2. Functions of food

Food extends far beyond "fuel." Its multiple roles can be grouped into **physiological**, **psychological**, and **socio-cultural/economic** domains. Understanding these layers helps dietitians craft practical advice that optimises health while respecting culture and individual preference.

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1 · Physiological (Biological) Functions

Sub-function	Core Processes Enabled	Key Nutrients/Food Groups	Illustrative Outcomes
Energy-yielding ("fuel")	Oxidative phosphorylation → ATP for basal metabolism, locomotion, thermogenesis	Carbohydrates, fats, and (to a lesser extent) proteins	Ability to perform work, maintain body temperature
Body-building & Maintenance	Cellular proliferation, tissue repair, hormone & enzyme synthesis, skeletal integrity	High-quality proteins, essential amino acids, minerals (Ca, P, Zn), water	Growth in children, wound healing, muscle hypertrophy
Regulatory & Metabolic Control	Cofactor activity, osmotic balance, neuromuscular excitability	Vitamins (B-complex, A, D, K, C), electrolytes (Na^+, K^+, Cl^-), trace minerals (I, Cr, Se)	Stable blood pressure, nerve impulse transmission, enzyme activation
Protective/Antioxidant & Immune Support	Neutralisation of reactive oxygen species, synthesis of immunoglobulins & cytokines	Vitamins A, C, E, selenium, flavonoids, carotenoids, omega-3 FA	Lower infection risk, reduced oxidative DNA damage
Hydration & Solvent	Medium for biochemical reactions, nutrient transport, thermoregulation	Water, watery foods (soups, fruits)	Adequate plasma volume, sweat evaporation, toxin excretion
Satiety & Gastro-intestinal Health	Delayed gastric emptying, microbiota modulation	Dietary fibre (soluble & insoluble), resistant starch, pre-/probiotics	Appetite control, improved bowel regularity, SCFA production
Detoxification & Excretion	Phase I–II liver enzymes, bile formation, renal clearance	Sulphur amino acids, polyphenols, adequate fluids, cruciferous veg	Biotransformation of xenobiotics, cholesterol elimination

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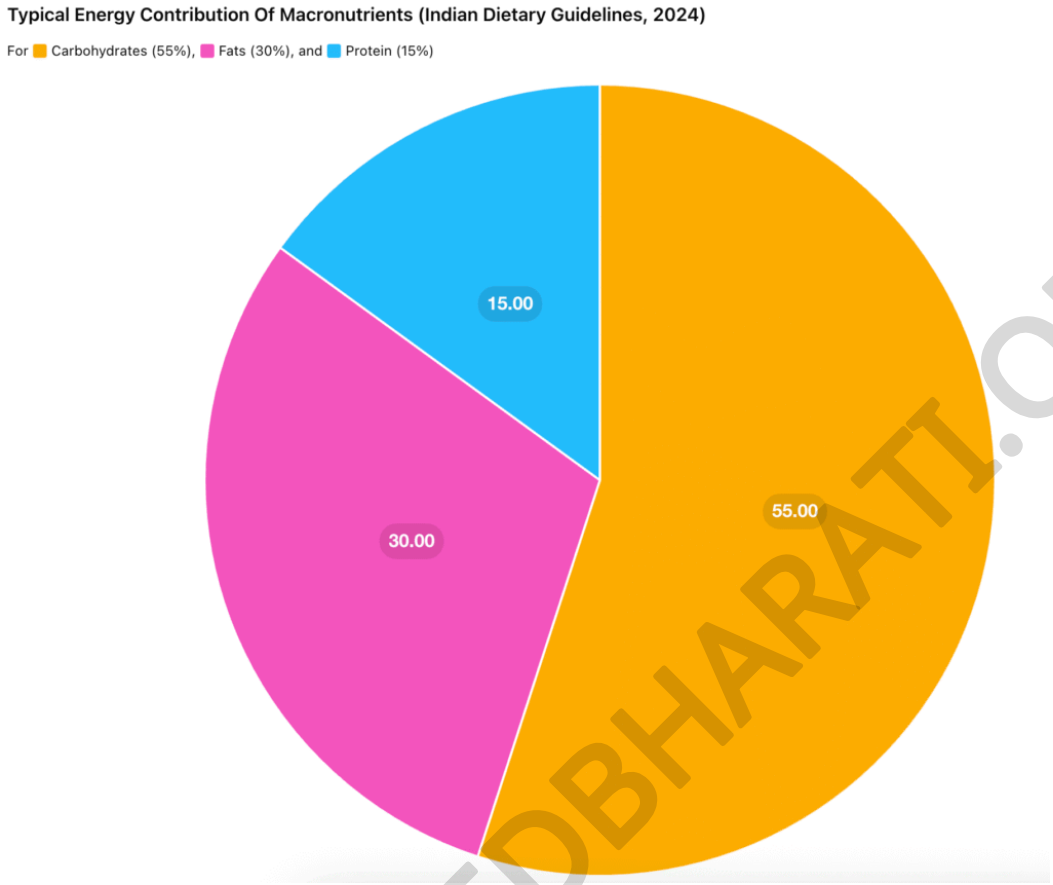
Functions Of Food – Summary Matrix

Function Category	Key Nutrients Involved	Typical Food Examples	Primary Outcome
Energy-yielding (Fuel)	Carbohydrates, Fats, Protein	Rice, Wheat, Oils, Ghee, Sugar	ATP production for work & basal metabolism
Body-building & Maintenance	Proteins, Minerals (Ca, P, Zn), Water	Milk, Pulses, Meat, Egg, Soy	Growth, muscle & tissue repair, enzyme synthesis
Regulatory & Metabolic Control	Vitamins, Minerals, Water, Electrolytes	Fruits, Vegetables, Salt, Water	Homeostasis of metabolism, nerve & muscle function
Protective/Antioxidant & Immune Support	Vitamins A, C, E; Selenium, Phytochemicals	Berries, Citrus, Nuts, Turmeric	Reduced oxidative stress, enhanced immunity
Sensory & Psychological	Flavour compounds, Tryptophan, Theobromine	Chocolate, Coffee, Spices, Herbs	Pleasure, satiety, mood modulation
Social & Cultural	Staple crops, Traditional dishes, Communal meals	Chapati, Thali, Festival sweets	Cultural identity, social bonding
Medicinal & Prophylactic	Fibres, Prebiotics, Bioactive phytochemicals	Garlic, Green tea, Yogurt, Millets	Disease prevention (e.g., fibre & CVD risk)

"Functions of Food – Summary Matrix" *– scrollable table above categorises each major function with nutrient drivers and typical food examples.*

Typical Energy Contribution of Macronutrients



- **Pie chart** – visualises *recommended energy split* (55 % carbohydrates, 30 % fats, 15 % protein) for a standard adult diet, highlighting the proportional nature of fuel nutrients.

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2 · Psychological & Sensory Functions

1. **Sensory Pleasure** – Aroma, flavour, colour, and texture stimulate salivation, gastric juice secretion, and positive emotional states (e.g., dopamine release from palatable foods like chocolate).
2. **Satiety Signalling** – Proteins and certain fatty acids trigger cholecystokinin and GLP-1, reducing subsequent intake.
3. **Mood Modulation** – Tryptophan (serotonin precursor) in milk or bananas aids calmness; caffeine and theobromine provide alertness.
4. **Comfort & Coping** – Familiar foods alleviate stress (“emotional eating”) and reinforce a sense of security.

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3 · Socio-Cultural, Economic & Environmental Functions

- **Cultural Identity & Ritual** – Festive sweets at Diwali, communal breaking of the fast (Iftar) in Ramadan, or sacramental bread in Christian liturgy.
- **Social Cohesion** – Shared meals strengthen family and community bonds; “breaking bread” signifies trust.
- **Economic Driver** – Agriculture, food processing, and hospitality sectors form a large share of national GDP and employment.

- **Communication & Status** – Choice of ingredients or dining venue can signal hospitality, wealth, or affiliation.
- **Environmental Stewardship** – Food choices (local vs. imported, plant-forward diets) influence carbon footprint and biodiversity.

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4 · Medicinal & Prophylactic Functions

Bioactive Component	Mechanism	Health Outcome
β-glucan in oats	Viscous fibre → reduced intestinal cholesterol absorption	↓ LDL cholesterol
Curcumin in turmeric	NF-κB inhibition, antioxidant	Anti-inflammatory, potential anticancer
Isoflavones in soy	Phyto-oestrogenic action	Alleviates menopausal symptoms
Prebiotic fructans in chicory	Fermentation → ↑ bifidobacteria	Improved gut health & immunity

In Ayurveda this aligns with the concept of *Ahar chikitsa*—food as the **first medicine**, prescribing specific *Pathya* (wholesome) and *Apathya* (unwholesome) diets for conditions such as *Prameha* (type 2 diabetes).

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5 · Integrated Perspective

Food's roles overlap: a bowl of curd rice simultaneously delivers fuel (carbohydrate), body-building (protein), regulatory (Ca, B-vitamins), probiotic protection, sensory comfort, and cultural resonance in South India. Effective dietetics therefore balances **quantity** (meeting energy and nutrient goals) with **quality** (minimising ultra-processed items) and **context** (culture, sustainability).

Self-Check & Application

1. **Explain** how the same food—e.g., fish curry—meets energy, body-building, and psychological functions simultaneously.
2. **Analyse** why fibre-rich millets are promoted both for physiological regulation and socio-economic sustainability in semi-arid regions.
3. **Design** a one-day menu for an office worker that harnesses at least five distinct food functions discussed.