



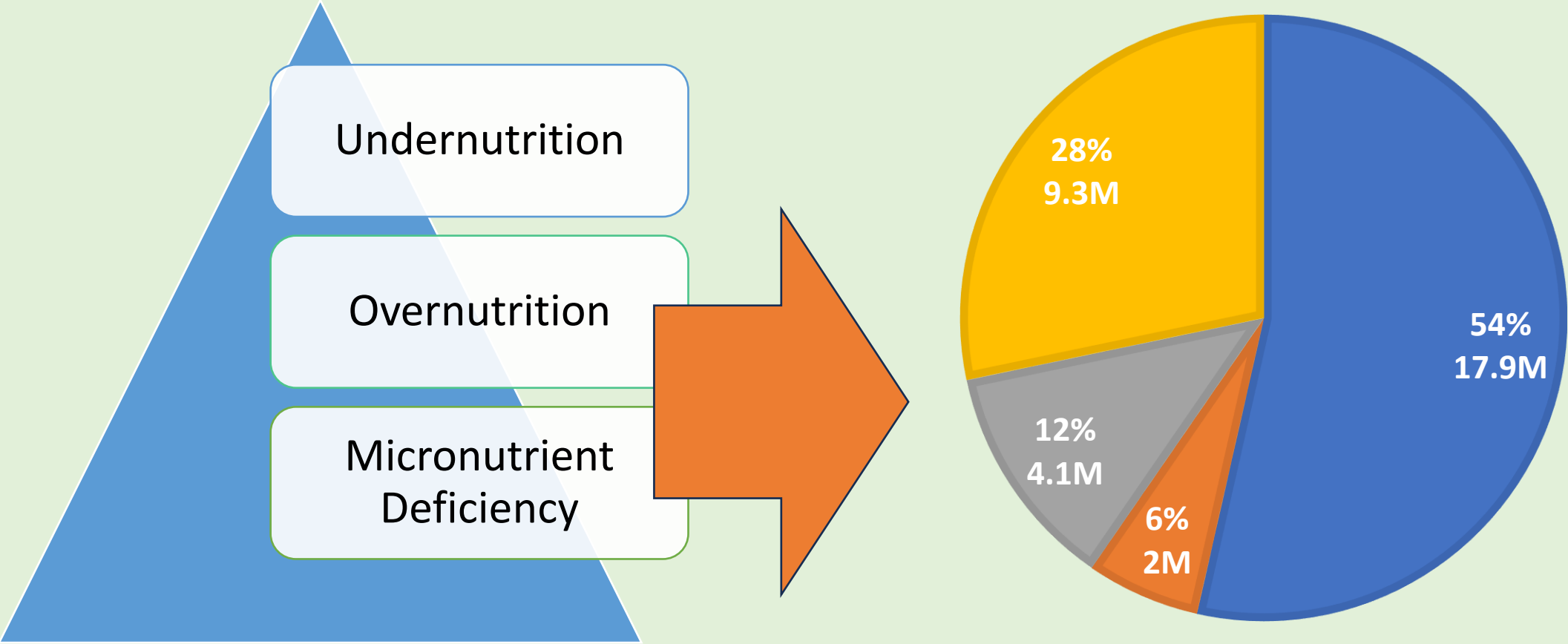
# The impact of plant-based diets on health and the environment

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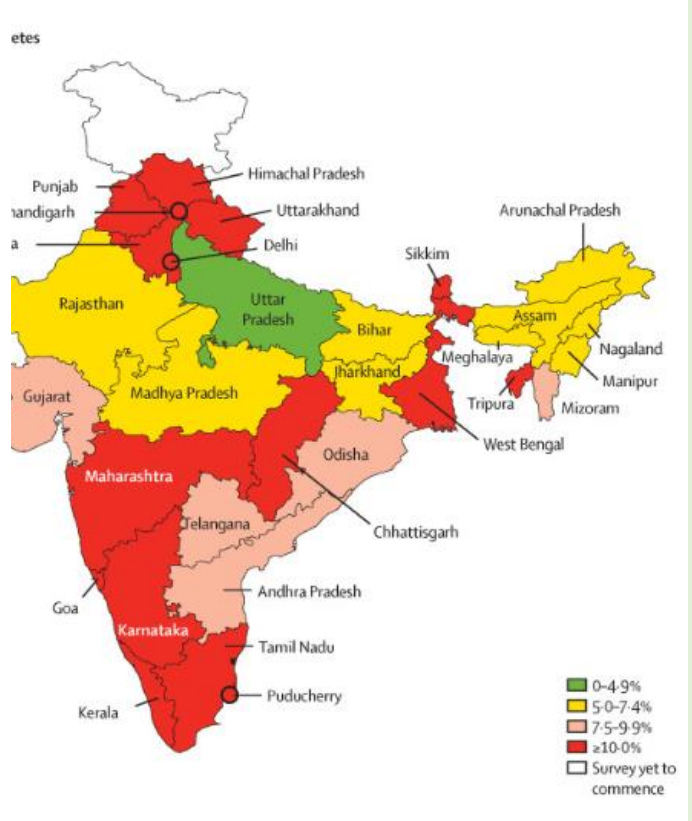
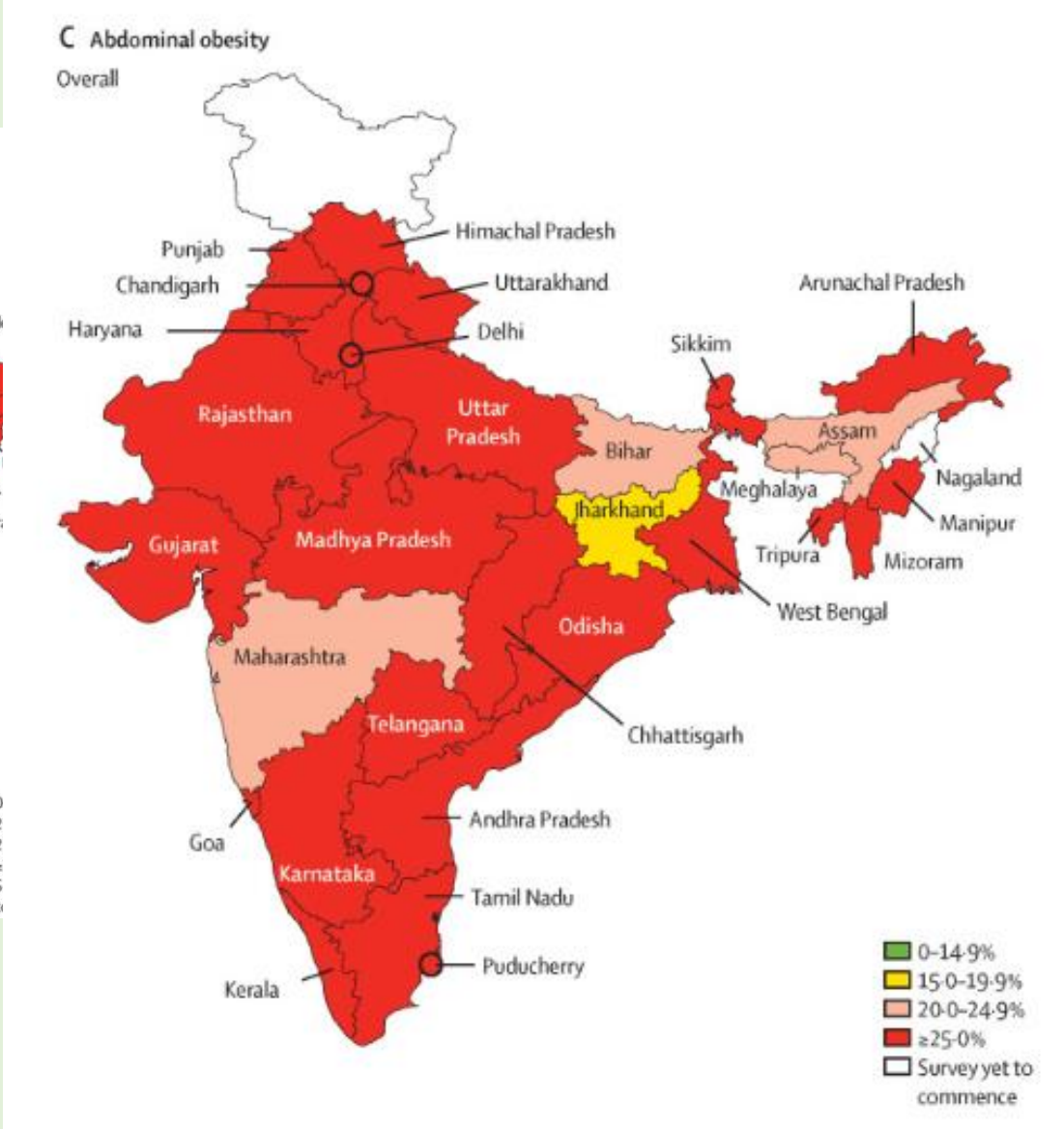
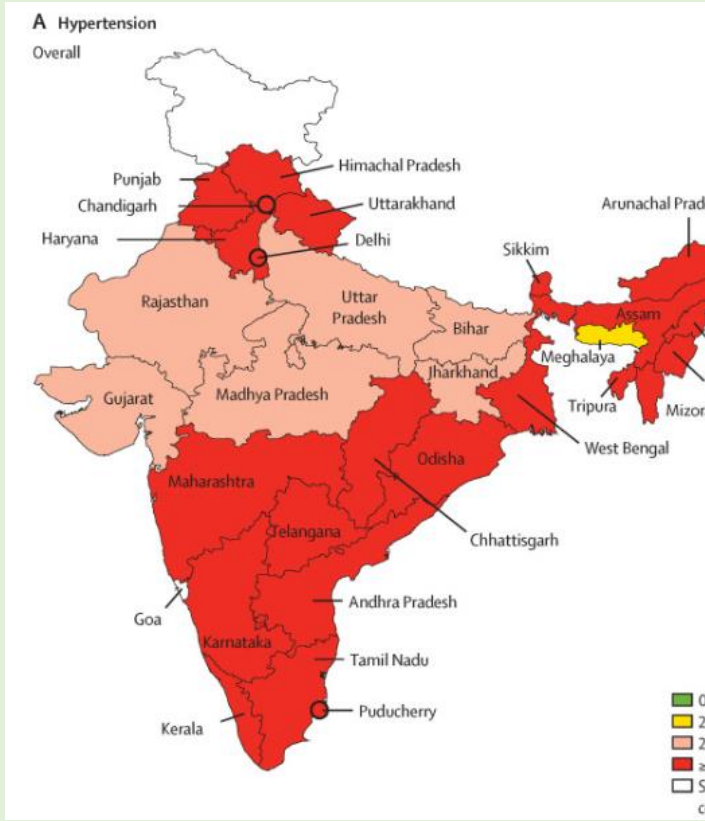
# The Global Epidemic of Non-Communicable Diseases

PERCENTAGE DEATH FROM NCDS

■ Cardiovascular diseases ■ Diabetes ■ Chronic Respiratory Issues ■ Cancer



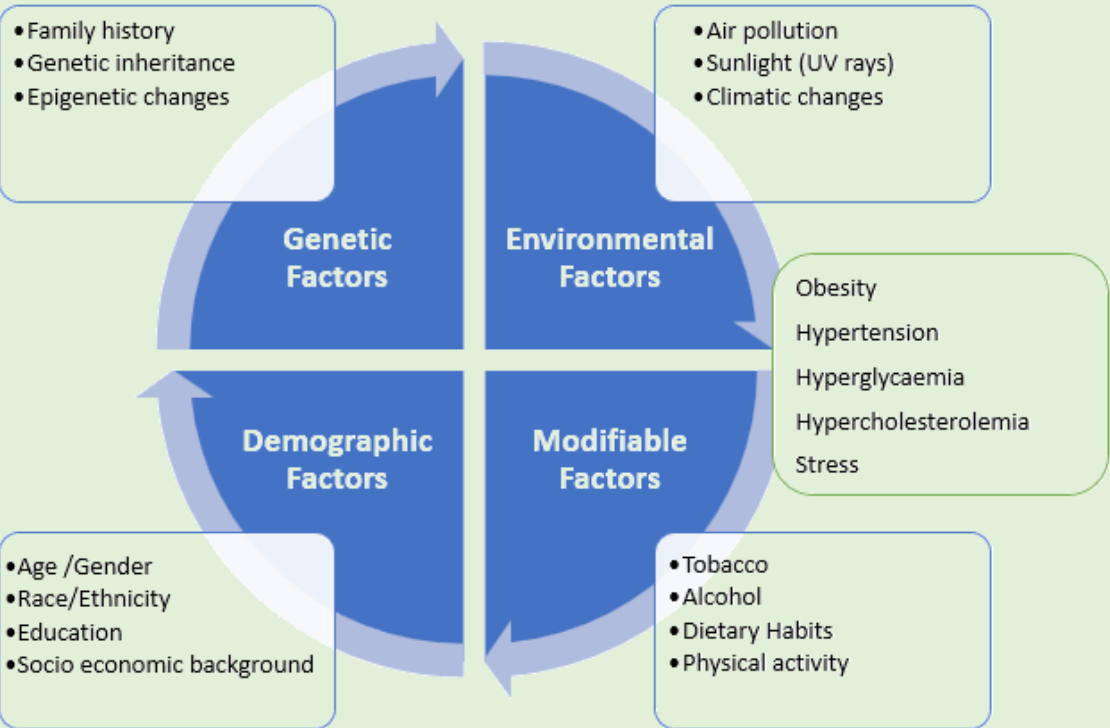
# The Global Epidemic of Non-Communicable Diseases



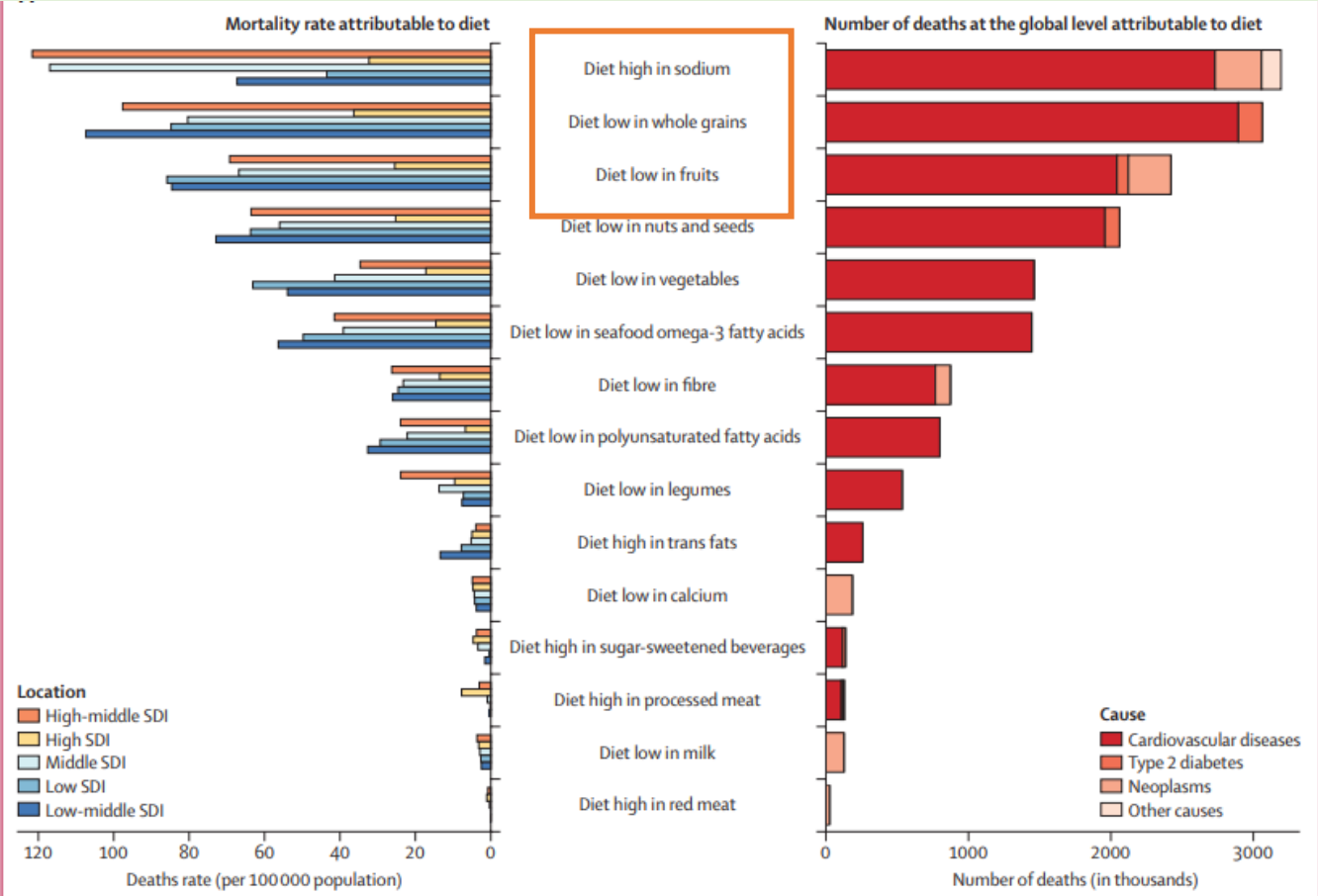
Metabolic non-communicable disease health report of India: the ICMR-INDIAB national cross-sectional study (ICMR-INDIAB-17), Mohan et al, 2023

# The role of Diet in Non-Communicable Diseases

## Risk Factors for NCDs



In 2017, **11 million deaths** were attributable to dietary factors.



Health effects of dietary risks in 195 countries, 1990–2017, Lancet, 2019



# Guidelines to Promote Cardiovascular Health

**Adjust energy intake and expenditure** to achieve and maintain a healthy body weight

**Eat plenty of vegetables and fruits**; choose a wide variety

Choose foods made mostly with **whole grains** rather than refined grains

Choose healthy sources of protein - **Mostly from plants (legumes & nuts)**

## **Fish and seafood**

Low-fat or **fat-free dairy products** instead of full-fat dairy products

If meat or poultry are desired, **choose lean cuts** and avoid processed forms

**Use liquid plant oils** (olive, safflower, corn) rather than animal fats (butter and lard) and tropical oils (e.g., coconut, palm kernel)

Choose **minimally processed foods** instead of ultra processed foods

**Minimize intake of beverages** and foods with added sugars

Choose and prepare foods with **little or no salt**

If you do not drink alcohol, do not start; if you choose to **drink alcohol, limit intake**

Adhere to this guidance regardless of where food is prepared or consumed

## **Diets that align with AHA Guidelines**

- ✓ **Dietary Approaches to Stop Hypertension**
- ✓ **Mediterranean Style**
- ✓ **Pescatarian**
- ✓ **Ovo-Lacto vegetarian**
- ✓ **Vegan**
- ✓ **Low fat**

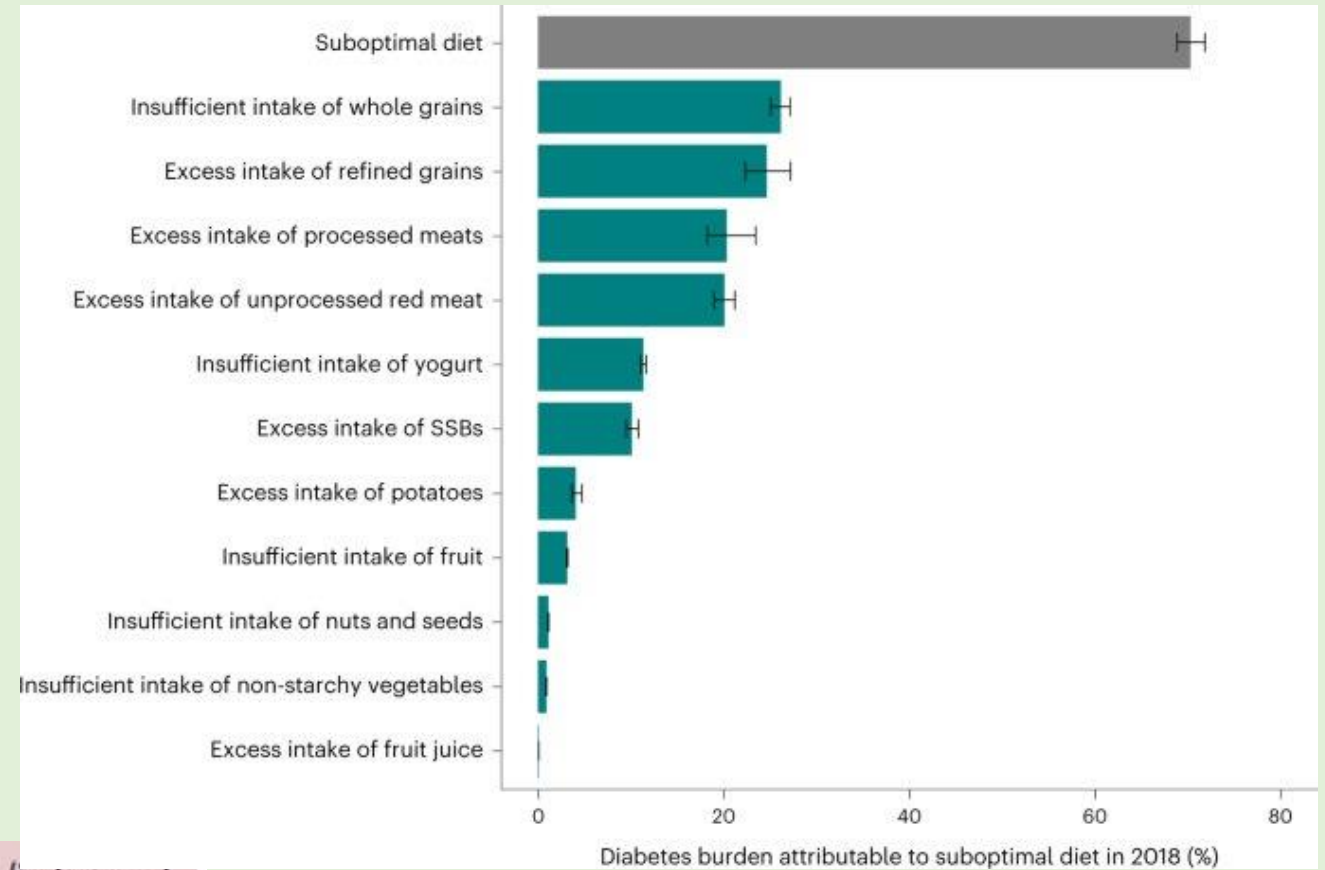
**Although all these diets have evidenced health benefits – The plant-based diet helps the environment**

# The role of Diet in Diabetes

Suboptimal intake was estimated to be attributable to **14.1 million** incident T2D cases, representing **70.3%** of new cases globally.

A **higher plant protein intake** and replacement of animal protein is associated with **lower risk of all-cause and cardiovascular mortality**.

Replacing animal with **plant proteins** leads to **small improvements in A1C and fasting glucose** in individuals with type 2 diabetes. Plant proteins are lower in saturated fat and support planetary health



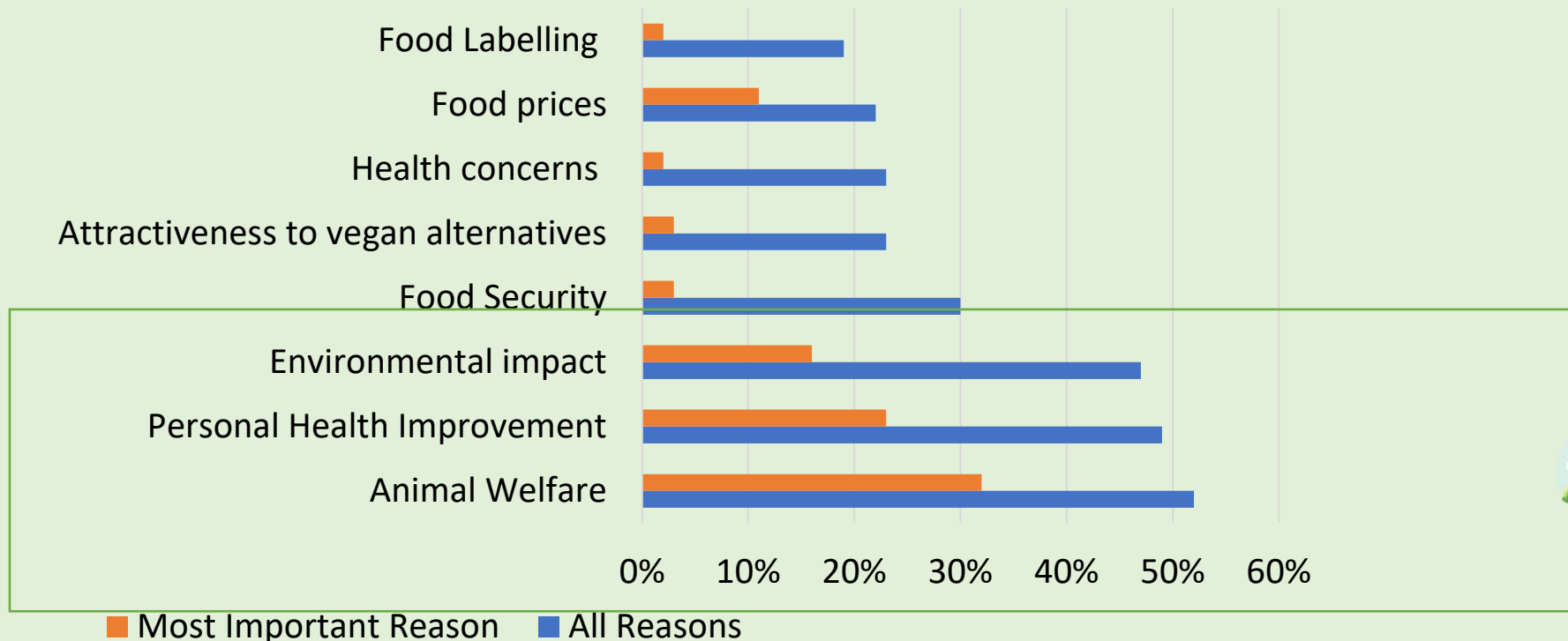
**5.13** Food-based dietary patterns should emphasize key nutrition principles (inclusion of nonstarchy vegetables, whole fruits, legumes, whole grains, nuts/seeds, and low-fat dairy products and minimizing consumption of meat, sugar-sweetened beverages, sweets, refined grains, and ultraprocessed foods) in people with prediabetes and diabetes. **B**

# Plant-Based Diet – A revolution

Plant based diets or plant forward eating constitute a diverse range of dietary patterns that emphasize **foods derived from plant sources coupled with lower consumption or exclusion of animal products.**

Vegetarian diets form a subset of plant-based diets, which may exclude the consumption of some or all forms of animal foods

## Consumer motivation to turn plant-based



# Are Plant-Based diet more sustainable?



Industrialized animal



According to a 2019 UN report, balanced diets that include plant-based foods can help address the climate crisis. The report also suggests that animal-sourced foods should be produced in a sustainable and low-emission system.

most pressing environmental issues such as water use, air pollution, and loss of biodiversity.

**emissions**—a higher share than the entire transport sector.

feeding livestock yet only provides **1/3** of the global protein supply.

and **51-91%** lesser aquatic nutrient pollution. It also takes up **47%** lesser land

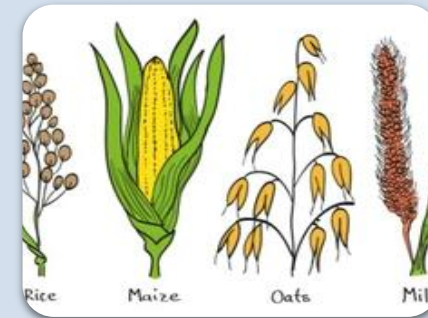
30- gas



# Protein and the Plant-Based Diet?

The sources of protein include plant and animal-based foods. Good animal-based food sources including milk, eggs, chicken, fish. These are complete proteins and have a high biological value.

However, they are less sustainable and contain cholesterol and saturated fats.



## Sources of Plant Protein in the Diet

### Legumes/Pulses

Soy

Pea

Chickpea

Kidney Bean

Lentil

Mung Bean

Navy Bean

### Nuts/oilseeds

Almonds

Peanuts

Pistachios

Cashews

Sunflower seeds

Flaxseeds

Sesame seeds

### Cereal Proteins

Wheat

Oat

Corn

Quinoa

Rice

Sorghum

Ragi

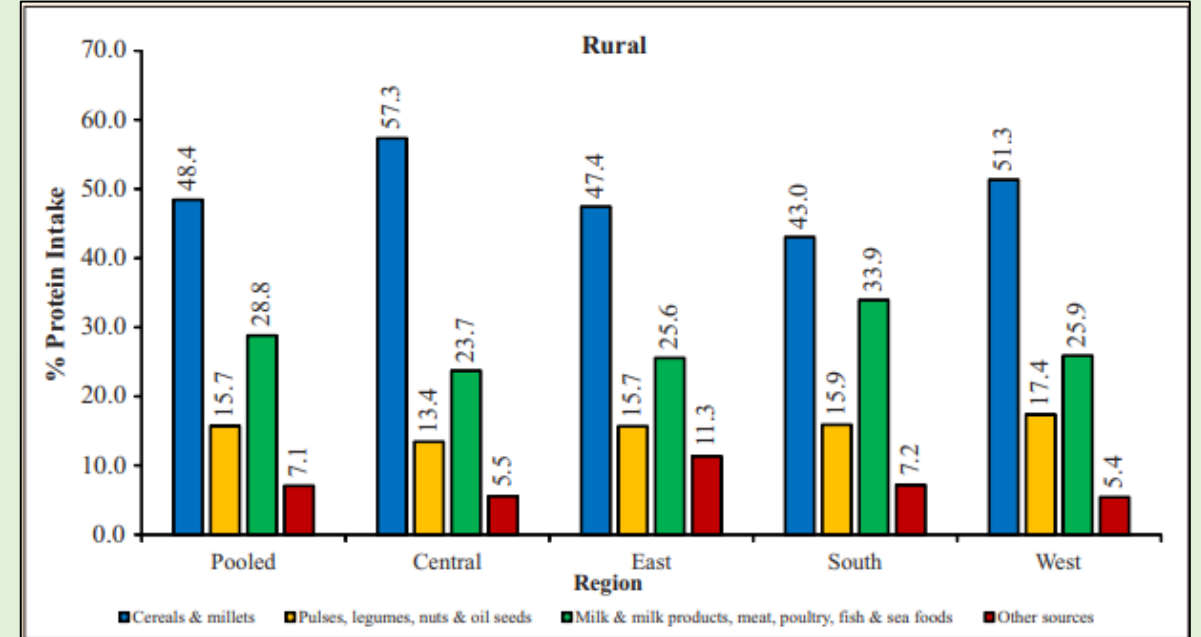
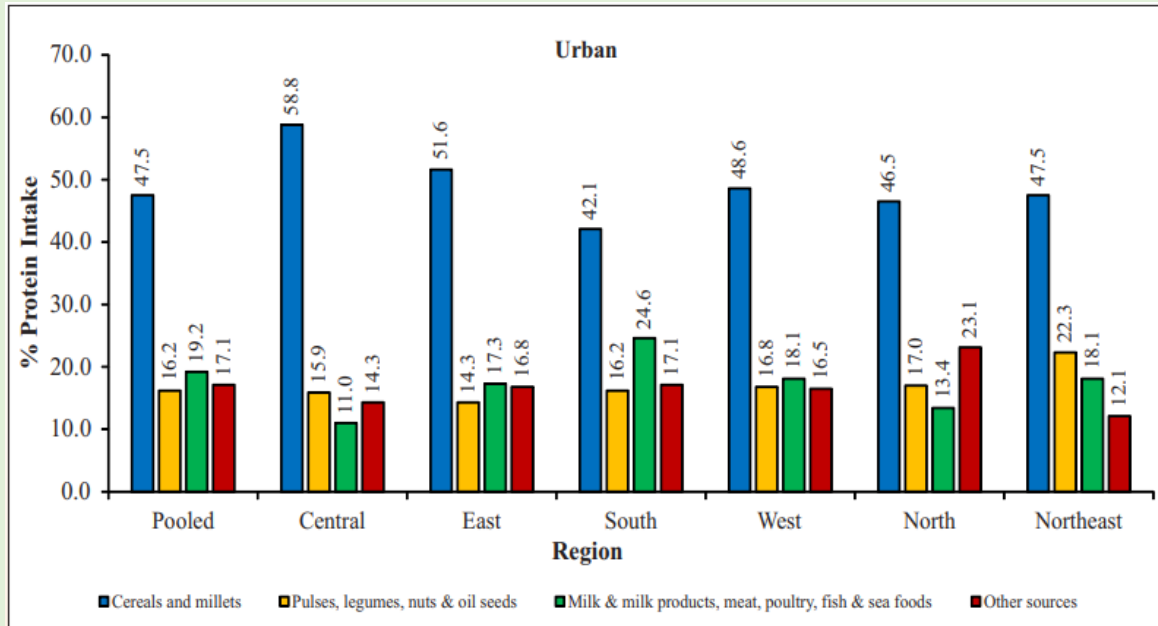
### Vegetables

Leafy greens

Jackfruit

Field & Broad Beans

# Consumption of Protein from Different Food Groups



In both, Urban and Rural India the consumption pattern to obtain protein, is from cereals and millets followed by milk and milk products.

There is a poor consumption of pulses, legumes and oilseeds.

# Understanding Oat Protein

## Available Formats

- Oat flour
- Oat milk



## Application

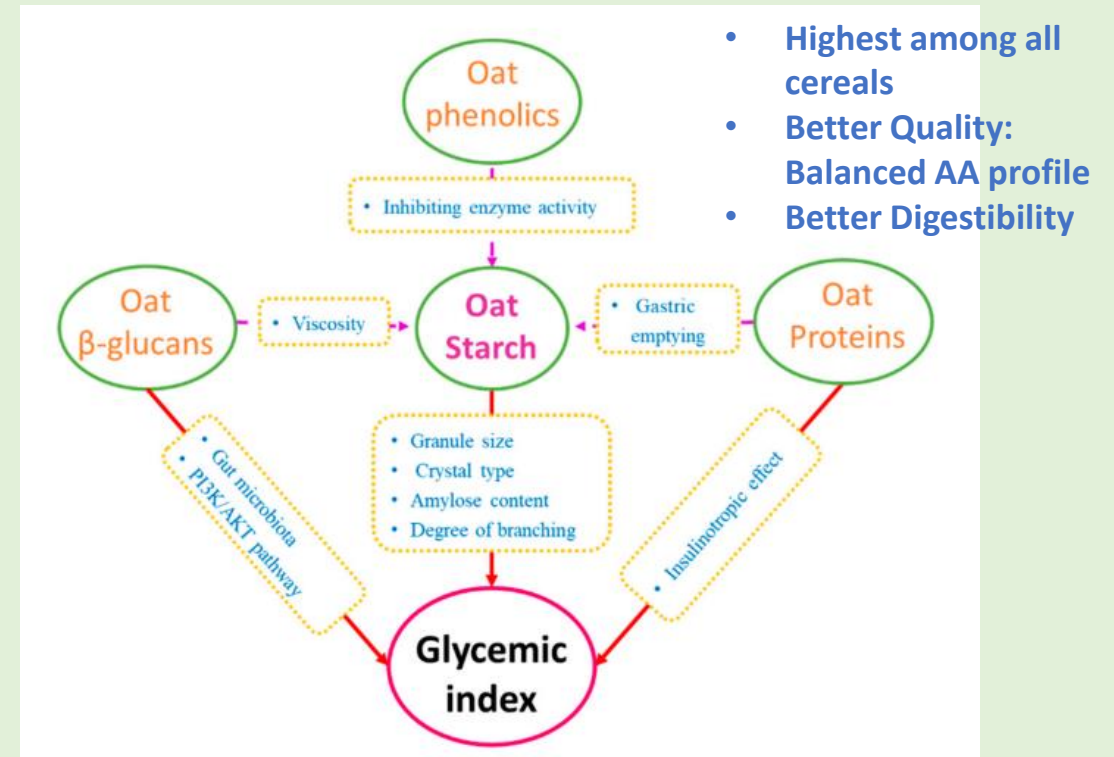
Oatmeal, dairy, Baking: bars, breads, snacks, breakfast cereals and nutritional shakes.

## Advantages

- PDCAAS Value : 0.66
- Protein content : 15%
- High glutamine, B-glucans & avenanthramides
- Gluten-free
- High stability emulsions and gelling

## Disadvantages

Limiting amino acids: Lysine  
Low solubility



- Highest among all cereals
- Better Quality: Balanced AA profile
- Better Digestibility



Good Food Institute – The protein primer, 2021  
Oat-Based Foods: Chemical Constituents, Glycemic Index, and the Effect of Processing, Zhang et al, 2021

# Understanding Soy Protein

## Available Formats

Flour (50-60% protein)  
Concentrates (65-80% protein)  
Isolates (>90% protein)

## Advantages

- PDCAAS Value : 0.99-1
- Protein content : 40%
- Phytoestrogens
- Viscosity and water binding capacity.
- Emulsification and foaming.
- Flavour Binding capacity.



## Application

- Beverage powder, creamer, frozen dessert, soup, whipped topping, dressings
- Texturized meat replacement

## Disadvantages

- Limiting AA: Sulphur containing amino acids - Methionine, and Cystine.
- Anti-nutritive: Trypsin inhibitors and hemagglutinins.
- Major Allergen
- Bitter/Beany note

The US FDA has authorized a health claim in 1999 that attempted to reduce the amount of cholesterol, and saturated fats. The argument was that eating **25 g** of soy per day would significantly **lower the risk of cardiovascular disease**.



# Understanding Peanuts

## Available Formats

- Defatted flour
- Peanut Isolates

## Advantages

- PDCAAS Value: 0.7
- Protein content: 28%
- Source of vitamin B & E, manganese, magnesium, phosphorus, fiber

**Project Peanut Butter's (PPB) outreach efforts have yielded tangible headway in reducing malnutrition in sub-Saharan Africa, while also providing local jobs.**



## Application

Peanut butter  
 Extruded crisps  
 Baked goods (including gluten-free),  
 sauces, protein supplement.

## Disadvantages

Limiting amino acids: Threonine  
 Aflatoxin risk  
 Allergen (0.6% in the USA)

Peanuts are a nutrient dense nut with the protein being plant-based: the fat being unsaturated MUFA, and the fiber are complex carbohydrate and good sources of vitamins and minerals which are all proved to be the best for human nutrition.

Peanuts are an excellent source of resveratrol, a polyphenol antioxidant which have been found to have a protective function against heart disease. Peanuts are also rich in niacin, which is biologically similar to cholesterol and may compete with cholesterol absorption.



Good Food Institute – The protein primer, 2021  
 Peanuts as functional foods – Arya et al, 2015

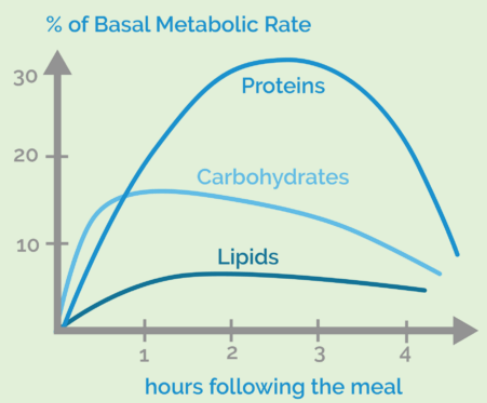
# Benefits of Protein in Weight Management

1



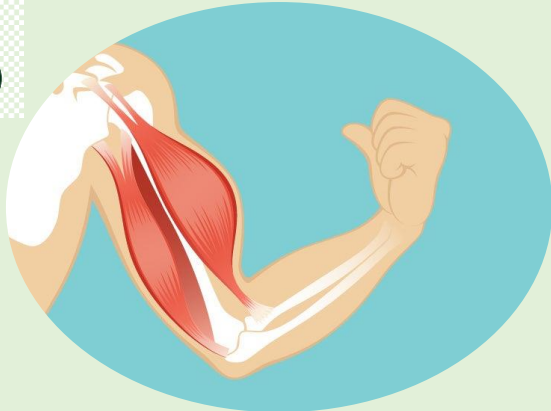
**Protein helps control appetite by stimulating satiety hormones & BCAA help provide energy**

2



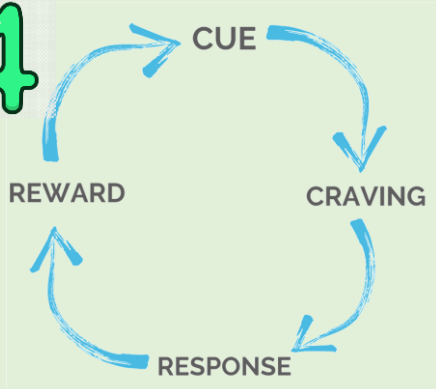
**Protein has a thermogenic effect in the body. It increases energy expenditure and has a higher BMR.**

3



**Adequate protein consumption improves body distribution with greater fat reduction and lower muscle loss**

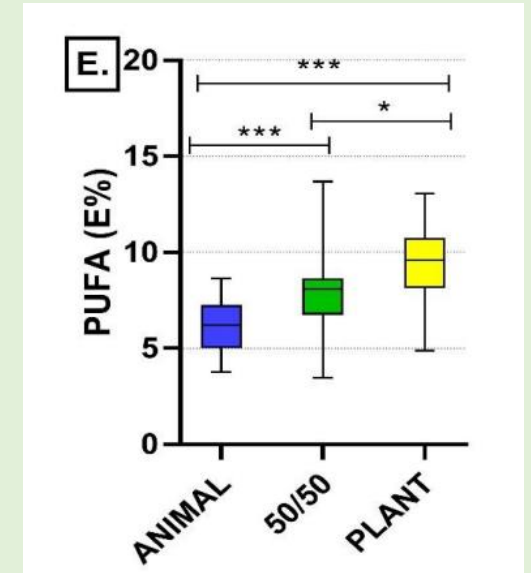
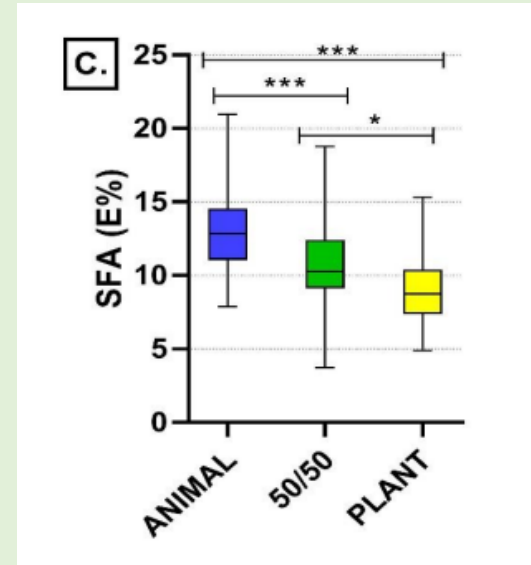
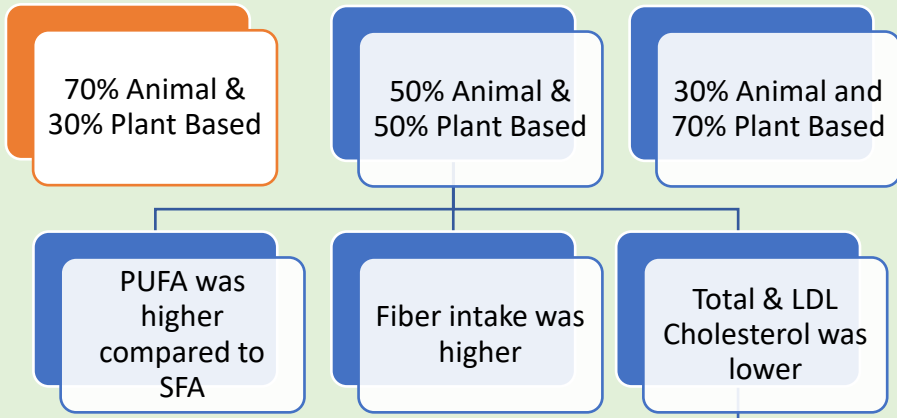
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**Protein reduces neural activation in the brain that are responsible for food motivation. Protein consumption at breakfast reduces food cravings compared to carbohydrate breakfast.**

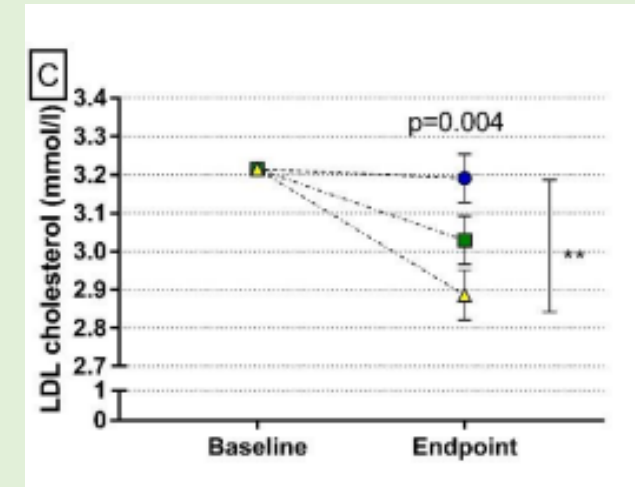
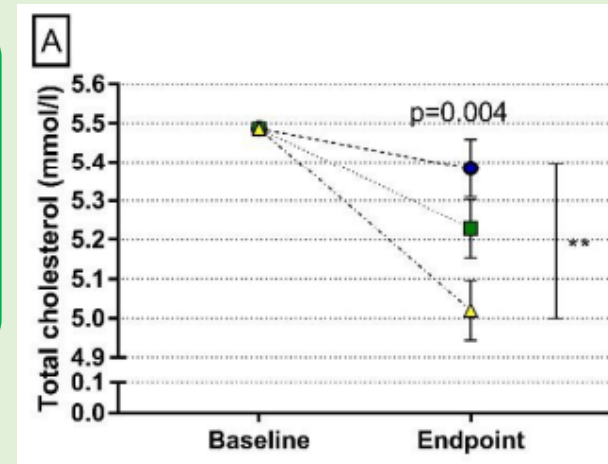
# Plant vs Animal Based Protein – Effect on Lipid Profile

Consumption of %E of SFA and PUFA when consuming plant vs animal foods



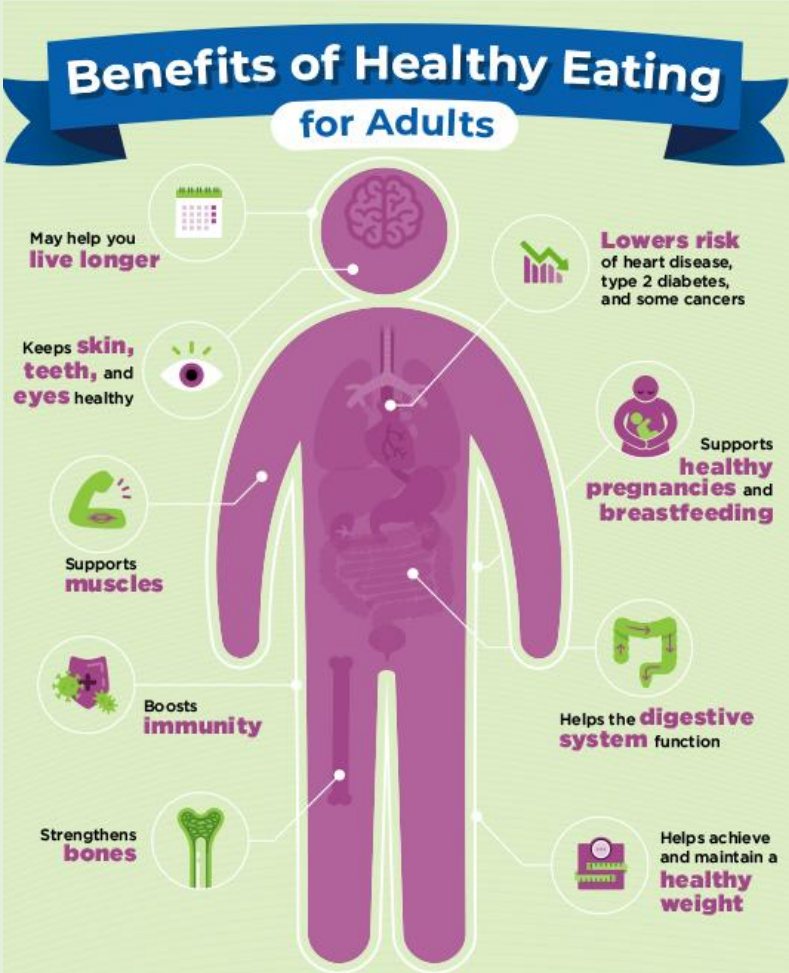
Effect of plant vs animal food on total and LDL cholesterol

**Conclusion: Replacing animal protein with plant-based protein reduced protein intake, increased fiber, improved dietary fat composition, and lead to a more favourable lipid profile**



# The role of diet and Non-Communicable Diseases

1 in 5 deaths in adults is associated with unhealthy diets.





# Plant Based Diet and Cardiometabolic Health

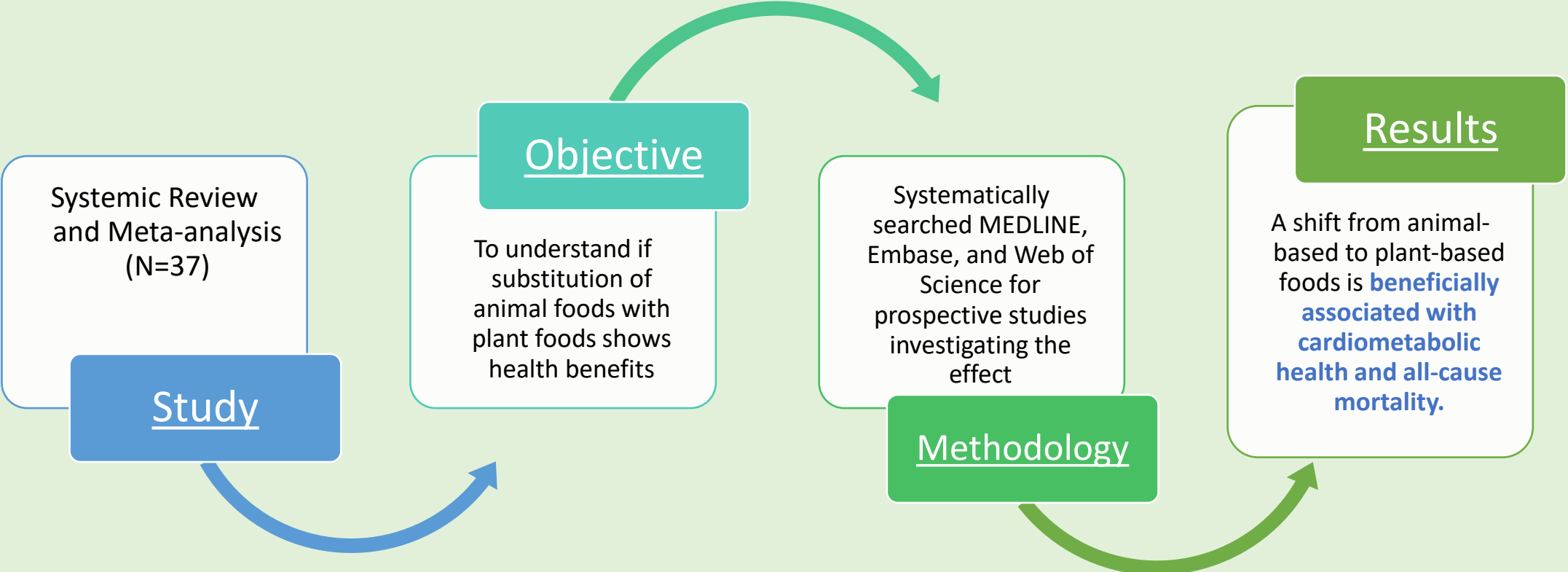


Fruits and Vegetables (400g/day)

Lowers the risk of NCDs, heart disease & stroke



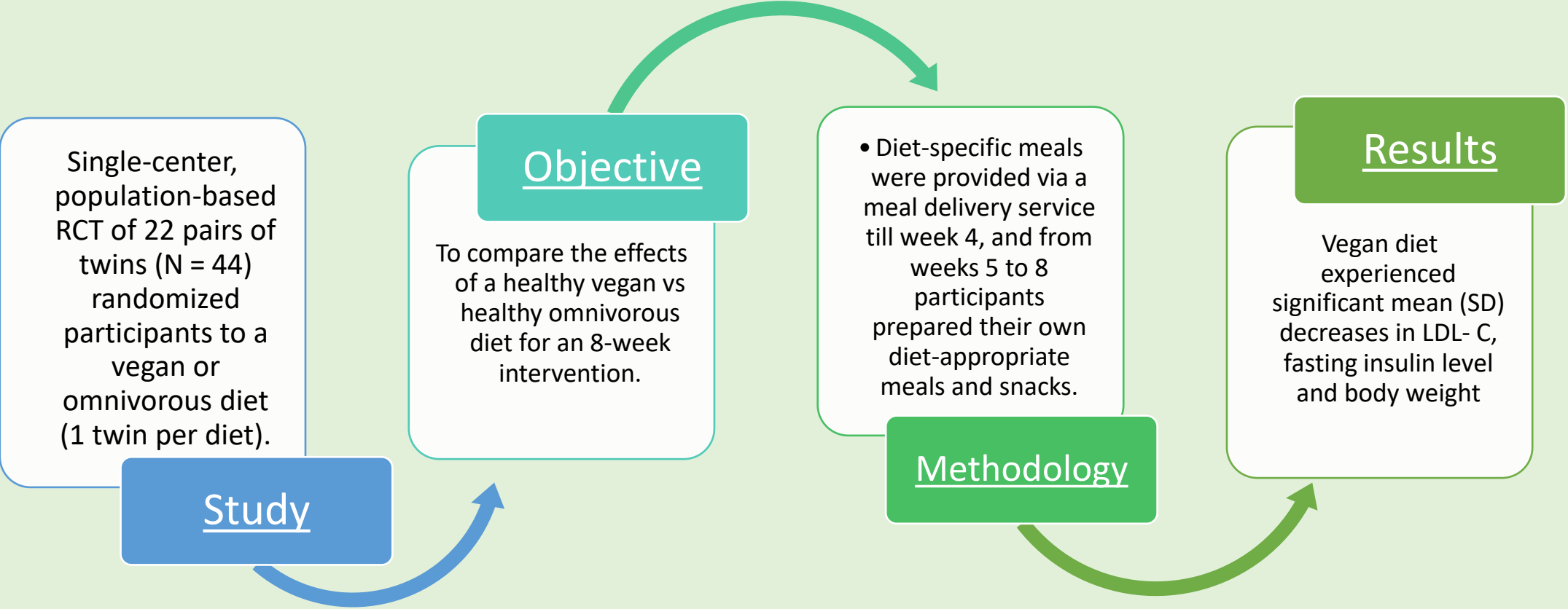
Has a protective effect against coronary heart disease



Substitution of animal-based with plant-based foods on cardiometabolic health and all-cause mortality, Neuenschwander, 2023  
WHO, 2023

# Vegan Diet and Cardiometabolic Health

Increasing evidence suggests that, compared with an omnivorous diet, a vegan diet confers potential cardiovascular benefits from **improved diet quality**



# Plant Based Diet and Diabetes



Lowers BMI which may lower diabetes risk

## Study

- A randomized single-blind controlled dietary intervention

## Objective

- To understand change in plant protein consumption would help with the phenomenon of diabetes remission

## Method

- Observational analysis – N=177 newly diabetic patients without glucose lowering drugs divided into 2 diets – Mediterranean or low-fat diet and analysed through FFQ for 60 months with a nutrition education done every 6 months

## Results

- Cox regression showed that patients increasing plant protein intake were more likely to remit from diabetes than those who decreased its intake with the remission mainly occurring in the 1<sup>st</sup> and 2<sup>nd</sup> year.
- **The increase in plant protein was associated with lower intake of animal protein, cholesterol, saturated fatty acids, and fat, and with higher intake of whole grains, fibre, carbohydrates, legumes, and tree nuts.**
- **There was a change in weight loss, glycaemic control and HbA1c.**
- **Plant-based proteins are negatively associated with T2 diabetes development**

# Plant Protein and Muscle Protein Synthesis

Although Protein Quality does affect Muscle Protein Synthesis – Increased Protein content and focusing on Leucine may also play a role.

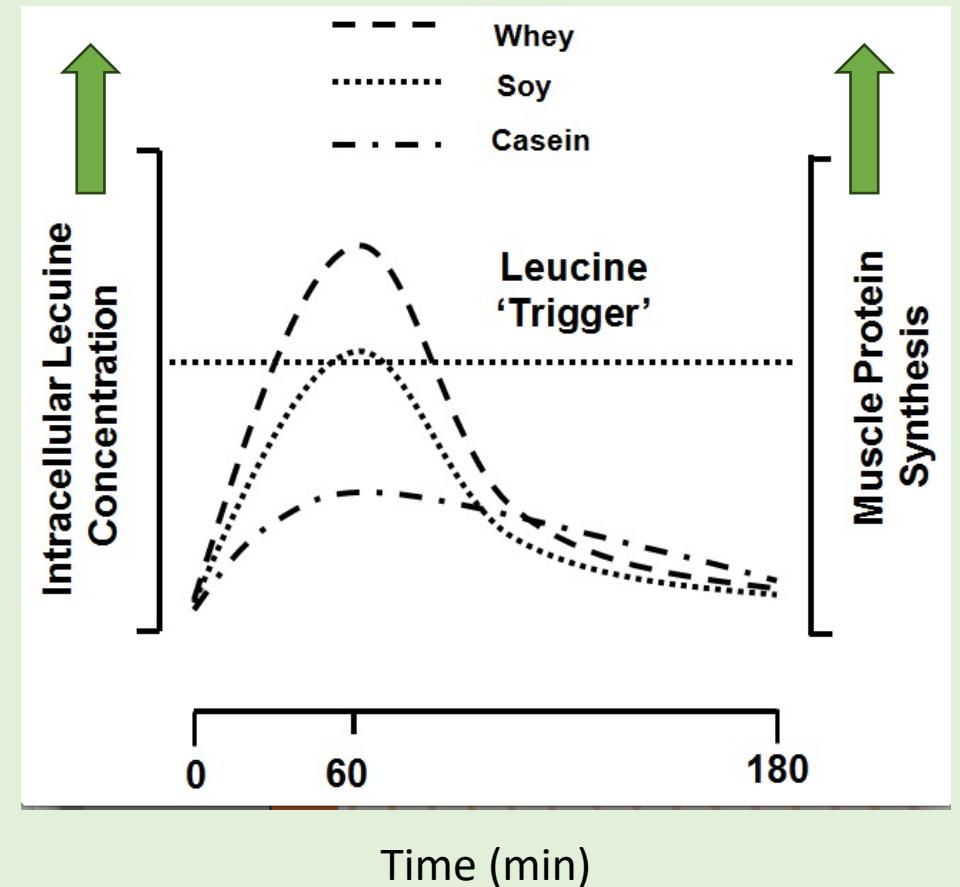
Muscle Protein Synthesis (MPS) is the driving force behind **adaptive responses to exercise**

Plant proteins consists of some limitations to affect the acute stimulation of MPS.

The absorption rate of plant vs animal proteins are variable - **Soy protein digests faster than casein but slower than whey protein.**

Leucine plays a major role in triggering the MPS m-TOR pathway. A per meal amount of **700-3000 mg** is sufficient for MPS stimulation and to retain muscles.

To achieve 2.7g of leucine - 25 g whey protein/**20 g corn/33 g potato/ 37 g brown rice/38 g pea/40 g soy/45 g wheat/47 g oat** is required.



# 8 simple ways to get started with a Plant-Based Journey



Eat lot of vegetables by filling half your plate with it.



Start your day with wholegrains like oats, millets like jowar, bajra and ragi



Change the way you think about meat. Use it as a side dish and consume smaller amounts.



Try a variety of leafy vegetables



Consume good fats (MUFA & PUFA) from nuts and oilseeds



Build a meal around a salad



Cook a vegetarian meal once a day



Have fruit for dessert

Thank you

