

## Policy Brief

### Nutrient Density and Affordability of the Habitual Diet: Implications for Policies and Programs

- Cereals dominate the Bangladeshi diet, with inadequate intake of good quality protein and micronutrient rich foods across all age and sex groups and regions.
- Leafy and non-leafy vegetables are noted to be the most nutrient dense, followed by fruits and fish.
- Nutritionally adequate diets can be made affordable for the poor through optimum combinations of locally available nutrient-rich foods. Healthy diets, including a range of nutrient-rich foods or food groups, such as animal source foods, fruits, vegetables, beans and pulses, whole grains, and dairy would need to be made accessible and affordable and promoted.
- Behaviour change communication for dietary improvement has to be scaled up to bring about changes in rice-based diets and improve nutrition.

Bangladesh is on track towards achieving its child nutrition targets for 2025 in line with the National Plan of Action on Nutrition-2 (NPAN2), the Country Investment Plan-2 (CIP-2), and SDGs. Child stunting (low height for age) reduced from 41.3% in 2011 to 31% in 2017-18 and wasting (low weight for height) from 15.6% to 8.4%.<sup>1</sup> However, a high prevalence of undernutrition and micronutrient deficiencies<sup>2</sup> still exists with overweight, obesity, and associated conditions creating a triple burden of malnutrition. As for food availability, the country is self-sufficient in rice and fish production but, there is a need to create a sustainable, resilient, and nutrition-sensitive food system for delivering healthy diets that can meet the energy and nutrient needs of the population. To this end, estimating the energy and nutrient content of habitual diets in relation to nutrient adequacy and density, comparing them to the estimated average requirements (EARs), and proposing desirable diets that are affordable and culturally acceptable across income groups are important policy considerations.

**Food consumption and dietary pattern of Bangladeshi population:** In the last decade, food intake has increased with some diet diversification; however, the pace of diversification has not been sufficient to fill up the micronutrient gaps in population. Dependence on cereals for nourishment has shown a decline while consumption of some animal source foods (e.g, fish, poultry, and eggs), some vegetables, and milk has increased. Yet, the consumption of these food items is much below the desirable norm. Cereals (predominantly rice) continue to dominate the diet, with the intake of pulses, nuts, and seeds and fruits being reportedly low as per the latest available survey estimates (Table 1). The per capita contributions of dietary carbohydrate, protein, and fat to total dietary energy per day are approximately 72%, 18%, and 10%, respectively. Across diets, 80% have 55-75% of energy coming from carbohydrates, 69% get 10-15% of energy from protein, and 65% have 15-30% of energy from fat. Since cereals dominate the diet, they provide a major contribution to energy, protein, and some micronutrients. Only a third of the protein comes from 'high quality protein', animal source foods.

**Nutrient gap in the diet:** The latest available estimates of median energy intake from the INFS survey 2017-18 are 2091 kcal which is much lower than that (2413 kcal) previously reported in the BIHS-2015 survey, indicative of a decline in energy intake. Calculations of the nutrient density or 'dietary quality' of the diets among women in the

reproductive age (WRA) by region, showed that the protein and fat density of the 2,000 kcal diet was high in urban areas, while carbohydrate density was high in the rural areas.

Table 1: Food intake (grams/ person/ day) in comparison with desirable dietary pattern

Food groups	Per capita intake (grams/day)	Desirable dietary pattern for moderately active men (2,430 Kcal)
Cereals	437.3	400
Rice	390	350
Wheat	47.9	50
Pulses and legumes	37.9	50
Non-leafy vegetables	98.9	200
Leafy vegetables	114.4	100
Roots and tubers	79.5	100
Nuts and seeds	13.8	0
Spices and condiments	4.3	0
Fruits	30.7	100
Fish	67.9	60
Meat and poultry	118	40
Eggs	38.1	30
Milk and its products	7.3	130
Fat and oils	29.9	30

The micronutrient density (iron, zinc, vitamin A, thiamin, riboflavin, niacin EQ, vitamin B6, and folate) in the diets of WRA was almost similar across urban and rural groups. However, calcium density was slightly higher in urban areas. The low micronutrient density of the diets of WRA points to the inadequate intake of micronutrient rich foods which are below the recommended nutrient requirements of this important age group. A similar picture is observed across other age and sex groups in all regions. Overall, the diet of the Bangladeshi population is reportedly nutrient poor in terms of micronutrients

**The Bangladeshi diet and requirement of essential nutrients:** Nutrient inadequacy of diets for different age and sex groups, when assessed based on EAR, pointed to a high percentage of risk of inadequacy of micronutrient intake. The prevalence of risk of the inadequacy of calcium, thiamine, riboflavin, vitamin B6, vitamin B12, and vitamin A was around 40-50% in all age and sex groups. Iron was noted to be a problem nutrient for females but not for adult males. The mean prevalence of risk of inadequacy across the 12 estimated micronutrients was found 27% in children under 2 years, 23% in adolescents, 13% in WRA, 27% in pregnant, and 24% in lactating women. Overall, calcium, thiamine, riboflavin, zinc, iron, riboflavin, vitamin B6, folate, vitamin A, and vitamin B12 were found to be crucial nutrients for the Bangladeshi population with a prevalence of risk of inadequacy ranging from 30 to 40%.

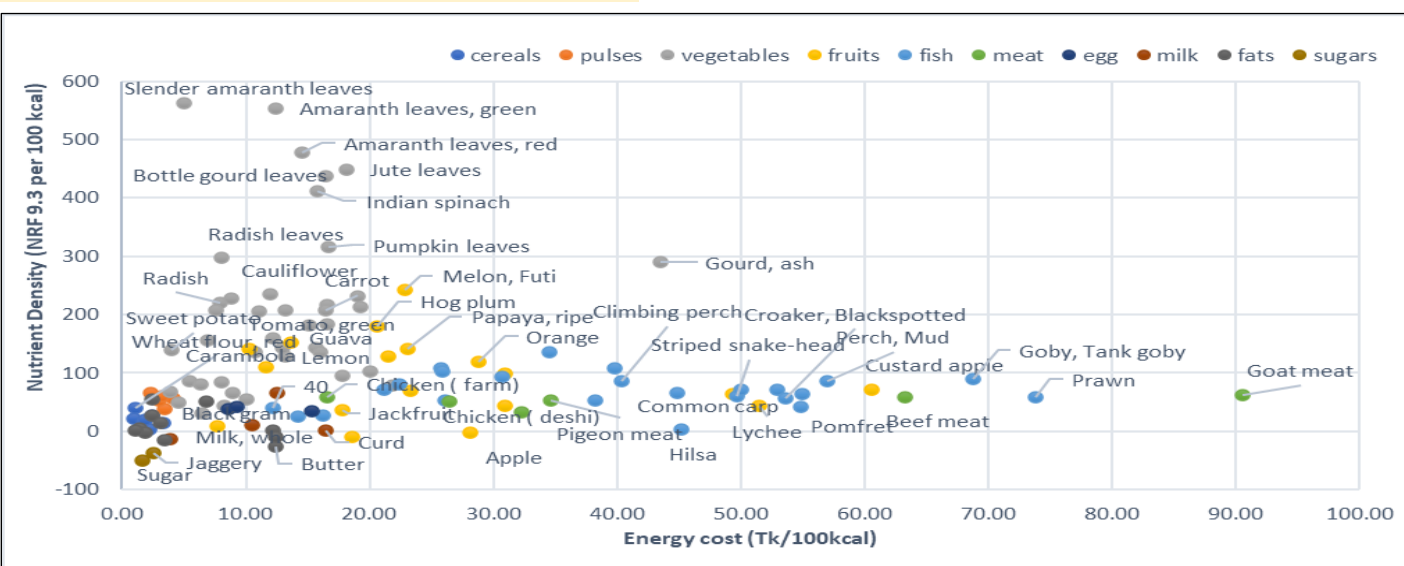
<sup>1</sup> Bangladesh Demographic and Health Survey 2017-18

<sup>2</sup> National Micronutrient Status Survey 2011-12

**Mapping of the nutrient density of foods:** Nutrient density (ND) refers to nutrient content in relation to the energy content of the whole diet. ND of foods was calculated within and across thirteen food groups as defined in the Food Composition Table for Bangladesh<sup>3</sup>. Several methods such as Naturally Nutrient Rich (NNR) score and Nutrient Rich Food Index (NRF) are used to calculate ND. NNR and NRF scores allow consumers to identify and select appropriate nutrient-dense foods. Leafy and non-leafy vegetables are the most nutrient dense food groups relative to their low energy density among the 15 food groups<sup>4</sup>, followed by fruits, fish, and eggs which are nutrient dense with less energy density. Leafy and non-leafy vegetables, fruits, fish, meat, poultry, eggs, and milk have high to moderate nutrient density.

**Relating the Nutrient Density of the foods/food groups with Energy cost:** The relation between cost of foods expressed as taka/100 Kcal with NRF9.3/100 Kcal showed that leafy vegetables (e.g., amaranth leaves- slender, green, and red), jute leaves, bottle gourd leaves, Indian spinach) provide the highest nutrient density return per taka with minimum energy content. Local seasonal fruits were identified as the least costly in terms of nutrient return per taka within the fruit group. Cereals provide the highest energy density return per taka, followed by sugar, fats, oils, and pulses. Sugar provides the lowest nutrient return per taka, followed by meat, poultry and fish, fruits, and milk due to their high price. Overall, fruits, leafy vegetables, and non-leafy vegetables are nutrient dense with low energy density, while meat, poultry and fish, egg, and milk are nutrient dense with medium energy density. Figure 1 shows the nutrient density of a range of foods in terms of cost (Taka/100 kcal). Vegetables and fruits have high nutrient density at low cost.

**Figure 1:** Energy cost vs. nutrient density NRF9



**Affordability of diets:** The retail prices of food items from a market survey were used to estimate the costs of three diets for a reference woman doing moderate physical activity. The three reference diets of increasing quality are (i) energy sufficient diet (ESD) meeting calorie needs for energy balance, (ii) nutrient adequate diet (NAD) providing adequate levels of energy and all essential nutrients required for a healthy and active life, and (iii) recommended healthy diet (RHD) meeting the recommendations of the food-based dietary guidelines of Bangladesh. The costs of these diets were compared with poverty lines and household food expenditures as reported in the Household Income and Expenditure Survey, 2016, to estimate the affordability of the reference diets.

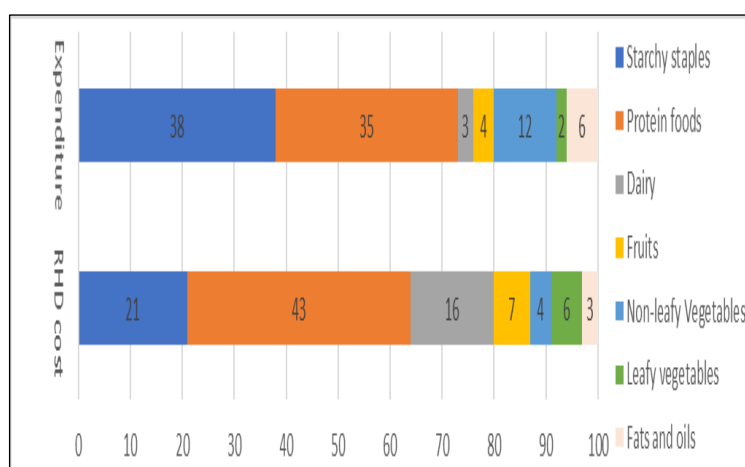
For a moderately active woman of reproductive age, the daily cost of ESD, NAD, and RHD would be 19.2 BDT, 38.1 BDT, and 83 BDT, respectively, in Bangladesh.

The increasing costs of the reference diets with their increasing quality were observed across all divisions and places of residence. Overall, RHD costs 133 percent more than the NAD that meets the requirements for energy and essential nutrients and more than 4 times the cost of the diet that meets only the dietary energy needs through a starchy staple (i.e., ESD). In terms of place of residence, the cost of RHD was higher in urban than rural areas, while those of ESD and NAD were higher in rural areas.

While the NAD is affordable for virtually the whole population (98.4%) using optimum combinations of nutrient-rich foods available in Bangladesh, a diversified, health-promoting diet (i.e., RHD) remains unaffordable for about 40% population. The burden of unaffordability of RHD is significantly greater in rural (42%) than urban (39%) areas. This may be counterintuitive given that the cost of RHD is greater in urban areas. However, the level of expenditures on foods by rural households is so low (perhaps due to lower purchasing power) that RHD remains unaffordable despite the assumption of a greater availability of local diverse foods in rural areas.

When compared to the national lower poverty line (LPL) (i.e., the level of income that the poorest people generally spend on food), the monthly costs of a NAD diet for an adult in Bangladesh are 46.5% and 50.2% of LPL in urban and rural areas, respectively. This puts NAD well within reach of even those living just below the poverty line across all divisions. However, households were found to heavily spend their money on cereals (38%) which could be used to increase their expenditure on non-cereal foods, animal source protein foods and fruits) to make their diet nutritionally adequate and healthy (Figure 2).

**Figure 2:** Comparison of % contribution to observed expenditure by households and cost in the RHD by food groups



<sup>3</sup> Shaheen et al., (2013). Food Composition Table for Bangladesh, INFS, DU/GoB/EU/USAID/FAO

<sup>4</sup> Cereals, pulses and legumes, non-leafy vegetables, leafy vegetables, roots and tubers, nuts and seeds, spices, fruits, fish, meat and poultry, eggs, milk and milk products, and fats and oils

## What can Policymakers do?

- Strategic attention and action are required to promote healthy food purchase and consumption behaviour (i.e., reallocating expenditure share to a diversity of food groups). With households spending more on cereals than is necessary for a healthy diet, appropriate guidance is required on nutrient composition and nutrient density of foods that have implications for healthy diets.
- Updating food-based dietary guidelines for Bangladesh encompassing age, sex, physiological stage, and physical activity level-specific recommendations could be an essential starting point. The guidelines should be widely disseminated and their use promoted.
- Given that price is an important factor in food choice, especially for low-income consumers, a broader set of food groups for healthy diets needs to be made more affordable and accessible. Pricing strategies need to explicitly include healthy food choices, preferences, and nutrition considerations for consumers.
- Food, agriculture, and nutrition policies should incorporate issues of nutrient density of foods in food diversification interventions and enable support to allow the flow of diverse nutritious foods into markets.
- Nutrition education and behaviour change communication strategies would need to sensitize the demand and enhance the consumption of nutrient dense foods. Nutrition messages should complement social protection programs for improving diets.



This fact sheet presents policy recommendations of a research study undertaken by the *Institute of Nutrition and Food Science and Institute of Health Economics, University of Dhaka*, with support under the Research Grants Scheme (RGS) of the Meeting the Undernutrition Challenge (MUCH) project. MUCH is implemented in collaboration with the Food Planning and Monitoring Unit of the Ministry of Food with technical support from the Food and Agriculture Organization of the United Nations (FAO).

MUCH is financially supported by the European Union (EU) and the United States Agency for International Development (USAID). The opinions expressed in this fact sheet are attributed to the research team and do not necessarily reflect those of the Government of Bangladesh, FAO, EU or USAID. For further information and comments: [fpmu.gov.bd](http://fpmu.gov.bd), Food Planning and Monitoring Unit (FPMU), Ministry of Food, Khaddya Bhaban, 16 Abdul Ghani Road, Dhaka-1000, Bangladesh