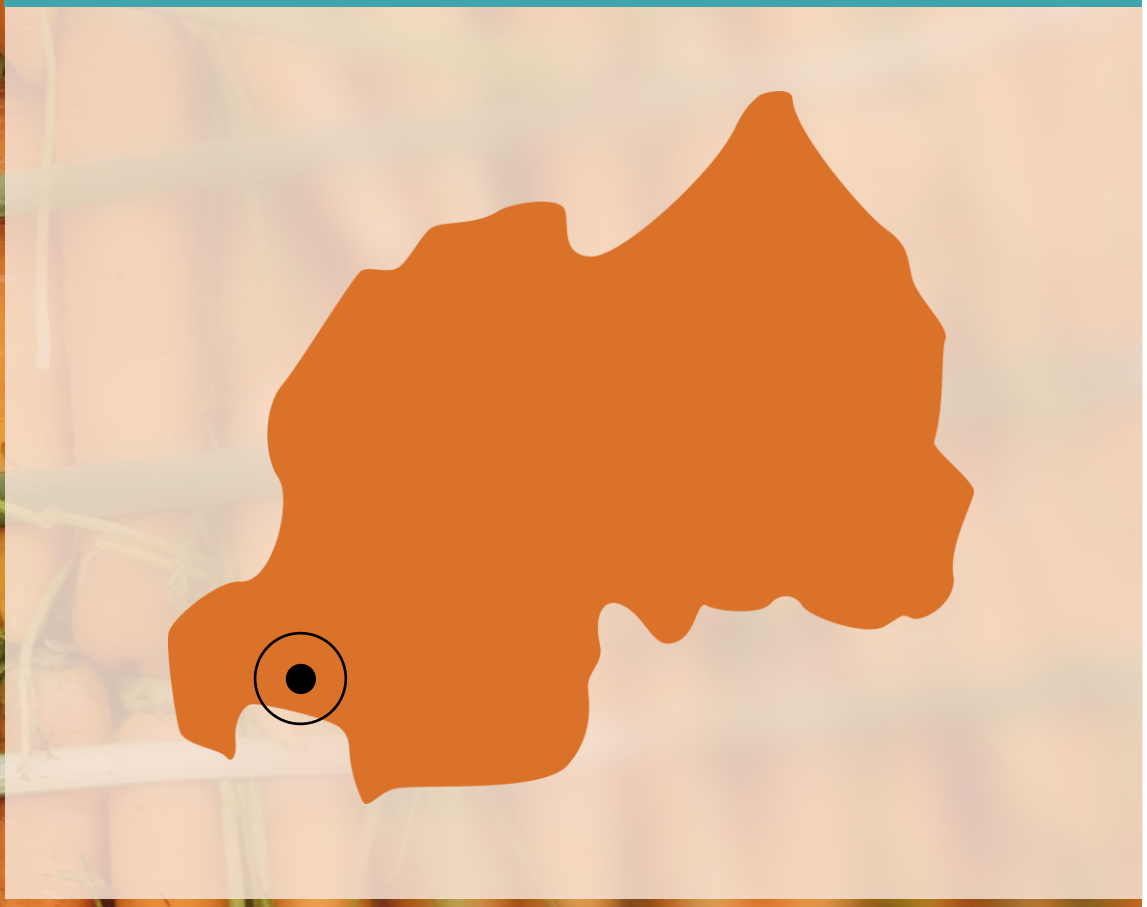
NUTRITION *in* CITY ECOSYSTEMS

March 2022

# FARMERS' SURVEY

RWANDA

Key insights into farming systems in **Rusizi**



The Nutrition in City Ecosystems (NICE) project works to improve nutrition and reduce poverty by increasing the supply of and demand for nutritious foods that are produced using agroecological practices in six secondary cities across Bangladesh, Kenya, and Rwanda. The NICE project works closely with local governments at city level and facilitates locally led actions to improve nutrition through agricultural, food, and health sector collaborations and public-private engagements, with strong emphasis on the role of women and youth entrepreneurs (see *Project Factsheet*).

**Agroecological practices** apply the concept of agroecology (utilization of ecological and social concept and principles in the design and management of sustainable agriculture and food systems) in agriculture. NICE specifically concentrates its efforts on five of the 10 main agroecology elements shaping sustainable food systems transformation: efficiency, recycling, diversity, resilience, and culture and food traditions.

*Source: FAO*

**Nutritious foods** are foods, that in the context where they are consumed and for the individuals that consume them, provide beneficial nutrients (e.g. vitamins, major and trace minerals, essential amino acids, essential fatty acids, dietary fibre) while being poor on potentially harmful elements (e.g. antinutrients, quantities of saturated fats and sugars etc.)

*Source: GAIN*

The six cities where NICE works are secondary cities, characterized by a relatively modest spatial scale and a physical proximity to rural areas, distinguishing them from primary or mega-cities. In these cities, food producers reside close to urban consumers, making shorter food supply chains with fewer intermediaries at least a possibility. The potential for direct producer-to-consumer connection offers practical opportunities for transforming food systems, notwithstanding it is quite common even for urban and peri-urban households to produce small amounts of food at the homestead in these contexts.

This short report gives the result of a farmers' survey held in March 2022 in Rusizi, Rwanda. Rusizi is situated in the Western Province of the country, next to Lake Kivu and bordering the Democratic Republic of Congo. The district has a tropical climate with average temperatures ranging between 20°C and 23 °C. Soils are considered fertile, yet farmers are often limited to subsistence farming. Fish farming takes place on a limited scale in the nearby Lake Kivu.

150 rural and peri-urban farmers, representing a household, were interviewed in the farmers' survey to complement more nutrition-focused data collected as a baseline for the NICE project among urban residents in the secondary city. Sampling was purposive to include farmers who are producing for the local market and to interview female farmers with a target of 50%.

Data from farmers and small holders were collected using an adapted version of a tool called Self-evaluation and Holistic Assessment of climate Resilience of farmers and Pastoralists (SHARP+) developed by the Food and Agriculture Organization (FAO). The SHARP+ tool collects a mix of quantitative and qualitative data on various aspects of farming households, such as fertilizer application, sales outlets, daily consumption, and more. All the questions in SHARP+ serve a dual purpose: Firstly, they help gauge the prevalence or distribution of specific practices among farmers, often presented as percentages. Secondly, they contribute to understanding farmers' resilience levels through a combined score derived from the thematic questions. Farmers' resilience levels are expressed in a set of 13 behavior-based resilience indicators scaling from 0-10. High scores indicate a high presence of the resilience indicators, suggesting a more resilient farming system.

The Economic Policy Research Network (EPRN) with their specifically recruited enumerators familiar with the local agricultural context and local language and culture collected the data, supervised by the NICE team. Data collection was approved by the local authorities and all findings have been discussed with various district stakeholders in July 2022.

# Household information

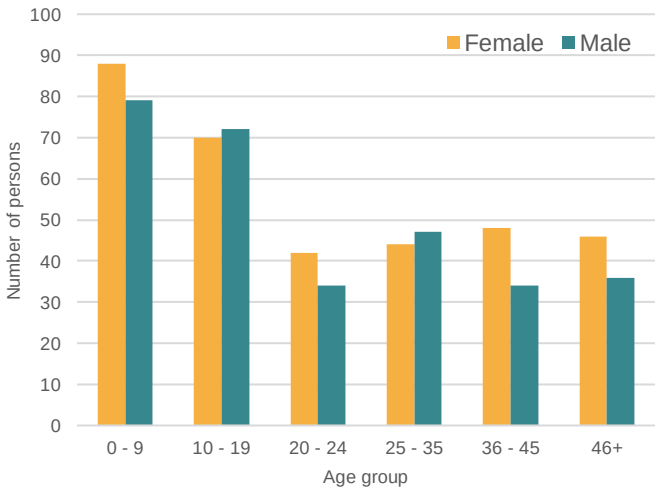



*Figure 1: Age group distribution of the sampled household population in Rusizi*

The farmer's survey, which covered 150 households in Rusizi, revealed a balanced gender distribution among respondents, with 51% female and 49% male participants.

Children (0-9), adolescents (10-19), and youth (20-35) were the predominant age brackets in the households, indicating a population skewing towards younger individuals. The average household size was approximately 4.3 individuals, and the gender distribution within these households appeared balanced.

# Farming practices

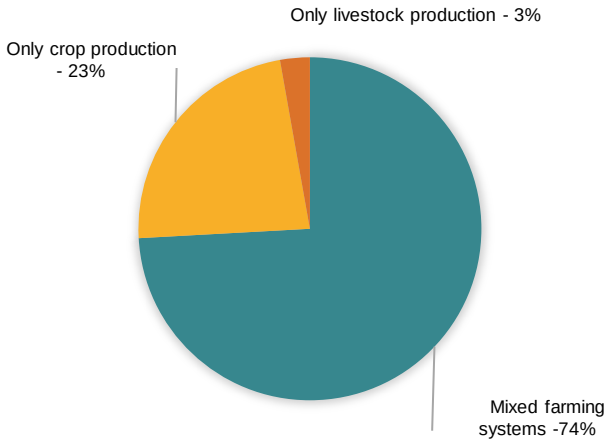



*Figure 2: Different farming systems practiced in Rusizi*

The farming system in Rusizi predominantly featured mixed farming practices, with 74% of respondents combining crop and livestock farming. Although 23% of the respondents engaged solely in crop production, standalone livestock farming is relatively uncommon, practiced by only 3% of the respondents. 44% of the respondents also indicated to rely on non-farm income sources besides their revenue from agricultural activities. Still, thorough record-keeping was affirmed by only 19% of the respondents, highlighting substantial shortcomings in farm management.

## Crops and animals

The variety of crops cultivated in Rusizi indicates a diverse agricultural environment. Maize was the most dominant seasonal crop mentioned (93%), while cassava is a top choice perennial crop for 77% of the surveyed household. Leguminous crops exhibited a more diverse cultivation pattern among household with soybean the most commonly cultivated leguminous crop among the surveyed households, grown by 21% of the household.

*Table 1: Household participation in production of crops*

| Seasonal crops[a] | % of households engaged in production | Perennial crops[b] | % of households engaged in production | Leguminous crops | % of households engaged in production |
|---|---|---|---|---|---|
| **Maize** | 93% | **Cassava** | 77% | **Soya bean** | 21% |
| **Beans** | 62% | **Avocado** | 49% | **Bambara beans** | 18% |
| **Peanuts** | 51% | **Banana** | 46% | **Cowpeas** | 10% |
| **Sweet potato** | 46% | **Passion fruit** | 30% | **Alfalfa** | 6% |
| **Irish Potato** | 36% | **Mango** | 25% | **Gravelia** | 5% |
| **Soybean** | 33% | **Tree tomato** | 13% | **Groundnut** | 5% |
| **Cabbage** | 21% | | | **Leucena** | 5% |
| **Onion** | 9% | | | | |
| **Sorghum** | 5% | | | | |

[a] Seasonal crops are plants that are cultivated and harvested during specific times of the year.
[b] Perennial crops are plants that live for multiple years and produce crops year after year.

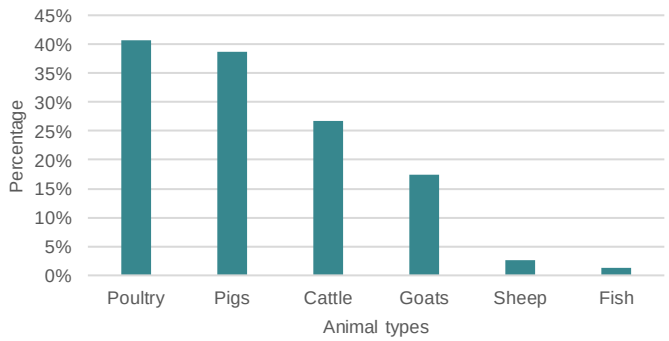



*Figure 3: Household participation in production of animals*

Among the households interviewed in Rusizi, livestock farming is predominantly focused on poultry and pigs, with a considerable majority of households (41% and 39% respectively) engaged in their rearing, followed by cattle (27%) and goats (18%) rearing, while only few of the respondents engaged in sheep rearing (3%) or fish farming (1%).

## Fertilizers and pest management

The sampled population adopted a variety of approaches to soil fertility management, combining the use of on-farm produced organic inputs with external synthetic inputs. While a large majority of farmers preferred organic fertilizers such as compost (88%), livestock manure (86%), and crop residues (84%), synthetic fertilizers (85%) remained a popular choice. Many farmers produce almost all the organic fertilizers on-farm highlighting a strong inclination towards self-sufficiency.

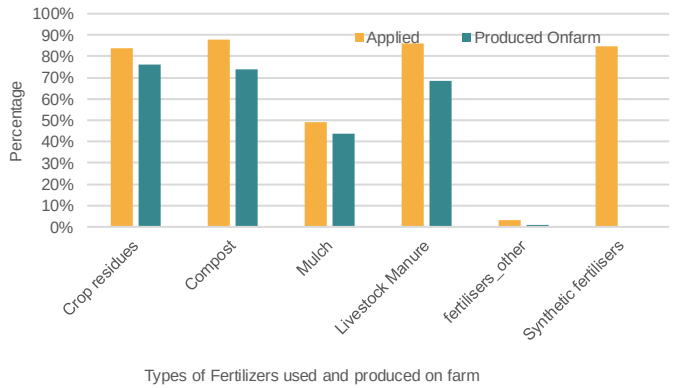



*Figure 4: Organic and synthetic fertilizer use in Rusizi*

While a vast majority of crops were adversely affected by pests, especially the fall army worms (67%), many farmers (74%) applied pest management practices in the last 12 months. Synthetic pesticides are the dominant countermeasure (84%) of farmers, but there were also strategies applied encompassing both traditional and novel methods.

### Seeds varieties and sources

When it comes to seed selection, most farmers (67%) have a strong inclination towards local varieties that are preferred over new varieties. However, many farmers also apply both local traditional varieties as well as to lower degree also new varieties. For animals, the situation presents more balanced while local breeds still surpass new breeds.

## Agroecological practices

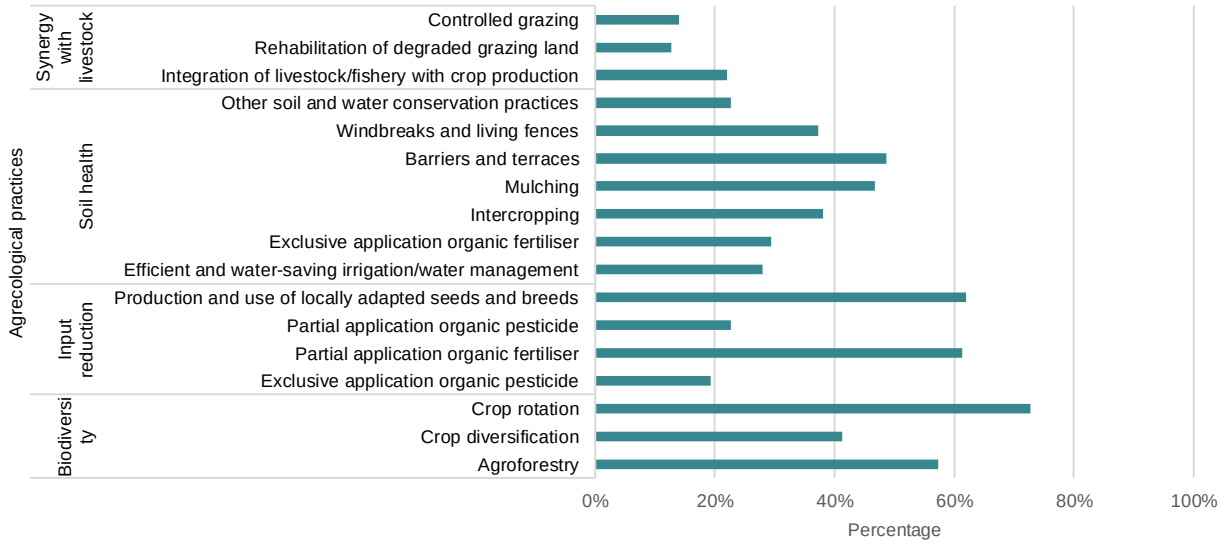



*Figure 5: Agroecological practices applied by the respondents. Agroecological practices specifically asked for are in line with definitions used in other projects, e.g. promoted by Swissaid*

In Rusizi, the sampled households engaged in a variety of agroecological practices. From among the agroecological practices specifically asked for (Figure 5). Crop rotation was the most prevalent biodiversity practice, while barriers and terraces are the dominate soil health efforts. Among input reduction techniques, using locally adapted seeds was the most applied practice. Synergies between livestock and crop farming remain an area with room for growth, as evidenced by the lower adoption percentages in this category.

## Market access

### Selling locations and prices

In Rusizi, local markets play a central role in commerce, while other channels are less prevalent in the region's trading ecosystem. A substantial number of sampled households sell their produce within a 5 km radius of their home. Most sellers (41%) preferred markets less than 1 km away from home, while 36% opt for markets between 1-5 km. This proximity suggests that farmers prioritize accessibility and the avoidance of transportation costs over other indicators such as selling in nearby markets in the neighborhood etc. In contrast, distant or indirect selling methods, like street selling or through intermediaries, were less favored by small holders, accounting for a share in the selling locations which indicates these avenues are relatively underdeveloped or less preferred by farmers for selling their products.

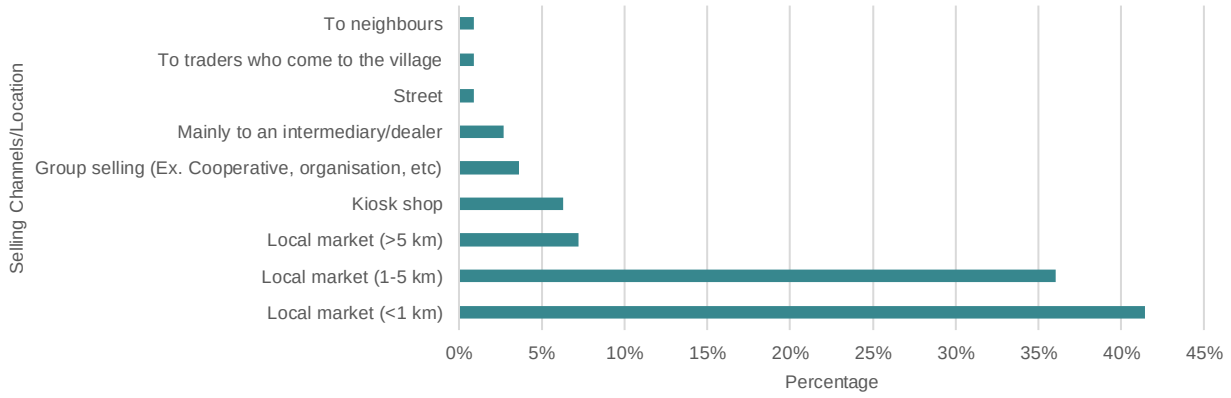



*Figure 6: Selling locations of farming output in Rusizi*

### Post-harvest practices

While most of the agricultural produce is either immediately consumed or transported and distributed, engagement in other post-harvest practices is limited in Rusizi. However, before being transported/distributed, cleaning and sorting are also regularly adopted. The use of refrigerated storage is minimal. Furthermore, there is also a noticeable absence of specialized processing for livestock.

## Women & youth empowerment

### Women participation in farming practices

When asked about their participation in agricultural decision-taking, female respondents affirmed the broad prevalence of joint decision-taking in farming activities; particularly when it comes to decisions regarding subsistence crops and post-harvest processing but also regarding inputs (varieties, seeds) and small livestock while their involvement in cash crop and larger livestock farming decisions is more limited.

### Youth participation in farming practices

In 79% of the households interviewed, at least one adolescent or youth, aged 10-35 years, showed significant interest in taking over the farm. Mentioning agriculture as the "backbone of our economy" and the "main source of livelihood", farmers' sentiments echo this positive appreciation.

# Food consumption

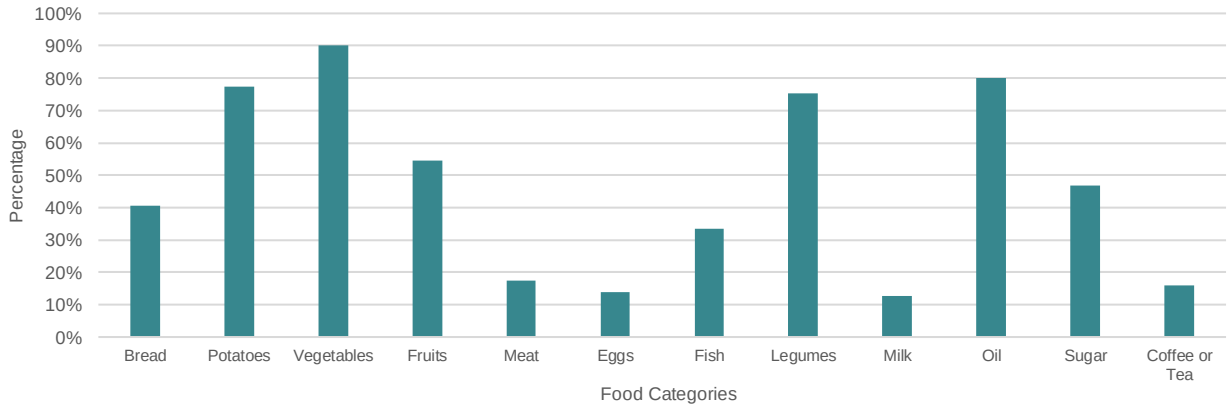



*Figure 7: Respondents' household food consumption patterns in the 24 hours prior to the survey*

Plant-based foods such as vegetables, potatoes, and legumes are the most consumed foods among the surveyed households in Rusizi. Animal-based products, with the exception of fish, are not often consumed, the same is the case for coffee or tea.

It is important to note that this analysis provides a snapshot of food consumption patterns at the time of the survey without delving into underlying factors such as seasonality of produce or personal dietary habits or requirements.

# Farmers' resilience

Figure 8 illustrates scoring on each of the 13 behavior-based resilience indicators evaluated with the SHARP+ tool and provides a detailed assessment of Rusizi's food system resilience.


*Figure 8: Representation of scoring on the 13 agroecosystem indicators of Cabell & Oelofse (2012)*

The standout strength of the surveyed farmers and small holders in Rusizi is their 'self-organizing local networks'-power, receiving a score of 8.5/10 indicating strong collective actions and cooperative structures such as farmer's group and co-operatives. The strong grassroots connectivity provides a fertile ground for the dissemination and adoption of agricultural innovations and effective knowledge sharing. This is also accompanied by 'strong solidarity within the local community' (6.3/10) and 'rich indigenous knowledge available' (5.0/10), affirming the community's commitment to preserving and incorporating traditional knowledge into farming, which have historically been central to resilience and adaptability.

While the indicators 'coupling agriculture and nature' (4.2/10) and 'reasonable use of natural resources' (4.9/10) show an average score, they indicate a potential reliance on external inputs and possibly limited resource conservation practices. Enhancing ecologically aligned farming practices and implementing techniques that enhance beneficial ecological interactions, like agroforestry or integrated pest management, can be transformative. The 'patchwork effects in time and space' (3.9/10) indicate a rather monocultural inclination, emphasizing the need for greater landscape diversification to reinforce resilience.

Similarly, economic resilience, as indicated by 'fair income' (4.8/10), suggests that while farmers may maintain their livelihoods, there is room to enhance economic stability and buffering capacity against market shifts and environmental stresses. Strengthening market connectivity and exploring diverse income sources can contribute significantly to economic resilience. Furthermore, diversifying income sources and enhancing the redundancy of critical components within farming systems are essential strategies to improve overall system resilience.

The strengths, notably the community unity and traditional knowledge, can be pivotal in reshaping farming practices aligned with ecological principles, paving the way for a more resilient and prosperous farming future. Harnessing the deep-rooted interconnectedness and respect for ancestral practices, interventions can be strategically developed to enhance ecological sustainability and introduce diverse farming methodologies.

**Authorship:** Tshering Lhamo, Agri-Food Sustainability Consultant with guidance from ETH Zurich and Sophie van den Berg Consulting

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Further information is available on the **NICE webpage:** *nice-nutrition.ch*