NUTRITION *in* CITY ECOSYSTEMS

June 2025

NUTRITION SURVEY

BANGLADESH

Key insights into nutrition status and consumer behavior in **Dinajpur**

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 nutrition survey conducted in February 2025 in Dinajpur, Bangladesh. Dinajpur municipality is part of the wider Dinajpur district in north-western Bangladesh. In terms of climate, Dinajpur faces few but heavy rains during the monsoon. Average daily temperatures for much of the year are around 30°C, and about 16°C from November to January. Dinajpur's economy mainly depends on agriculture with a strong focus on rice production.

For this data collection, 303 eligible households were selected using a two-step process: first identifying neighborhoods with high level of malnutrition, then randomly choosing households within those areas. The same sampling strategy was applied during the baseline nutrition survey in 2021.

Data collection was conducted electronically using Open Data Kit (ODK) software, and the collected data were subsequently anonymized, cleaned, and analyzed using STATA software.

Key outcomes of the survey are updated estimates of malnutrition prevalence, household and women's dietary diversity, food consumption patterns, and levels of food insecurity. These findings contribute to a deeper understanding of urban nutrition dynamics in Dinajpur and shall guide interventions to improve healthy food access in the city.

The protocol for this data collection was approved by the Institutional Review Board of the Institute of Health Economics (IHE-IRB), and the ethics committee of Northern and Central Switzerland (Ethikkommission Nordwest- und Zentralschweiz (EKNZ)) and findings have been discussed with stakeholders in May 2024.

Household information

The nutrition survey carried out in Dinajpur covered a total of 303 households. Among these, 88.8% were headed by men, while 11.2% were headed by women. The average age of household heads was 41 years, and households on average consisted of four members.

In terms of location, 83.5% of households were situated in urban areas, with the remaining 16.5% located in peri-urban settings. 72.6% of households reported owning land, while 56.8% said they kept livestock or poultry. The most commonly owned livestock included chickens (34.3%), cattle (13.5%), goats (12.5%), and ducks (5.3%), and which play an important role in household nutrition and income.

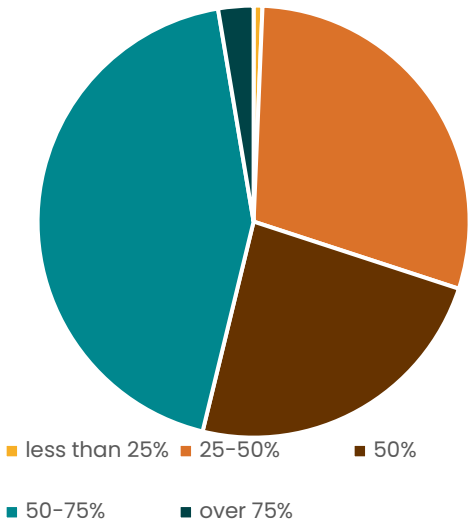

Figure 1 Percentage of household income spent on food

The average monthly income per household was reported as BDT 22,211. The majority of households (132 out of 303; 43.6%) reported allocating between 50% and 75% of their monthly income to food expenditures. This was followed by 89 households (29.4%) spending between 25% and 50%, and 72 households (23.8%) spending exactly 50%. Only a small proportion of households reported allocating less than 25% (2 households; 0.7%) or more than 75% (8 households; 2.6%) of their monthly income to food (see **Error! Reference source not found.**). This indicates that food is the major component of household expenses and poses challenges to affordability, especially among lower-income families.

Gendered decision-making in food and farming

As part of the survey, all households were asked to provide information on their food purchase patterns, with a specific focus on identifying the household member responsible for deciding which foods to buy. In households with access to agricultural land or kitchen gardens, additional questions addressed decision-making related to food production, including the selection of crops to cultivate and the choice of seeds to purchase. For each decision domain, respondents were asked to indicate whether the decision was primarily made by a male household member, a female household member, or jointly by both. This approach enables a gender-disaggregated analysis of intra-household decision-making, facilitating the examination of how authority and agency are distributed across key domains of food provisioning.

Figure 2 shows how decisions are made within households in Dinajpur across three key areas of the food system: food production, food purchases, and seed selection. The data reveal a strong gender imbalance in agricultural decision-making. In both food production and seed selection, men make 56% of decisions on their own, while women do so in only 6% of cases. Joint decision-making is reported in 39% of households for

both domains, indicating some level of shared involvement, though men clearly dominate decision-making in these areas.

In contrast, food purchase decisions follow a more balanced pattern. In this domain, 52% of households report making decisions jointly. Female-only decision-making is found in 23% of households, which is nearly equal to the 24% where men decide alone. This suggests that, unlike agricultural production, decisions about buying food are more evenly shared between men and women.

These findings highlight a gendered division of roles in Dinajpur households. While men tend to lead in decisions related to agricultural activities such as production and seed selection, women participate more actively in decisions related to food consumption. This may reflect social norms that associate household food purchases more closely with women's responsibilities, allowing for greater female involvement in this area.

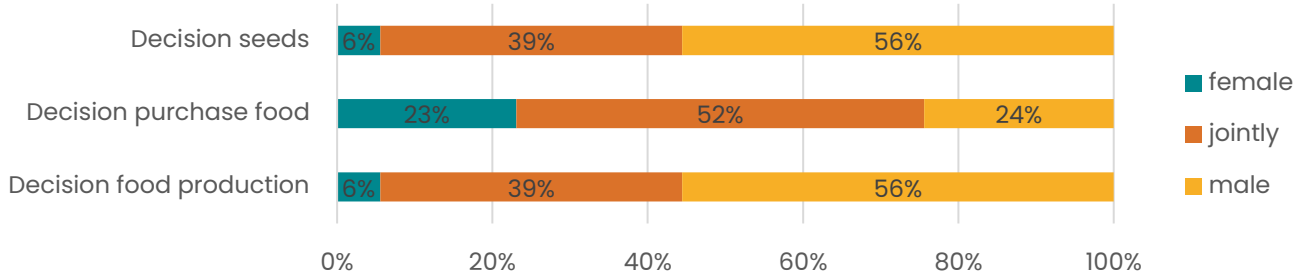

Figure 2 Decision making pattern in the households

Food provenance

Consumption of locally produced food in secondary cities prone to food insecurity is vital for enhancing dietary resilience, reducing dependence on external supply chains, and supporting local agriculture. Overall, 86.4% of surveyed households sourced half or more of their food locally (Figure 3), with particularly high reliance on local vegetables (98.7%), dairy products (98.3%), meat (98.0%), fruits (95.7), fish (91.7%), and legumes (36.0%).

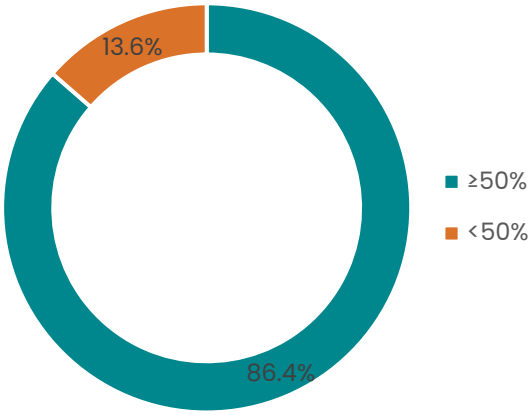

Figure 3 Percentage of household consuming half or more (blue) or less than 50% (orange) of the food from local sources

Knowledge on healthy diet

Understanding which foods contribute to a healthy diet is essential for fostering informed consumer demand and promoting dietary choices that support improved nutritional outcomes. To structure an assessment of the dietary knowledge within a widely recognized conceptual framework, the food pyramid (Figure 4) was adopted as the basis for evaluating participants' understanding of healthy eating. The food pyramid serves as a visual representation of balanced dietary intake, emphasizing the relative proportions in which various

food groups should be consumed, ranging from those recommended for frequent consumption to those advised only sparingly.

While the visual was not shown to participants during data collection, the underlying principles of the food pyramid informed the design of the household questionnaire and guided the development of a scoring metric for dietary knowledge. Specifically, respondents were asked the following question: "Assuming all food types were equally available, which food groups should be consumed liberally, moderately, or sparingly?" The food groups were presented in a randomized order, using locally relevant examples to ensure contextual appropriateness. The six food groups assessed were: 1) Dairy, fish, meat, egg; 2) Cereals, rice, beans, potatoes; 3) Sweet and snacks, 4) Nuts, oil and fats, 5) Vegetables and fruits; 6) Water and plain tea, plain coffee (without sugar or milk).

Responses were subsequently scored based on their alignment with the pyramid's recommendations. Specifically, fruits, vegetables, and water were classified as food groups to be consumed liberally, foods high in fat and sugar as those to be consumed sparingly, and all others in moderation. This scoring system enabled a standardized classification of dietary knowledge across households.

In Dinajpur, 57.1% of households demonstrated a good level of understanding of the recommended dietary consumption patterns, based on the defined scoring criteria. Additionally, 39.9% exhibited a moderate level of comprehension, while 3.0% were classified as having a low or insufficient understanding of appropriate nutritional practices.

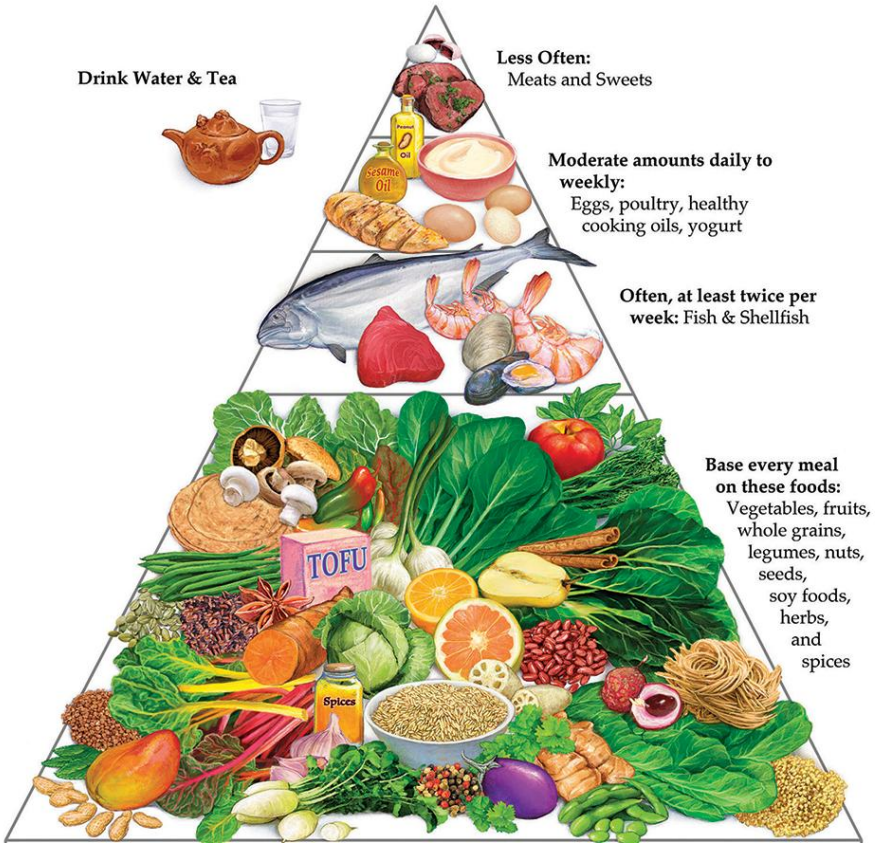

Figure 4 Asian diet pyramid (https://oldwayspt.org/blog/introducing-updated-asian-diet-pyramid/, accessed 6.6.2025)

Dietary Diversity Questionnaire

The Dietary Diversity Questionnaire (DDQ)[1] is a standardized tool designed to assess individual-level dietary intake by capturing the variety of food consumed over a 24-hour recall period. It categorizes foods into 29 distinct groups, allowing for a detailed characterization of diet quality across multiple dimensions, including nutrient adequacy and the presence of both health-promoting and potentially harmful foods. These food groups span key dietary components such as fruits, vegetables, legumes, whole grains, dairy, animal-source foods, and processed products. Thereby DQQ is offering a comprehensive framework for evaluating the complexity and nutritional value of the individual's diet. A variety of indicators can be drawn from this questionnaire such as the minimum dietary diversity for women (MDD-W) and the AII-5 indicator, but also some more specified indicators related to non-communicable disease (NCD) such as NCD-protect, NCD-risk and the dietary recommendation score (GDR score).

In this survey, a total of 303 women of reproductive age (WRA, 15-49 years) residing in Dinajpur were surveyed using the DDQ to capture detailed information on their food consumption over the preceding 24-hour period. This population subgroup was selected given the critical importance of nutritional adequacy during reproductive years, with implications for both maternal and child health.

Minimum Dietary Diversity for Women

The Minimum Dietary Diversity for Women (MDD-W) is a globally recognized indicator used to assess the quality of women's diet, particularly among women of reproductive age (15-49 years). Since early 2025, the MDD-W has also been recognized as an official indicator for Sustainable Development Goal 2 (SDG 2), which aims to achieve zero hunger worldwide. The MDD-W reflects the micronutrient adequacy of an individual's diet by quantifying the number of different food groups consumed over the preceding 24-hour period. According to the global standard, a woman is considered to achieve minimum dietary diversity if she consumes food from at least five out of the following ten groups: 1) grains, white roots and tubers, and plantains; 2) pulses (beans, peas, and lentils); 3) nuts and seeds; 4) dairy; 5) meat, poultry, and fish; 6) eggs; 7) dark green leafy vegetables; 8) other vitamin A-rich fruits and vegetables; 9) other vegetables; 10) other fruits.

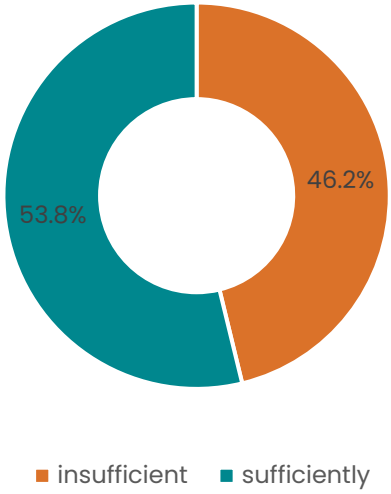

Figure 5 Percentage of women consuming and adequately (blue) or inadequately (orange) diverse diet

In the current survey, women in Dinajpur consumed an average of 4.7 out of the 10 food groups, indicative of a moderately to insufficiently varied diet. Specifically, 46.2% of the women did not meet the minimum threshold of five food groups (Figure 6), highlighting a risk for dietary and micronutrient deficiencies among a significant proportion of this population. These findings underscore persistent challenges regarding access, availability, and affordability of a diverse, nutrient-rich foods in the area. Addressing these issues is critical, not only for improving the health and well-being of women but also for enhancing the nutritional outcomes of their children and families.

[1] Global Diet Quality Project:https://www.dietquality.org/

All-5

The All-5 indicator assesses dietary diversity by measuring the proportion of individuals who consume foods from all five essential food groups in the preceding 24-hour period. These groups are 1) vegetable, 2) fruit, 3) pulse, nuts or seed, 4) animal source food and 5) starchy staples. The all-5 indicator captures minimal adherence to dietary guidelines.

In Dinajpur, 26.1% of women of reproductive age reported consumption of all five essential food groups on the reference day. This relatively low prevalence indicates substantial limitations in achieving even the minimum recommended level of dietary diversity, thereby underscoring potential nutritional vulnerabilities within this demographic subgroup.

NCD-indicators

This analysis focuses on three key indicators that capture critical dimensions of diet quality in relation to non-communicable diseases and adherence to global dietary recommendations:

- **NCD-Risk (0-9):** Consumption of foods associated with increased non-communicable disease (NCD) risk, such as sugary beverages, processed meats, and fried snacks.
- **NCD-Protect (0-9):** Consumption of the 9 foods protective against NCDs, including fruits, vegetables, whole grains, and legumes.
- **GDR score (0-18):** Reflects adherence to Global Dietary Recommendations (GDRs) that relate to NCD risk factors. The higher the GDR score, the more GDRs on healthy diets are likely to be met.

Analysis of the NCD-related indicators suggests that women in Dinajpur showing a low average risk for diet-related NCDs; however, their NCD-Protect score remains low (Figure 6), indicating limited consumption of foods protective against NCDs. The GDR score of 10.7 suggests a moderate alignment with international dietary guidelines, reflecting a partially adequate diet with considerable scope for improvement.

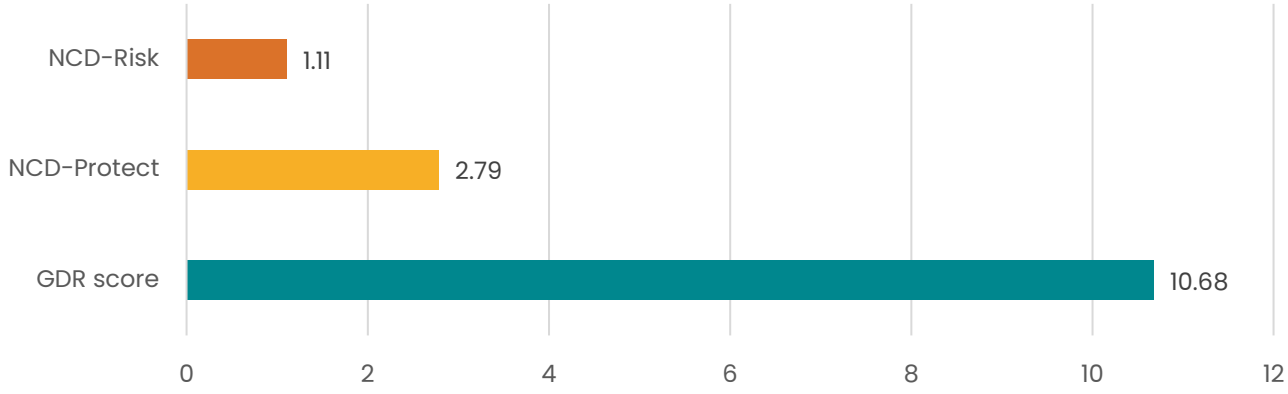

Figure 6 Dietary diversity questionnaire indicators

Household Dietary Diversity Score

The Household Dietary Diversity Score (HDDS) is a widely utilized proxy indicator for assessing the quality of diet and, indirectly, household food access. It reflects the economic ability of a household to access a variety of foods, which is often correlated with nutrient adequacy and food security status. Dietary diversity, as

measured by HDDS, is based on the premise that consumption of a greater number of food groups is associated with better nutrient adequacy. While it does not directly measure nutrient intake, it serves as an effective indirect indicator, particularly in settings where detailed dietary assessments are impractical.

The Dietary Diversity Score is assessed using a structured 24-hour recall question posed to a knowledgeable household respondent, typically phrased as: *"Which of the following food groups were consumed by anyone in your household in the past 24 hours?"* The respondent is then prompted to identify all applicable food groups from a standardized list of twelve, which typically includes: (1) cereals; (2) roots and tubers; (3) vegetables; (4) fruits; (5) meat, poultry, and offal; (6) eggs; (7) fish and seafood; (8) pulses, legumes, and nuts; (9) milk and milk products; (10) oils and fats; (11) sugar and honey; and (12) miscellaneous foods and beverages, including condiments and beverages. Each food group is scored 1 if consumed, 0 if not, and the scores are aggregated to generate a composite Household Dietary Diversity Score (HDDS) ranging from 0 to 12.

The average HDDS among surveyed households in Dinajpur was 6.3. A score of 6.3 indicates that, on average, households consumed items from slightly more than 6 different food groups within the reference period. This is neither indicative of severe dietary monotony nor of high dietary variety, placing it in a mid-range category. Households with such scores typically meet some, but not all, nutritional requirements. It remains important to recognize that HDDS captures diversity qualitatively rather than quantitatively and does not account for portion sizes, nutrient bioavailability, or intra-household distribution. Therefore, despite this moderately favorable dietary diversity, nutritional adequacy cannot be conclusively inferred without complementary dietary or biomarker data.

Household food insecurity

Food security is given "*when all people, at all times, have physical and economic access to sufficient safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life*" (FAO 1996[2]).

Households were classified as food insecure if they reported any experience of compromised food access in terms of quantity, quality, or regularity over the preceding four weeks. This classification was based on affirmative responses to a series of standardized experiential questions adapted from established food insecurity measurement tools. Specifically, respondents were asked whether, due to insufficient resources, they or other household members: (1) worried about the adequacy of their food supply; (2) were unable to consume preferred foods; (3) had to restrict dietary diversity; (4) were compelled to consume foods they found undesirable; (5) ate smaller meals than needed; (6) reduced the

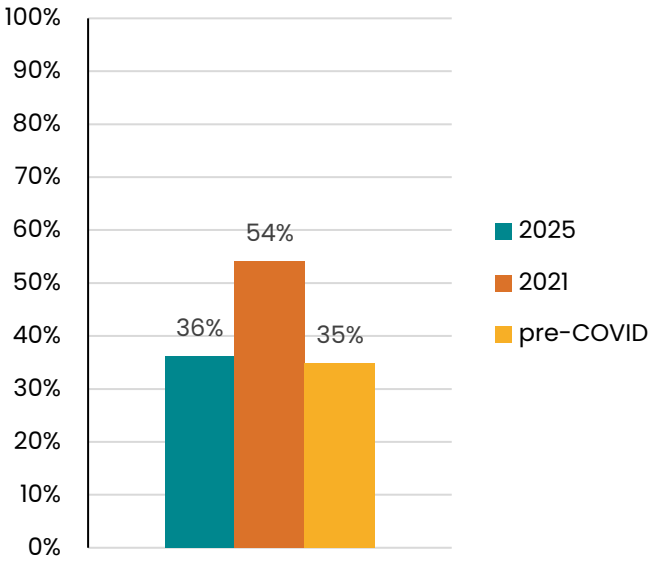

Figure 7 Percentage of households with indication of food insecurity in pre-COVID (2020), 2021 and 2025

[2] Food and Agriculture Organization of the United Nations. (1996). *Rome Declaration on World Food Security and World Food Summit Plan of Action*. FAO. https://www.fao.org/3/w3613e/w3613e00.htm

number of daily meals; (7) experienced a complete absence of food in the household; (8) went to bed hungry; or (9) went an entire 24-hour period without eating.

In Dinajpur, 36% of households reported experiencing at least one form of food insecurity in the month preceding the 2025 nutrition survey. This has come down since the baseline survey in 2021 (54%) and reached the levels of the reported estimated levels pre-COVID-19.

Exclusive breast feeding

Exclusive breastfeeding for the first six months of life is critically important, as it provides optimal nutrition, enhances immune protection, and supports neurodevelopmental outcomes, thereby reducing infant morbidity and mortality, particularly in low-resource settings. [3] The World Health Organization and UNICEF recommend exclusive breastfeeding until six months of age, followed by continued breastfeeding alongside appropriate complementary foods, as a foundational public health strategy to promote child survival and long-term health. [4]

Mothers in the households were asked to report the duration for which they exclusively breastfed their children. In Dinajpur, only 39.1% of children were exclusively breastfed for the recommended six months.

Nutrition status indicators

The nutrition assessment (using height, weight and mid-upper arm circumference (MUAC)) in Dinajpur shows that both, children and adults are affected by different forms of malnutrition. Among children under five years, 16.6% were stunted, meaning they were too short for their age due to long-term poor nutrition (see Table 1). Wasting, which indicates recent or severe weight loss, was seen in 9.3% of children. Additionally, 6.8% of children were underweight, reflecting a combination of chronic and acute undernutrition. About 2.0% of all children under 5 years were classified as overweight.

Among adults, the most common issue was being overweight, 59.0% of women and 37.5% of men were overweight. These results show a growing double burden of malnutrition in the community, where children face undernutrition while many adults struggle with overweight. This highlights the need for health programs that address both types of nutrition problems.

Table 1 Nutrition assessment (using height, weight and MUAC) of the households in Dinajpur

Children under five years				**Adults**	
Stunting	Wasting	Underweight	Overweight	Female overweight	Male overweight
16.6%	9.3%	6.8%	2.0%	59.0%	37.5%

[3] Victora, C.G., et al., *Breastfeeding in the 21st century: epidemiology, mechanisms, and lifelong effect.* Lancet, 2016. **387**(10017): p. 475-90.

[4] *https://www.who.int/news-room/fact-sheets/detail/infant-and-young-child-feeding*, accessed 26.5.2025

Authorship: Nutrition in City Ecosystems (NICE) project

The NICE project is supported by the Swiss Agency for Development and Cooperation and implemented by a public-private consortium that includes the Swiss Tropical and Public Health Institute, ETH Zürich, Sight and Life foundation, and the Sustainable Agriculture Foundation Africa.

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