



Theme:

Climate Action and Food & Nutrition Security

ENVIRONMENTAL FOOTPRINTS OF INDIAN DIETS AND SOCIO-DEMOGRAPHIC DRIVERS

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Introduction

- India is the fourth largest emitter of greenhouse gases (GHG) (UNEP, 2020), with the highest crop water footprint in the world (Mekonnen and Hoekstra, 2010).
- The agriculture sector is India's second largest contributor to GHG emissions.
- Quantifying the environmental footprints of Indian diets and identifying socio-demographic drivers can inform demand-side strategies to combat climate change.

Aim

- To quantify the environmental footprints of Indian diets
- To identify the socio-demographic predictors of the dietary environmental footprints

Methodology

- The dietary intake of 930 Indian adults was collected through an online semi-quantitative food frequency questionnaire.
- India-specific footprint data for food groups was used to quantify dietary GHG emissions, green water footprint, blue water footprint, and land use footprints.
- Multiple linear regression was run to identify socio-demographic predictors of dietary environmental footprints.

Results

➤ Environmental footprints of the current sample's diet were 30 to 46 % higher than the NIN 'My Plate for the Day' (Fig. 1).

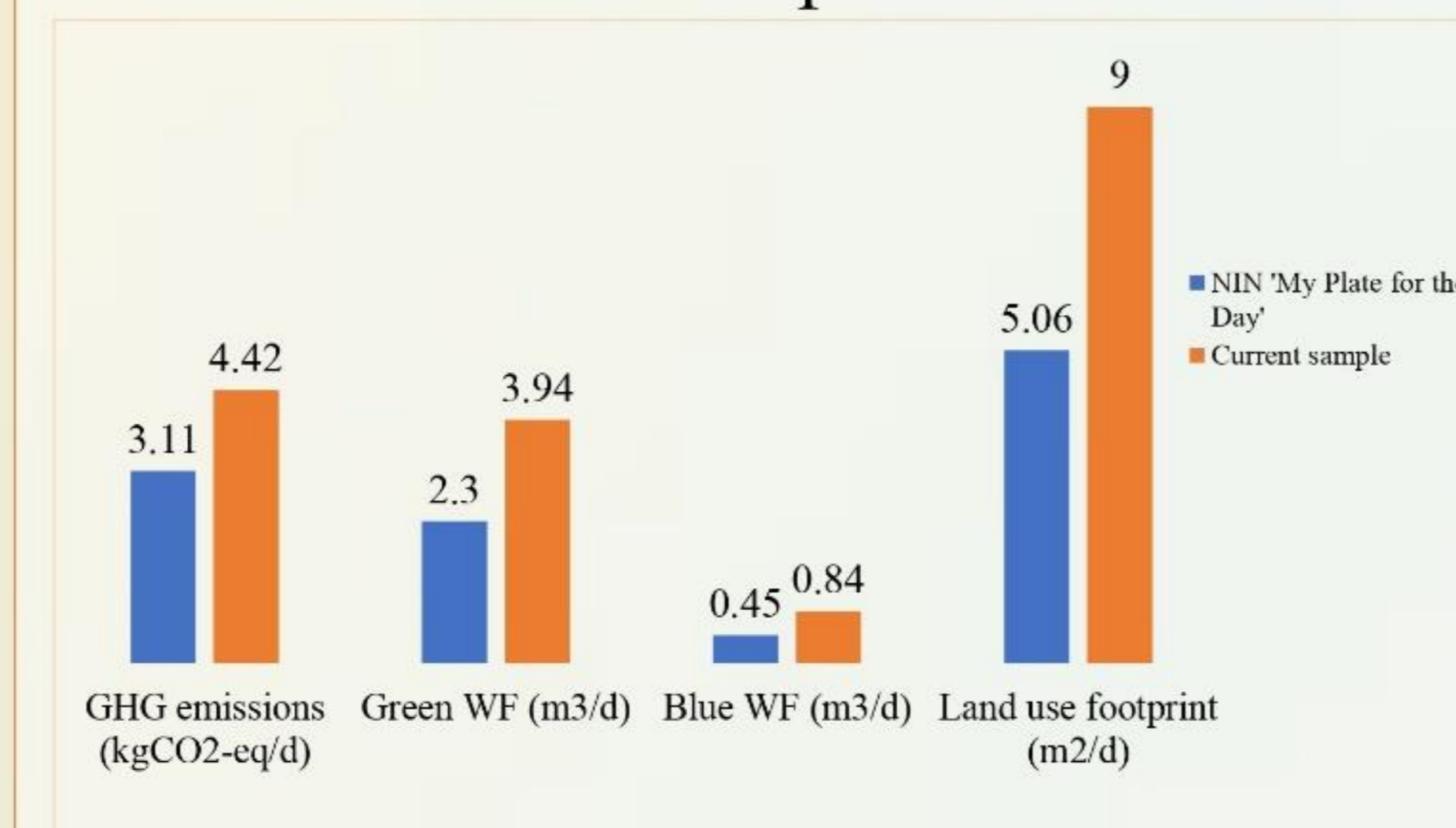


Fig. 1 Environmental footprints of NIN 'My Plate for the Day' and current sample

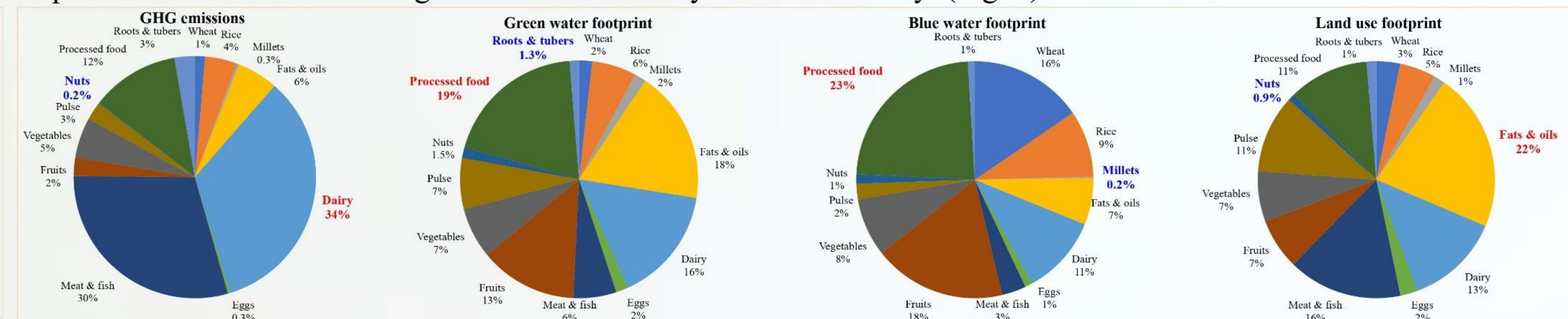


Fig. 2 Percent contribution of food groups to dietary environmental footprints

➤ Dairy accounted for the largest share of dietary GHG emissions. Processed foods were the highest contributor to dietary green and blue water footprint. Fats & oils contributed most to land use footprints (Fig. 2).

➤ **Socio-demographic predictors of dietary environmental footprints: Multiple linear regression**

- Females had significantly ($p < 0.001$) lower dietary environmental footprints than males.
- Age was positively associated with dietary green and blue water footprint.
- The diets of married respondents have higher GHG emissions and land use footprints than unmarried respondents.
- Individuals with two or more children or adolescents in their households were more likely to have higher dietary green and blue water footprint.
- The western region's diet has lower dietary green and blue water footprint than the northern region.

Conclusion

- Environmental footprints of Indian diets were higher than NIN 'My Plate for the Day.'
- Variability in dietary environmental footprints across socio-demographic profiles in India was observed.
- Following dietary guidelines can reduce the environmental footprints of diets.

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Acknowledgement

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Food Insecurity is a major concern in a slum of Delhi

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Introduction

- India was successful in achieving self-sufficiency by increasing its food production but it could not solve the problem of chronic household food insecurity.

Aim

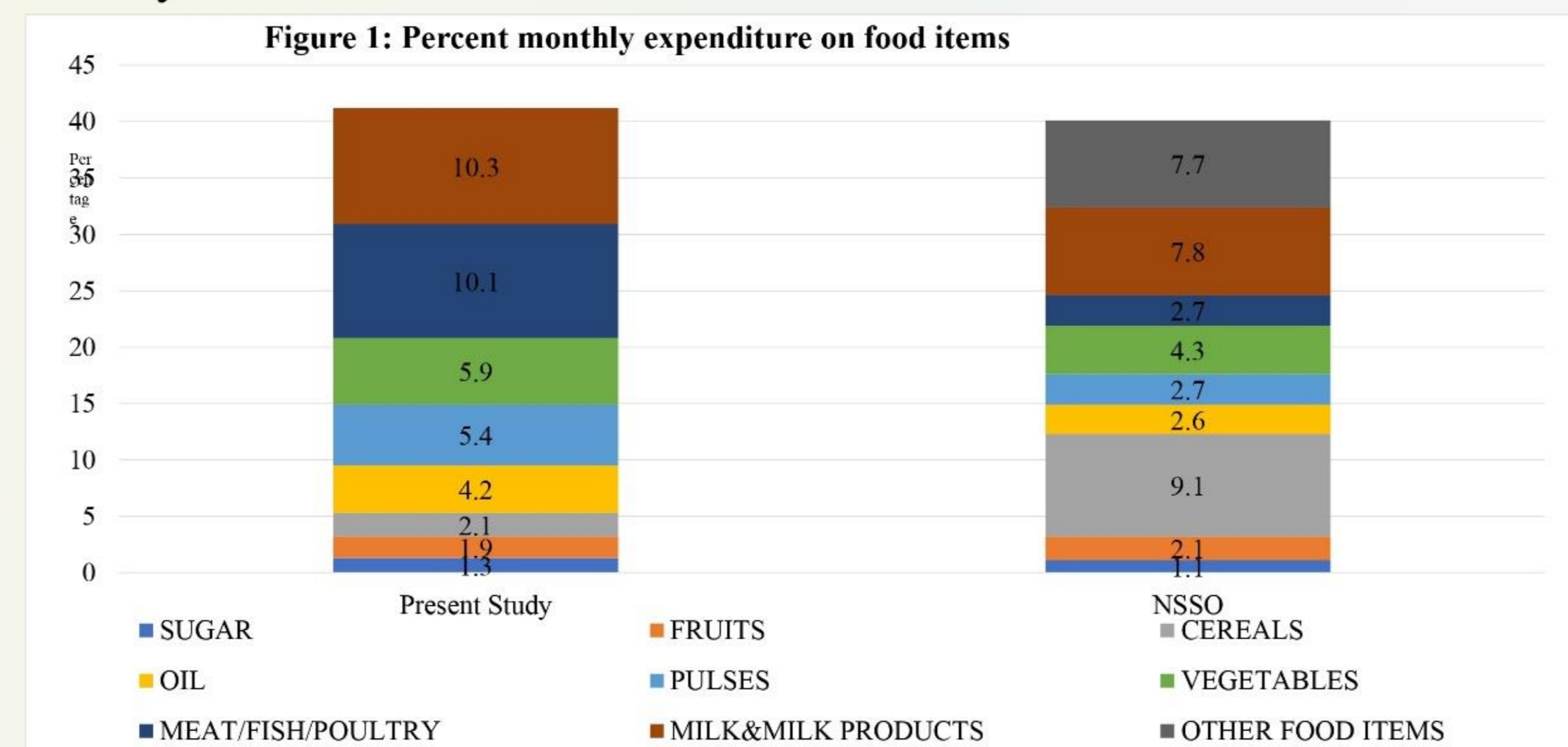
- The Present study was conducted with the aim to assess intra-familial food distribution pattern among Below Poverty Line families living in a slum of Delhi.

Methodology

- An observational study was undertaken to assess the food distribution pattern among 40 BPL families living in the slum of Delhi by using standardized procedures through a structured questionnaire.

Results

- The monthly per capita expenditure on milk, meat, pulses and vegetables was higher than cereal and sugar. The intake of energy, protein, fat, vitamin C and B-complex vitamins were much higher in adults as compared to children in the BPL families owing to higher consumption of cereals, pulses, roots and tubers, fat and meat by fathers and mothers. However, the diets of infants and pre-schoolers were deficient in most of the nutrients.
- In comparison, the nutrient composition of the diets of older children (7-18 years) was better than younger ones (7 months -6 years) and poorer than adults in the family.



Food group	Fathers (n=40)		Mothers (n=40)		Infants and preschoolers (n=61)		Children and adolescents (n=22)		F-value
	Mean intake (g/d)	Mean % adequacy	Mean intake (g/d)	Mean % adequacy	Mean intake (g/d)	Mean % adequacy	Mean intake (g/d)	Mean % adequacy	
Cereals	317.5±74.0	84.5±34.45	238.0±41.08	88.1±54.05	37.7±26.05	16.0±7.83	184.9±66.45	62.4±16.3	7.111*
Pulses	60.6±61.95	80.1±56.32	57.7±58.01	88.9±80.54	6.5±4.92	30.0±9.81	38.4±7.79	58.2±8.07	14.429*
Milk	97.2±64.78	32.4±13.46	132.2±59.65	44.0±23.50	104.2±33.57	21.9±3.9	115.7±100.8	23.1±2.04	23.488*
Roots & tubers	208.2±117.1	104.2±83.45	204.0±112.48	102.0±67.44	19.3±12.18	28.3±11.4	73.8±20.3	60.5±13.0	22.534*
Green leafy vegetables	8.87±15.92	8.8±1.13	6.0±25.01	6.0±2.13	58.3±5.06	11.6±15.06	15.6±2.3	15.6±2.32	5.862*
Other vegetables	62.6±84.01	31.3±11.98	50.5±72.5	25.25±24.56	15.20±13.76	23.0±5.78	46.3±4.32	26.8±8.80	2.808*
Fruits	56.3±49.34	56.3±20.82	55.1±49.24	55.1±30.44	5.7±5.42	5.7±4.42	26.8±8.80	16.2±4.08	89.974*
Sugar	9.5±7.32	47.6±38.02	15.0±6.19	56.6±48.33	8.0±3.71	57.7±10.4	10.5±0.77	37.2±16.3	2.790*
Fat	25.0±11.04	100.0±0.00	27.3±10.69	115.5±102.32	17.5±4.33	47.1±8.2	17.1±4.56	48.0±16.6	19.455*
Meat/poultry	120.7±160.41	402.1±112.34	109.1±159.5	363.5±90.21	10.2±17.7	20.4±28.9	52.4±9.6	107.9±19.3	4.126*

*, ANOVA test, F-value significant at p <0.05

Conclusion

The data clearly showed that even after diverting food expenditure on cereals to other food items there is an unequal distribution of food items among the family members living in an urban slum.

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DO INDIAN DIETS PROMOTE FOOD SECURITY AND PLANETARY HEALTH?

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Introduction

- The usually consumed diets by our population are either lacking in nutrients or are nutritious but not sustainable.
- Achieving the Sustainable Development Goals requires accessible, affordable, and sustainable healthy diets for all.

Aim

- To analyze the sustainability of commonly consumed diets as well as four hypothetical diets (vegan, vegetarian, ovo-vegetarian, and mixed) from various Indian states.
- To assess the minimum dietary diversity for women (a proxy for food and nutrition security) in rural and urban areas of various Indian states.

Methodology

- Household Consumption Expenditure Survey (2011-12, 68th round) data for commonly consumed diets in all Indian states and union territories.
- Four hypothetical diets - Cost of Diet program.
- Data on Green House Gas emissions (GHGe) - "Environmental implications of dietary modifications in India: A modelling analysis utilising nationally representative data" (Aleksandrowicz et al., 2019).

Results

Mean GHG Emissions g/g of diet from various states of India				
Diets	Urban		Rural	
	Women	Men	Women	Men
Mixed diets	2.1	2.9	1.9	2.4
Vegetarian diets	2.6	2.8	2.6	2.6
Ovo-veg	2.7	2.7	2.6	2.6
Vegan	0.7	0.8	0.8	0.9

- Vegan diets had the lowest mean GHG emissions while mixed diets and ovo-vegetarian diets had the highest.
- GHG emission (g/ g of diet) was highest in Nagaland, Mizoram and Meghalaya in rural as well as in the urban areas.
- Diets from the states of Jharkhand, Manipur, and Chhattisgarh had the lowest GHG emissions and the least dietary diversity.

- The highest contributors to GHG emissions are animal-source foods namely, meat, chicken and fish, milk and milk products and rice among cereals.
- States with the highest GHG emission diets comprised primarily of rice and meat namely, pork, beef and yak meat and products.
- Vegan diets are sustainable, but they are out of reach for most people.
- Urban women had adequate MDD-W in 39% of the states, while rural women did not meet the same.
- Women from both rural and urban areas had low MDD-W in 57% of the states.
- Women in Kerala, Goa, Haryana, Karnataka, Maharashtra, and Tamil Nadu, both rural and urban, had desired MDD-W.
- Women from the state of Odisha, Manipur, and Jharkhand had lowest MDD-W scores.
- Diets of women in general and those from rural household were high in staples and low in Vitamin A rich fruits and vegetables.
- Substitution of meat (GHGe 85.6 g/g) with legumes (GHGe 1.6 g/g) or poultry (GHGe 1.8 g/g) and that of rice (GHGe 1.8 g/g) with other cereals (0.8 GHGe g/g) will promote planetary health.
- Inclusion of fruits and vegetables (GHGe 0.2 -0.1 g/g) will promote both human and planet health.

Conclusion

- The inclusion of foods from various food groups will increase food and nutrition security in Indian homes, particularly among women.
- To make diets more sustainable, new crop types and farming practices may reduce GHG emissions and water footprint.
- Efforts must be made to limit the consumption of processed foods with large GHGe and water footprints.

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