NUTRITION *in* CITY ECOSYSTEMS

December 2021

FARMERS' SURVEY

KENYA

Key insights into farming systems in **Busia**

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 December 2021 in Busia, Kenya. Busia is a secondary city in Busia county, bordering with Uganda and situated in the Lake Victoria Basin. The climate in Busia is a moisty tropical climate with a slightly higher amount of precipitation in the first half of the year compared to the second half summing up in an annual rainfall of 750-2000 mm. Mean temperature is between 21-27°C. Besides agriculture and fishing, trade is another important economic activity in Busia. Agricultural production is mainly at a subsistence level.

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.

Penguin Agricultural Consultants Limited 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 November 2022.
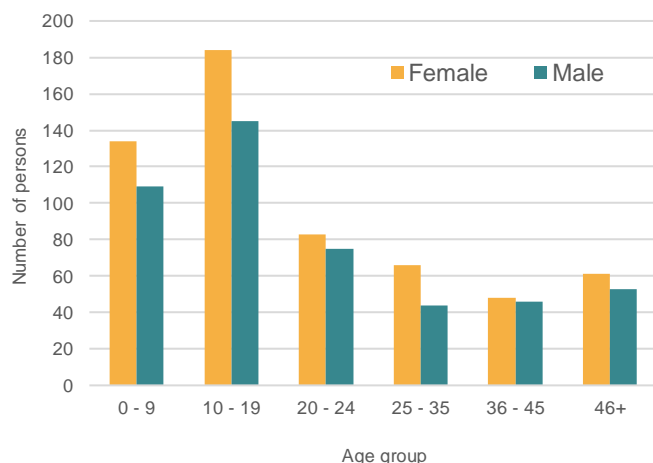
Household information

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

The farmer's survey in Busia covered 156 households. Despite the higher female representation in the population and survey respondents, the majority of households (78%) were headed by males, with only 20% of the households female-headed and a marginal 2% of households reporting joint headship.

Children (0-9), adolescents (10-19), and youth (20-35) were the predominant age brackets in the households, indicating a population leaning towards younger individuals. The average household size in this sample was notably large, with 6.7 individuals.
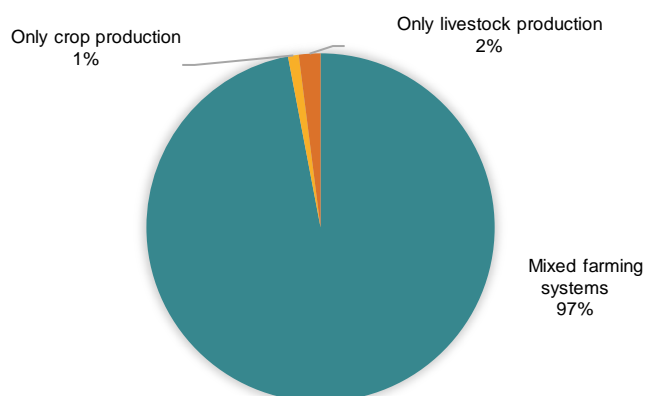
Farming practices

Figure 2: Different farming systems practiced in Busia

Mixed farming systems were the most prevalent in Busia, with 97% of the surveyed households in Busia combining both crop and livestock farming. A significant proportion (60%) also supplemented their agricultural activities with non-farm income sources, albeit with varying frequencies. The practice of record keeping was adopted by just over a quarter of the households, highlighting a measure of proactive management within a segment of the farming community.

Crops and animals

The diversity of crops grown in Busia suggests a multi-faceted agricultural landscape. Maize (88%), staple providing the primary sustenance for the local population, dominates the agricultural scene. Alongside maize, beans (69%), African leafy vegetables (65%), and banana (62%) also significantly contribute to the multi-faceted agricultural scene.

Seasonal crops[a]	% of households engaged in production	Perennial crops[b]	% of households engaged in production	Leguminous crops	% of households engaged in production
Maize	88%	Banana	62%	Beans	69%
African leafy vegetables	65%	Avocado	41%	Cowpea	27%
Cassava	35%	Mango	39%	Groundnut	24%
Sorghum	10%	Sugar cane	19%	Soybean	16%
Finger millet	10%	Orange	3%		
Sweet potato	8%	Lemon	3%		
Pumpkin	6%	Pawpaw	2%		
Tomato	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.
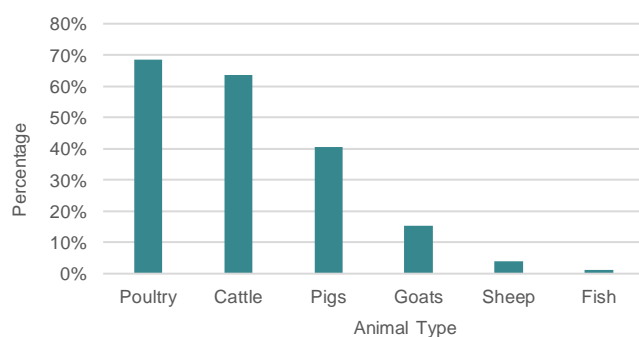

Among the households interviewed in Busia, livestock farming is predominantly focused on poultry and cattle, with a considerable majority of households (69% and 63% respectively) engaged in their rearing, followed by pigs at 40% rearing, while goat, sheep, and fish farming are less common.

Figure 3: Household participation in production of animals

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, yet only 36% checked the soil before application, indicating a gap in best soil management practices. Mulch is the most commonly applied type of soil fertilization (67%), followed by synthetic and livestock manure (both at 61%), indicating a balance between organic and synthetic practices. Many farmers produced almost all the organic fertilizers on-farm highlighting a strong inclination towards self-sufficiency.
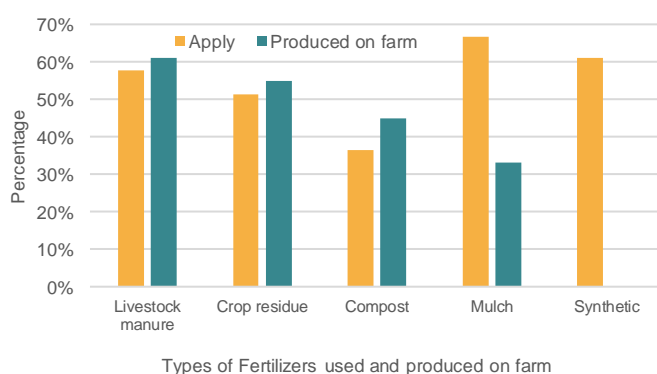

Over the past 12 months, two-thirds of farmers reported significant pest issues, predominantly from armyworms, which affected 67% of the surveyed households. Otherpests, including cutworms and stalk borers, had a moderate presence, and pests like whiteflies and anthracnose were less common.

Figure 4: Organic and Synthetic fertilizer use in Busia

Seeds varieties and sources

Shops and markets are the primary seed sources for 37% of households, while a quarter rely on their own seed production. 15% turn to family, friends, or neighbours, displaying community engagement in seed exchange. Interestingly, 41% of households diversify with three or more seed sources, enhancing their resilience against seed failure, whereas one-third depend on just one source, suggesting varying levels of access.

Table 2: Sources of seeds for seasonal and perennial crops in Busia

Variety of seed sources	% of households	Number of seed sources for each household	% of households
Own production	25%	Households with 1 source	33%
Shop/Market	37%	Households with 2 sources	26%
Family/Friend/Neighbour	15%	Households with 3 or more sources	41%
Government	5%		
NGO	9%		
Cooperative	4%		
Plant nursery	5%		

Agroecological practices

In Busia, our data indicates a mixed level of adoption of agroecological practices in surveyed households. Intercropping and rehabilitation of degraded grazing land are adopted in more than two thirds of the surveyed households, suggesting that these practices may serve as entry points for broader agroecological adoption within the community. Windbreaks and living fences, barriers and terraces, partial application of organic pesticides and fertilizers, crop rotation, crop diversification, and agroforestry are also moderately adopted. Furthermore, one third of the surveyed households even indicated to apply exclusively organic fertilizers and pesticides. Other soil and water conservation practices have very low adoption rates.
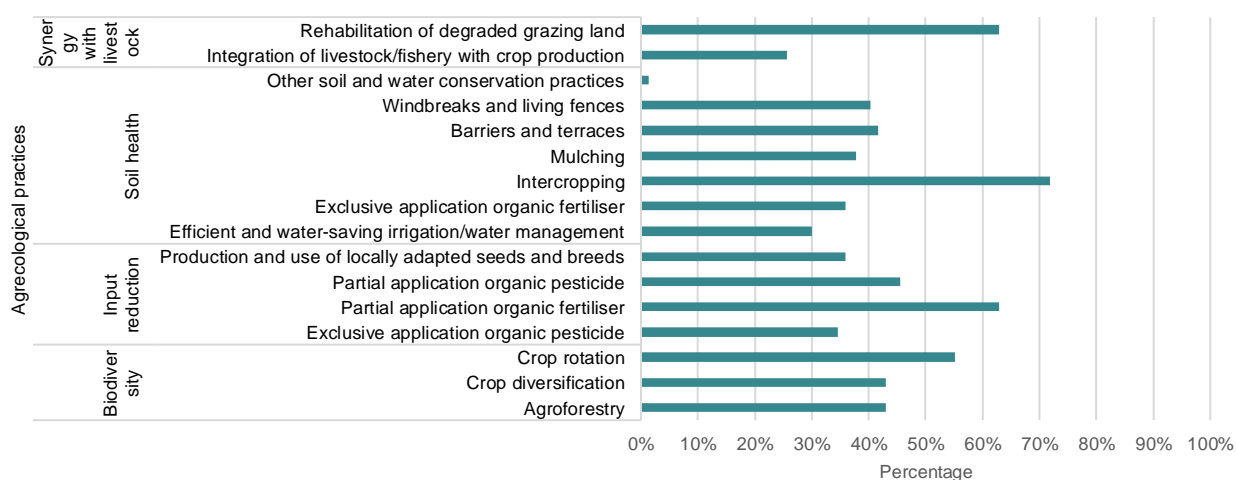

Figure 5: Agroecological practices applied by the respondents. Agroecological practices specifically asked for are in line with definitions used in other projects, e.g. promoted by Swissaid.

Market access

Selling locations and prices

In Busia, the majority of interviewed households prefer selling their agricultural produce through local markets within a 1 km radius or directly to neighbors, which suggests the importance they place on convenience and accessibility. Local and community-based commerce seems to be very important for the agricultural economy in Busia.
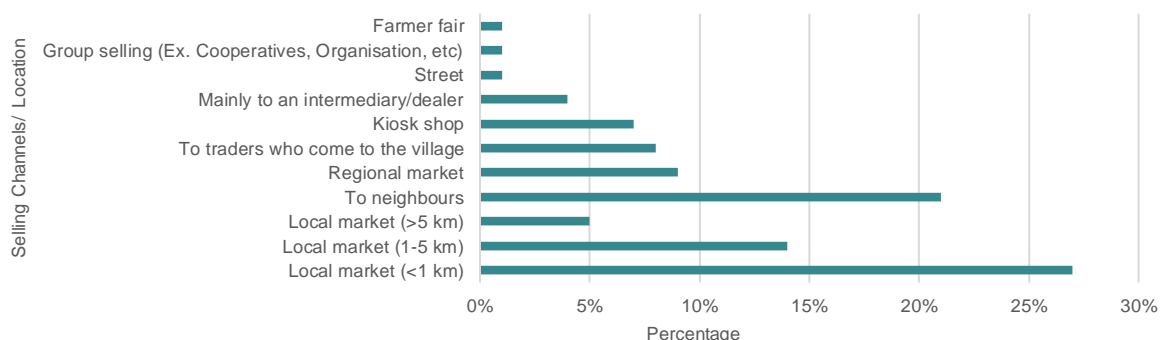

Figure 6: Selling channels/locations of farming output in Busia

Post-harvest practices

The post-harvest practices in Busia displayed a predominant trend towards immediate consumption, particularly with staple crops like maize, which 82% of the households consumed immediately. Processing techniques, including cleaning, sorting, and especially packaging, were not extensively utilized. The levels of transportation and distribution differed among crops, hinting at the influences of perishability and market demand—evidenced by the high transportation rates for maize and African leafy vegetables. Transformation and value addition were minimal across most crops, except for sugarcane, which saw a comparatively higher transformation rate by 13% of the households. These patterns point to a primarily subsistence-based agricultural model with minimal participation in broader market activities, highlighting potential opportunities for value addition growth and market integration.

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, inputs (varieties, seeds), post-harvest processing, and animal product production while their involvement in cash crop decisions is a bit more limited.

Youth participation in farming practices

Also, in 79% of the households interviewed, at least one adolescent and or youth, aged 10-35 years, showed significant interest in taking over the farm. Female youth are particularly active in crop production, exceeding male participation. The participation of children (0-9) in agricultural tasks suggests early exposure to farm life, with a higher reported involvement of boys (39%) than girls (19%).
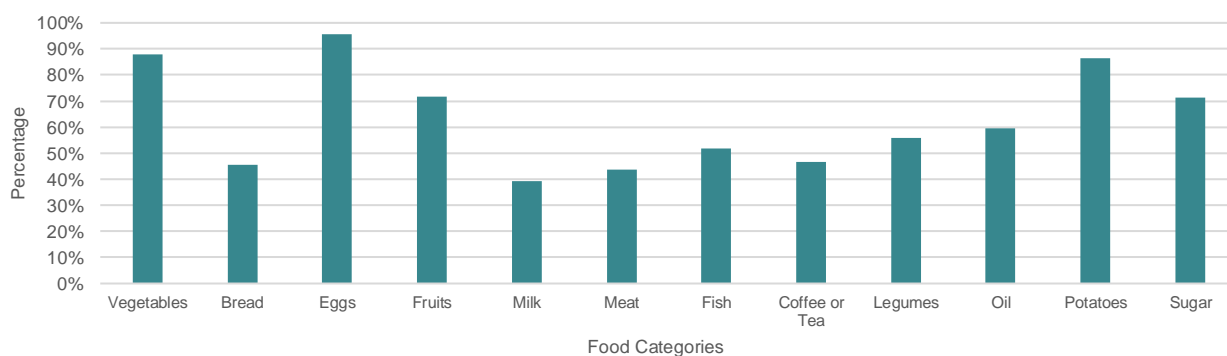
Food consumption

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

The dietary pattern of the surveyed households in Busia reveals a strong inclination towards vegetables and potatoes consumption. Similarly, eggs also play a critical role in the daily diet, featured in the meals of 96% of households. In contrast, other animal products such as milk and meat were less frequently consumed, noted by 39% and 44% of households, respectively. Meanwhile, coffee or tea found its way into nearly half of the households' daily routines, at 47%.

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 Busia's food system resilience.
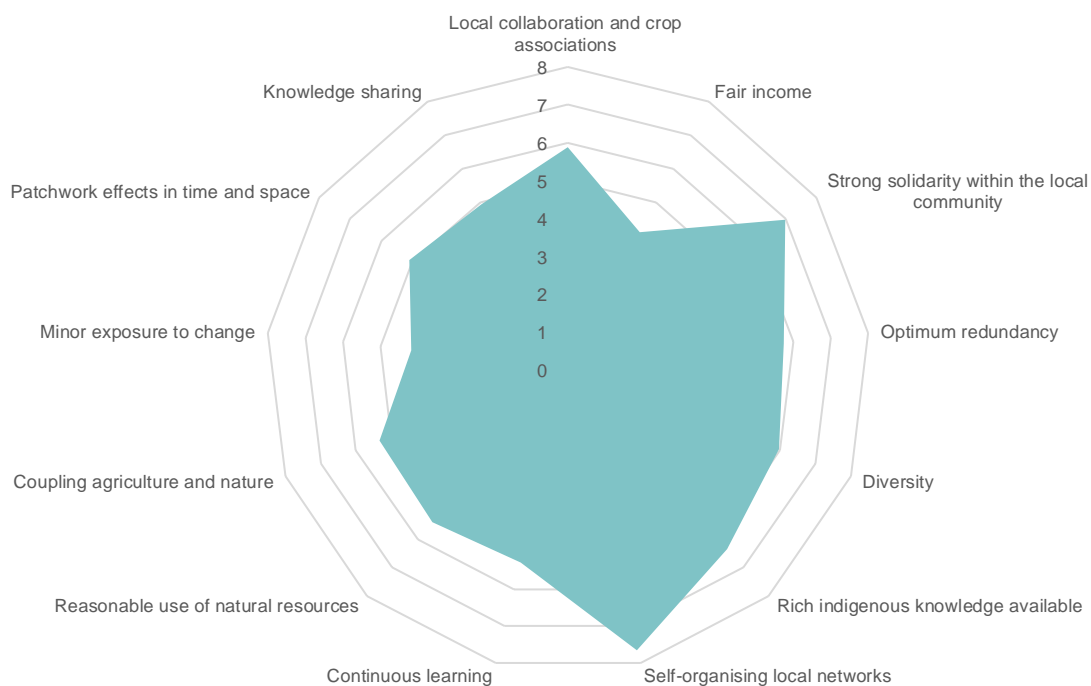

Figure 8: Representation of scoring on the 13 agroecosystem indicators of Cabell & Oelofse (2012)

The standout strengths of the surveyed farmers and small holders in Busia are their 'self-organising local networks'-power, receiving a score of 7.7/10 as well as their 'strong solidarity within the local community' potential, receiving a score of 7.0/10, both indicating strong collective actions and cooperative structures such as farmer's group and cooperatives. The strong grassroots connectivity provides a fertile ground for the dissemination and adoption of agricultural innovations and effective knowledge sharing. An adequate score of 6.3/10 on 'rich indigenous knowledge available' affirms the community's commitment to preserving and incorporating traditional knowledge into farming, which has historically been central to resilience and adaptability.

Ecologically, the farmers' approach to agricultural sustainability is currently at a baseline level. The practices of ecologically self-regulated farming systems, as indicated by the 'coupling agriculture and nature' indicator score (5.3/10), reflect a fair but not optimal integration of agriculture with the natural environment. However, the increased presence of trees on farms is a positive sign of a shift towards more sustainable practices. The scores for 'diversity' (6.0/10) and the 'reasonable use of natural resources' (5.4/10) are average, pointing to potential areas for growth. These aspects underscore the opportunity to enhance the diversity of farming systems and to improve the efficiency of resource utilization, critical measures necessary for boosting ecological 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.

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