to consider

- Increased risk now from uncertain investments in infrastructure can reduce long-term need for funds for recurring costs e.g., social protection programs

Policy opportunities

- Limited articulation of the role and need for ICT with gaps in data management, sharing and integration along value chains
- Investment plans in PSTA-4 to improve linkages between production and processing need spatial specificity to explicitly target districts with high production and connect them to districts with production shortages

Implementation challenges

- High cost of infrastructure projects that require upfront fundraising, while managing expenditures on the ground
- Limited capacity to manage operations leading to infrastructure under-utilization and quality degradation
- High cost of energy and transport

How and by whom can this be done?

- MINAGRI and MININFRA to map district, national and international food flows, link the information to infrastructure development and maintenance plans for each value chain
- MINICT, MINAGRI & Private sector to continue developing and supporting scale up of relevant digital innovations to enable uptake by farmers
- NISR to expand metrics on food loss to the whole value-chain
- MINAGRI to reduce farm-based post-harvest handling for value-chains e.g., maize
- Promote private investment in building and maintenance of post-harvest infrastructure and services
- Private sector to invest and operate infrastructure at points of accumulation e.g., markets

Financing and Investments | Key challenges and how they can be addressed

Why should this be a priority for Rwanda?

Description of the priority area

- While 93% Rwandans have access to a financial institution, **access to credit facilities for agricultural investments remains low and constrains** productivity and commercialization: only 5.2% of credit went to agriculture in 2017 (18)
- Drivers include lack of collateral, weak financial literacy, high risks and costs for banks and insurers to service smallholders
- **Low insurance penetration rate** (<.5%) despite the National Agriculture Insurance Scheme (NAIS), a government-subsidized risk mitigation and insurance platform with private insurers
- High **cost of energy (e.g. for irrigation)** slows uptake

Benefits of addressing the challenge

Improving access to affordable credit and growing insurance coverage by trusted insurers will enable food producers, processors, transporters and distributors to competitively scale and market their goods locally and regionally

What challenges need to be overcome to address this?

Trade-offs to consider

- Encouraging farmers to invest in insurance vs purchasing tangible inputs
- Prioritizing de-risking for large private entities vs de-risking for smallholder farmers
- High opportunity costs to capital in agriculture vs. other sectors

Policy opportunities

- Limited inter-ministerial coordination to support implementors, align trade-offs across food systems
- Links between social protection programs and insurance coverage absent

Implementation challenges

- Limited long and medium-term liquidity in SACCO and microfinance institutions
- It is difficult for financial institutions to access business and transaction records and historical data on yields, losses etc
- Despite government subsidy, there is a perception is that insurance premiums are too high

How and by whom can this be done?

Set-up suitable governance

- Develop robust system of inter-ministerial coordination

Increase access to finance

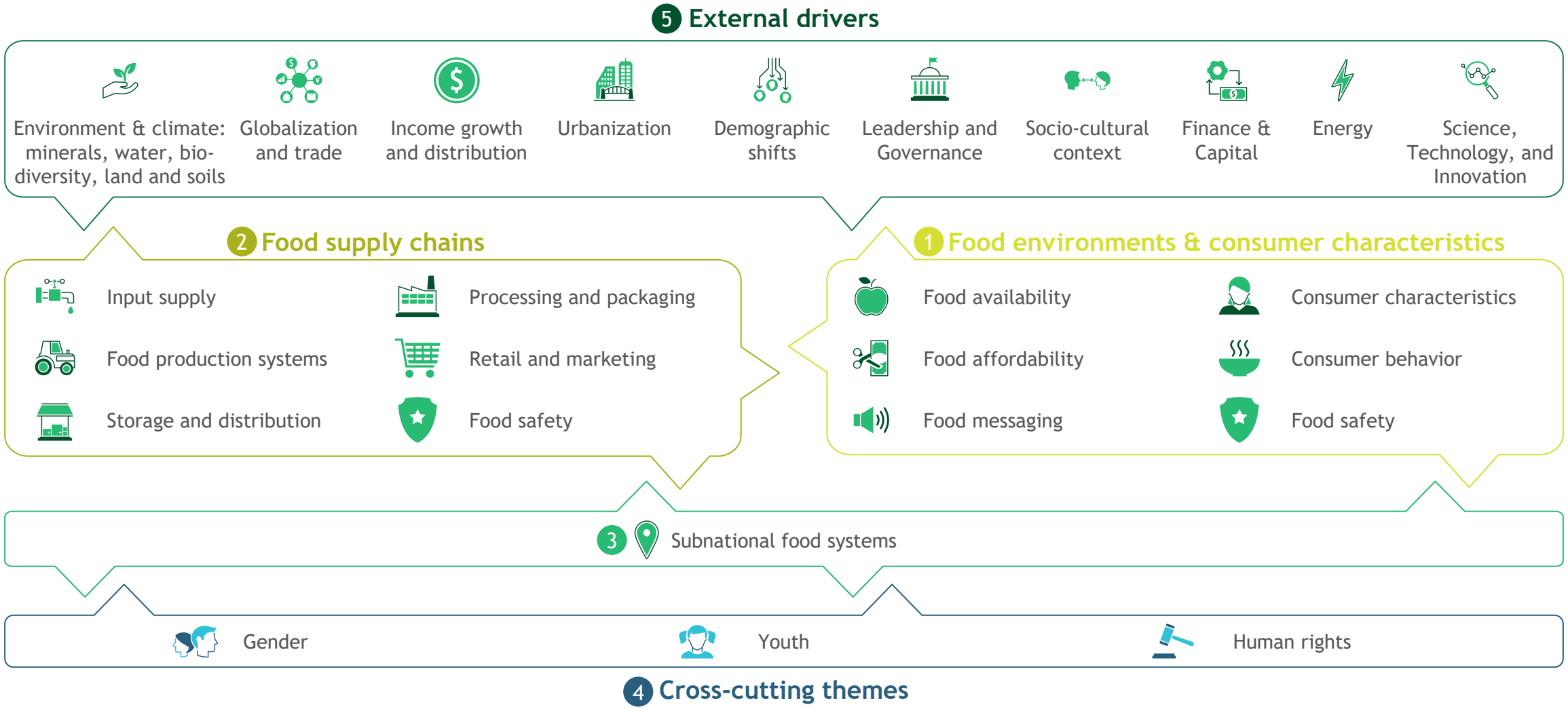
- Removing regulatory barriers to encourage greater levels of private engagement in the space
- Build a competitive environment to encourage investment in value chains, distribution channels
- MINAGRI to partner with actors e.g., AFR to de-risk producers, processors and offer guarantees to ensure affordable financing

Increase access to insurance

- Strengthening the reinsurance market to transfer risks
- Private sector participation in extension for farmer sensitization on insurance
- Digitalization to lower costs of sales, claims payment time

(1) Number of the associated supra-indicator

Diagnostic analysis| A 5-part framework to describe the food system



Source: Adapted from the Food Systems Dashboard, the Food systems Decision-Support Toolbox; HLPE; and FS-TIP research

High-level view| Food environments and consumers characteristics

Food availability	**~19% of households are food insecure, mostly located in Western, Southern and Northern Provinces[1]** • Staple foods in Rwanda include bananas, maize, cassava, wheat, groundnuts, beans, sorghum, cassava and sweet potatoes[2] • Government efforts to promote food security primarily focused on production of priority crops(mostly carbohydrates) • Low access to modern grocery, with informal markets that meet 2-3x/week dominating • Production for staple and non staple foods insufficient to meet diet needs, gap filled by imports
Food affordability	• A healthy diet cost 245% of household food expenditure, which is unaffordable for ~90% of the population[3] • A nutrient adequate diet costs ~87% of household food expenditure and is unaffordable for ~49% of the population[3] • An energy-sufficient diet costs ~30% of household food expenditure and is unaffordable for ~3% of the population[3] • Poorer households (45% of households in Ubudehe 1&2)[4] typically consume 1-2 meals per day with diets made of ugali (maize flour), beans, sweet potatoes, cassava, occasionally indagara (small fish), tomatoes, onions, green vegetables • Limited income means purchasing food and cooking fuel is done daily at local kiosks/duka and average expenditure per household at RWF 1,000 – 2,000 per day and cooking material (wood, charcoal, and gas) can form a significant proportion of expenditure in meal preparation.
Food messaging	• Limited control on marketing of unhealthy foods, consumers assume more processed foods are safer and better for you • Food-based dietary guidelines for Rwanda are in development, while requirements for mandatory nutrition facts are not yet in place
Consumer characteristics	• Misconception that ultra-processed foods are more nutritious and that refined grains are safer than whole-grains • While spending power of consumers has increased drastically in the last 20 years, ~40% of the population was still living below the national poverty line by 2014[5] • 16% of the population live below the extreme poverty line determined as the food cost to achieve 2,500 Kcals per day per adult equivalent unit is set at RWF 105,064 per year (January 2014 prices) limiting the ability to purchase foods[6]
Consumer behavior	• A typical Rwandan diet consists of cooking bananas, Irish and sweet potatoes, dry beans, cassava and some other vegetables. Beans and sweet potatoes make up the highest contribution to calories nation-wide[7] • Traditionally, Rwandans consume a lot of beans as part of their diet, with (one of the) highest per capita bean consumptions (29kgs pppy)[8] • Culture affects food handling practices e.g., cassava fermentation methods which increase levels of aflatoxins • Increasing demand among consumers for processed foods • Low dairy consumption of ~68L milk per person per year[9] (vs. 200L pppy recommended by WHO)

1. CFSVA 2018 2.USAID Staple Food Value Chain Analysis, 2009 3. FAO State of Food Security and Nutrition in the World 2020; 4. Ubudehe 1 and 2 are social protection categories that include the most vulnerable households. Towards the end of 2020, the government introduced a new Ubudehe classification system with households classified from A to E. Households in category 1 are the poorest and receive full state social protection including solar electrical subsidies, community-based health insurance, fortified blended foods and Girinka 5. UNDP 6. EICV5 2017 7. GAIN Marketplace for nutritious foods Rwanda Landscape Report, 2016 8. CGIAR, 2014 9. FAO, 2019

High-level view| Food Supply Chains (I/II)

Input supply	• Government subsidizes inputs for priority crops—maize, wheat, rice, Irish potato, beans, and cassava—including distribution of certified seeds, chemical fertilizer, and irrigation; driving up starch production and consumption • Rwanda's seed sector is diverse with supply coming from different sources depending on the type of crop: farmer-saved seeds(local food crops), intermediary sources(food and cash crops), public sector(major foods and cash crops) and private(high value crops)[1] • Government programs e.g., Girinka, provide cows, small stock (pigs, chicken, etc.) to poor households to build income
Food production systems	**Rwanda is characterized by a family-farm centric model, with high levels of land fragmentation leading to small land holdings(~90% <1ha)[2]; government has tried to address with its land consolidation policy with limited results to date** • Agriculture is main source of income for rural households with ~70% of population farming at the subsistence level[3] • 42% of adults generating an income from farming activities and 12% from farm work wages[4] • An estimated 70% of domestic cropland is on slopes[5], risking erosion and making mechanization more challenging **Various programs have been set-up to improve productivity and livelihoods** • Crop Intensification Program (CIP), which facilitates access to inorganic fertilizer and improved seeds and Girinka, which provides poor households with a crossbred dairy cow, are examples of programs seeking to improve livelihoods • Since 2007 Rwanda has a Crop Intensification Program (CIP) that focusses on monocropping and commercialization of priority crops: maize, wheat, rice, Irish potato, beans, and cassava; overall productivity of crops remains low • The top 7 crops produced by weight were bananas, sweet potatoes, cassava, potatoes, plantains, beans and maize[6] **Production of animal source foods has been rising, but remains relatively low** • Production of milk, meat, fish and eggs has been on the rise; increasing by 2%, 3.7%, 0.02%, 0.5% YoY (2018 to 2020[7]) • Only 8% of country is covered by water, with little fishing taking place (31,465 MT produced in 2019)[7]
Storage and distribution	• Limited infrastructure for food storage and transportation and high transaction costs for farmers • High level of food loss(~10% vegetables[8], 11% fruits[8], ~7% cereal[8]), with some sources citing up to 40% loss in specific value chains[9], with a big aflatoxin issue(~10% sampled maize from 15 districts[10]) • Rural areas lagging far behind urban areas in access to electricity (26% vs. 93%)[11]

1. WUR 2014 2. World Bank 3.WEF 4. FINSCOPE 2020 5.FAO 6. FAO 2019 7. MINAGRI Annual Report 2019/20 8. Food Systems Dashboard 9. World Bank Food Smart Diagnostic(2020) 10. Niyibituronsa et. al, 2020 11. World Bank 2019

High-level view| Food Supply Chains (II/II)

Processing and packaging

Agro-processing contributed US$451M to GDP (62% of total manufacturing output), with a CAGR of 6% (2015-2020)[1]

- 4.6K agro-processing establishments(~33K workers[2]), with most jobs found in tea, coffee, maize and cassava processing
- Most (88%) agro-processors are micro with 1-3 employees while just 0.7% are defined as large (100+ employees)[3] . The larger agro-processors include Africa Improved Food, Azam, MINIMEX, Inyange Industries, Sosoma, & Kinasi Cassava

Expensive inputs and limited local demand can form a barrier to growth

- Larger processors rely on imports for most inputs, smaller processors source locally but are at risk of price fluctuations[4]
- Price fluctuations/ variability in inputs maintains fluctuation in end-products (e.g., chicken/ animal feed is highly variable, causing further down stream variability in the prices of meat and dairy)
- Packaging materials incl. plastics, glass, and foil are sourced internationally as demand in Rwanda is still too low to attract investment in domestic production. Packaging can account for a big share of the final cost of processed food

More collaboration in the region and between actors might be beneficial

- Lack of locally available operational capacity, requires investment in training schemes & hiring from EAC region
- Collaboration among producers, processors, retailers & exporters on nutrition-sensitive production and trade is limited

Retail and marketing

- Markets are largely informal (92% of enterprises in wholesale and retail trade are micro-enterprises)[5], with formal retail channels concentrated in urban centers
- Rwanda has 540 markets with 10,143 traders with at least one main market in each district[11]
- Time to access markets is higher in rural vs. urban areas (57 minutes vs 24 minutes)[1]. In villages without a market, it takes ~86 minutes on average to reach the nearest market[6]
- Longer time taken in the districts of Rutsiro (145 minutes), Nyaruguru (122 minutes), Nyamasheke (111 minutes) and Kayonza (109 minutes) mainly due to the steep landscape, a lower road network coverage or poor road conditions[6]

Food Safety

- There is very limited control on marketing of un-healthy foods and limited view on food safety in the country as overall number of certified foods in the market is low and laboratory testing capacity is low
- Perceptions around safety and nutrition of food can vary, for example, sensory studies of maize flour indicate consumer preferences for whiter flours as white is associated with cleanliness
- Few processors meet formal standards including ISO, Rwanda S-Mark or Rwanda FDA approval

1. NISR (2020) National Accounts 2.NISR (2017) Establishment Census 3.Ibid 4.Vanguard Economics(2021) Horticulture Processor Mapping Report 5. IBES 2018 6. MINAGRI (Nutrition Sensitive Agriculture Mainstreaming Guidelines)

High-level view| Subnational food systems

Subnational food systems

Rwanda is divided into 5 provinces (Northern, Eastern, Western, Southern and City of Kigali) and 30 districts[1]

- The western and north-central regions are made up of mountains and foothills with elevations that exceed 2000 meters, cool and wet climate and annual rainfall of 1200-2000 millimeters[1]
- The eastern plateau comprises hills that gradually level into flat lowlands, a few hills and lake-filled valleys with elevation generally below 1,500 meters, warmer and drier climate and the average annual rainfall is in the range of 800-1,200 millimeters[1]

Weather, climate and food (in)security vary by region

- The most reported shocks were weather-related, such as drought, irregular rains, or prolonged dry spells, which mainly affected the Eastern and Southern Provinces[1]
- Household food insecurity varies by region, with the Western Province having the highest prevalence (29.9%), followed by the Southern Province (20.5%), Northern Province (17.8%) and Eastern Province (16.2 %) and the City of Kigali (2.2%)[1]

Various programs are aimed and transformation of lands and increasing productivity across regions

- The Land Husbandry, Water Harvesting and Hillside Irrigation (LWH) is a flagship program of the government that aims to transform hillside production, increasing productivity in an environmentally sustainable manner[2]
- Crop Intensification Program (CIP), which facilitates access to inorganic fertilizer and improved seeds and Girinka, which provides poor households with a crossbred dairy cow, are examples of programs seeking to improve livelihoods

Income has a big influence on consumer habits

- Wealthier households (55% of households in Ubudehe 3&4) eat three times per day with some snacking. Cooking is done twice per day with assistance from house help. Diets are comprised of eggs, milk, rice, beans, pasta, fresh vegetables, fish, meats (beef or Pork) and occasionally chicken
- Wealthier households in Kigali spend RWF 80,000 to 100,000 per week on food and can afford bulkier purchases meaning weekly shopping in markets for perishables like vegetables and meats and monthly for basics like rice, flours and packaged food like cornflakes, tea, sugar, etc.

1. CFSVA 2018 2. IGC Impacts and Sustainability of irrigation in Rwanda Policy Brief(2018). 3.National Statistics of Rwanda (NISR), EICV 5

High-level view| Cross cutting themes

Gender	• Rwanda ranks 2nd of 54 African countries on the Mo Ibrahim Gender Index, with a score of 76.1/100[1] • Law allows equitable 50% of women access to land and agricultural inputs[2], however, especially in rural areas, they have limited control over resources and decision making in households and communities • 25% of households are headed by females, 6% of households were headed by females in the absence of a male head[3] • 63% of working females are in agriculture related occupations compared to only 43% among working males[3] • Women carry a disproportionate work burden in the household which constrains their participation in economically productive activities[4] • 60% of men and 38% of women own a cell phone[5]
Youth	• 50% of Rwandans are under 20 years; youth population (16-30 years) makes up 26.6% of the total population of Rwanda[6] • Working age youth (15-34) comprise 77% of rural population[7] • In 2015, unemployment amongst people aged 16-24 years is twice as high as that of the 35-44-year age group[8] • Farming is the largest source of employment for young people: >50% of youth (16-24) work exclusively in agriculture[9]
Human Rights	• Rwanda's constitution references the country's history with a focus on integration of ethnic communities, eradication of discrimination and promotion of national unity • Rwandan culture serves as a source of home-grown solutions to deal with matters that concern Rwandans • The constitution promotes rights for all Rwandans including equality before the law, protection from discrimination, right to education, good health, free choice of employment and participation in government and public services • The country ranks: – 104th of 113 countries in 2020 food security index[10] - ~19% of the population is food insecure vs 10% global average – 33rd of 179 countries in 2020 Index of Economic Freedom[11] indicating a relatively high degree of freedom for individuals to work, produce, consume and invest, with that freedom protected and unconstrained by the state

1. Mo Ibrahim Gender Index 2. UN Women, FAO (2017): Gender Gaps In Agriculture Sector Of Rwanda: Briefing To Members Of Parliament, Nov 2017 3. National Statistics of Rwanda (NISR), EICV 5 Women thematic Areas 4. Gender and agriculture (2017). GMO. 5. CGIAR, 2020 Rwanda Digital Agricultural profile 6. National Statistics of Rwanda (NISR), EICV 5 Youth thematic Areas. 7. Fourth Population and Housing Census, Rwanda, 2012 8.National Youth Policy, 2015. 9. MINAGRI, Gender and Youth strategy, 2019 10. Food Security Index, 2020 11. KNOEMA

High-level view| External drivers of the food system (I/II)

Environment and climate	• Country consists mostly of hillside land (close to 70%)[1] which is prone to erosion and leaching of minerals • Climate change expected to result in increased temperatures (up to 2.0°C by the 2030s from 1970), intensified rainfall (-100 mm and +400 mm in annual rainfall between 2000-2050) and prolonged dry seasons[2] • High Vulnerability to global pests e.g., Fall Armyworm(FAW) which spread from Latin America and invaded maize in all 30 districts in 2017[3]
Globalization and Trade	• Exports of goods and services was 21.8% of GDP while imports of goods and services were 36.1% of GDP in 2019[4] • Tea and Coffee are Rwanda's two major food exports generating ~$150M per annum in export revenue[6] • Rwanda is a net importer of food. In 2020, Rwanda imported $370M in food and beverages (~10% of total food market in the country)[7]. Local rice and wheat production are below demand with imports filling the gap, resulting in a dependency ratio ~40%[8] • In the past 5 years, agro-processed food, which is either formally or informally exported to regional markets, has emerged as an important export sector and now accounts for ~5% of total goods exports[7]
Income growth and distribution	• Income is unevenly distributed (Gini index 44/100); trend has been towards more equal distribution (47/100 in 2010) • Agriculture is an important source of income for Rwanda, with value added accounting for 23.5% of GDP in 2019[8] • The "Made in Rwanda" policy supports the food sector by promoting creation of 200K/year off-farm jobs and income[9]
Urbanization	• ~17% of the population lives in urban areas[10], mostly in Kigali. Rwanda has an annual urbanization growth rate of 4.5%, which is higher than Africa's urban growth rate of 3.2%[11] • Population density of the country is one of highest in the world at 499 people per square km of land[10] and over 10x that of Sub-Saharan Africa average (45)[10]
Demographic shifts	• Population of ~13M (2021), which is projected to increase to between 15.4M and 16.9M by 2032[11] • ~50% of Rwandans are under 20 years of age and working age youth (15-34) comprise 77% of rural population[12] • An increasing population, combined with unmet demand for jobs leads to additional pressure on small land holdings

1. MINAGRI, 2017 2. Climate Change Profile Rwanda Government of the Netherlands 3. FAO, 2020. Fall Armyworm Project Achievements and Impacts in Rwanda 4. WITS 2020 5. 2019 10. EU, Agri food trade statistical factsheet, Rwanda 2021 2. FAOSTAT avg. 2015-2017 3. World Bank 4. MINAGRI, 2018 5. EU, Agri food trade statistical factsheet, Rwanda 2021 6. BNR (2020) External Sector Statistics. 7. World Bank (2019) Future Drivers of Growth Study 8. World Bank 9. MINAGRI, 2018 10. WorldBank 11. National Institute of Statistics Rwanda 12. 2012

High-level view| External drivers of the food system (II/II)

Leadership and Governance	• Rwanda is a presidential republic, with policy development centralized at the national level; implementation driven through 30 districts (smallest has a population of 284K, largest 531K)[1] • Presidential elections occur every 5 years, with the latest in 2017
Socio-cultural context	• Women have taken a more prominent role in the country since the genocide (e.g., 64% of members of parliament[2]) and gender equality and women's empowerment must be included in all development frameworks • Barriers in terms of access to land and finance persist and negatively impact production and equity
Finance & Capital	• 93% of the population 16 years or older use financial products or services, whether formal or informal[3] • Access to finance (credit) for farmers is limited, with only ~6% of bank loans going to agriculture (2014-2018)[4] • Only 27.5% of men and women in agriculture had access to financial services (2015-2018)[5]
Energy	• 228.2 MW electricity generated(2020), with 556 MW targeted in 2024[6] • 51% Rwandan households have access to electricity (national grid (37%), off-grid systems (14%))[6] • Rural areas lagging far behind urban areas in access to electricity (26% vs. 93%)[7] • The cost of gas, wood and charcoal are major determinants of how to cook: gas is quick and clean but more expensive, charcoal is good for products that require long boiling periods e.g., beans. Wood is the cheapest and is less optimal under all cooking conditions but used for longer cooking periods • Recently the government has started blocking use of charcoal and wood, due to environmental and health damage • ~80% energy consumption is based on biomass(2017), with a target of reducing biomass usage for fuel to 42%(2024)[8]
Science and technology	• Rwanda invested 0.44% Ag GDP in agricultural R&D in 2016 and had 2.9 research FTEs per 100K farmers (excluding private and for-profit sector)[9] • 57% of research FTEs focused on crops, while 17.8% focused on livestock. Natural resources had 5.0% FTEs, while forestry had 1.7% and fisheries had 1.8%[9] • Rwanda Agricultural Board(RAB) leads research and coordination of research actors, infrastructure upgrading and human resource strengthening. RAB collaborates with higher education agencies and the private sector • Emerging research areas include horticulture, biotechnology, post-harvest and food processing and climate change[9]

1. 2012 Census 2. IPAR-RWANDA 3. FINSCOPE 2020 4. IPAR-Rwanda 5. CAADP Biennial Review 2015-18 6. MINIFRA 2021 7. World Bank, 2019 8. MINIFRA 9. ASTI

Overview of Rwanda's Food System through Supra-Indicators

Click to go to SOURCES

Current status of Rwanda's food system captured in supra-indicators

	Action Tracks	Supra-indicators	Rwanda	World	Unit
Action Track 1	**Ensure access to safe and nutritious food for all**	1 **Diet quality:** Food Consumption Score (FCS)	**Poor: 4% Borderline: 20%**	N/A	Percent
		2 **Nutrient supply:** Net supply in country of key macro and micro nutrients as a share of total consumption requirements for a healthy diet	**Below sufficient production**	N/A	Percent
		3 **Undernourishment:** Percent of population undernourished	**35.6**	**8.9**	Percent
		4 **Overweight & obesity:** Percent of population overweight or obese(adult population)	**22.0**	**39.1**	Percent
		5 **Food safety:** Food Safety Systems Index	**60**	**75.34**	Index (0-100)
Action Track 2	**Shift to sustainable consumption patterns**	6 **Affordability:** Cost of a healthy diet as a percent of household food expenditure	**245**	**95**	Percent
		7 **Sustainability of diets:** Per capita GHG emissions of food consumption	**1094**	**2603**	Kg CO2eq./person
		8 **Food waste:** Food waste index	**208**	**121**	kg/capita/year
		9 **Food environment:** Composite index combining food environment policies	**3**	**N/A**	Index (0-14)
Action Track 3	**Boost nature-positive production**	10 **Emissions:** Green House Gas (GHG) emissions from agriculture	**3.44**	**30.1**	MtCO2e
		11 **Land:** Average forest land being deforested for agriculture use over past 3 years	**1.11**	**0.17**	Percent
		12 **Food loss:** Percent food loss across supply chain	**7-11**	**4-8**	Percent
		13 **Regeneration:** Biodiversity and habitat index	**47.3**	**54.5**	Percent
Action Track 4	**Advance equitable livelihoods**	14 **Income:** Gini coefficient (specific) based on incomes across the food system	**Not published**	N/A	Coefficient (0-1)
		15 **Income:** Gap between farmgate price and retail price	**119%**	N/A	Percent
		16 **Gender equity:** Women empowerment in agriculture index	**0.924**	N/A	Index (0-100)
Action Track 5	**Build resilience to vulnerabilities, shocks and stress**	17 **Economic:** Household Resilience Capacity Index	**No data**	N/A	Index
		18 **Risk distribution:** Proportion of men and women engaged in agriculture with access to macro and micro credit financial services	**28%**	N/A	Percent
		19 **Social:** Government social security budget as a % of total requirements to cover vulnerable social groups	**83.23%**	N/A	Percent
		20 **Environmental:** ND-GAIN (Notre Dame Global Adaptation Initiative) Country Index	**43.1**	**49.0**	Index(0-100)
		21 **Production diversity:** Percent of kilograms from top 5 crops produced	**70**	N/A	Percent
Governance		22 **Governance:** Food Systems Transformation Governance Index	**7**	**N/A**	Index (0-14)

Green Performance better than world average

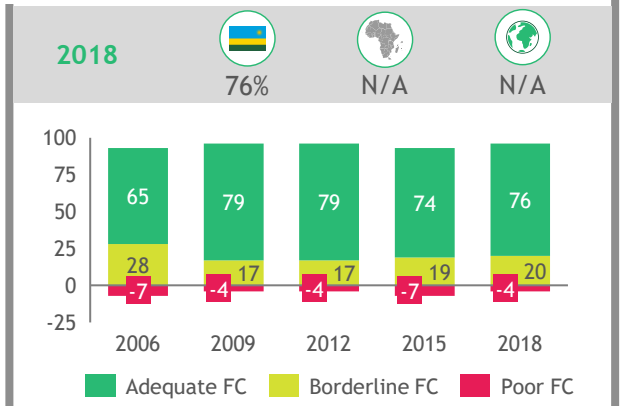
Action Track 1: *Ensure access to safe and nutritious food for all*

Food consumption score (FCS)

Aggregates household-level data on diversity and frequency of food groups, weighting according to the relative nutritional value

Click for Meta data: Sources

Food Consumption Score



Country target	Global target
N/A	N/A

Summary

Trend: Adequate Food Consumption Score has been relatively steady, between 76%-79% since 2009[1]

Target: No national targets or global targets set on recommended FCS. Desired score is 100% with adequate Food Consumption

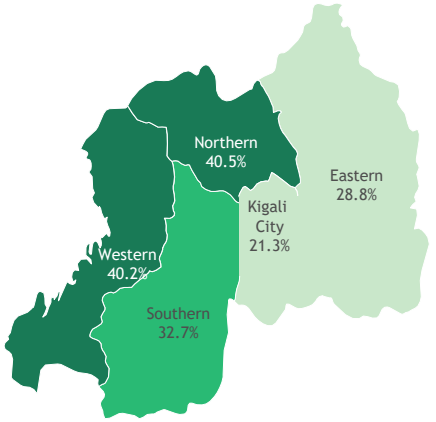
Drivers- Key leading indicators

- Production: ~24% of Rwandans do not have a diverse enough diet(poor or borderline FCS)[1], in part due to monocropping, which affects household and market availability of nutrient-rich foods (See supra-indicator 2 for nutrient specific details on production)
- Inputs: Kitchen gardens, have increased production of nutritious foods, but the land area is often too small to provide households with year-round access
- Availability: Households seem incentivized to aggregate and sell high quality nutritious food, e.g., fruit and vegetables, to capture economic gain while retaining voluminous staples to consume[2]
- Socio-culture: Food preparation, intra-household distribution and consumption based on culturally acceptable practices, instead of nutritional sensitivity
- Food Utilization: The typical diet consists of bananas, Irish or sweet potatoes, beans and other vegetables[3]

Outcomes- Key lagging indicators

- Undernourishment: 35.6 % of population undernourished in 2019[4] (see supra-indicator 3)
- Overweight & obesity: ~21% of population overweight or obese[5] (see supra-indicator 4)
- Food insecurity: ~19% households are food insecure[1] (see supra-indicator 3)
- Stunting: ~33% of children are stunted, with more affected in rural areas (36%) than in urban areas(20%)[6] (see supra-indicator 3)

2019-20 Stunting rates by province[6]



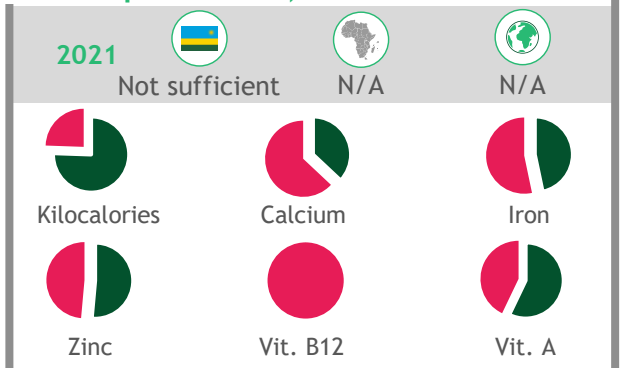
Implications and potential interventions

- Improved dietary diversity impacts health, wellbeing and productivity
- Rwanda leads the world in bean consumption, with 79-88% of beans eaten by a household from own production[7]- this is a potential lever to increase nutrient intake
- Potential interventions include:
  - Providing access to nutrient-rich foods to vulnerable populations by expanding programs e.g., Girinka, small stock and tracking outcomes e.g., social protection graduation
  - MINEDUC, MINAGRI expanding school feeding programs (including Early Childhood Development centers) to ensure healthy diets, linking this effort to public food procurement to stimulate ASF production and consumption
  - MOH, MINAGRI researching drivers of nutrition-sensitive purchase, food preparation and distribution, tailoring solutions e.g., trade, social and behavior change communication, training
  - MOH, MINAGRI, FDA to promote consumption of fortified staple products via consumer education

Net supply in country of key macro and micronutrients as a share of total consumption requirements for a healthy diet

Click for Meta data: Sources

Net Nutrient Supply (from production)[1]



Country target	Global target
N/A	N/A

Summary

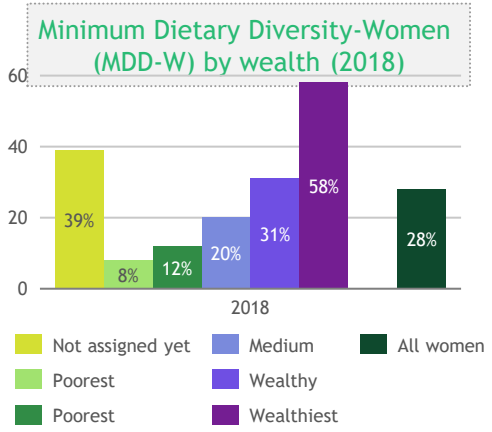
Trend: Rwanda has made important strides to increase food security from 48% (2006) to 81% (2018)[2]; yet production is below macro and micronutrient need[1]. Imports fills gaps in nutrients e.g., folate and alternative sources needs for remaining nutrients
Target: To ensure adequate availability of nutrients in country

Drivers- Key leading indicators

- Production: Low productivity of staple and non-staple foods; food production (e.g., kilocalories from crops, ~1950kcal/person/day, is below food poverty line defined as access to 2500kcal/person/day[3]
- Production: Low but rising production of meat, fish and eggs[4]- with animal sourced foods (ASF) production not yet sufficient
- Supply gaps observed in calcium, iron, zinc, vit. B12, and vit. A at both production, distribution and consumption[1]
- Limited Trade: Imports from neighboring countries and trade between districts can help fill supply gaps, especially where imports are more affordable. Yet international trade is constrained by protectionism and sometimes, political disputes[5]
- Food loss: High food loss along the value chain(10-40%)[6] limits parts of the population from accessing a diverse diet while raising costs and risks to small-scale nutritious food producers and value chain entrepreneurs (supra-indicator 12)

Outcomes- Key lagging indicators

- Undernourishment: 35.6% of population undernourished[7] (see supra-indicator 3)
- Diets: Only 28% of women receive Minimum Diet Diversity[8], a rate which increases with wealth and consumption of fortified blended food



- Micronutrient deficiencies: ~37% children suffer from some anaemia, with highest prevalence in North(~41%) and West(~41%) Provinces, in boys (~38%) and among pregnant women(~25%)[9]

Implications and potential interventions

- Building on improved food security, the focus needs to expand to include household access to nutrients
- Possible interventions could include:
  - Creating an enabling business environment for producers and processors of nutrient-rich foods for the domestic market
  - RRA reducing taxes on healthy food produce and processing to encourage healthy food choices where possible
  - MINAGRI partnering with Private Sector to provide the investment and operational capacity to develop, manage infrastructure for increased production, storage and distribution of perishable food
  - MINAGRI, cooperatives, investors developing alternative protein sources with limited environment impact (e.g., small pelagic fish) and underlying cold chain
  - MINAGRI, NCDA promoting selling and consumption of nutritious but neglected crops and biofortified crops through community nutrition leadership programs

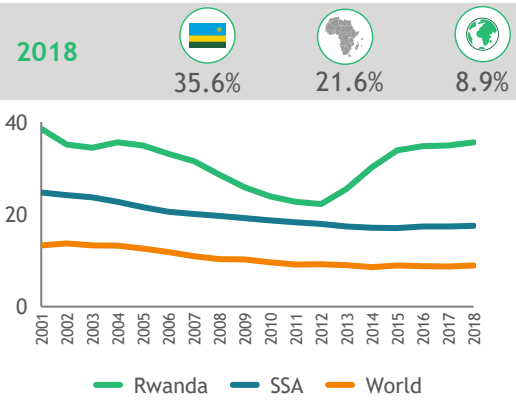
Prevalence of undernourishment (% of population)

Percentage of the population whose food intake is insufficient to meet dietary energy requirements continuously

Click for Meta data: Sources

% of population undernourished[1]

2018



Country target (2024)	Global target (2030)
Related goals	0% undernourishment

Summary

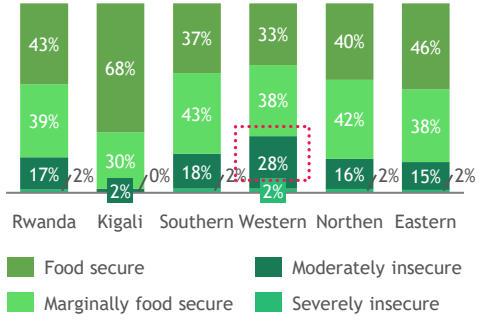
Trend: Even as wasting and stunting in children (<5y) steadily decreased since early 2000s, undernourishment in the general population declined and then grew from ~22% in 2012 to 35.6% in 2020[1]

Target: No national undernourishment target. Rwanda's goal is to reduce stunting to 19% by 2024[2]. SDG 2 aims to end all forms of malnutrition by 2030

Drivers- Key leading indicators

- Food insecurity: ~19% of Rwandan households are food insecure[3]. In the West, food insecurity is linked low-income agriculture, and acidic, depleted soils which have lower productivity

% population food insecure (2018)[3]

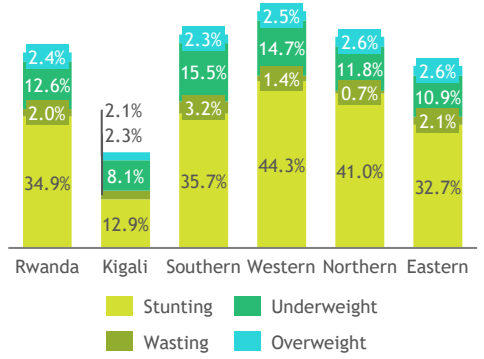


- Nutrient supply: Nutrients from production are inadequate for dietary needs (supra-indicator 2)
- Poverty: The poorest households (40% of Ubudehe1) used crisis or emergency livelihood coping strategies (e.g., consuming seed stock, lower inputs investment) to face food shortages, which may affect resilience to future shocks[4]

Outcomes- Key lagging indicators

- Stunting: 33% of children (<5y) are stunted[5]. Stunting in the North linked to poor sanitation and hygiene facilities and repeated infections
- Malnutrition: ~2% of children (<5y) suffer from acute malnutrition, linked to poor diet in first 1000 days and poor complimentary feeding practices[6]; only 56% of children aged 6-8 months receive complementary foods[7]

% children <5 years malnourished (2018)[8]



- Micronutrient deficiencies: 13.1% prevalence of anemia among women of reproductive age (15-49 years old)[9]

Implications and potential interventions

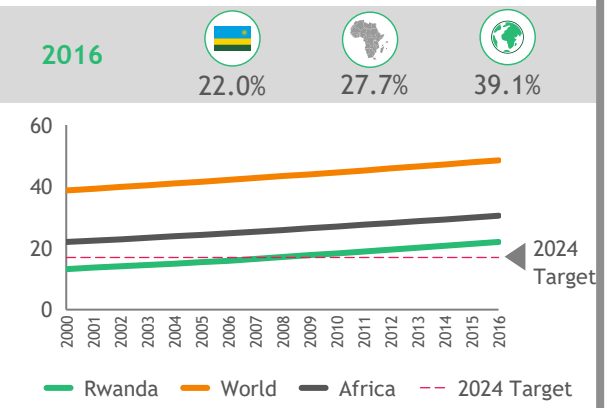
- Rwanda aims to reduce stunting to 19% by 2024 and the proportion of food insecure households to 10% by 2024[2]
- With a rising population, pressure on limited land and agricultural production 40-50% below potential[10], Rwanda risks stagnating and even declining on progress made to reduce stunting and undernourishment
- Potential interventions include:
  - MINAGRI, MOH customizing regional interventions e.g., strengthening strategic food reserves in regions with chronic food insecurity to ensure access, while aligning with efforts to encourage local sourcing among food processors
  - MINAGRI designing incentives to drive retention of nutritious food for consumption instead of sale
  - NCDA designing solutions for working caregivers e.g., easy to carry, affordable complementary food options for rural mothers who bring children to the farm

% of population overweight or obese (adult population)

Percentage of the population(men and women) with excessive fat accumulation that presents a risk to health

Click for Meta data: Sources

% of population overweight or obese[1]



Country target (2024)	Global target
Less than 17%	N/A

Summary

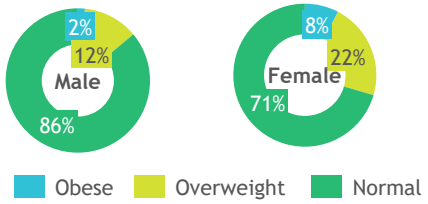
Trend: Obesity rates in Rwanda are ~20% lower than average global and Africa rates. Both adult and child obesity are rising steadily by ~1-2% annually

Target: Rwanda's 4th health sector strategic plan aims to have overweight and obesity in adults reduced to below 17% by 2024[2]

Drivers- Key leading indicators

- Urbanization: Higher obesity and overweight in children(<5y) in urban areas(11%) than rural areas (7%)[3] linked to rising sedentary behaviours in urban areas. Weight gain is seen as a sign of affluence
- Gender: 29.5% women and 14% of men are overweight or obese (BMI)[4]. Women 2-3x more likely to be overweight and obese, with higher rates in more educated women and wealthier households[3]

% population overweight or obese by gender(2016)[4]

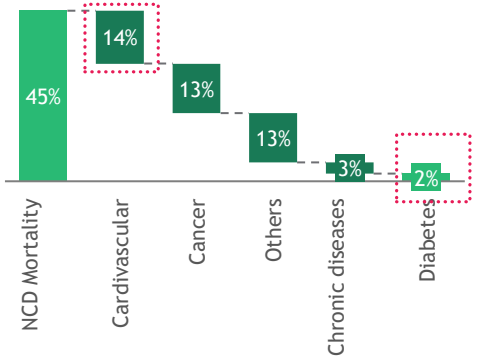


- Dietary patterns: Dependency in carbohydrate for dietary energy (50% calories from potato, rice, banana, and cassava). Increased intake of ultra-processed foods which are perceived as safer and convenient

Outcomes- Key lagging indicators

- NCD mortality rate (100,000 inhabitants): ~45% of deaths in 2016 were attributed to NCDs[4]. Overweight and obesity contribute to cardiovascular diseases and diabetes

NCD mortality rate (2016)[4]



- Economic impact: from direct (diagnosis and treatment) costs, and indirect costs(including illness, lost days of productivity, premature death) increasing medical spend
- Intergenerational health risks: Overweight in mothers is associated with overweight and obesity in their children[3]

Implications and potential interventions

- Rwanda's head start in a relatively low obesity/overweight needs to be maintained to prevent the double burden of malnutrition and gain from avoided NCD costs.
- With the population projected to double to 23M by 2050 and rapidly urbanize[5], cities and peri-urban towns need to enable healthier diets and reduce sedentary habits
- The urban imperative is to shape consumption patterns towards more healthy diets while building demand and willingness to pay
- Possible interventions include:
  - Cities investing in adequate levels of transport, storage and market infrastructure for nutritious foods
  - FDA collaborating with private sector to develop guidelines on food marketing & messaging
  - MOH, NCDA targeting campaigns on both over-& undernutrition; promoting physical activity for urban and peri-urban populations
  - MOH, NCDA targeting urban populations with Behavior Change Communication Campaigns on around healthy eating at buffets, which tend to be the urban norm

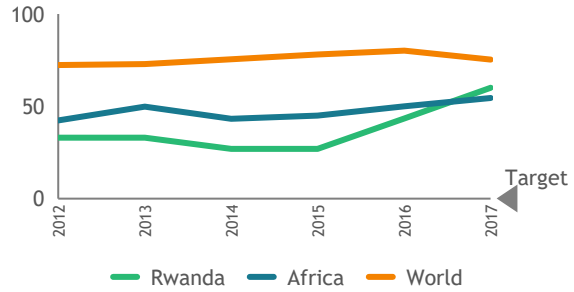
Africa food systems safety index

Combines three food safety indices; food safety systems index, food safety health index and food safety trade index

Click for Meta data: Sources

Africa Food Systems Safety Index[1]

2017	66.00%	54.70%	75.34%



Country target	Global target (2025)
N/A	>50% burden reduction

Summary

Trend: With agencies like the RSB, Rwanda has increased food systems safety over the past few years. It is outperforming Africa by ~10%

Target: No national targets available for index but regional Malabo declarations on food safety health index target 50% reduction[2] in food borne diseases incidence by 2024

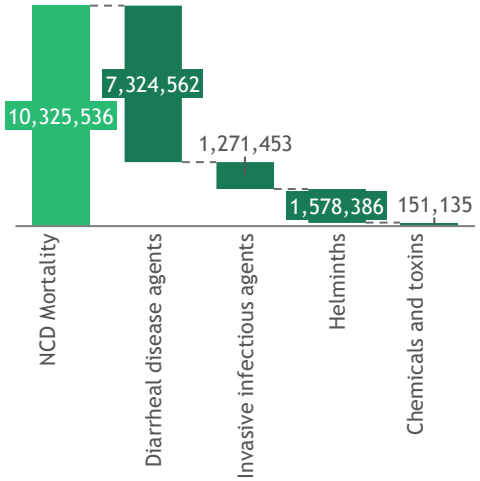
Drivers- Key leading indicators

- Mandate: Food safety systems still show substantial gaps and need adequate infrastructure and controls to ensure safety of processed and unprocessed foods. Several agencies share responsibility for food safety with mandates that overlap and are in some instances contradictory
- Processing capacity: Capacity to do quality testing constrained by centralized testing infrastructure; with limited aflatoxin testing sites available- RSB, AIF, MINIMEX
- Production: Food safety starts with production. Current farming practices, e.g., misuse of agro-chemicals or irrigation with waste-contaminated water, can expose fresh vegetables to high chemical and microbial contamination[1]
- Low access to handwashing: only 11.5% households having a place for handwashing[3] making even food that was safely produced unsafe to consume

Outcomes- Key lagging indicators

- Increased burden of disease: 75% population exposed to fecal contamination via drinking water[4]. This is similar with foodborne diseases estimates in other African countries

Africa foodborne disease (DALYS per 100,000)



- Poor product quality: Complementary food products (e.g., infant porridge) show inadequate nutrient contents and high aflatoxin and microbial contamination levels[5]

Implications and potential interventions

- The resulting high levels of food loss, food waste, and increasing the burden of disease (e.g., liver cancer associated with aflatoxins) have economic and health costs
- Robust food safety systems will give food processors and food service incentives to purchase local produce instead of imports
- Potential interventions include:
  - RSB, FDA and private sector increasing laboratory food testing capacity to complement resources at the national reference lab and match mandatory testing requirement
  - FDA Implementing and updating food safety improvement frameworks, with a focus on supporting informal markets through training, incentives and materials
  - Investing in training and support for farmers and microprocessors to acquire needed infrastructure to maintain quality and safety of food along distribution
  - Increasing investment in cold chain systems to improve shelf-life of perishable goods(see supra indicators 8, 12)

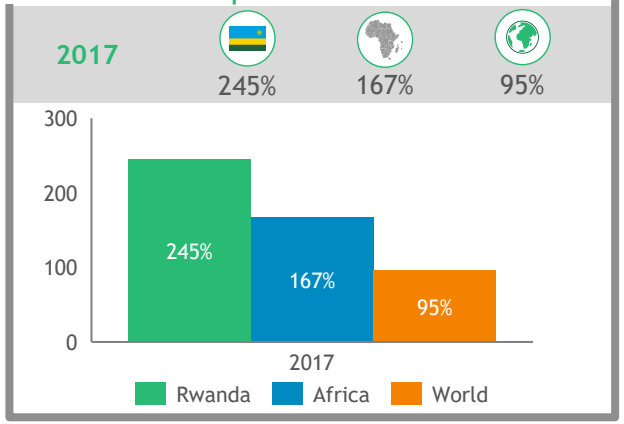
Action Track 2: *Shift to sustainable consumption patterns*

Cost of a healthy diet as a percent of average household food expenditure (%)

It is the cost of acquiring a healthy diet as a share of total household expenditure being spent on food

Click for Meta data: Sources

% cost of a healthy diet to food expenditure[1]



Country target	Global target
N/A	N/A

Summary

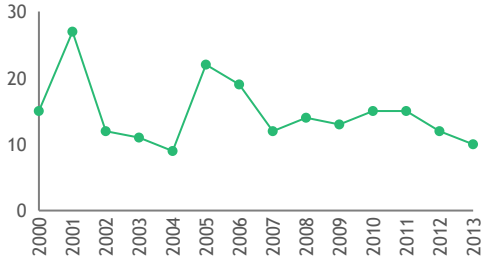
Trend: A healthy diet costs ~245% of average household food expenditure(%), while a nutrient adequate diet costs ~86% and energy sufficient diet costs ~30%[1]. Predominant sources of food are markets (~70%) and own production(~30%)[2]

Target: No national targets or global targets set. Desired score is 100% of population can afford a healthy diet

Drivers- Key leading indicators

- Nutrient supply: Own production relies on land parcels that are too small to feed a household all year.
- Market Access: At least 1 main market per district; In some areas, access is a critical challenge (~86 min. to reach the nearest market in villages without market)[3]
- Price volatility: 10% domestic food price volatility index. In lean seasons as own production declines & most food is market-sourced, households are exposed to seasonal food price increase

Price volatility of all crops (%)[5]

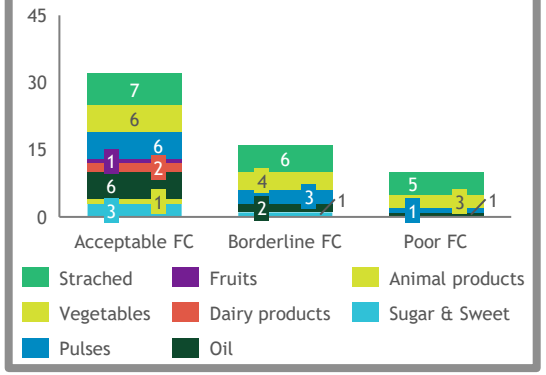


- Income: Low-income levels among farmers limits purchasing power to buy diverse food products in market to supplement own production

Outcomes- Key lagging indicators

- Affordability: 89.6% of Rwandans cannot afford a healthy diet[1]. Following the 2016-17 droughts, in 2018, ~67% households reported having lack of food or money to buy food[2](+17% compared to 2015)
- Diet quality: Due to the high costs of nutritious foods, the bulk of households' food expenditure is dedicated to cereals[2]
- Low Food Consumption Score: Households with poor or borderline consumption show almost no consumption of animal products, fruits, and sugar[2]

Number of days in a week different food groups are consumed(2018)[2]



Implications and potential interventions

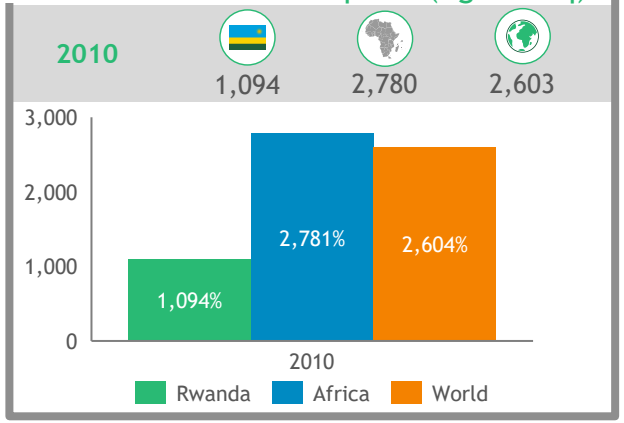
- Daily and unskilled laborers and households relying on external support spend large fractions of their budgets to purchase filling food that is not nutritious[2]
- Potential interventions include:
  - During crises, e.g., COVID-19, leverage short-term price-lowering strategies e.g., price ceilings
  - Expand social protection services e.g., by setting a target for nutrition spend as a percentage of total spend
  - Subsidizing inputs for vegetables and fruits to raise production for domestic markets and exports
  - MININFRA, Private Sector investing in processing, storage and logistics infrastructure to reduce loss and extend shelf-life e.g., tomatoes whose prices spike in dry season
  - MINECOFIN, MOH exploring fiscal policy, including taxes and subsidies, to lower costs and improve access to healthy foods
  - MINALOC, MOH, MINAGRI mapping food flows across districts and internationally to strengthen linkages between producers and purchasers of nutritious foods

Per capita GHG emissions of food consumption (kg CO2eq./person)

It is the total of emissions arising along the entire food value chain from agricultural production to the end consumer

Click for Meta data: Sources

Per capita GHG emissions of food consumption (Kg CO2eq)[1]



Country target (2030)	Global target
Emission reduction of 4.6M tCO2e[2]	N/A

Summary

Trend: Rwanda is substantially lower in emission of GHG by ~150% compared to African averages and by ~140% compared to world averages

Target: Attain **total** emission reduction of 4.6M tCO2e in 2030 compared to Business As Usual 12.1M tCO2e2, ~62% reduction from the NDCs. Agriculture is expected to account for 49% of the reduction potential[2]

Drivers- Key leading indicators

- Local Sourcing: Short distance covered by consumed food: ~30% contribution of self-grown food to the diet[3]; 72% of fruit & veg. never leave district of production[4]
- Geography: Small land area lowers environmental impact of transport of food from rural to urban areas
- Consumption: Low consumption of animal products, which tend to have higher environment impact in terms of emissions processing, storage & transportation
- Demographics: Only 17% of Rwandans live in urban areas[5]; as incomes & urbanization increase, diet preferences tend to shift towards animal products and imports grown from further away
- Food loss and waste: Relatively high levels of food loss and waste, which if lowered, could reduce GHG emissions further by an estimated 16%[6](see supra-indicator 8 and 10)

Outcomes- Key lagging indicators

- The outcomes of emissions are affected by interactions of local, regional and global factors
- Temperature has increased in Rwanda by 1.4°C since 1970, (higher than the global average)[7], and is expected to rise by up to 2.5°C by the 2050s from 1970. This could raise incidence of heat-related illnesses, pests, diseases

Temperature trend and projections in Rwanda (2020)[7]

1.4°C	2.5°C	4°C
Increase since 1970	Increase by 2050	Increase by 2080

- Weather shocks: East African projections over Rwanda show an increased rainfall intensity for both rainy seasons which is likely to cause floods and storms; can result in landslides, crop losses and infrastructure damage

Implications and potential interventions

- In 2015, agriculture (excluding forestry) contributed 55% of GHG emissions, followed by energy(31%), waste (12%) and industrial processes/products(2%)
- The targeted emissions reduction (which implies ~466-688 Kg CO2e per capita in 2030) is challenging to attain without tradeoffs on other goals e.g., fertilizer use, livestock production, processing[8]
- Consumption choices are driven by many other considerations apart from environmental concern e.g., accessibility, affordability, tastes and socio-cultural norms
- Potential interventions include:
  - MINAGRI encouraging production of sustainable animal-based food alternatives as sources of protein
  - Min. Environment, MINAGRI fast-tracking site-specific fertilizer recommendations and blends
  - Min. Environment, MINALOC encouraging reduced food waste from retail sources e.g., through 'sort from source' campaigns in Kigali

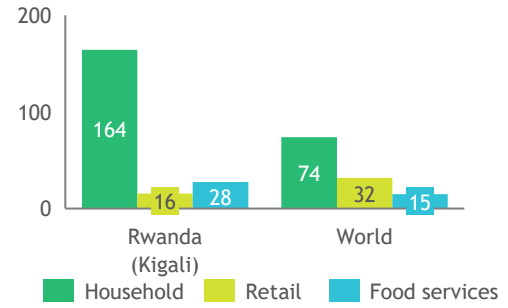
Food waste index

Food that completes the food supply chain up to a final product, of good quality and fit for consumption, but still doesn't get consumed. It covers both edible and in-edible parts of food (e.g., peels, banana skins)

Click for Meta data: Sources

Food Waste in Kg/Capita/year[1]

2020	Rwanda	Africa	World
	207.65	N/A	121



Country target	Global target (2030)
N/A	Halve per capita global food waste (SDG 12.3)[2]

Summary

Trend: On a per capita basis, food waste is estimated to be ~71% higher in Kigali than the world average[1]

Target: No national targets available, however government programs e.g., Africa Center for Cooling Excellence suggest intent[3]. It is necessary to measure food waste to track national progress and report on SDG 12.3[2]

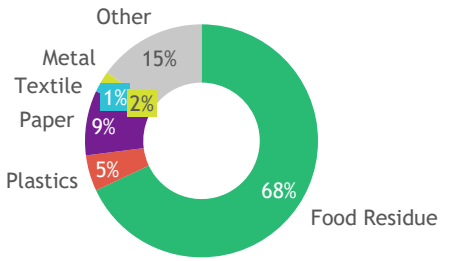
Drivers- Key leading indicators

- Poor household planning: Urban areas tend to have spoilage due to improper storage, over buying, cooking or serving too much food
- Market infrastructure: Prevalence of traditional open-air markets, which lack cooling and storage infrastructure to extend produce shelf-life[4]
- Purchase decisions: Customers abandon purchase of fruits & vegetables for reasons related to price (too expensive), availability (out of season), cleanliness and quality (not fresh)[5]
- Subsistence: Less amount of food wastage in rural homes due to subsistence farming and high rates of consuming own production[6]
- Food services: While penetration of restaurants is still low, drivers of waste include poor demand forecasting, overstocking, low product quality and customer behaviours e.g., serving too much

Outcomes- Key lagging indicators

- Environment costs: Rwanda combined losses and wastes are ~40% of annual food production. This loss is ~16% of its greenhouse gas emissions and represents 21% of land use (564,400 ha. of land)[7]
- GDP: 12% loss to Rwanda's annual GDP due to food waste and losses[7]
- Waste management costs: Food waste is an urban and health management problem. 68% waste in landfill is organic matter[8]

Waste Composition in Kigali City[8]



- Coping mechanisms: Players in food services apply various strategies: e.g., donation, redistribution, price reduction and dumping to manage food waste

Implications and potential interventions

- Food waste occurs at a smaller scale than food loss nationally
- Rwanda's rapid urbanization rate[9] of ~4.5% creates an urgency to reduce food waste and loss to ensure food security. Reducing food waste and loss can increase availability of domestic food for consumption and reduce pressure on the import bill
- Potential interventions include:
  - MININFRA, MINAGRI supporting investing to lower energy costs- including access to off-grid and renewable energy-efficient storage solutions for households
  - MINAGRI, MINICOM encouraging investing in processing, other infrastructure and food messaging on how to store and prepare produce to extend their shelf-life
  - MIN. Environment investing in robust data collection to guide prevention of food waste and alleviate pressure on waste management systems
  - Accelerating programs to valorize inedible parts of food waste (bone shells, etc.) and convert food waste into organic fertilizer to boost crop production via 'sort from source' campaigns in Kigali

Composite index combining food environment policies

Food environment policies that encourage consumption of sustainable and healthy diets

Click for Meta data: Sources

Food Environment Index[1]

2017	3	N/A	N/A

Building indicator	Status
Marketing restrictions of junk and non-alcoholic beverage to kids	
Marketing of alternatives to breastmilk restrictions[2]	
Tax on Sugar Sweetened Beverage (SSB)[3]	
Low tax on fruits/vegetables	
Reduction of consumption of salt/sodium policies	
Limit saturated fatty acids or trans fatty polices	
Fortification legislation of key foods[4]	

Country target	Global target (2025)
! N/A	! N/A

Summary

Trend: Policies and guidelines to support sustainable, healthy diets are partially available

Target: No national targets or global targets set. Index developed in 2021 by FS-TIP

Drivers- Key leading indicators

- Legislation: Laws on mandatory fortification of key foods (maize flour, wheat flour, edible oil and fats, sugar and salt) passed right before COVID-19- and implementation affected by the pandemic. Processors face adoption constraints: high cost of equipment, costs of premix, limited demand and low consumer purchasing power[4,5]
- Taxation: Rwanda has 39% tax on all soft drinks, including sugar sweetened beverages and non-SSB[3]
- Child feeding practices: Legal provisions guiding the marketing of breastmilk substitutes[2] exist, with monitoring mechanisms that need to be strengthened (e.g., prohibition of free/low-cost supplies t health workers)
- Political will: Commitment of resources (both monetary and talent) is catalyzed by evidence of a public health problems (e.g., stunting) and community advocacy from village to national level

Outcomes- Key lagging indicators

- Food safety systems index: Rwanda has increased food systems safety over the past few years (See supra-indicator 5)
- Malnutrition: Unhealthy diets are the common denominator across all forms of malnutrition (see supra-indicators 1, 2, 3 and 4
- Food affordability: A healthy diet costs 245% household expenditure (see supra indicator 6)
- NCD mortality rate (100,000 inhabitants): 44% of deaths in 2016 were attributed to NCDs. (see supra-indicator 4)

Number of processing companies[5] with fortification potential(Aug. 2020)

7	7	636
No. of certified processors	waiting to get certified	Marked with areas to improve

- Market focus: companies involved in fortification are largely focused on the urban consumers and regional markets

Implications and potential interventions

- Food environment not governed in a way to strongly encourage consumption of healthy foods and discourage consumption of non-healthy foods. Need to prioritize and subsidize desired health outcomes e.g., lower NCDs burden

Potential interventions include:

- RRA reducing taxes on healthy foods to encourage healthy food choices where possible
- MINICOM, FDA providing equipment financing to processors to address financial challenges in cost of production to enable processors to meet the standards
- Reduction on tariffs and taxes on fortification inputs that are not locally available
- FDA, NCDA developing consumer guidance mechanisms (Food-based dietary guidelines, Front-of-pack labeling with relevant, readily understood front of pack nutrition labelling to help consumers, to make informed choices
- Restricting the promotion of unhealthy foods to children

Action Track 3: *Boost nature-positive production*

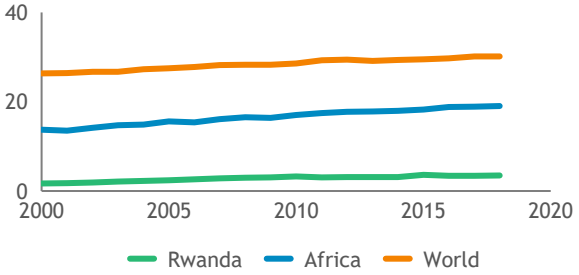
Green house gas (GHG) emissions from agriculture

These are all emissions and removals occurring on 'managed land' and that are associated with the use of land for agriculture

Click for Meta data: Sources

Total GHG emissions from agriculture (MtCO2e)[1]

2018			
	1.42	N/A	32.60



Country target (2030)	Global target (2050)
Reduction of 4.6 MtCO2e in 2030[2]	Net Zero Emissions

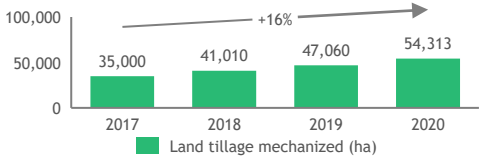
Summary

Trend: GHG emissions related to agriculture substantially lower than World average. The biggest sources of agriculture emissions are enteric fermentation(44%), manure (28%) and N20 from managed soils(25%)[2]

Target: Agriculture sector accounts for 49% of the total reduction potential of 4.6 M tCO2e by 2030[2]

Drivers- Key leading indicators

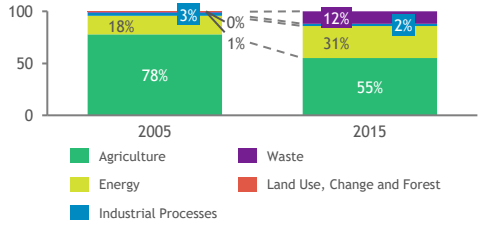
- Domestic livestock: Enteric fermentation rose by 35% from .95 MtCO2e(2005) to 1.284 MtCO2e (2015) with increased livestock[3]
- Farming practices: NO2 emissions from agricultural land fell by 73% to 0.73 MtCO2e (between 2005 and 2015). 56% of agriculture land was under sustainable land management practices in 2016
- Fertilizer utilization: Inefficient use of subsidized fertilizer (application at wrong time, wrong types or incorrect quantities,) due to limited training among farmers
- Mechanization: +16% annual growth in mechanized land tillage, which can increase profit and production, but breaks up the soil (a natural carbon sink) and releases carbon into the air[7]



Outcomes- Key lagging indicators

- Contribution to GHG Emissions: Agriculture's direct contribution to overall emissions shrunk from 78% in 2005 to 55% in 2015 as those from energy and waste expanded[2,3] *(Indirect, but important contributions e.g., mechanization, were not listed under agriculture)*

GHG Emission Sources in Rwanda[2]



- Fertilizer emissions: 17,607 Mg CO2e yr-1 in 2017
- Temperature change: Rwanda has experienced a 1.4˚C rise since 1970, higher than the global average[5] (see supra-indicator 7)
- Adverse weather shocks: Changes in rainfall patterns likely to affect producers dependent on rain-fed agriculture[5] (see supra-indicator 7)

Implications and potential interventions

Government-initiated programs e.g., Crop Intensification Program (CIP) and Girinka are examples that improve livelihoods while also driving emissions e.g., Girinka reduced food insufficiency by 11%, but increased GHG by 1174 kg CO2e/hh/yr[6]. Impacts and trade-offs will need to be addressed across programs to ensure sustainable healthy dies for all

Potential interventions include:

- MINAGRI, Min. Environment reducing enteric fermentation emissions through breed selection and investing in small stock
- MINAGRI accelerating soil & crop-specific fertilizer blends, avail the right types in good time, with messaging on correct usage
- MINAGRI enhance extension services to improve understanding and farmer skills in balancing chemical and organic fertilizer
- MINAGRI to support appropriate knowledge transfer on issues e.g. animal health, manure management
- MINAGRI, MINALOC strengthening soil conservation measures including terracing, conservation tillage, multi-cropping and crop rotation, leveraging evidence to train farmers & extension officers

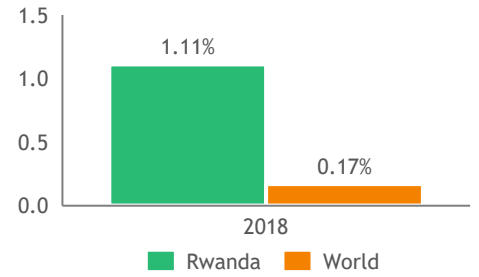
Average forest land being deforested for agriculture use over the past 3 years

Implies the long-term or permanent loss of forest cover by transformation into agricultural use

Click for Meta data: Sources

Avg. forest land deforested for agriculture use (%)[1]

2018	Rwanda	Africa	World
	1.11	N/A	0.17



Country target (2024)	Global target
30% forest cover[3]	N/A

Summary

Trend: Widespread deforestation with ~64% decline in natural forests (1960-2007) due to human activity, including the resettlement of refugees. The government has taken ambitious steps to reverse the impact of deforestation[2]

Target: Rwanda aims to increase forest cover to 30% of total land area by 2024[3]

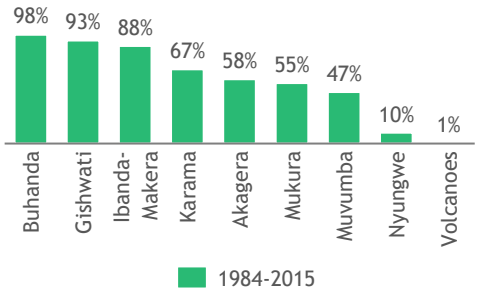
Drivers- Key leading indicators

- Population density and growth: Result in high pressure on small land holdings. Low productivity from constant cultivation increases need to clear more land
- Land management: Misconceptions and practices e.g., vegetation burning before planting season are thought to raise soil fertility, but end up leading to forest fires[4]
- Extensive use of firewood: ~85% of households[5] depend on firewood as the primary cooking fuel(95% in rural areas). Firewood and charcoal diversifies income

Outcomes- Key lagging indicators

- Environment: Biodiversity and habitat index: natural forest is disappearing rapidly[6]

% forest loss for forests >1000ha[6]



- Erosion: Increased erosion risk from unsustainable agriculture on steep land without adequate soil conservation measures. Floods and landslides have become increasingly common
- Global climate risk: Rwanda has high vulnerability (ranked 168 out of 182) & a medium change readiness score (ranked 92 out of 192) in 2019[7] (See supra-indicator 20)

Implications and potential interventions

- Forests enable Rwanda's tourism and protect watersheds and downstream wetlands and serve as water catchments areas
- The government has spearheaded a 2019 countrywide campaign to boost the plantation of fruit trees (3/household) to improve fruit production, restore soil health[8] and mitigate climate change

Other possible interventions include:

- MINAGRI improving productivity through better soil management practice of current farmland to reduce drivers of deforestation
- Min. Environment, MINAGRI equipping farmers on conservation agriculture and agroforestry with opportunities to diversify income e.g., beekeeping
- MINIFRA improving access to and lowering cost of electricity to provide alternative fuel source
- MINAGR developing Soils Investment Hubs to bring together key stakeholders to drive aligned investments and mechanisms to scale healthy soil agriculture practices
- MINALOC to mainstream, reinforce forestry activities at local level

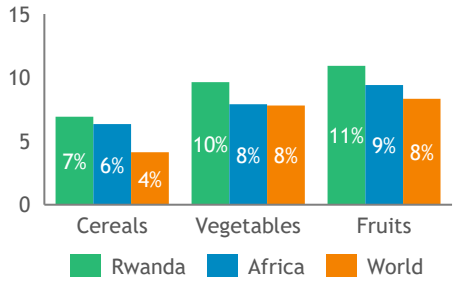
Food loss along the supply chain

Refers to food that gets lost, or incurs reduction of quality during its process in the supply chain before it reaches its final product stage

Click for Meta data: Sources

Post-harvest, pre-retail food loss (%)[1]

2018	Rwanda	Africa	World
	N/A	N/A	N/A



Country target	Global target
Post harvest loss <1% for maize, beans and rice	Reduce food losses along production and supply chains

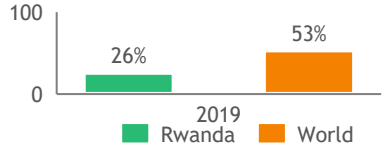
Summary

Trend: Food loss is higher than world average for cereals, fruits and vegetables[1]. Food loss hotspots at production, post-harvest storage & wholesale & retail stages.
Target: Global targets to reduce post-harvest losses exist. Rwanda aims to reduce loss to <1% from 10.4%(maize), 27.4%(beans), 8.3%(rice) in 2014[2]

Drivers- Key leading indicators

- Distribution: Fragmented, expensive transportation system. In 2017, 13.3K km rural feeder roads were in good or passable condition[3](45% of 30K km target)

Ag. Infrastructure Index[4]



- Storage capacity: Rural storage infrastructure is inadequate to meet the local production. The government has supported post-harvest infrastructure e.g., 369 maize drying shelters, 17 mobile dryers, 2 vegetable cold rooms.[5] Farmers don't know how to optimize use
- Harvest techniques that bruise produce
- Post-harvest handling: focused on almost-ripe fruits & vegetables, transported without preservation
- Vulnerability to global pests e.g., Fall Armyworm, which invaded maize in all 30 districts in 2017[6]
- Data Gaps: Historical data on storage, transport, market losses is not systematically captured, limits usability for decision making

Outcomes- Key lagging indicators

- Access: The quality, shelf-life & value of produce is diminished; produce has a relatively short shelf-life, can't be transported long distance- only ~28% fruits and vegetable leave district of origin[2]
- Access: High food loss lowers dietary diversity by discouraging the production of nutrient-rich perishable foods
- Emissions: Food loss also puts an unnecessary burden on the environment. Resources are used and emissions occur to produce foods that never reach consumers
- Contamination: Poor cereal storage and handling(including mixing of pest-infested batches with better batches), limited testing infrastructure resulting in aflatoxins in key foods, including processed foods
- Health risks: Increased burden of disease e.g., liver cancer, associated with high levels of aflatoxins

Implications and potential interventions

- High levels of food loss reduce the economic and livelihood benefit that Rwandans from increased agriculture productivity. The same practices that lead to food loss reduction are also effective at improving food safety (see supra-indicator 5)
- Loss reduction requires continued investments in infrastructure and innovative logistics models

Possible interventions could include

- MINAGRI exploring scale up of models that reduce farm-based post-harvest activities e.g., Kumwe cob model which buys unshelled maize from farmers for industrial drying and storage[3]
- MINAGRI introducing affordable on-farm storage & handling tech to cooperatives and training on early warning systems, monitoring & management of pests e.g., FAW
- Min. Environment, MINAGRI supporting investing in proper assessment and disposal of fungus and aflatoxin affected crops e.g., as feed for soldier flies
- MININFRA supporting transport infrastructure to link producers to markets, storage and processors

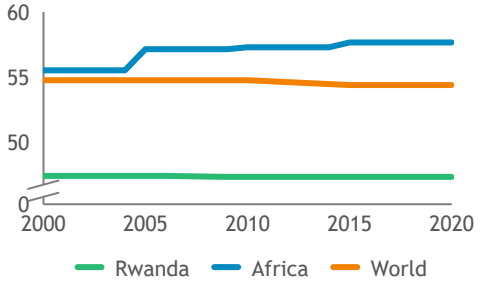
Biodiversity and habitat index

Assesses countries' actions toward retaining natural ecosystems and protecting the full range of biodiversity within their borders

Click for Meta data: Sources

Biodiversity and habitat index[1]

2020			
	47.30%	57.65%	54.50%



Country target	Global target
Related targets for forest cover and bio-diversity conservation	SDG 15 on protection, and restoration of forest[2]

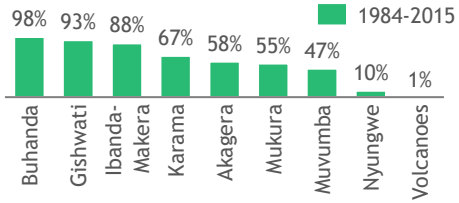
Summary

Trend: Ranked 120 globally out of 180 countries. Rwanda's ranking declined between 2005 and 2010 and has remained steady since then[1]
Target: No global or national targets available. Related targets include NBSAP (Target 11) which focuses on safeguarding genetic diversity of local breeds to minimize genetic erosion[3]

Drivers- Key leading indicators

- Protected areas: Biodiversity is relatively well preserved in protected areas(~10% national territory) but highly threatened in unprotected ecosystems[4]
- Population pressure: Population growth on the scarce land has led to the reduction of protected areas and land degradation, resulting in high loss of habitats and biodiversity[5]

% forest loss for forests >1000ha(2017)[5]

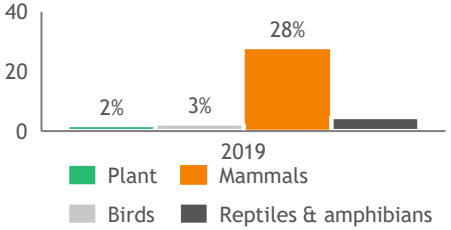


- Deforestation: Vegetation clearing for subsistence agriculture & fuel and conversion of natural forests into farming & grazing lands[5] threaten habitats (see supra-indicator 11)
- Limited forestry extension services leading to poor survival of planted seedlings, low intensity management of forest plantations and low productivity[5]
- Inputs: Excessive use of pesticides which kills pollinators e.g., bees

Outcomes- Key lagging indicators

- Genetic Erosion: Risk of genetic erosion in agro-biodiversity with the replacement of local animal and crop varieties with improved or exotic species[6]
- Species Loss: Rwanda hosts 30% of the global population of the endangered mountain gorilla and 2100+ species of plants. Without registering and preserving biodiversity, there is a risk of reduction in diversity of food and medicinal plants, and an overall less resilient food system[7]

% Species in Rwanda classified as Endangered or vulnerable[7]



- Livelihood Risk: >65% of Rwandans rely directly on biological resources for their livelihoods, and the sustainability thereof is closely linked to biodiversity in the country

Implications and potential interventions

Rwanda's aims to achieve an overall 30% sustained forest cover of the total national land surface by 2030[8]. The next stage is to drive productivity of existing land and weaken the cause of biodiversity and habit loss

Possible interventions include

- Min. Environment, MINAGRI articulating and socialization of biodiversity goals to reduce knowledge gaps
- MINAGRI delivering healthier diets and restoring land through tree-based food production
- Min. Environment, MINAGRI and MINEMA to scale up initiatives to restore/ rehabilitate degraded ecosystems and promote indigenous species in agroforestry & landscape restoration in high-risk areas
- Promote agro-systems at local level that utilize ecosystem-based approaches and maximize production on small land (e.g., Agroforestry)
- Ecosystem Restoration: The UN Decade on Ecosystem Restoration (2021) was launched to galvanize action to restore degraded ecosystems

Action Track 4: *Advance equitable livelihoods*

Gini index (specific) based on incomes across the food system

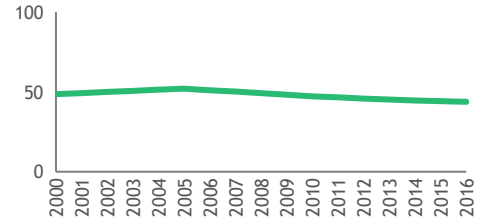
Highlight's income distribution among various players in the food systems

Click for Meta data: Sources

GINI Index (specific)

2020			
	N/A	N/A	N/A

National GINI Coefficient[1]



Country target	Global target
! Eradicate extreme poverty by 2024	! Related target

Summary

Trend: New **proposed** index focused on food systems, therefore no historic trend available. Rwanda Food System income data not available. Analysis based on national GINI
Target: New index, no global targets available. SDG 10 targets include to reduce income inequality via income growth of the bottom 40%[2]

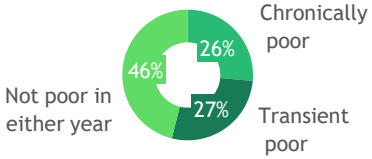
Drivers- Key leading indicators

- Value add: Low-productivity, low value-add agriculture is main income source for the majority. Agriculture daily laborers, unskilled laborers, and households living from external support or begging spend more than 50% of their budget to buy food[3]
- Income distribution: Disaggregated data shows income inequality varies within and across provinces. Income inequality is high in urban centers, especially Kigali, and lower in rural areas[4]
- Employment: Lack of income-generating opportunities outside farming in rural areas; focus has been on formal instead of semi-formal opportunities[5]
- Credit: Affordable credit can provide investible resources to raise income. Rural access to credit is low. Only 3% of females in rural areas secured a loan from a formal source compared to 6% of male[5]

Outcomes- Key lagging indicators

- Poverty Rates: Rwanda aims to reduce percent of population below poverty line from a baseline of 38%(2016) to 17%(2024)[6]

Population affected by types of poverty Between 2010/11 and 2013/14



- Subsistence reliance: ~70% of Rwandans practice subsistence agriculture, which is vulnerable to droughts and floods and other effects of climate change. ~50% of the households in Ubudehe 1 and low-income farmers reported seasonal food access issues[7]
- Household resilience capacity: In 2018, ~40% of households reported having experienced at least one shock or an uncommon situation during the last 12 months that affected their access to food, with 84% observing a decrease or a loss of their assets or belongings[8] (See supra indicator 17)

Implications and potential interventions

Rwanda aims to accelerate inclusive economic growth and development founded on the private sector, knowledge and natural resources. Rwanda has made overall progress with poverty reducing from ~59%(2000) to ~34%(2017)

Additional interventions to create decent and productive jobs include:

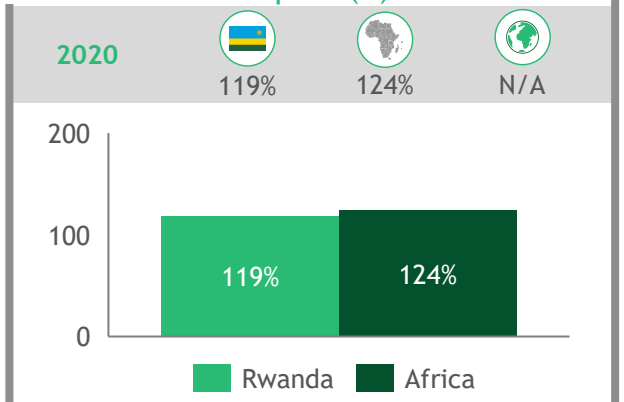
- MINALOC, MINAGRI and private sector offering more credit and insurance to protect smallholder farmers against shocks e.g., extreme weather and pests
- RLMUA increase proliferation of income models that retain land ownership e.g., rental/lease
- MINICOM creating a competitive business environment via electrification, infrastructure and training to increase private sector investment in value-added food processing, manufacture and distribution
- Accelerate creating of jobs in other sectors, allowing people to graduate from subsistence farming and reduce pressure on land
- Expanding social protection focusing on the most vulnerable to support livelihoods through income, inputs

Gap between farmgate price and wholesale price

Highlights the gap between farmgate price and wholesale price. compares income to farmers vs. prices paid by wholesalers

Click for Meta data: Sources

Gap between farmgate and wholesale price(%)[1]



Country target	Global target
Related target	N/A

Summary

Trend: Substantial differences in prices between farmgate, district market and Kigali market prices with prices in Kigali multiple times higher than farmgate
Target: PSTA-4 includes a related target on reduction rate of the gap between wholesale and farmgate price, however no numeric targets included

Drivers- Key leading indicators

- High route-to-market costs: Difference in prices arise in part from high costs of aggregation and transport as each intermediary needs a sustainable cut
- Infrastructure: Quality of roads adds to the increase of retail prices as transportation of goods remains very costly[3]
- Financial inclusion: Individual farmers have low bargaining power due to limited capacity to wait for payment[4] and lack of access to credit
- Incentives to sell: Farmgate traders can offer immediate cash payment to farmers for multiple crops without holding up quality or packaging standards[4] and free time for other obligations, so there are few incentives to incur costs to travel to market
- High food Loss: Before the products are retailed, an important part of it rots or spoils. (see supra-indicator 12)The level of waste is considered by retailers when setting the prices[5]

Outcomes- Key lagging indicators

- Income distribution: Individual farmers attract low produce prices- with women sellers receive lower prices than male sellers[6] contributing to gender inequities
- Food insecurity: ~50% of the households in Ubudehe 1 and low-income farmers reported seasonal food access issues[7]

Implications and potential interventions

Farmers are exposed to price volatility and dominate the lowest wealth quintile, and thus the role is becoming less attractive to young people who seek better paying and more 'professional jobs

Trade off includes increasing costs of food since prices increases will likely be passed to consumer. There is need to modelling the impact on prices as well as the effect of farmer incomes

Potential interventions could include

- MININFRA, MINAGRI creating an environment for private-sector to professionalize the quality and relevance of services (production, processing, distribution, promotion and market access) for farmer organizations with limited capacity to systematically market aggregated commodities or negotiate for better prices[2]
- MINAGRI promoting fair prices and fair wages to secure sustainable livelihoods for agricultural workers and small-scale farmers
- MINAGRI, MININFRA and MINICOM to facilitate intra-district trade of meat, fish, eggs, fruits and vegetable via investment in infrastructure

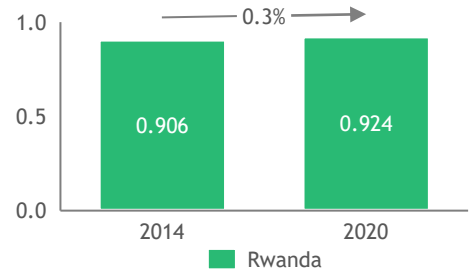
Women empowerment in agriculture index

Shows the degree to which women are empowered in their households and communities and the degree of inequality between genders

Click for Meta data: Sources

Women Empowerment in Agriculture Index[1]

2020			
	0.924	N/A	N/A



Country target	Global target
N/A	N/A

Summary

Trend: Rwanda has taken proactive steps resulting in high levels of inclusion of women in public and governance spheres. Since 2014, the WEAI has improved by 0.3%, however there is need to drive empower-ment of women, especially in rural areas
Target: No national or global targets available for this indicator

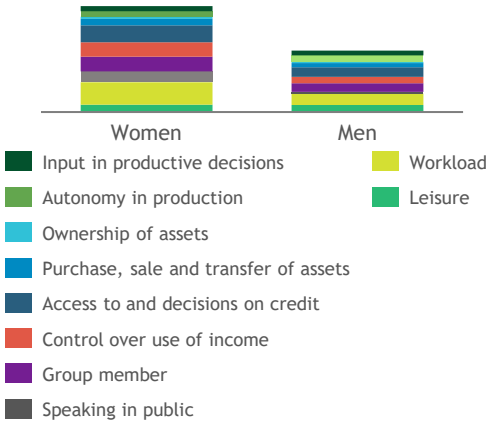
Drivers- Key leading indicators

- Land: Women-managed farms are ~10% smaller; smaller land sizes and lack of control over land resources, limit women's access to selected seeds and fertilizers[2]
- Decision-making: Women have limited decision-making control over resources in households, cooperatives and planning bodies, especially in rural areas[2]
- Dependency ratio: Women-managed farms have a higher dependency ratio[2]
- Lower financial inclusion: In rural areas, ~20% women have bank account compared to ~33% men[2], with women's accounts more likely to be in SACCOs, while men bank with commercial banks
- Credit: Rural access to credit is low but still biased against females. Only 3% of females in rural areas secured a loan from a formal source compared to 6% of male[2]
- Gender Norms: Women are relegated to low paying and subsistence farming while men dominate higher paying areas

Outcomes- Key lagging indicators

- Productivity: Women-managed farms have ~12% less productivity; Female farm managers spend 35% less on fertilizers & insecticides[2]
- Participation: Fewer women access off-farm jobs[2] and participate in lucrative parts of agricultural value chains
- Income: Lower prices for agri-produce (compared to prices achieved by men)
  Lower benefit from government guarantee schemes: Rural Investment Facility Phase 1 and 2 had only 8-9% women beneficiaries[2]

Disempowerment contributors (2014)[3]



Implications and potential interventions

Inclusion of women and youth is a cross-cutting priority for all and backed by high levels of political will and progressive laws that give women same succession rights and equal land access. Agriculture accounts for ~80% of the female labor force, mostly subsistence farmers. Empowerment has the potential to increase GDP by ~ USD 418 million and reduce poverty[2]

To further accelerate these potential gains, there is need to strengthen the capacity across institutions to mainstream gender-responsiveness in all programing by:

- All: Ensuring adequate and inclusive budget levels for mainstreaming gender in policies and institutions
- All: Developing gender-responsive accountability mechanisms, e.g., imihigo, public hearings to drive ownership, especially around participation in agri-value chains
- MINAGRI, MIGEPROF, MINALOC, MYCULTURE to accelerate profitable participation of women and youth in short-cycle value chains e.g., fruits, vegetables by providing mechanisms to enable women farmers to access extension, inputs and technologies

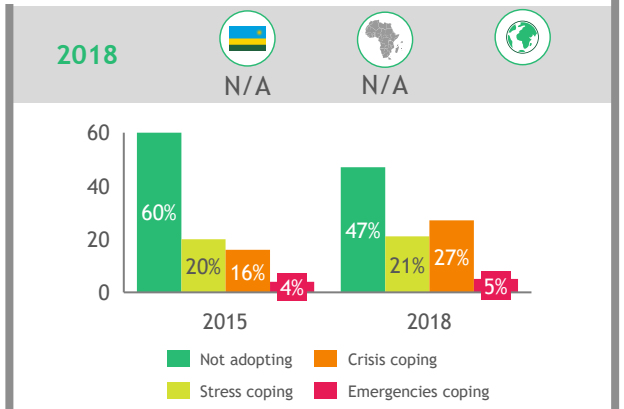
Action Track 5: *Build resilience to vulnerabilities, shocks and stress*

Household resilience capacity index

Estimates household resilience to food insecurity with a quantitative approach

Click for Meta data: Sources

Livelihood Coping Strategies[1]



Country target	Global target
Related targets	N/A

Summary

Trend: Resilience to shocks is low for many households in face of repeated shocks and natural disasters[2] that disrupt livelihoods and lives. Household resilience capacity index data unavailable for Rwanda. Livelihood coping strategies data is used instead.
Target: Rwanda aims to eradicate extreme poverty by 2024[3]

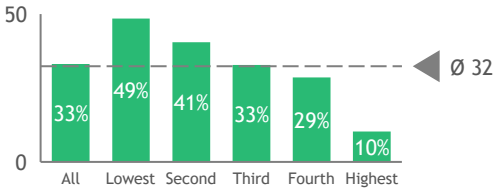
Drivers- Key leading indicators

- Livelihood Shocks In 2018, 40% of households, compared to 27% in 2015, reported having at least one shock during the last 12 months[4] that affected its ability to provide food for itself or eat in a manner it is accustomed to or impacted household ownership (See supra-indicator 19 on social protection)
- Low insurance penetration: In 2020, uptake of agriculture insurance was less than 0.5%[5]
- Cash-purchase dependency: The majority (~65-70%) of food eaten in Rwandan households comes from cash purchases in markets[6], making households vulnerable to changes in food price inflation
- Climate Variability: Drought, intense and erratic rainfall, increasing incidence of high winds and seasonal temperature shifts affect agriculture[7], which is a main source of livelihood
- Production inputs: Food insecure households in agriculture typically have less livestock, land and grow fewer crops. They are likely to have lower food stocks and consume more of their own production at home[1]

Outcomes- Key lagging indicators

- Income instability: 84% of households impacted by the 2016-2017 drought observed a decrease or a loss of assets or belongings, reducing their capacity to recover and accumulate wealth over time[1]
- Malnutrition and food security: ~19% households in Rwanda remain food insecure. Malnutrition is strongly related to incomes with malnutrition rates in the poorest quintile standing at ~49%[8] (See supra-indicator 3)

% children stunted by wealth quintile (2019-20)[8]



- Coping mechanisms: The poorest households (41% of Ubudehe1)[1] used crisis or emergency livelihood coping strategies (e.g., consuming seed stock, lower inputs investment) to face food shortages, which may decrease resilience to future shocks

Implications and potential interventions

If not addressed, climate variability will impose significant economic costs ($50M-$300M USD) annually[9] by 2030 given the country's dependence on rainfed agriculture
Potential interventions include:

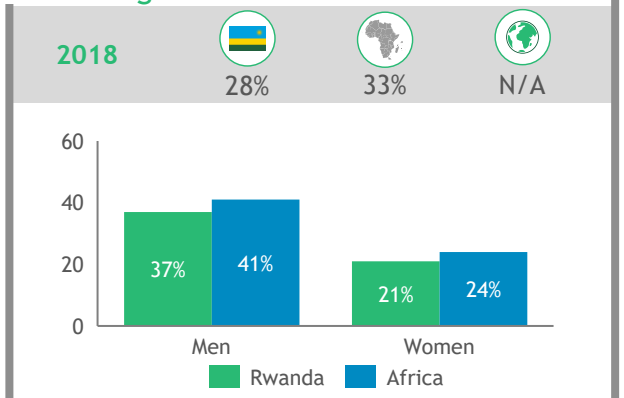
- MINALOC developing shock-responsive/sensitive social protection system to adequately respond to potential shocks (i.e., early warning, contingency plans, financing, etc.)
- MINAGRI, MININFRA promoting intra-country trade of grains, meat, eggs, fruits and vegetable and investing in storage, especially at selling points, and transportation facilities
- Establish a strong partnership between MINAGRI and MINALOC to ensure a coordinated approach when targeting agricultural asset transfer schemes and agricultural extension services to poor and vulnerable population groups
- MINAGRI strengthening strategic food reserves in regions where food insecurity is linked to climate change to ensure access to and affordability
- MINAGRI and Min. Environment to improve access to drought-tolerant, pest-resistant seeds in vulnerable agro-ecological zones

Proportion of men and women engaged in agriculture with access to financial services

Access of micro and macro credit by people involved in the agriculture sector

Click for Meta data: Sources

Proportion of men and women in agriculture with access to credit[1]



Country target	Global target
Related targets	N/A

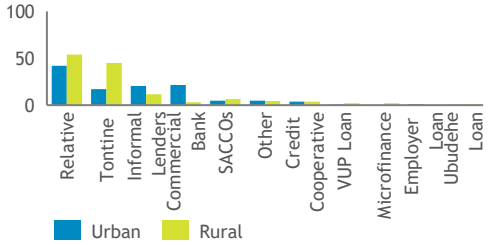
Summary

Trend: Men and women in Rwanda have lower access to credit than across the continent of Africa. Agriculture in Rwanda presents important production and market risks that discourage banks, MFIs and SACCOs
Target: In the NST-1, the goal is to double credit to the agriculture sector as a percent of loans from 5.2% in 2017 to 10.4% in 2024[2]

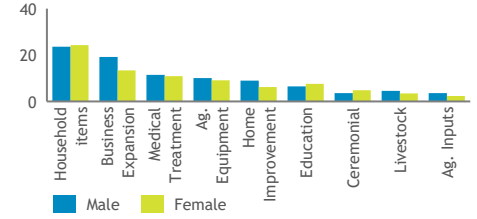
Drivers- Key leading indicators

- Accessibility: MFIs are the most accessible, available in every district working with cooperatives, while formal banks are introducing mobile banking with micro services. Relatives and tontines were the most preferred source[3]

% households with credit from various sources- 12 months[3]



- Borrowing Reasons: Household items leads in borrowing reason (24%), while agriculture and equipment and inputs was (13%) and livestock purchase(4%)[4]



Outcomes- Key lagging indicators

- Uptake of credit: Rural access to credit is low. Only 3% of females in rural areas secured a loan from a formal source compared to 6% of male[5]
- Sources of credit: Women borrow at lower rates from commercial banks, 2.2% vs 7.1% for men[4], and more from informal sources e.g., relatives(57%), tontines(41%) and informal lenders (14%)[3]
- Productivity inputs: Women have lower access to water, improved seeds, fertilizers, pesticides and agricultural tools due to Lack of collateral ownership, control over decision making which limit ability to register for financial services that require documentation[5]
- Low gendered- benefit from government schemes: Of loans provided under the Women Guarantee Fund (WGF) only 12% were utilized in the agriculture sector by March 2010 compared to 63% in commerce[5], even though most women work in the agricultural sector
- High Costs-to-Operate: Low uptake numbers, combine with production, market and climate risks to make it expensive to serve farmers[6]

Implications and potential interventions

There is need to improve access to credit both men and women in the agriculture and to improve uptake. Without access to financial services, women and youth will continue to participate mainly in the less lucrative parts of the value chain that require little capital/credit to engage in

Addressing demand-side barriers e.g., low levels of financial literacy and limited access to information, needs to happen at the same time as supply-side barriers are addressed e.g., ensuring financial products and services are available and tailored to the population

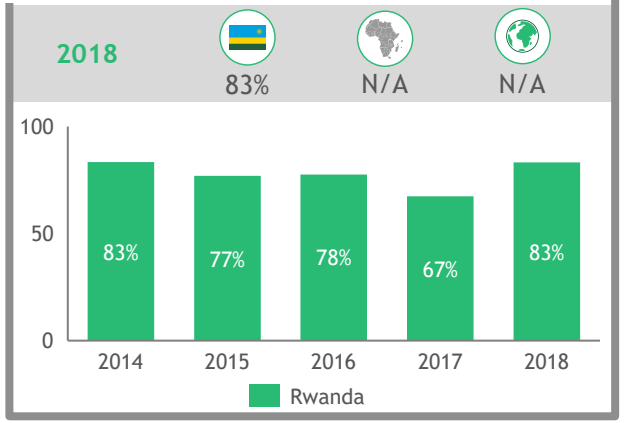
Potential interventions include:

- MINAGRI, MYCULTURE developing business services, concessional loans, grants to locally owned gender and youth-sensitive incubation value-chain projects
- MINECOFIN strengthening the reinsurance market to transfer risks
- Private sector participation in extension for farmer sensitization on insurance
- Digitalization to lower costs of sales, claims payment time

Government social security budget as a % of total requirements to cover vulnerable social groups

Click for Meta data: Sources

Social protection budgets as % total resource need[1]



Country target (2024)	Global target (2030)
Eradicate extreme poverty	Reduce no. of people living in poverty by 50%

Summary

Trend: Government spend on social protection grew from RWF 73B (2014/15) to 198B in 2020/21, a 150% increase in five years[2]
Target: Rwanda aims to eradicate extreme poverty by 2024 and reduce percent of population below poverty line from a baseline of 38%(2016) to 17%(2024)[3]

Drivers- Key leading indicators

- Government commitment: The Social Protection Policy (2020) is to ensure that 'all extreme poor and vulnerable groups are cushioned against vulnerability and shocks. They are, protected and guaranteed transformational interventions towards sustainable graduation
- Livelihood Shocks: ~40% of households affected by shocks (e.g., drought, floods, landslides), with nearly 20% of people who were not poor in 2010/11 finding themselves poor in 2013/14[4]
- Budget and GDP: Social protection spending represented 6.1% of the national budget and 2% of GDP in 2020/21 compared to 4.1% of and 1.2% respectively in 2016/17.[2]
- Nutrition allocation: 'Enhanced contribution of social protection for reducing malnutrition' is a central pillar of the National Social Protection Sector Strategy 2018-2024, which may explain the increase in nutrition allocated spending, including ECD which was RWF 20.6B in 2020/21 up from RWF 15.3 billion in 2018/19

Outcomes- Key lagging indicators

- Coverage: Despite significant scale up of direct income support schemes(DIS), coverage is low compared to need, only ~50% households in Ubudehe[5] 1 (former scheme) covered by DIS
- Nutrition spend share: The share of social protection spent on nutrition reduced over the past three years from 11% in 2018/19 to 10% in 2020/2021.
- Access to nutrition support: ~78% of food insecure households covered by the three lowest Ubudehe categories[6], yet only ~31% of households with unacceptable food consumption and ~25% of households with a malnourished child receive social assistance[6]
- Responsiveness: Social protection was expanded to assist vulnerable households impacted by Covid-19

Implications and potential interventions

Rwanda's commitment to social protection stems from a need to deliver rapid and inclusive socioeconomic development and guarantee security and stability countrywide.

In October 2020, the government launched new Ubudehe groups (A-E)[7] to improve distribution of support to the most vulnerable to ensure the most vulnerable receive the greatest benefit from social protection spending

Potential interventions could include:

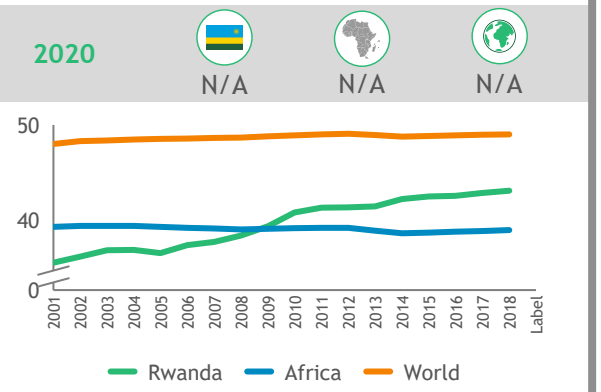
- MINALOC to expand Public Works programs to regions that require market and storage infrastructure, or with transportation access challenges and areas that have been affected by climate changes
- NCDA augmenting existing programs to provide essential nutrition-related training services to vulnerable groups
- MINALOC making social security systems more adaptive to crises- and with defined graduation mechanisms and appropriate levels of post-graduation support e.g., linking graduated beneficiaries to other programs and opportunities

ND-GAIN (Notre Dame Global Adaptation Initiative) Country Index

Summarizes a country's climate change vulnerability and its readiness to improve resilience

Click for Meta data: Sources

Notre Dame GAIN Country Index[1]



Country target	Global target
N/A	N/A

Summary

Trend: Rwanda has high vulnerability (ranked 168 out of 182) & a medium change readiness score (ranked 92 out of 192) in 2019[2]
Target: Regional target is at least 30% of African farm, pastoral, and fisher households are resilient to climate and weather-related risks[3]. No national targets available

Drivers- Key leading indicators

- Land Deforestation and Reforestation: Widespread deforestation with ~64% decline in natural forests (1960-2007) due to human activity[4]. The government has taken ambitious steps to reverse the impact[4], aims to increase forest cover to 30% of total land area by 2024[5].(See supra-indicator 11)
- Vulnerability to Extreme Weather: Because of its geography and climatic profile, Rwanda is prone to various hazards but especially localized floods and landslides[6]. Most affected districts include Burera, Rubavi, Gicumbi, Nyabihu, Ngororero, Musanze, Rutsiro, Nyamagabe, Muhanga, Kamonyi and Bugesera[7].
- Governance: Rwanda's Nationally Determined Contributions (NDCs) lay out commitments to Attain total emission reduction of 4.6 M tCO2e in 2030 compared to Busines As Usual 12.1M tCO2e and highlight measures that different major contributors can take to achieve the intended outcomes of emissions reductions[8] (see supra-indicator 7)

Outcomes- Key lagging indicators

- Emissions: Since 2010,total GHG emissions from agriculture have reduced from 78% to 55% with investment in small stock, even as emissions from waste and energy continue to rise[8,9] (See supra-indicator 7 and 10)
- Climate change: Increasing uncertainty about rainfall events; most models predict higher rainfall intensity, and possible changes in rain patterns leading to shifts in timing of agricultural seasons that depend on rain-fed water systems (See supra-indicator 7 and 10)
- Household Resilience Capacity Index: Livelihood shocks from frequent incidence of adverse weather and climate change could increase reliance on crisis and emergency coping strategies (e.g., consuming seed stock) to counter food shortage[10] (see supra-indicator 3 and 17)

Implications and potential interventions

Climate variability could impose significant economic costs estimated at $50-300 Million annually by 2030[11]. Agricultural intensification needs to be implemented with strategies to reduce climate change vulnerability and build adaptive capacity in food systems

Potential interventions could focus on:

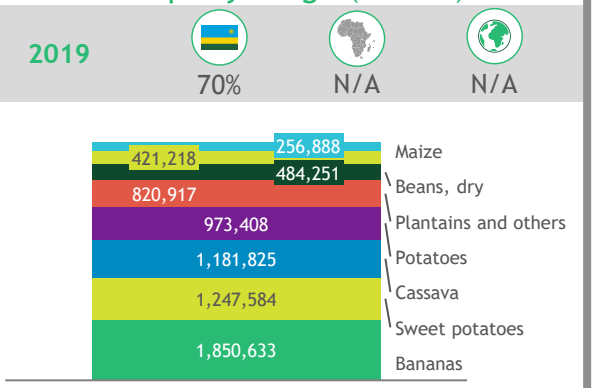
- MINAGRI, Min. Environment to jointly track indicators, share data on climate resilience
- MINAGRI, Min. Environment to restore degraded systems for sustainable food production
- Min. Environment and MINEMA to develop early warning systems, to improve forecasting, monitoring and assessment of risk vulnerability and share timely information
- Min. Environment to explore private sector-led forest protection models
- MINAGRI, Insurance players to integrate with extension, give timely payments for crop loss
- MINAGRI, Min. of Environment to encourage private capital in financing environmental adaptation strategies e.g., focus on insurance where it's cheaper to invest ahead of disaster instead of fixing after, and irrigation

% production from top 5 crops

The proportion of production (by weight) occupied by the key foods produced in the country

Click for Meta data: Sources

% production from top 5 crops by weight(tonnes)[1]



Country target	Global target
Related target	Related target

Summary

Trend: No historical trend data. The top five crops mostly consumed in Rwanda are: beans, maize, potatoes, sweet potato and banana

Target: Global target is 70% of the genetic diversity of crops conserved[2]. Related targets include NBSAP (Target 11) which focuses on safeguarding genetic diversity of local breeds to minimize genetic erosion[3]

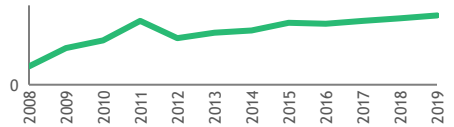
Drivers- Key leading indicators

- National policies: The CIP (Crop Intensification Program) has been in place since 2007, specifies production of one priority crop in a region depending on soil type and weather conditions. CIP has also shaped farmers' decisions via subsidies for inputs, and possibly their consumption patterns
- Government support: To ensure yield of prioritized crops, land use policy has increased arable lands for CIP crops to promote direct consumption and food market sales. Government investment in small-scale irrigation, land husbandry, and mechanization drives crop production.
- Production inputs: Costs of farm inputs, crop marketability and profitability influence the farmers' willingness to produce; if cost of one or more of farm inputs rises for a given crop, it lowers perceived profitability, and farmers may substitute that crop out
- Market availability: Crops with an available, accessible market are more likely to be adopted by farmers

Outcomes- Key lagging indicators

- Increased food production: Crop Intensification led to production increase for some crops such as climbing beans[4], played an important role in addressing food security & reduce malnutrition among children. Population pressure and limited land resources, these prioritized crops provide a food security buffer

YOY Growth rate of beans[5]



- Diets: Production and consumption linked as ~30% of food eaten[6] comes from own production. Carbohydrates main source of energy (50% calories from potato, rice, banana &cassava) (See supra-indicator 4)
- Dietary patterns: Rwanda has the highest bean consumption in the world. Bean consumption per capita rose from 29kg in 2014[7] reached 38.4 kg in 2018[8]. In an avg. Rwandan diet, beans provide 32% of calorie intake and as high as 65% of protein intake[1]

Implications and potential interventions

- The subsidized input prices and the facilitation of supplying inputs by the government of Rwanda have eased the access to inputs by farmers in the country, especially for CIP priority crops.
- While land tenure reforms have increased food production for priority crops, there is still a challenge in accessing adequate nutritious foods which affects diet and health outcomes. (See supra indicator 1, 2 and 3)
- Potential interventions include:
  - MINAGRI strengthening agriculture extension services by proximity service providers, even private sector platers
  - MINAGRI, MININFRA training and building the capacity of farmers in agricultural production, post-harvest operations, and value chain development
  - Increasing infrastructure support for production and processing of more diverse, nutrient rich foods e.g., fruits, vegetables, bio-fortified crops

Cross cutting

Presence of food systems related governance bodies and mechanisms

Governance that encourages food systems transformation

Click for Meta data: Sources

Food Systems Governance Index (0-16)[1]

2020	7/16	N/A	N/A

Building indicator	Status
On Track with CAADP process[2]	●
Minimum 10% of public expenditure is on agriculture	◑
Explicit long-term goals on FS transformation	◑
Determined framework to look at food systems	◑
Supra-ministerial body for food systems transformation	○
Highest level government support for food system transformation	○
Dedicated resources with required capability	○
Formalized process to include stakeholders	◑

Country target	Global target
! Related target	! N/A

Summary

Trend: Policies and guidelines to support sustainable, healthy diets are partially available

Target: No national targets or global targets set. Index developed in 2021 by FS-TIP

Drivers- Key leading indicators

- Legislation: Laws on mandatory fortification of key foods (maize flour, wheat flour, edible oil and fats, sugar and salt) passed right before COVID-19[3]. Processors face adoption constraints: high cost of equipment, costs of premix, limited demand and low consumer purchasing power[8]
- Taxation: Rwanda has 39% tax on all soft drinks, including sugar sweetened beverages and non-SSB[4]
- Child feeding practices: Legal provisions guiding the marketing of breastmilk substitutes[5] exist, with monitoring mechanisms that need to be strengthened (e.g., prohibition of free/low-cost supplies to health workers)
- Political will: Commitment of resources (both monetary and talent) is catalyzed by evidence of public health problems (e.g., stunting) and community advocacy from village to national level

Outcomes- Key lagging indicators

- Food safety systems index: Rwanda has increased food systems safety over the past few years. Rwanda is outperforming Africa by ~10pp on food safety systems (see supra-indicator 5)
- Malnutrition: Unhealthy diets are the common denominator across all forms of malnutrition (see supra-indicators 1, 2, 3 and 4)
- Food affordability: A healthy diet costs 245% household expenditure[6] (see supra indicator 6)
- NCD mortality rate (100,000 inhabitants): 44% of deaths in 2016 were attributed to NCDs[7]. (see supra-indicator 4)

Number of processing companies[8] with fortification potential(Aug. 2020)

7	7	636
No. of certified processors	waiting to get certified	Marked with areas to improve

- Market focus: companies involved in fortification are largely focused on the urban consumers and regional markets

Implications and potential interventions

- Food environment is not governed in a way to strongly encourage consumption of healthy foods and discourage consumption of non-healthy foods Need to prioritize and subsidize desired health outcomes e.g., lower NCDs burden

Potential interventions include:

- RRA reducing taxes on healthy foods to encourage healthy food choices where possible
- MINICOM, FDA providing equipment financing to processors to address financial challenges in cost of production to enable processors to meet the standards
- FDA, NCDA developing consumer guidance mechanisms (Food-based dietary guidelines, Front-of-pack labeling with relevant, readily understood front of pack nutrition labelling to help make informed choices
- Restricting the promotion of unhealthy foods to children
- Continue inclusive stakeholder participation e.g., national food system dialogues

The Policy and stakeholder landscaping focuses on the most important strategies, potential opportunities, trade-offs and implications

What is covered in this policy and stakeholder landscape

- Most relevant declarations, policies & strategies and stakeholders related to food systems
- Most important gaps and trade-offs in policies based on qualitative diagnostic
- Most important stakeholders related to food systems

What is not covered in this policy and stakeholder landscape

- An exhaustive analysis of all policy, strategy and stakeholders' documents
- Exhaustive analysis of all challenges and gaps in food systems policies
- All key stakeholders across the food system

Policy mapping conducted using framework sub-components…

External drivers - Environment & Climate, minerals, water, bio-diversity, land and soils; globalization and trade; income growth and distribution; urbanization, demographic shift; leadership and governance; socio-cultural context; finance; energy; science technology and innovation

Food supply chains – Input supply, food production systems, storage and distribution, processing and packaging and retail and marketing

Food environment - Food availability, food affordability, food messaging, consumer characteristics

Consumer behaviour - food acquisition, preparation, meal practices and storage

Cross-cutting themes - Gender, youth, human rights

Outcomes

- **Nutrition, diet and health**
- **Livelihoods**
- **Environment**

… which is assessed by corresponding component coverage

Sub-component adequately covered and as expected

Sub-component only partially addressed

Substantial part of sub-component not addressed

Policy mapping

Hierarchy of policies in Rwanda

Rwanda Vision 2050 outlines the long-term strategic direction for Rwanda and enabling pathways to achieve this ambition. Its acts and the planning and policy blueprint for all players. Agriculture for wealth creation is one of 5 key pillars

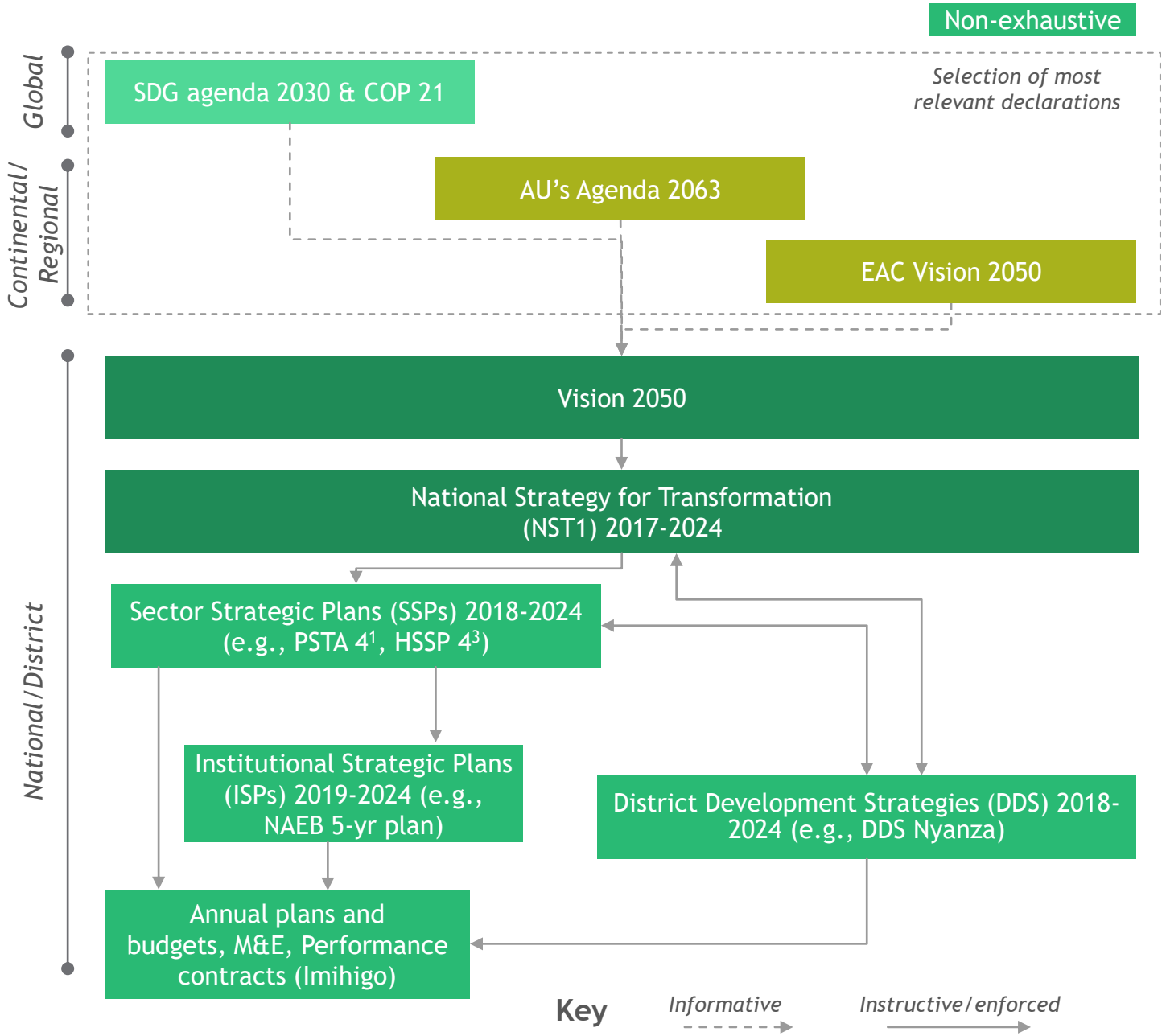
To ensure harmonization of targets and indicators, preparation of Vision 2050 considered the SDGs, AU's Agenda 2063 and East African Community Vision 2050 and national contribution to the Paris accord.

Vision 2050 is implemented through 7-year mid-term strategies starting with National Strategy for Transformation 1 (NST1 2017-2024)

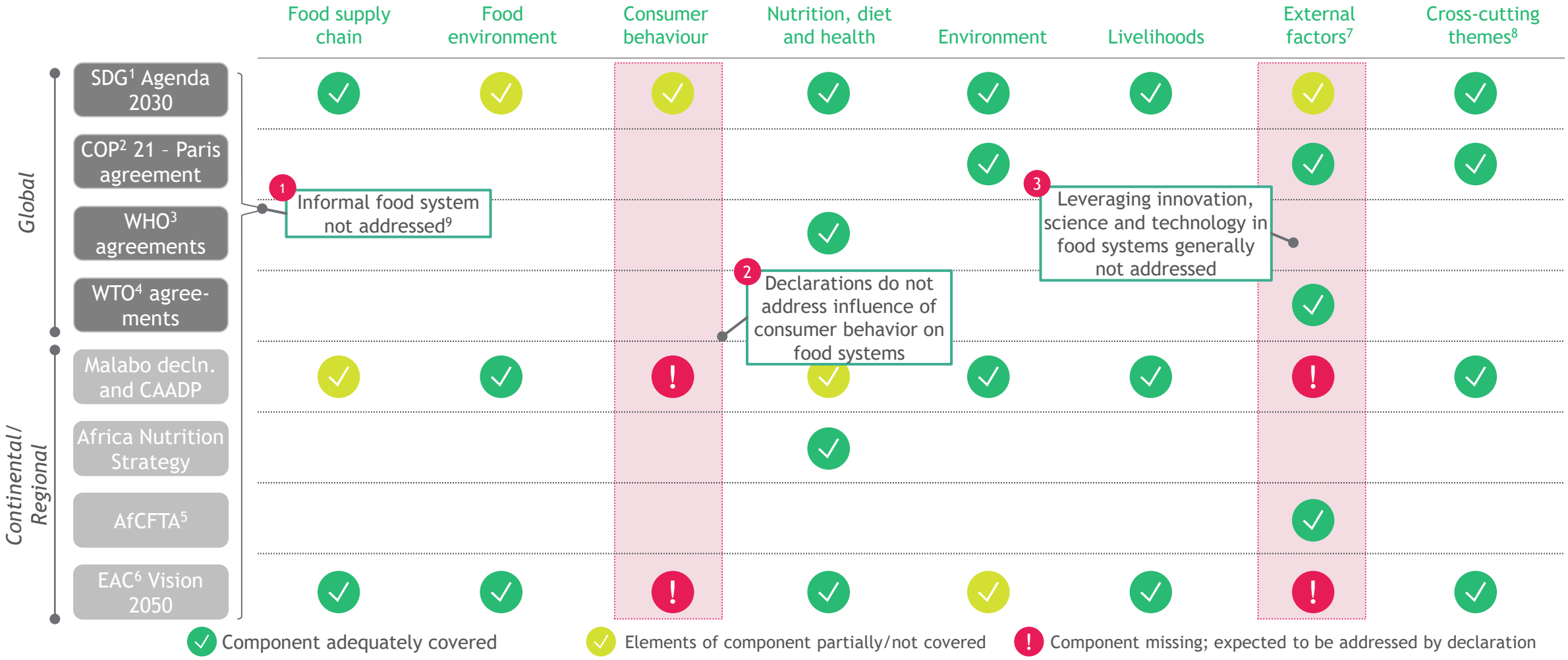
This feeds into Sector Strategic Plans (15 sectors) and national policies (each ministry), covering specific areas e.g., PSTA 4[1], NAP[2]. District Development plans are implementation plans for districts, include all sectors and tailor for district specificities.

PSTA 4 is the implementation plan for NAP however accounts for elements in other policies e.g., National health policy. Policy implementation is decentralized at the district level, through annual plans and targets

1. PSTA 4 – Agriculture Sector transformation Strategy 2. NAP – National Agriculture Policy 3. HSSP 4 – Health Sector Strategic Policy

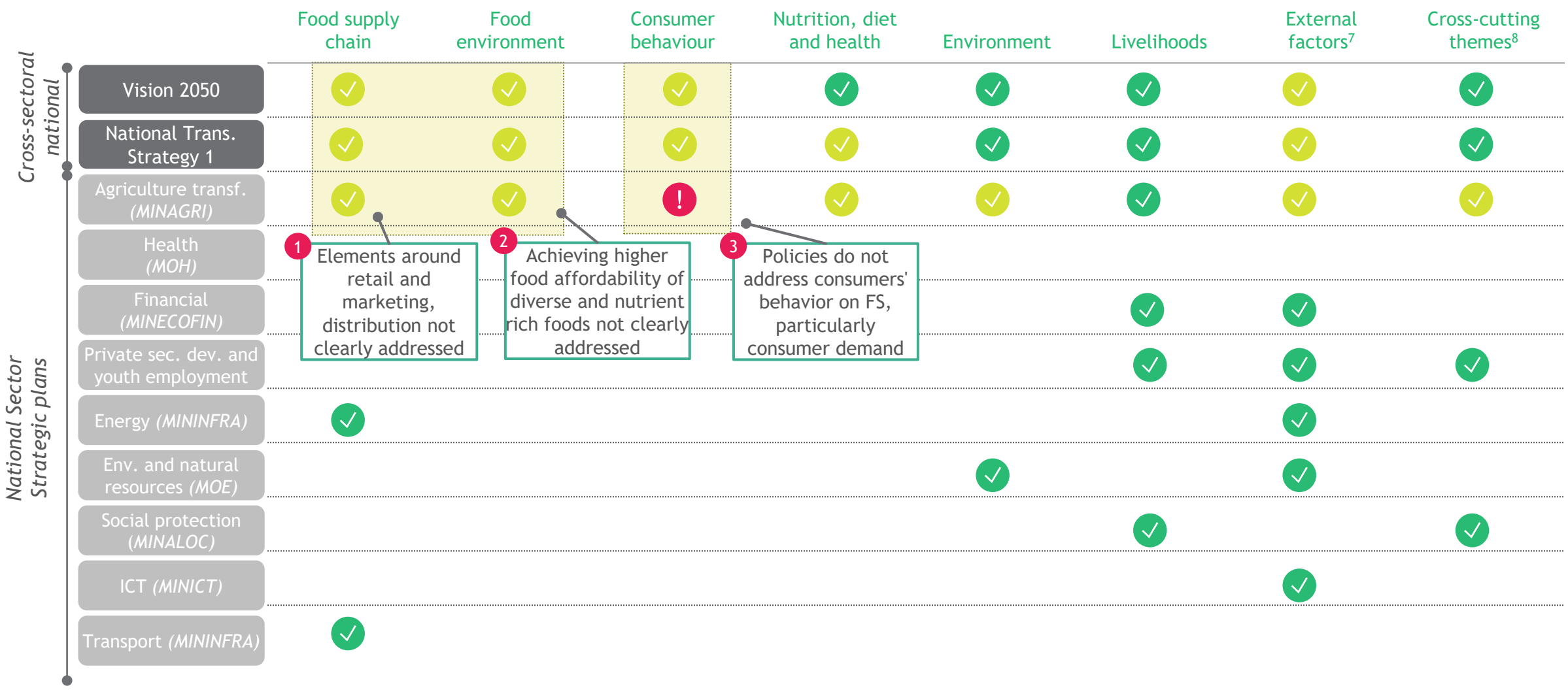


Global and regional declarations touch upon many parts of the food system, but three main gaps exist



1. Sustainable Development Goals 2. Conference of Parties ; 3. World Health Organization; 4. World Trade Organization 5. African Continental Free Trade Area; 6. East Africa Community; 7. External factors based on qualitative framework developed. 8. Cross-cutting themes include gender, human rights and youth 9: Includes pop-up stalls, informal markets and traders etc.

National strategies touch upon most elements, though parts of the food supply chain and environment remain unaddressed



Potential changes required in national policies and strategies when implementing potential game changing solutions (I/II)

Diet quality and nutrition security	Livelihood equity	Environmental resilience	Agricultural productivity	Infrastructure capacity	Financing and Investment
~20% Rwandans are food insecure with low consumption of healthy foods	*~38% live below poverty line(2016), female-headed households worse off; leads to consumption of cheaper less nutritious meals*	*Increasingly-frequent climate shocks, challenges from crop disease and pests affecting food availability*	*Agricultural production is ~40-50% below potential due to inefficient production systems*	*Weak infrastructure from farm to fork and limited private sector investment leading to high food loss and lower food quality*	*Too little financing directed to food production and processing, limiting value chain growth and resilience*
Agriculture *Tailor input subsidies to increase healthy food production e.g., for animal feed, horticultural inputs*	***Agriculture*** *Invest in agric. Commercialization and extension services with private sector*	***Agriculture*** *Invest in micro-irrigation & lower cost electricity to increase uptake Prioritize drought and flood resistant crop varieties*	***Agriculture*** *Accelerate soil and crop-specific fertilizer blends with farmer and extension officer trainings on both chemical and organic fertilizer*	***Agriculture*** *Invest in storage and cold chain operations with skilled managers along key food market routes and accumulation points to reduce loss and facilitate local trade*	***Finance*** *Partner with actors to de-risk producers, processors Govt acting as guarantor to ensure affordable financing*
Trade and Industry *Strengthen market linkages including cold chain Promote nutrition sensitive trade*	***Finance*** *Extend credit and insurance including de-risking particularly for small holder farmers and women*	***Governance*** *Track joint indicators and share data on climate vulnerability across ministries Develop early warning systems*	***Trade and Agriculture*** *Articulate further how food production can be better linked with markets (district, national and global)*	***Technology*** *Specify the role and need for ICT and planning tools to fill gaps in data management, sharing and integration along value chains*	***Finance*** *Subsidize production and cost of nutritious foods & tax unhealthy foods*

Policy *Change to make*

Key Policy *Trade-off's*

Potential changes required in national policies and strategies when implementing potential game changing solutions (II/II)

Diet quality and nutrition security	Livelihood equity	Environmental resilience	Agricultural productivity	Infrastructure capacity	Financing and Investment
~20% Rwandans are food insecure with low consumption of healthy foods	*~38% live below poverty line(2016), female-headed households worse off; leads to consumption of cheaper less nutritious meals*	*Increasingly-frequent climate shocks, challenges from crop disease and pests affecting food availability*	*Agricultural production is ~40-50% below potential due to inefficient production systems*	*Weak infrastructure from farm to fork and limited private sector investment leading to high food loss and lower food quality*	*Too little financing directed to food production and processing, limiting value chain growth and resilience*
Health *Promote consumption of animal proteins from owned-sources and nutrition-sensitive role models*	***Social protection*** *Distinguish between farmers best supported to commercialize and those needing continued social protection programs*	***Land and natural resources*** *Increase awareness of importance of forests & train farmers on conservation agriculture Engage private forest protectors*	***Land use*** *Strengthen use of the land rental/lease models to reduce fragmentation while maintaining ownership among smallholders*	***Finance*** *Increase PPPs to invest in infrastructural development Incentivize credit extension for ag. infrastructure to reduce food loss*	***Social protection finance*** *Strengthen links between social protection programs and insurance coverage Developing reinsurance sector*
Trade vs. Agric./Health *Increased local availability, consumption of nutrient rich foods vs. export income; ASF consumption increases GHG*	***Agric. vs. Finance*** *Increase in incomes can raise labor costs and overall cost of production, making food more costly*	***Land/Finance vs. Agric.*** *Cultivating hillsides, marshlands can increase production, but raises costs to protect ecosystems and limit erosion*	***Agric. vs. Finance*** *Increasing irrigation could reduce hydropower capacity Conservation and eco-friendly farming could impact production*	***Finance vs recurring costs*** *Increased risk now from uncertain investments in infrastructure can reduce long-term recurring costs e.g., social protection*	***Finance Distribution*** *Prioritizing de-risking for large private entities vs de-risking for smallholder farmers*

Policy *Change to make*

Key Policy *Trade-off's*

Linking potential gaps, policies and opportunities to the key challenges of Rwanda's food system yields several issues and opportunities (I/III)

Key challenges in FS	Current policies related to challenge (non-exhaustive)	Potential policy opportunities	Potential Implications
Diet quality and Nutrition Security & diversity: Limited production diversity to meet population's nutritional needs	• **PSTA 4:** Crop intensification focuses on select crops based on comparative advantage resulting in monocropping; kitchen gardens promote household diet diversity • **PSTA 4:** Focus on non-diverse food subsidies; focus on productivity • **NCDA & HSSP 4:** Addressing malnutrition and stunting with nutrition sensitive interventions • **Private sector & youth development**: Export of nutrient rich fruits & vegetables; focus on processed foods that are less nutrient rich	• Inter-ministerial collaborations have made great progress in reducing malnutrition (stunting) • There is a strong focus on food security(as opposed to nutritional security), via selection of main crops. Livestock intensification efforts need to produce affordable foods to improve diet diversity • In addition, agricultural trade is incentivizes exporting high value nutrient rich foods	• Continue scaling-up of agroforestry and fruit-tree programs • Potential to review crop intensification and livestock intensification programs to increase diversity and availability of nutrient-rich foods so that nutritional needs at household level can be met • Ramp up in sensitization of nutrition sensitive trade
Agricultural productivity Production levels and yield low, with production methods that might harm long-term sustainability	• **PSTA 4:** Focuses more on provision of subsidized inputs (e.g., fertilizer), rather than proper application • **PSTA 4:** Subsidies focused on imported inputs vs. local production of inputs (e.g., seeds) • **Environment and Natural resource:** Ensure forest cover maintained at 30%, limit fertilizer use to reduce soil degradation, eutrophication of water bodies • **Financial:** Increased access to financial services for inputs	• Proper application of inputs by farmers as well as ensuring their timely availability not addressed • Agricultural research focuses more on conventional farming processes[1] • Counter-measures against climate impacts need acceleration • Productivity improvements futile if supply chain infrastructure not developed hand in hand	• Identify opportunities to maintain crop productivity without direct government support • Potential to build and provide localized understanding of soil, seasonal & climatic conditions • Continue to educate on fertilizer application, optimize number of planting cycles each season • Scale up adoption of agroforestry in areas with larger land holdings and consistent farm water supply

1.Farming using pesticides and synthetic fertilizer, however not considering the use of biotechnology and other innovative technology applications

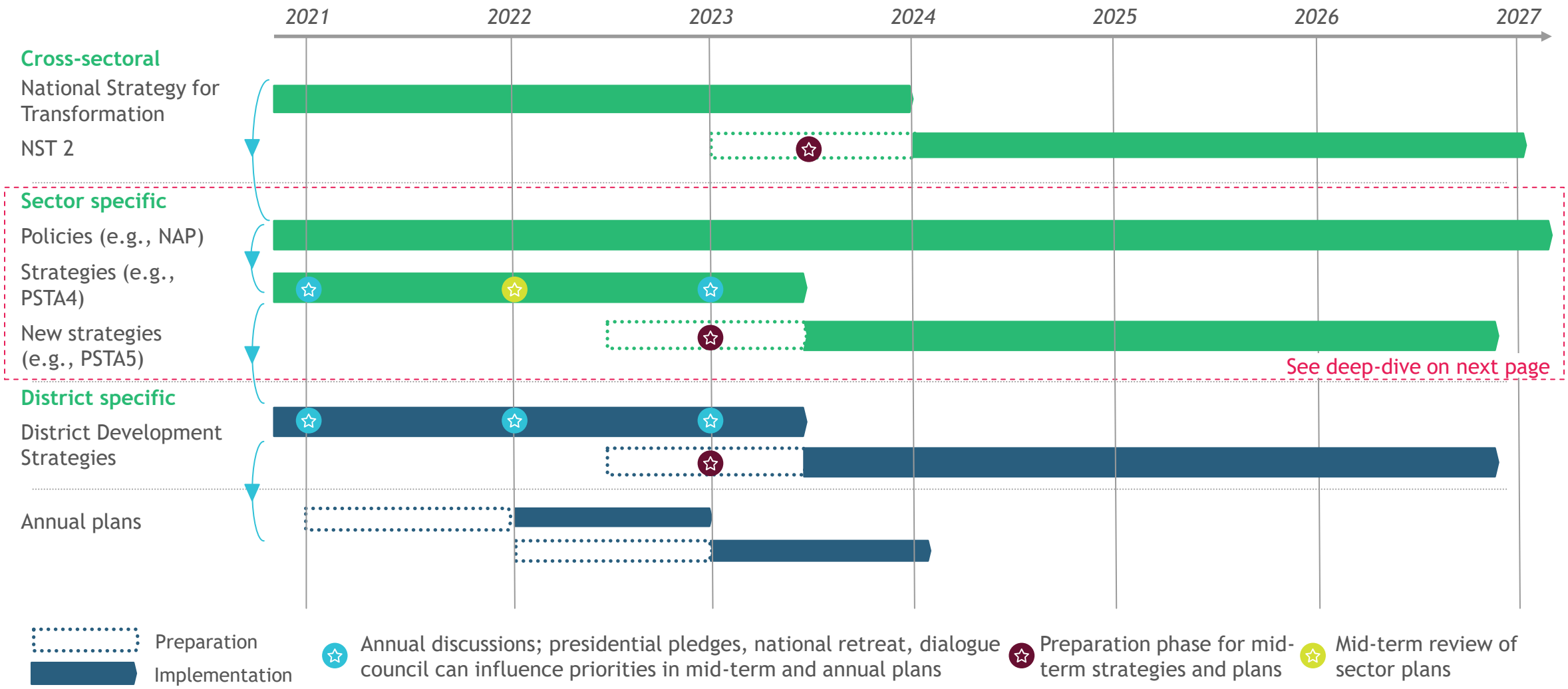
Linking potential gaps, policies and opportunities to the key challenges of Rwanda's food system yields several issues and opportunities (II/III)

Key challenges in FS	Current policies related to challenge (non-exhaustive)	Potential policy opportunities	Potential Implications
Infrastructure capacity Under-developed supply chain infrastructure with limited private sector investment	• **PSTA4** encourages the private sector to develop infrastructure e.g., drying grounds, warehouses, silos, cold chain facilities etc. • **Rwanda National Cooling Strategy** recognizes the need for energy-efficient and climate-friendly cooling solutions to support agriculture, fisheries, horticulture and trade • **Social protection:** promote behavioral change around food hygiene e.g., food stalls • **Priv. sector & youth dev.:** Development of urban infrastructure, feeder roads and transport services, including 14100 km of scheduled bus routes to improve transport of agricultural products to markets	• Infrastructure financing is limited, with road capacity needed in key food producing regions e.g., Gishwati (a milk-producing region) • Limited infrastructure constrains food flows and availability for trade, consumption or processing • De-risking mechanism not in place to ensure sufficient financing of micro-supply chains in rural areas • Installed facilities are unused (<50% cold rooms in use due to poor management, maintenance, few market linkages, limited coordination with producers)	• Strategy aims at scaling up cold chains and off-grid cooling infrastructures • Need to detail the social and economic ROI of opportunities e.g., community markets, collection centers, whole-sale markets and export logistics facilities e.g., packing houses • Continue exploring re-allocation of resources to ease significant bottlenecks in supply chain • Explore means to incentivize credit extension to build infrastructure including PPPs
Environmental resilience High vulnerability to the effects of climate change, and emerging challenges from crop disease, insects and changing biodiversity profile	• **PSTA 4** recognizes the changes in climate and hence the impact on environment and agricultural activities. Due to limited land, focus on production and intensification, farmers increasingly cultivate on steep hills • **Env. and Nat. resource:** Increased sustainable use of land and resources • **Social Protection** : Community resilience through agriculture support programs	• Cultivation on steep slopes is not aligned with sufficient resourcing to combat soil erosion: terracing and other cost-effective measures • Modelling of climate variation and associated planning for changes in seasonal rainfall patterns • Reducing electricity costs to limit reliance on firewood for fuel	• Deploy more sustainable resource management practices Explore harvesting N-fixing plants • Accelerate transition from rain-fed to irrigated agriculture • Potential to leverage climate related data to mitigate changes to climate

Linking potential gaps, policies and opportunities to the key challenges of Rwanda's food system yields several issues and opportunities (III/III)

Key challenges in FS	Current policies related to challenge (non-exhaustive)	Potential policy opportunities	Potential Implications
Livelihoods equity: Limited income and income growth for those that depend on agriculture for their livelihoods	• **NST1** commits to improved management of the One Cow per Poor family (Girinka) and other social protection programs, supporting poor households to acquire small livestock • **PSTA 4** seeks to enhance graduation from poverty and extreme poverty and promote resilience by raising production; investment in skills development across value chains is needed to meet required talent levels • **Financial:** Limited mechanisms in place to provide financing to small holder farms • **Transport :** Investment in feeder roads to improve access to market	• Current environment limits income growth avenues given; limited market access; mechanisms/incentives to improve credit growth to farmers; and extending relevant skills development that has limited value addition of products • High transaction costs in the produce market leads to low returns for rural farmers due to low prices for their produce, and high prices for urban buyers	• Explore adoption of area-yield index insurance to protect farmers incomes from climate related impacts • Explore credit extension through credit risk scoring innovation • Educate farmers on value addition techniques
Financing and investment: Too little financing channeled towards food production and agro-processing due to perceptions of risk leading to low processing capacity	• **Vision 2050** aims for better insurance and financial services and other risk management and transfer tools • **PSTA4** emphasizes the need for financial services in agriculture, capacity development and improved financial literacy and credit-worthiness of producer cooperatives and SMEs • **PSTA 4 and Finance:** >50% of budget allocated to improving productivity, 25% to inclusive markets	• Infrastructure financing is limited, with infrastructure gaps increasing transaction costs in production, processing & market access • Investment plans in PSTA-4 to improve linkages between production and processing need spatial specificity to explicitly target districts with high production and connect them to districts with production shortages	• Develop opportunities in fit-for-purpose agricultural financial products targeting smallholder farmers and MSME agribusinesses, women and youth • Strengthen nascent re-insurance sector for effective risk transfer and affordable insurance • Articulate the role and need for ICT in data management, sharing and integration along value chains

Planning phases of mid-term strategies and annual discussions are potential windows to change or adopt new policy



Multiple opportunities to change or develop new policies along the process

Problem identification	Research & agenda setting	Lobby & input from civil society	Policy formulation	Policy decision making	Implementation & monitoring and evaluation
Need for a new policy including vision is identified through top-down & **bottom-up processes.** Includes ensuring alignment with national priorities	**Public institutes,** agenda setting groups meeting quarterly to discuss policy and gaps, suggest new policies	Opinion forms as **industry associations, interest forums, and PA[1] firms** make their voices heard	**Parliamentary committees & task forces** make bill recommendation to the Ministry	**Ministry** approves or rejects the proposal, 1st and 2nd chamber vote, and bill is signed	Once approved, policy is implemented in cascade by ministries, local government and finally stakeholders e.g., farmers, processors. Imihigo used to track progress
Top down - President, Sector working group, RAB **Bottom up** - villages, sectors, districts	Sector working groups, Intl Community (FAO), Academia (e.g., Univ. of Rwanda), Dev. partners (WB, EU)	CSO's, Private sector, citizens, farmer coop's, medica	Technical advisors	Parliament	National institute of Statistics; Ministry of local government, Private sector, development partners

Key stakeholders *(non-exhaustive)*

1. Public Affairs

Stakeholder landscaping

First overview of key stakeholders of food systems in Rwanda (I/II)

Public sector	Int. community and development org.	Private sector	Civil society and other	Academia	Media
Min. of Agriculture and Animal Resources	European Union	Africa Improved Foods	Imbaraga Farmers Fed.	University of Rwanda	Rwanda Television
Nat. Child Dev Agency	Howard Buffet Foundation	Inyange	SUN alliance	IFPRI	Radio Rwanda
Min. of Environment	World Bank	One Acre Fund	ADECOR (consumer protection union)	CGIAR	The New Times
Min. of Health	Japanese International Cooperation Agency	Bank of Kigali	Trade Union Centre of Workers of Rwanda	Rwanda Agricultural Research Institute (ISAR)	The Rwandan
Min. of Trade and Industry	USAID	Minimex	Rwanda co-operative agency	Institute of Policy Analysis and Research – Rwanda	Igihe
Min. of Local Govt	Rwanda Institute for Conservation Agriculture	Sosoma Industries Ltd	ACORD	Rwanda Polytechnic	
Min. of Finance and Econ. Planning	Foreign Commonwealth Development Office	Sina Rwanda	SAIC	Institute of Policy Analysis and Research – Rwanda	
Fonerwa	Food & Agriculture Organization	ACRE Rwanda	Rwanda Organic Agriculture Movement (ROAM)	Rwanda Agricultural Research Institute (ISAR)	
Min. of Youth and Culture	World Food Programme	Pula		Regional Research Centre for Integrated Development	
Min. of Gender and Family promotion	AGRA	Seed Co International Rwanda Ltd		National Institute of Statistics	
Min. of Youth and Culture	UNICEF	Yara Rwanda Ltd			
Min. of Education	UNDP	Agriterra			
Environmental Protection Agency	African Development Bank	AgroPy			

continued next page

First overview of key stakeholders of food systems in Rwanda (II/II)

Public sector	Int. community and development org.	Private sector	Civil society and other	Academia	Media
Rwanda Agriculture Board	Clinton Foundation	Rwanda Trading Company			
National Agriculture Export Dev. Board	African Union	Bufcoffee Ltd			
Min. of Infrastructure	East African Grain Council	Magerwa			
Lands Commission Rwanda	Government of Sweden	Kumwe			
Rwanda Land Management And Use Authority	Kilimo Trust	Horizon Sopyrwa			
Rwanda Water Resource Commission	Agriprofocus	H2O Impact ventures			
Ministry of ICT & Innovation	IFC	Laterite data research advisory			
Rwanda Standard Board	International Fertilizer Development Center	Rwanda Private Sector Federation (PSF)			
Rwanda Food and Drug Authority	Send a cow				
National Institute of Statistics	Spark online				
	Rwanda initiative for sustainable development				
	Access to Finance Rwanda				

Main stakeholders relevant to key food systems challenges (I/II)

Key challenges in FScc	Relevant supra-indicators related to FS challenge	Stakeholders[1] that seem most actively involved	Initial view on key decision maker(s)[2]	Stakeholders that could be more actively involved
Diet quality and Nutrition Security & diversity: Limited production diversity to meet population's nutritional needs	• Diet Quality – Food consumption score • Nutrient supply • Overweight and Obesity • Production diversity	• Min. of Agriculture and Animal Resources • Min. of Health • Min. of Local Government • Min. of Trade and Industry • Min. of Gender and Family planning • European Union	• *G. Mukeshimana -Minister MINAGRI* • *J. Ngabitsinze- Min. of State MINAGRI* • *Dr. N. Daniel – Minister MoH* • *Dr. T. Dushime – Technical Advisor MoH*	• National Child Development Agency
Agricultural productivity Production levels and yield low, with production methods that might harm long-term sustainability	• Affordability – cost of health diet as % of household food expenditure • Land - % deforestation for agric. land • Regeneration: Biodiversity and habitat index • Sustainability of diet • Emissions	• Min. of Agriculture and Animal Resources • Min. of Trade and Industry • Min. of Local Government • Min. of Finance and Economic Planning • Howard Buffet Foundation	• *G. Mukeshimana -Minister MINAGRI* • *J. Ngabitsinze- Min. of State MINAGRI* • *Herbert Asiimwe – Director Baking MINECOFIN* • *H. Buffet – CEO H. Buffet Foundation*	• Min. of ICT • Min. of Infrastructure • Min. of Education • Rwanda Agriculture Board • Media (Rwandan Television, radio)
Infrastructure capacity Under-developed supply chain infrastructure with limited private sector investment	• Risk distribution - propn of men/women with access to financial services • Food loss - % of food loss across supply chain • Food waste – Food waste index	• Min. of Infrastructure • Min. of Trade and Industry • Min. of Finance and Economic Planning • Min. of Local Government • European Union • Min. of Agriculture and Animal Resources	• *C. Gatete – Minister MININFRA* • *H. Béata – Minister MINICOM* • *J. Munyurangabo – Director planning MINICOM* • *N. Bellomo – EU Amb. to Rwanda*	• Min. of ICT • Private sector logistics players (e.g, Kumwe)

1. Stakeholders involved in policy design/implementation; Decision makers are those who influence directly impact food systems policy or implementation

Main stakeholders relevant to key food systems challenges (II/II)

Key challenges in FScc	Relevant supra-indicators related to FS challenge	Stakeholders[1] that seem most actively involved	Initial view on key decision maker(s)[2]	Stakeholders that could be more actively involved
Environmental resilience High vulnerability to the effects of climate change, and emerging challenges from crop disease, insects and changing biodiversity profile	• Emissions – GHG emissions from agriculture • Land - % deforestation for agriculture land • Food Loss - % of food loss across supply chain • Regeneration – Biodiversity and habitat index • Food waste – Food waste index • Risk distribution • Environmental : ND-Gain	• Min. of Environment • Min. of Agriculture and Animal Resources (RAB)	• *J. Mujawamariya – Minister MoE* • *P. Karangwa – Director Gen. RAB*	• Min. of Infrastructure (Water and Sanitation Corporation)
Livelihoods equity Limited income and income growth for those that depend on agriculture for their livelihoods	• Economic – household resilience capacity index • Financial - % of men/women engaged in FS • Social – • Gender equity : Women empowerment in agric. Index • Income – Gap between farmgate and retail price & Gini coefficient	• Min. of Agriculture and Animal Resources • Min. of Finance and Economic Planning • Min. of Gender and Family Promotion • Trade Union Centre of Workers of Rwanda • Rwanda co-operative agency	• *Dr. U. Ndagijimana – Minister MINECOFIN* • *Dr. U. Claudine – Min. of State MINECOFIN* • *G. Mukeshimana –Minister MINAGRI* • *J. Ngabitsinze– Min. of State MINAGRI*	• Development partners (World Bank, EU, JICA, Howard Buffet Foundation) • Min. of Trade and Industry

1. Stakeholders involved in policy design/implementation; Decision makers are those who influence directly impact food systems policy or implementation

With the Diagnostic and Landscaping analysis completed, it is time to think about "what comes next"

Food Systems Transformation

0 Engagement	1 Diagnostic analysis (April - Aug 2021)	2 Policy development	3 Policy implementation
National government • Integrative leadership and capacity • Political will and commitment	National government • Connection to relevant agencies • Access to data and relevant officials • Interaction with Food System Dialogues • National TIP structure	Development of policies, with engagement of: • Ministries and agencies • Legislature • Private sector • Civil society • Academia • Other stakeholders	Implementation of policies, with engagement of: • Ministries and agencies • Private sector • Civil society • Other stakeholders
• Country prioritization and selection • High-level government engagement	• Key food system challenges and opportunities, based on fact base • Key policy gaps, incoherencies, and opportunities • Key data and evidence gaps	• Process facilitation and coordination • Identify potential policies • Analyses, modelling and evidence generation & synthesis • On-demand expertise • M&E, learning, implementation research, cross-pollination	• Process facilitation and coordination • Analyses, modelling and evidence generation & synthesis • On-demand expertise • M&E, learning, implementation research, cross-pollination

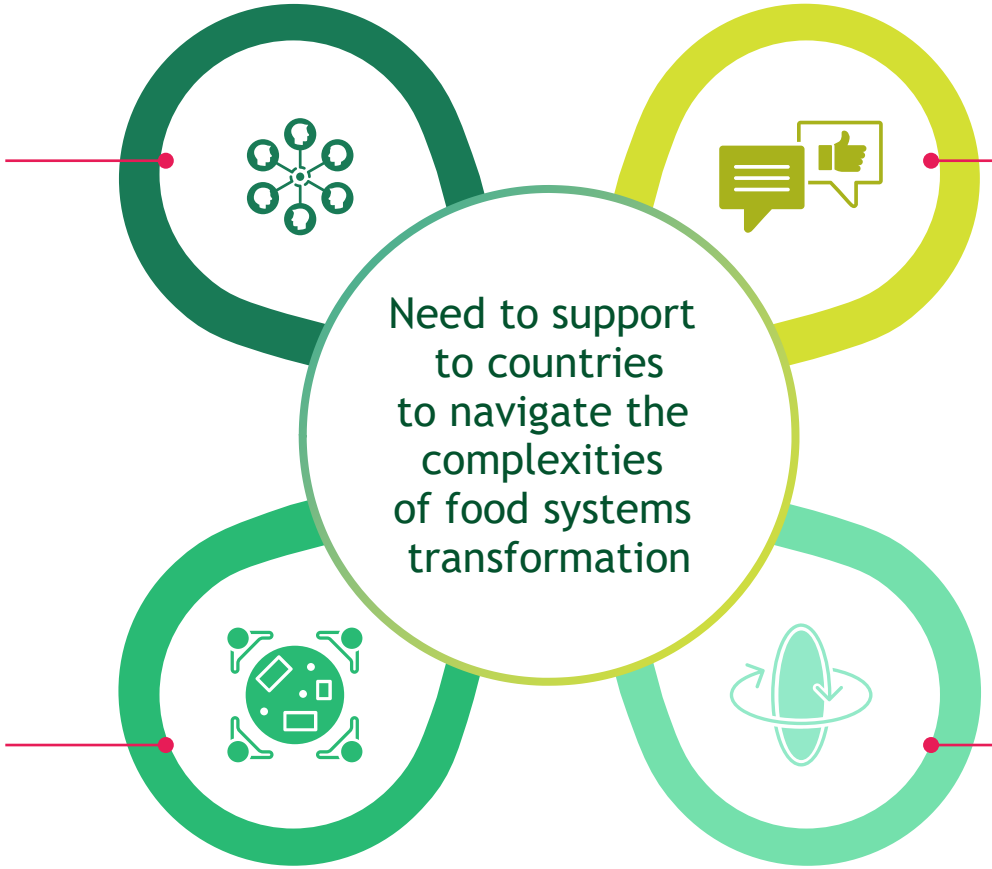
Sustainable healthy diets for all

UN Food Systems Summit
September

We believe that it is the time to harness the momentum of the UN Food Systems Summit towards accelerated food systems transformation

Countries increasingly realizing the need for **integrated policy and governance structures** that build on what works while addressing functional gaps

Ambitious commitments expected at the Summit: **a moment to move beyond visioning and analysis to planning for action and accelerating change**



Food system gaps and aspirational outcomes articulated at FSS Dialogues **bringing together a wide range of stakeholders**

Realization that **coalitions of diverse partners** are required for food systems transformation

To enable locally-led transformative and integrated action in the food system, there is a need for an integrator, facilitator and curator to provide support

Wide range of initiatives, resources and **complexities** coming at countries

Need for an **integrator, facilitator and curator** to help turn this complexity into transformative and integrated **action**

Publications and reports (academic publications, private and public sector reports, etc.)

Frameworks (CAADP, Food Systems Dashboard, FSS action tracks, HPLE, etc.)

Data sources (FAO, UN, World Bank, WHO, FS Dashboard, ReSAKSS, WFP, etc.)

Targets and policies (SDGs, WHO 2025, Malabo Declaration, national strategies, etc.)

Food systems complexity

Phase 1: Diagnostic & landscaping analysis

- Created a diagnostic tailored to the country's context and focused on implementation
- Identified existing data gaps & approaches to fill
- Brought together quantitative data analysis and qualitative policy & stakeholder mapping
- Built the foundation for local prioritization and ambition setting
- Created buy-in though our co-creative and iterative approach

Phase 2: Transformative and integrated policies

- Support local leadership to **integrate existing initiatives and resources** into a coherent and prioritized approach
- Facilitate country **ambition setting & prioritization**
- **Convene stakeholders** for an inclusive & integrated approach
- **Build local analytical capacity**

FS-TIP can help navigate complexity

Support governments to accelerate towards the vision of **sustainable healthy diets for all** starting with evidence-based policy design and implementation

Ministries of Agriculture, Health, Environment, Trade, Local Government, etc.

Need to align objectives and policies across ministries to accelerate food systems transformation

Equitable livelihoods that deliver sustainable healthy diets for all

Ministry of Agriculture

- Enhanced smallholder incomes
- Quality farmer extension training
- Increased productivity
- Access to inputs

Ministry of Health

- Healthy citizens; extended lifespans
- Non-communicable disease cost avoidance
- Reduction in stunting and wasting

Presidential Initiative with FS-TIP support integrating, aligning, coordinating

Ministry of Industry and Trade

- Increased value addition activities
- Development of a "good food" processing sector
- Linkages across the value chain

Ministry of Environment

- Protection & restoration of natural resources
- Management of water & land resources
- Building resilience against climate change and shocks

Enablers: Investment & innovation


Diet quality and nutrition security


Livelihoods equity


Environmental resilience


Infrastructure capacity


Agricultural productivity

Harnessing the Food Systems Summit Dialogues & FS-TIP diagnostic analysis to prioritize challenges & policies

Three key actions to move from diagnostic to actions to realize country-owned food systems transformation

Prioritize set of food system challenges: Align stakeholders on the most urgent and important challenges and identify how they align with existing strategies and policies

Set ambition and formulate policy to address priority challenges:

- Convene the public, private, development, academic, and social sectors, as well as civil society and the media, to develop a national ambition and priorities for action
- Formulate the relevant policies, addressing interdependencies, synergies and trade-offs with robust analysis and evidence
- Outline the funding, programs, processes, and monitoring and evaluation mechanisms to address challenges

Design governance, coordination and delivery models for locally-led food system transformation: functions, processes, funding, capacity building and use of technology to drive efficiency and effectiveness

Required conditions in country for successful food systems transformation

Government support at the highest level

President or Prime Minister to support a national agenda for food systems transformation and empower the governance structure with the necessary mandate

Highly capable, independent and respected leadership

Champion(s) that can lead planning and delivery efforts, make tough decisions, face vested interests, and inspire others to set bold ambitions and realize them

Strong multidisciplinary local teams that can "over-deliver"

- Strong local team(s), with technical expertise to build capacity over time
- Accelerated delivery of programs at scale
- Leveraging digital technology to make and measure impact
- Ability to scale up and scale down required capabilities in an agile way

Governance, coordination and delivery models for a high-performance culture

- Well designed set of performance indicators and evaluation mechanisms, leveraging the FS-TIP 'scorecard/dashboard' as the baseline
- Structures that can adapt to changing realities and evolving insights

Sufficient and sustainable funding for intergenerational effort

Blend of public, development and private sector finance and investment to realize ambition over a 10+ year period

The in-country governance structure to drive food systems transformation should follow five design principles

Bold transformative agenda with a clear review process

Able to set bold ambitions for true food system transformation, with equally ambitious local capacity-building goals; accountable to national government via a formal review process

Integrate all components of the food system

Must work across all components of the food system to enable prioritization, coordination and integration of policies, leverage synergies and manage trade-offs

Connect stakeholders from local to regional to global levels

Ensures all voices are heard, siloes are broken and coordination takes place between stakeholders; brings subnational, national, regional, and global stakeholders together in an inclusive and meaningful way enriched by feedback to the stakeholders and public

Long-term commitment and strong, clear mandate to deliver

Needs long-term focus (10+ years); must have sufficient mandate to make tough decisions and deliver on ambition within its timeframe; must be able to survive government transitions

Able to attract funding and investment for implementation

Should attract funding and investment into food systems from public and private sector, locally and from abroad; will align interests behind shared priorities

From Diagnostic to Action | Four functions to realize food systems transformation

Executive function

- Coordinates and ensures delivery across different Ministries and Government agencies that are part of the FS policy environment
- Sets the priorities and ambitions for transformation
- Conducts analysis, designs policies and programs and supports implementation to realize ambitions
- Ensures development of capacities of local teams

Data custodian and progress reviewing function

- Provides the data-foundation for ambition setting and prioritization of actions, based on FS-TIP scorecard of supra- and key indicators
- Tracks progress towards the ambitions
- Enables performance comparisons across countries (in Africa) through the CAADP biennial review

Inclusive participation function

- Brings together voices of all food system stakeholders
- Breaks down siloes between actors and components of the food system
- Acts as a “checks and balances” mechanism to ensure policies are relevant and implementable
- Has an advisory, consultative or participatory role in decision-making

Thinking and advisory function

- Brings together academics, development partners and other stakeholders with expertise in food systems, that are not direct actors
- Develops evidence to inform policy design and implementation
- Continuously develops capacities of local teams

Coordination & budget function

- Ensures coordination between the different functions
- Develops budget for different functions
- Conducts fundraising and mobilizes resources (together with the executive function)

TBD if separate function or part of one of the other functions

Illustrative

Illustrative set of options for each function

Executive function	Select ministries in charge, coordinating in ministerial cluster	"Presidential Initiative' with technical and steering committees	New Food Systems Coordination and Transformation Delivery Unit
Data custodian and progress reviewing function	CAADP indicators, ReSAKSS, biennial review with added FS elements	CAADP indicators, ReSAKKS, biennial review, supported by detailed FS-TIP scorecard	CAADP indicators, biennial review, FS-TIP dashboard as local version of the Food Systems Dashboard
Inclusive participation function	SUN Civil Society Network & SUN Business Network expanded to full Food System view	Food Systems Summit Dialogues transformed into a Permanent Forum on Food Systems	New system of food systems consultation "hubs"
Thinking and advisory function	National Council or National Technical Working Group	Academic institutes connected into food systems platform	New Food Systems Think Tank

There are different options for the exact set-up...

Functions can be built upon existing structures or might require new structures

- Existing structures to consider: SUN network, National Technical Working Groups, CAADP and Biennial Review, UN FSS Dialogues, etc.
- New structures can take inspiration from ATA, ATO, etc.

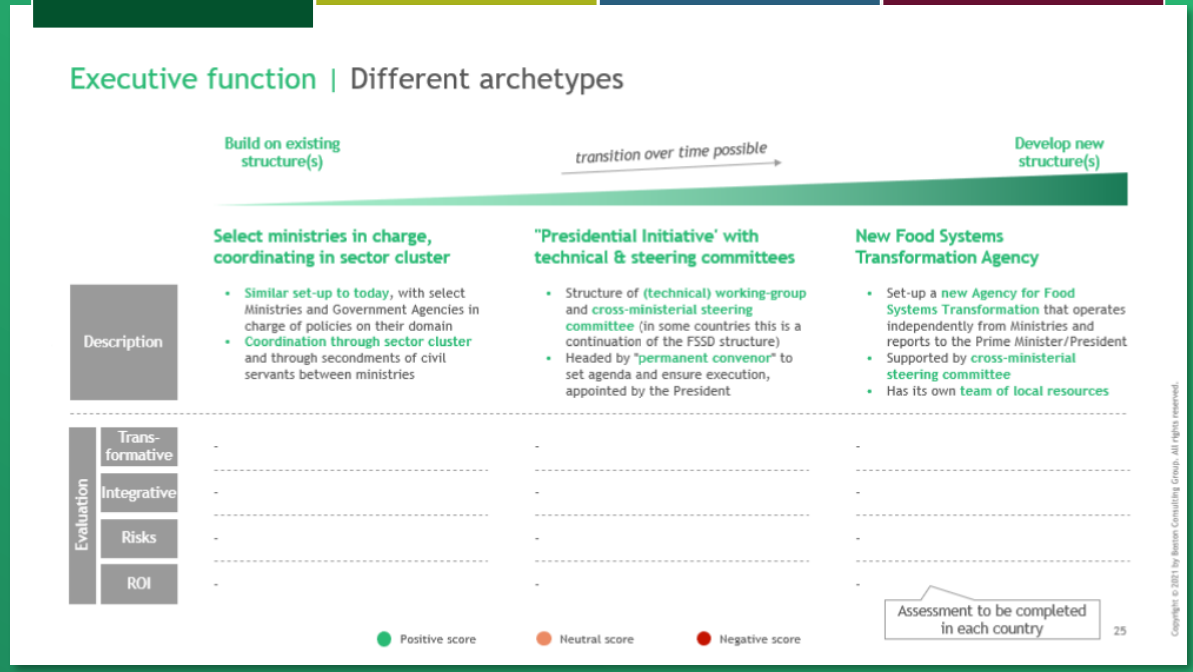
Two or more functions may be combined into a single organizational structure

Each set-up will be developed in-country against a set of criteria

- Ability to be transformative
- Ability to develop and implement integrated policies and programs
- Level of risk associated
- Return on investment
- Others

...which should be defined for each function by the country

Executive function | Data custodian & progress reviewing | Inclusive participation | Thinking and advisory



We want to thank the following people and organizations for their feedback and contributions(I/VI)

Sounding Board with individual contributors from

- Ministry of Agriculture and Animal Resources
- Ministry of Environment
- Ministry of Local Government
- National Child Development Agency
- Chamber of Deputies
- World Food Programme
- FAO
- IFPRI
- SUN Civil Society Alliance
- ACORD Rwanda
- Inyange
- FCDO (Rwanda)
- One Acre Fund
- University of Rwanda
- SAIC Agribusiness Incubator
- Africa Development Promise
- ADECOR
- Rwanda Agriculture Board

We want to thank the following people and organizations for their feedback and contributions (II/VI)

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James Munanura	Food and Nutrition Consultant	Tony Blair Institute for Global Change	TBI Advisor
Tony Nsanganira	Strategic Advisor – Industry	Tony Blair Institute for Global Change	TBI Advisor
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We want to thank the following people and organizations for their feedback and contributions (III/VI)

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Sheryl Hendricks	Head of Department and Professor of Food Security	University of Pretoria	Expert Panel Member
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Amos Laar	Associate Professor	University of Ghana	Expert Panel Member
Jeroen Candel	Associate Professor	Wageningen University Research	Expert Panel Member

We want to thank the following people and organizations for their feedback and contributions (IV/VI)

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Ross Smith	Senior Regional Program Advisor	World Food Programme	Advisory Committee Member
Ousmane Badiane	Founder and Executive Chairperson	AKADEMIYA 2063	Advisory Committee Member

We want to thank the following people and organizations for their feedback and contributions (V/VI)

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Jessica Fanzo	Professor of Global Food and Agricultural Policy and Ethics	John Hopkins University	Advisory Committee Member
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Suraj Shah	Consultant	Boston Consulting Group	Project Management Office
Shirley Mujera	Consultant	Boston Consulting Group	Project Management Office

Supra-indicators| Ideal scores defined for the supra-indicators (I/II)

Action Tracks	Supra-indicators	Definition of supra-indicators	High	Low
Ensure access to safe and nutritious food for all	Diet quality: Food Consumption Score (FCS) in Rwanda and Malawi Diet Quality (GDR+) in Ghana	• Aggregates household-level data on the diversity and frequency of food groups consumed, weighting food groups according to the relative nutritional value	100 30	0 0
	Nutrient supply: Net supply in country of key macro and micro nutrients as a share of total consumption requirements for a healthy diet	• Net supply in country of key macro and micronutrients as a share of total consumption requirements for healthy diet	Varies by country	
	Undernourishment: Percent of population undernourished (%)	• Percentage of the population whose food intake is insufficient to meet dietary energy requirements	0	100
	Overweight & obesity: Percent of population overweight or obese (%)	• Abnormal or excessive fat accumulation that presents a risk to health	0	100
	Food safety: Africa Food Safety Index	• Combines three food safety indices; Food Safety Systems Index, Food Safety Health Index and Food Safety Trade Index	100	0
Shift to sustainable consumption patterns	Affordability: Cost of a healthy diet as a percent of household food expenditure (%)	• It is the cost of acquiring a healthy diet as a share of total household expenditure being spent on food	<50	>50
	Sustainability of diets: Per capita GHG emissions of food consumption (Kg CO2eq./person)	• Total of emissions arising along the entire food value chain from agricultural production to the end consumer	N/A	N/A
	Food waste: Food waste index	• Food that completes the food supply chain up to a final product but still doesn't get consumed because it is discarded, spoilt or expires. At retail and consumption stages	N/A	N/A
	Food environment: Composite index combining food environment policies	• Food environment policies that encourage consumption of sustainable and healthy diets	14	0
Boost nature-positive production	Emissions: Green House Gas (GHG) emissions from agriculture (MtCO2e)	• These are all emissions and removals occurring on 'managed land' and that are associated with the use of land for agriculture	N/A	N/A
	Land: Average forest land being deforested in hectares for agriculture use over the past 3 years (%)	• Implies permanent loss of forest cover from transformation into agricultural use.	0	100
	Food loss: Percent food loss across supply chain (%)	• Refers to food that gets spilled, spoilt or lost, or reduces in quality and value during supply chain before reaching final product. From production to distribution	0	100
	Regeneration: Biodiversity and habitat index	• Assesses countries' actions toward retaining natural ecosystems and protecting the full range of biodiversity	100	0

Supra-indicators| Ideal scores defined for the supra-indicators (II/II)

Action Tracks	Supra-indicators	Definition of supra-indicators	High	Low
Advance equitable livelihoods	Income: Gini coefficient (specific) based on incomes across the food system (under development)	• Highlight's income distribution among various players in the food systems. Zero indicates a perfectly equal distribution of income within the FS while 100 represents a perfect inequality when one person in a population receives all the income, while other people earn nothing	Varies by country	
	Income: Gap between farmgate price and wholesale price (%)	• Highlights the gap between farmgate price and retail price. Compares income to farmers vs prices paid by consumers. Better if narrow	0	TBD
	Gender equity: Women empowerment in agriculture index	• shows the degree to which women are empowered in their households and communities and the degree of inequality between women and men (who are married or in some other form of partnership) within the same household. Measures the empowerment, agency, and inclusion of women in the agriculture sector	1	0
Build resilience to vulnerabilities, shocks and stress	Economic: Household Resilience Capacity Index	• Estimates household resilience to food insecurity with a quantitative approach to establish a cause effect relationship between resilience and its critical determinants	TBD	TBD
	Risk distribution: Proportion of men and women engaged in agriculture with access to finance	• Access of micro and macro credit by people involved in the agriculture sector	100	0
	Social: Government social security budget as a % of total requirements to cover vulnerable group (%)	• The amount of money that the country allocates for preventive, protective, promotive or transformative assistance to farm individuals, households or communities	100	0
	Environmental: ND-GAIN (Notre Dame Global Adaptation Initiative) Country Index	• Summarizes a country's vulnerability to climate change and other global challenges in combination with its readiness to improve resilience	100	0
	Production diversity: Percent of kilograms from top 5 crops produced (%)	• The proportion of production occupied by the key foods produced in the country	<50	>50
Governance	Governance: Food Systems Transformation Governance Index	• Combines key components such as vision, ambition which are essential for food systems transformation	14	0

Supra-indicators| Data sources for supra-indicators data in Rwanda

Ensure access to safe and nutritious food for all	1 Diet quality: Food Consumption Score (FCS) in Rwanda and Malawi Diet Quality (GDR+) in Ghana	CFSVA	2018
	2 Nutrient supply: Net supply in country of key macro and micro nutrients as a share of total consumption requirements for a healthy diet	National Survey	2020
	3 Undernourishment: Percent of population undernourished (%)	World Bank	2018
	4 Overweight & obesity: Percent of population overweight or obese (%)	WHO	2016
	5 Food safety: Africa Food Safety Index	WHO	2017
Shift to sustainable consumption patterns	6 Affordability: Cost of a healthy diet as a percent of household food expenditure (%)	FAO-SOFI	2020
	7 Sustainability of diets: Per capita GHG emissions of food consumption (Kg CO2eq./person)	WWF	2010
	8 Food waste: Food waste index	UNEP	2021
	9 Food environment: Composite index combining food environment policies	WHO NCD Monitor	2021
Boost nature-positive production	10 Emissions: Green House Gas (GHG) emissions from agriculture (MtCO2e)	Climate Watch	2018
	11 Land: Average forest land being deforested for agriculture use over past 3 years	World Bank, Forest Watch	2019
	12 Food loss: Percent food loss across supply chain (%)	National sources	TBD
	13 Regeneration: Biodiversity and habitat index	EPI	2019
Advance equitable livelihoods	14 Income: Gini coefficient (specific) based on incomes across the food system (under development)	National survey	No data
	15 Income: Gap between farmgate price and wholesale price (%)	CAADP Biennial Review	2018
	16 Gender equity: Women empowerment in agriculture index	MINAGRI/IFPRI	2018
Build resilience to vulnerabilities, shocks and stress	17 Economic: Household Resilience Capacity Index	FAO	TBD
	18 Risk distribution: Proportion of men and women engaged in agriculture with access to macro and micro credit financial services	CAADP Biennial Review	2018
	19 Social: Government social security budget as a % of total requirements to cover vulnerable group (%)	CAADP Biennial Review	2018
	20 Environmental: ND-GAIN (Notre Dame Global Adaptation Initiative) Country Index	ND-GAIN	2018
	21 Production diversity: Percent of kilograms from top 5 crops produced (%)	FAO	2019
Governance	22 Governance: Food Systems Transformation Governance Index	National policies	2021

Summary list of Sources by Supra-Indicator (I/III)

1. Sources: 1. Comprehensive Food Security & Vulnerability Analysis, December 2018; 2. Stunting, food security, markets and food policy in Rwanda; 2019 3. The Marketplace For Nutritious Foods, Rwanda Landscape Report 2016; 4. World Bank | Trading Economics; 5.World Health Organization – Diabetes country profiles, 2016; 6. Rwanda Demographic and Health Survey 2019-20; 7. J Mulambu: Iron Beans in Rwanda

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Please reach out to authors of this document to access detailed meta data

Summary list of Sources by Supra-Indicator (II/III)

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Glossary

List of abbreviations

AGRA	Alliance for Green Revolution in Africa
APHRC	African Population & Health Research Centre
AU	African Union
AUC	African Union Commission
BCG	Boston Consulting Group
CAADP	Comprehensive Africa Agriculture Development Programme
EAC	East Africa Community
FAO	Food and Agriculture Organization of the United Nations
FCS	Food Consumption Score
FSS	Food Systems Summit
FS-TIP	Food System Transformative Integrated Policy
GDP	Gross Domestic Product
GHG	Green House Gas
HLPE	High Level Panel of Experts on Food Security and Nutrition
IDRC	International Development Research Centre
IFPRI	International Food Policy Research Institute
NCD	Non-Communicable Diseases
ND-GAIN	Notre Dame Global Adaptation Initiative
SDGs	Sustainable Development Goals
UN	United Nations
WFP	World Food Programme
WHO	World Health Organization

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