What are food groups?

Foods have been categorized into 10 groups to help people make choices from different food groups. Adequate quantities of foods from at least 5–7 food groups should be consumed on a daily basis (Table 1.1). Other foods may be consumed at least two to three times a week. This method of ensuring diversity and variety within groups will meet adequacy of most nutrients such as essential amino acids (protein), essential fatty acids, vitamins, minerals, phytonutrients, fibre and bioactive substances. Spices like turmeric, cumin, ginger, garlic, cinnamon, pepper and cloves are rich in antioxidants and could be part of a balanced diet.

Adequate quantities of foods from at least 5–7 food groups should be consumed on a daily basis.

The quantities of foods needed to meet the nutrient requirements vary with age, gender, physiological status and physical activity. A balanced diet should provide not more than 45% calories (energy) from cereals and millets (Nutricereals: diversify staples with millets) and up to 15% calories from pulses, beans and meat (Table 1.2a & 1.2b). Rest of the calories should ideally come from nuts, vegetables, fruits and milk. In other words, this will ensure 50%–55% of total calories from carbohydrates, 10%–15% from proteins and 20%–30% from dietary fats.

Table 1.1. Food Groups

1	**Cereals and millets**	Rice, wheat, millets and other cereals, etc.	
2	**Pulses**	Lentil, green gram, chickpea, rajma, cowpea, etc.	
3	**Vegetables**	Seasonal vegetables	
4	**Nuts, oil seeds, oils and fats**	Peanuts, walnuts, almonds, pistachio, hazel nuts, and other nuts, vegetable oils, etc.	
5	**Green leafy vegetables (GLV)**	Seasonal GLVs	
6	**Fruits**	Seasonal fruits	
7	**Dairy**	Milk, curd and butter milk	
8	**Roots and tubers**	Beetroot, radish, carrot, tapioca, sweet potato, etc.	
9	**Flesh foods**	Marine fish, poultry and lean cut meat	
10	**Spices and herbs**	Turmeric (haldi), ginger, mustard, pepper, cumin, corriander (dhania), etc.	

The 'My Plate for the Day' (Figure 1.3) developed by the ICMR-National Institute of Nutrition provides a simple guidance to achieve a balanced diet sourcing energy from different food groups. Tables 1.2a & 1.2b show the percent calories from different food groups that would ensure appropriate balance of all nutrients. The plate typically illustrates proportion of foods from different food groups to be sourced for a 2000 Kcal Indian diet. The proportion of each of the food groups serve an important function. The plate recommends sourcing of macronutrients and micronutrients from a minimum of 10 food groups with vegetables, fruits, green leafy vegetables, tubers and roots forming essentially half the plate of the recommended foods per day. At least half of the recommended cereals should be whole grains such as millets, which are rich sources of micronutrients such as vitamins and minerals, and also provide antioxidants, phytonutrients, fibre and bioactive compounds and induce favourable changes in the gut microbiota (microbes). Millets can be consumed to the extent of 30%–40% of total recommended cereals in raw weight.

Figure 1.3. My Plate for the Day for 2000 Kcal

The energy cut-off level is 250 Kcal for every 100g of cooked food.

Table 1.2a. Nutrients from 'My Plate for the Day' (Vegetarian)

Food groups (2000 Kcal)	Foods to be consumed raw weight (g/day)	% of Energy from each food group/day	Total Energy from each food group/day (Kcal)	Total crude protein from each food group/day (g)	Total fat from each food group/ day (g)	Total Carbohydrates from each food group/day (g)
Cereals (incl. millets)	250	42	~843	~ 25	~5	~172
Pulses	85	14	~274	~20	~3	~42
Milk/curd (ml)	300	11	~216	~10	~13	~16
Vegetables+, Green leafy vegetable (GLV)	400	9	~174	~10	~2	~28
Fruits#	100	3	~56	~1	~1	~11
Nuts & seeds	35	9	~181	~6	~15	~6
Fats & oils	27	12	~243	0	~27	0
Total	1200	-	~2000	~72g (15% energy (Kcal) from total protein)	~ 66g (30% energy(Kcal) from total fat)	(55% energy (Kcal) from total carbohydrates)

Note: One may consume sugar, but it must be restricted to 25–30 grams per day. To adjust the total calories, cereals must be reduced if sugar is taken.

+ Prescribed amount of vegetables (excluding potato) may be consumed either in cooked form or salad # Prefer fresh fruits (avoid juices)

Table 1.2b. Nutrients from 'My Plate for the Day' (Non-vegetarian)

Food groups (2000 Kcal)	Foods to be consumed raw weight (g/day)	% of Energy from each food group/ day	Total Energy from each food group/ day (Kcal)	Total protein from each food group/ day (g)	Total fat from each food group/ day (g)	Total Carbohydrates from each food group/day (g)
Cereals (incl. millets)	260	45	~876	~ 25	~5	~178
Pulses*	55	9	~177	~ 13	~2	~27
Chicken/meat	70	5	~103	~15	~5	0
Milk/curd (ml)	300	11	~216	~10	~13	~16
Vegetables+, Green leafy vegetable (GLV)	400	8	~184	~10	~2	~21
Fruits#	100	3	~56	~1	~1	~11
Nuts & seeds	30	11	~155	~5	~12	~6
Fats & oils	27	12	~243	0	~27	0
Total	1242	-	~2000	~ 79g (16 % Energy)	~ 67g (30 % Energy)	-

+ Prescribed amount of vegetables (excluding potato) may be consumed either in cooked form or salad # Prefer fresh fruits (avoid juices)

Dietary fibre, antioxidants and phytonutrients have positive health benefits. Antioxidants such as vitamins C and E, betacarotene, riboflavin and selenium protect the human body from free radical damage. Other phytonutritents such as polyphenols, flavones, etc. also offer protection against oxidant damage.

Nutritive values (raw foods) of different food groups are provided in Tables 1.3–1.5. Model balanced diets for adult men, adult women and for adolescents, including information on quantity of different food groups for sample menu plans are presented in Table 1.6

What are nutrient requirements, Recommended Dietary Allowances (RDA) & Estimated Average Requirements (EAR)

Nutrient requirements are the quantities of nutrients that healthy individuals must obtain from food to meet their physiological needs. The ICMR-NIN Nutrient Requirements-2020 Report (Updated-2023), defines the nutrient requirements for Indians, based on concepts related to the distribution of nutrient requirements in normal individuals. The mean of nutrient requirements distribution is called the Estimated Average Requirement (EAR) and the 97.5th percentile of the requirement distribution is called the

Recommended Daily Allowance (RDA). The EAR is used to assess the nutrient adequacy of individuals or population groups, and is also used for planning the dietary nutrient requirements for healthy individuals or population groups. However, while diet planning for individuals and populations is based on EAR, the RDA is intended for the purpose of supervised supplementation in deficient individuals. To prevent the risk of adverse side effects associated with excessive intake of nutrients, this report also provides Tolerable Upper Limit (TUL) for some important nutrients.

Table 1.3. Average values of macronutrients and dietary fibre in various food groups (Per 100g raw weight)

Foods	Protein (g)	Fat (g)	Carbo hydrates (g)	Energy (Kcal)	Total dietary fibre (g)
Cereals	9.3	1.2	72	343	6
Millets	9.9	2.7	65	330	7
Pulses	22.8	3.0	49	323	12
GLVs	3.8	0.7	5	45	2
Roots & tubers	1.5	0.2	12	59	2
Vegetables	1.8	0.4	5	35	2
Nuts	17.5	41.3	18	516	9
Fruits	1.0	0.6	11	59	2
Meat & poultry	20.8	6.8	0	250	0
Fish & sea foods	18.4	3.1	2	110	0
Milk	3.1	4.2	5	72	0
Egg	13.3	10.0	1	147	0
Dry spices	8.5	10.0	31	240	17
Milk products	21.6	18.6	16	337	0
Dry fish	55.5	5.0	1	271	0
Cooking oil/fats		100.0		900	
Table sugar	0	0	100	400	0

Source: Indian Food Composition Tables 2017 & Nutritive Values of Indian Foods

Diet planning for individuals and populations is based on EAR, the RDA is intended for the purpose of supervised supplementation in deficient individuals.

The recommended level of nutrients depends upon the 'bioavailability' of nutrients from a given diet. The term 'bioavailability' indicates what is absorbed and utilized by the body. The nutrient requirements are presented for physiological groups such as infants, pre-schoolers, children, adolescents, pregnant women, lactating mothers and adult men and women, taking into account of their physical activity. However, in practice, fluctuations in intake may occur depending on the food availability and demands of the body. But the average requirements need to be satisfied over a period of time.

Carbohydrates

The major sources of carbohydrates include cereals and millets. Other sources of carbohydrates are grains, pulses (lentils, beans and peas), nuts, milk, fruits and vegetables. All plant foods have carbohydrates.

Carbohydrates are either simple or complex, and are major sources of energy in all human diets. They provide energy of 4 Kcal/g. The simple carbohydrates, glucose and fructose are found in fruits, vegetables and honey. Sucrose and lactose are disaccharides; while lactose is found in milk, sucrose is the table sugar. Starches and fibre are the two forms of the complex carbohydrates, both are associated with most plant foods such as cereals, millets, pulses, vegetables and tubers. Fibre is the indigestible part of vegetables, fruits, whole grains, pulses, nuts and seeds. These (fibre) are cellulose in vegetables and whole grains, while gums and pectin are present in vegetables, fruits as well as cereals. Dietary fibre delays and retards absorption of carbohydrates and fats and increases the satiety value. Diets rich in fibre reduce glucose and lipids in blood, and improves insulin sensitivity. It also increases the bulk of the stools.

Proteins

Proteins are primary structural and functional components of every living cell. About half the proteins in our