



NUTRITION *in* CITY ECOSYSTEMS

March 2022

FARMERS' SURVEY



RWANDA

Key insights into farming systems
in **Rubavu**



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 Rubavu, Rwanda. Rubavu is situated in the Western Province of the country, next to Lake Kivu and bordering the city of Goma in the Democratic Republic of Congo in the west and the Rubavu Mountain in the east. Less than 50% of the population are engaged in agricultural work in Rubavu with cross border trade with Goma town another important business sector. In terms of agricultural production Rubavu is characterized by volcanic fertile soils resulting in high production volumes of potatoes, sweet potatoes, cassava, sorghum, maize, beans, vegetables, and fruits (mangoes and passion fruit) for subsistence and export to other regions of the country and beyond country's border to the Democratic Republic of Congo. The city has an equatorial climate with an average temperature of 21.5°C as well as annual rainfalls of 1200-1300 mm fairly well distributed throughout the year except for the period of long dry season, which extends from June to mid-September.

150 rural and peri-urban farmers, representing a farming 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

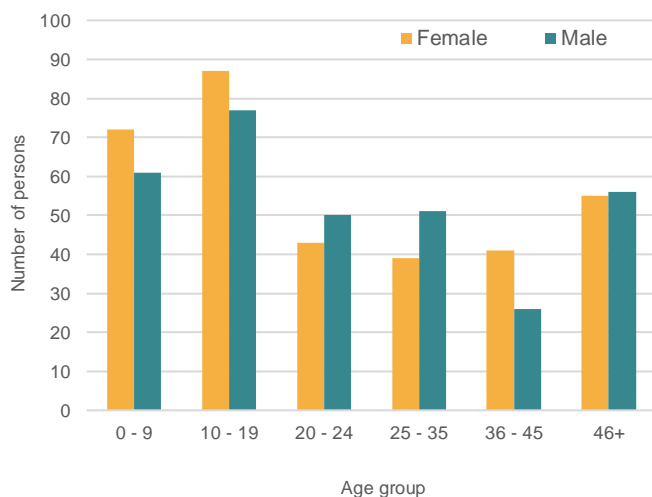


Figure 1: Age group distribution of the sampled household population in Rubavu

The farmer’s survey, which covered 150 households in Rubavu, had a balanced gender distribution among respondents, with 53% female and 47% male participants.

Children (0-9) and adolescents (10-19) were the predominant age brackets in the households, indicating a population skewing towards younger individuals. The average household size of the surveyed population was 4.4 individuals, and the gender distribution within these households appeared balanced.

Farming practices

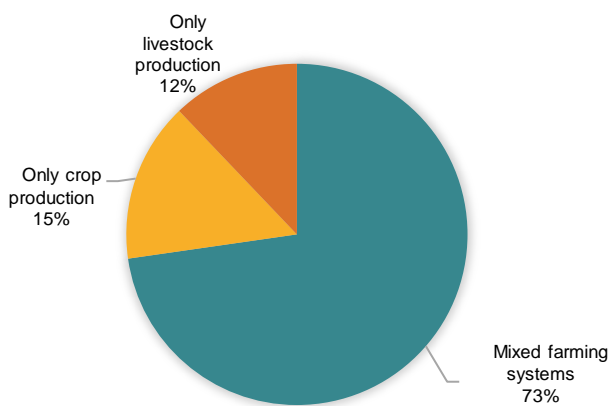


Figure 2: Different farming systems practiced in Rubavu

The farming system in Rubavu predominantly featured mixed farming practices, with 72% of respondents combining crop and livestock farming. Furthermore, 15% of the respondents engaged solely in crop production, and 12% in standalone livestock farming. 43% of the respondents also indicated to rely on non-farm income sources besides their revenue from agricultural activities. Some form of record-keeping was affirmed by 30% of the respondents, indicating a certain degree of proactive management among a segment of the surveyed farmers.

Crops and animals

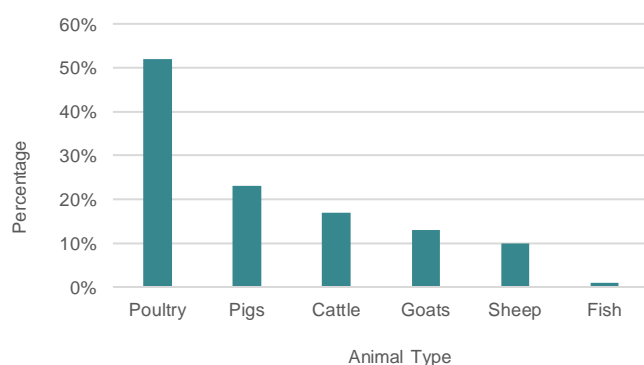
The variety of crops cultivated in Rubavu indicates a diverse agricultural environment. Maize was the most dominant seasonal crop mentioned (51%), followed by beans (46%) and peanuts (32%), while banana is the top choice perennial crop for 35% of the surveyed household, followed by avocado (32%) and cassava (22%).

Table 1: Household participation in production of crops

Seasonal crops ^a	% of households engaged in production	Perennial crops ^b	% of households engaged in production
Beans	46%	Banana	35%
Maize	51%	Mango	8%
Irish potato	23%	Cassava	22%
Onion	10%	Tree tomato	4%
Cabbage	14%	Avocado	32%
Sweet potato	19%	Passion fruit	4%
Sorghum	4%		
Soybean	25%		
Peanuts	32%		

^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.



Among the households interviewed in Rubavu, livestock farming is predominantly focused on poultry, with a considerable majority of households (52%) engaged in their rearing. The data suggest a tendency for households to favour smaller and potentially less resource-intensive animals for rearing, with pig (23%), cattle (17%), goats (13%) and sheep (10%) rearing considerably less common than poultry rearing. Only 1% of the surveyed households engaged in fish farming.

Figure 3: Household participation in production of animals

Fertilizers and pest management

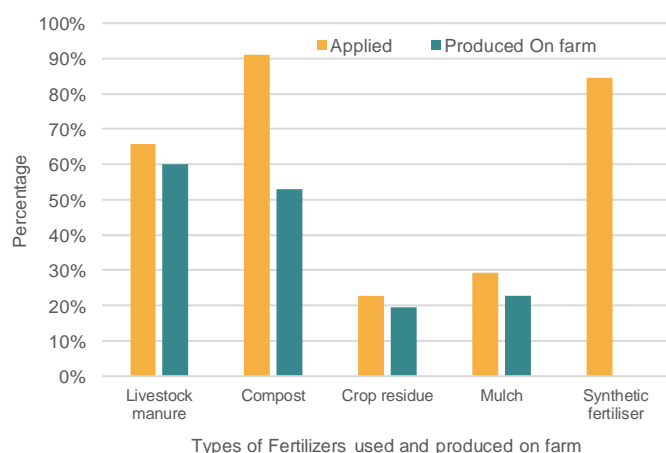


Figure 4: Organic and synthetic fertilizer use in Rubavu

While only 25% of the interviewed farmers assess the soil's condition, the sampled population adopted a variety of approaches to soil fertility management, combining the use of both on-farm produced organic inputs with external synthetic inputs. While 91% of interviewed farmers applied organic fertilizer in the form of compost, synthetic fertilizers also remains a popular choice, applied by 85% of farmers. Only 65.8% of farmers regularly adopt livestock manure as organic fertilizer while crop residue application and mulching have only been named as regular practices by 22.7% and 29.2% of the interviewed farmers. While most farmers produce almost all their livestock manure, crop residues and mulch on their farms, only 53% of the farmers also produced compost also directly on their farms.

Seeds varieties and sources

When it comes to seed selection, most farmers (68%) 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

In Rubavu, the sampled households engaged in a variety of agroecological practices. From among the agroecological practices specifically asked for (Figure 5). Crop rotation was notably the most prevalent biodiversity practice (applied by 67% of the surveyed households), while partial application of organic fertilizer was the dominant input reduction measure (applied by 59% of the households), closely followed by production and use of locally adapted seeds and breads. Among the soil health techniques, using barriers and terraces was the most applied practice. However, soil health as well as synergies between livestock and crop farming remains an area with room for growth, as evidenced by the lower adoption percentages in these categories.

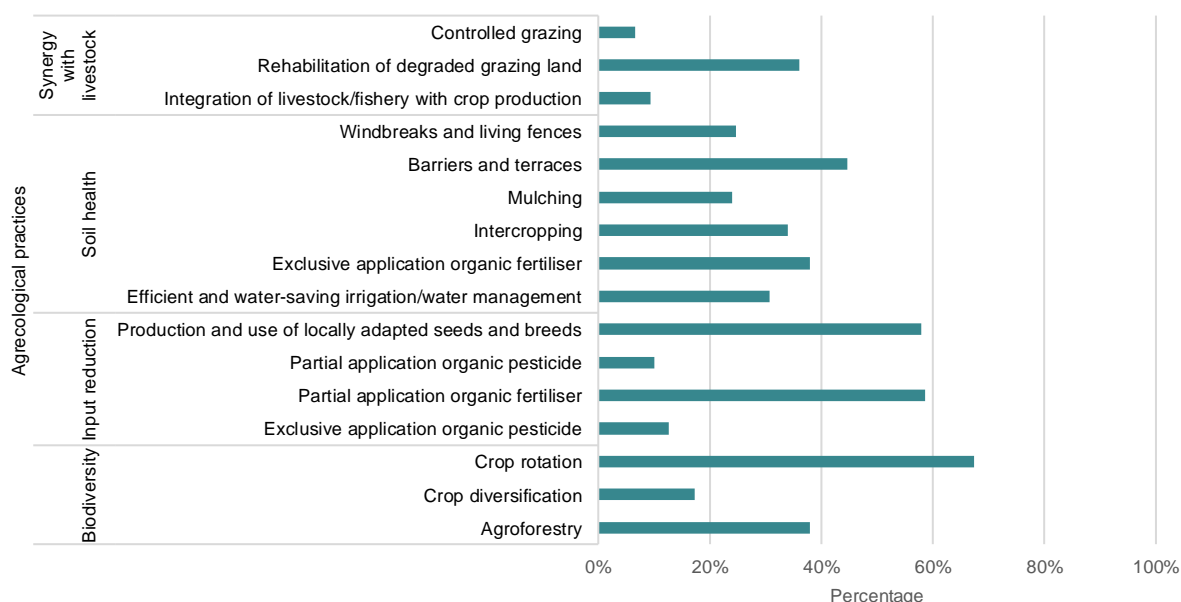


Figure 5: Agroecological practices applied by the respondents. Agroecological practices specifically asked for are in line with definitions used in other projects, e.g. promoted by Swissaid

Market access

Selling locations and prices

In Rubavu, the majority of interviewed households prefer selling their agricultural produce through local markets within a 1 km radius, accounting for 56% of the household, which suggests the importance they place on convenience and accessibility. Additionally, 28% of households opt for selling directly to neighbours. Meanwhile, 21% of households engage in trading through cooperatives or farmers' organizations. More distant selling points like regional markets and intermediaries attract minimal engagement, with each drawing only 7%. Intermediate selling options such as kiosks, streets, and restaurants are chosen by 12% to 17% of households. This pattern suggests that households in Rubavu prioritize proximity and community-based selling channels, while organized and distant markets cater to a smaller segment of the population.

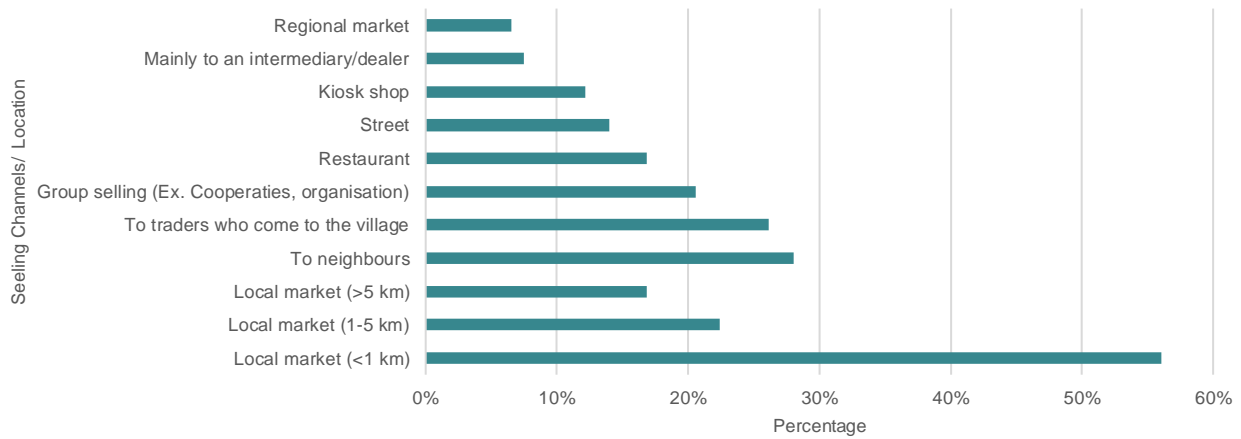


Figure 6: Selling locations of farming output in Rubavu

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 Rubavu. However, before being transported/distributed, cleaning and sorting are also regularly adopted. Maize and banana are the food items transported most often while advanced processing or transformation of these crops remains negligible, but offers potential for interventions. The use of refrigerated storage is minimal.

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.

Food consumption

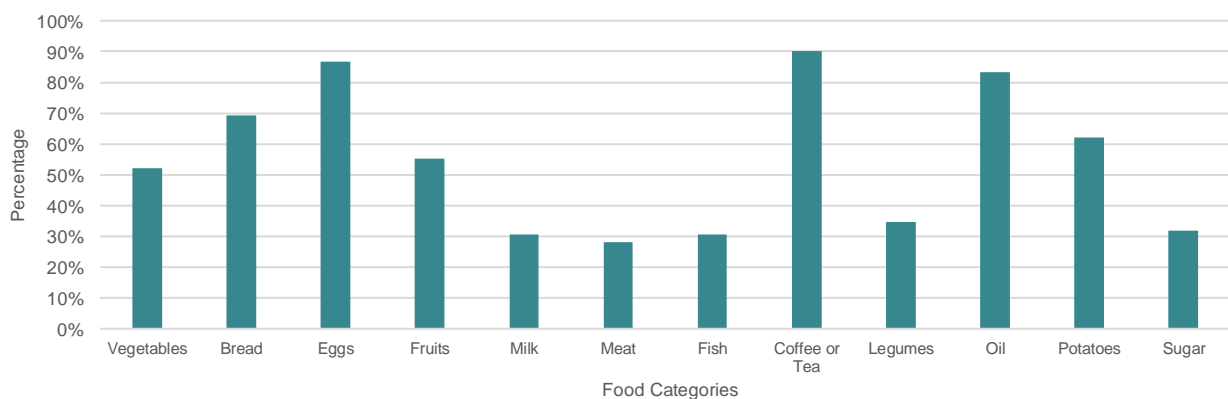


Figure 7: Respondents' household food consumption patterns in the 24 hours prior to the survey

In Rubavu, plant-based foods such as vegetables, fruits and potatoes, but also bread and coffee or tea are the most consumed foods among the surveyed households, consumed in more than half of the surveyed households on the previous day. Similarly, eggs are also very widely consumed (more than 80% of households consumed an egg on the previous day) while other animal-based products are not often consumed.

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 Rubavu'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 Rubavu is their 'self-organising local networks'-power indicating strong collective actions and cooperative structures such as farmer's group and cooperatives. The strong grass-roots 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' (6.7/10) and 'rich indigenous knowledge available' (6.0/10), affirming the community's commitment to preserving and incorporating traditional knowledge into farming, which have historically been central to resilience and adaptability.

Still, it remains imperative to address the challenges identified by indicators, especially concerning ecological sustainability. Ecologically 'coupling agriculture and nature' (3.2/10) and 'reasonable use of natural resources' (3.7/10) suggest potential over-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' 2.4/10 indicate monocultural inclination, emphasizing the need for greater landscape diversification to reinforce resilience.

Economically, the 'fair income' indicator at (5.1/10) presents a nuanced situation. While it indicates that farmers can sustain their livelihoods, there are potential challenges in ensuring consistent incomes. Efforts to stabilize earnings, reduce external dependencies, strengthen market connections, manage price fluctuations, and diversify income sources can steer farmers

toward heightened economic resilience. Strategies like diversifying income sources and having backup resources are paramount for enduring resilience amidst unpredictability.

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. Employing the deep-rooted interconnectedness and respect for traditional practices, interventions can be strategically developed to enhance ecological sustainability and introduce diverse farming methodologies.

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