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IDENTIFYING KEY FOOD SOURCES OF VITAMIN A, IRON AND ZINC AND POTENTIAL FOOD FORTIFICATION VEHICLES IN BANGLADESH

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BACKGROUND

- Globally, there is a scarcity of national food consumption data
 - Collected with acceptable periodicity and valid representation from all population groups and regions in a particular country
 - Collected directly from the food consumers

BACKGROUND

- To overcome this scarcity of dietary data, alternative sources of information have to be used.
- For example, food consumption patterns and apparent intakes of energy and nutrients may be obtained from national household consumption and expenditure surveys (HCES)
- This type of surveys...
 - Collect national and regional representative data
 - Collect data on food acquisition and/or food costs
 - Are conducted periodically



OBJECTIVES

To use the Household Consumption and Expenditure Survey (HCES) conducted in Bangladesh in 2010 to:

- Assess food sources of energy and of Vitamin A, Iron and Zinc
- Assess risk for inadequate intakes of those micronutrients

To inform about potential food vehicles for nutrient fortification



METHODS

Data from the 2010 HCES from Bangladesh

- Demographics,
- Income and economic data
- Food and non-food expenditure
- Food acquisition by origin
 - Purchased
 - Produced
 - Gifted (gifts, donations)
 - Other (e.g. wage in-kind)
- Foods consumed at home and away from home

METHODS

- Food acquisition data was collected over a 14 day period (at household levels)
 - Converted into daily food amounts
- Development of a Food Composition Table for foods in the BD-2010 HCES
- Assessment of data plausibility
 - Per capita energy intake <500 or $\geq 5,000$ kcal/d
- Statistical estimations with sample expanded with sample weights



METHODS

- Intra-household food and nutrient distribution
 - Using FAO adult consumption equivalents (ACE)
 - For all household members plus aggregated by household
- Estimation of Nutrient Recommendations per member and aggregated by household
 - Applied Estimated Average Requirements from the US Institute of Medicine) for the micronutrients:
 - Vitamin A
 - Iron: adjusted to 5% bio-availability
 - Zinc: with bioavailability based on an unrefined, cereal-based diet, as estimated by the International Zinc Consultative Group

RESULTS

DEMOGRAPHICS (2010)

	Households		Individuals	
	N	%	N	%
National	12,240	100	55,580	100
Area				
Rural	7,840	64.1	35,894	64.6
Urban	4,400	35.9	19,686	35.4

- The average household size was 4.5 members
- Higher for rural (4.5) than for urban (4.4) households

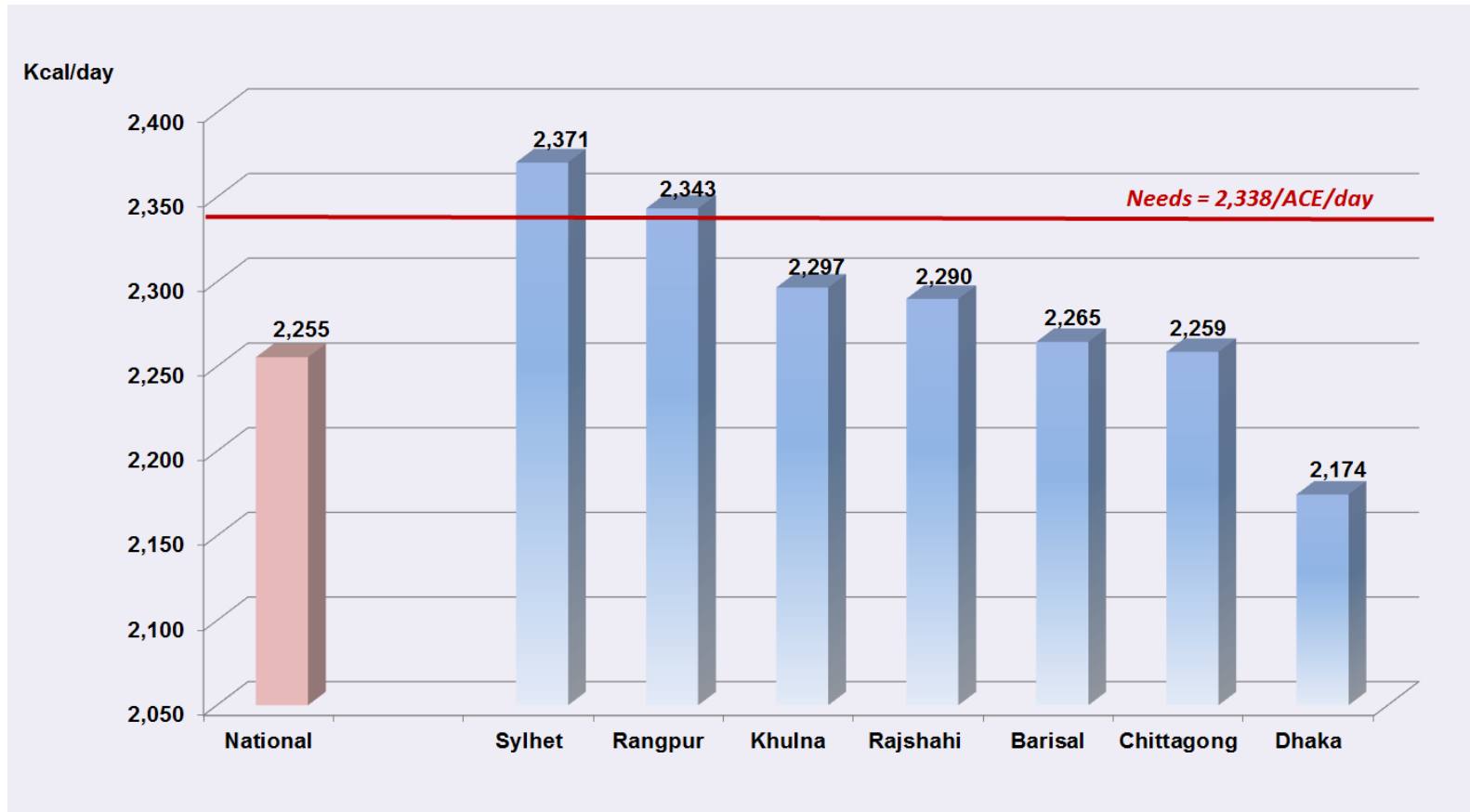
Households Reporting Apparent Consumption of Selected Food Groups

Food Groups	Households ($\geq 50\%$) reporting apparent food intake	
	N	%
Rice	11,885	97
Vegetables	11,885	97
Spices	11,876	97
Miscellaneous	11,874	97
Potatoes	11,851	97
Fish	11,731	96
Pulses	10,833	89
Soybean oil	10,810	88
Wheat flour & products	9,531	78
Eggs	8,771	72
Fruits	8,492	69
Sugars	8,256	67
Milk & Dairy	6,110	58

Ten Main Sources of Dietary Energy

Food Groups	Energy %
Rice	68.4
Soybean oil	8.8
Wheat flour	5.3
Vegetables	4.6
Fish	2.8
Pulses	2.6
Mustard oil	2.3
Sugars	2.1
Potatoes	2.0
Meat	1.9

Mean Energy Intake by Divisions (Kcal/per ACE/d)



Main Food Sources of Vitamin A (RAE*, ug/ACE/d) - National

Food Groups	Vitamin A (ug RAE)
Vegetables	430
Milk & Dairy	43
Fish	22
Other oils & fats (e.g. ghee)	19
Fruits	15
Poultry	11

*RAE: retinol activity equivalent
Daily needs per ACE: 486 ug of RAE

Main Food Sources of Iron (mg/ACE/day)

Food Groups	Iron (mg/day)
Vegetables	9.6
Rice	4.5
Spices	3.0
Pulses	1.6
Wheat flour	1.6
Meat	0.6
Fish	0.5

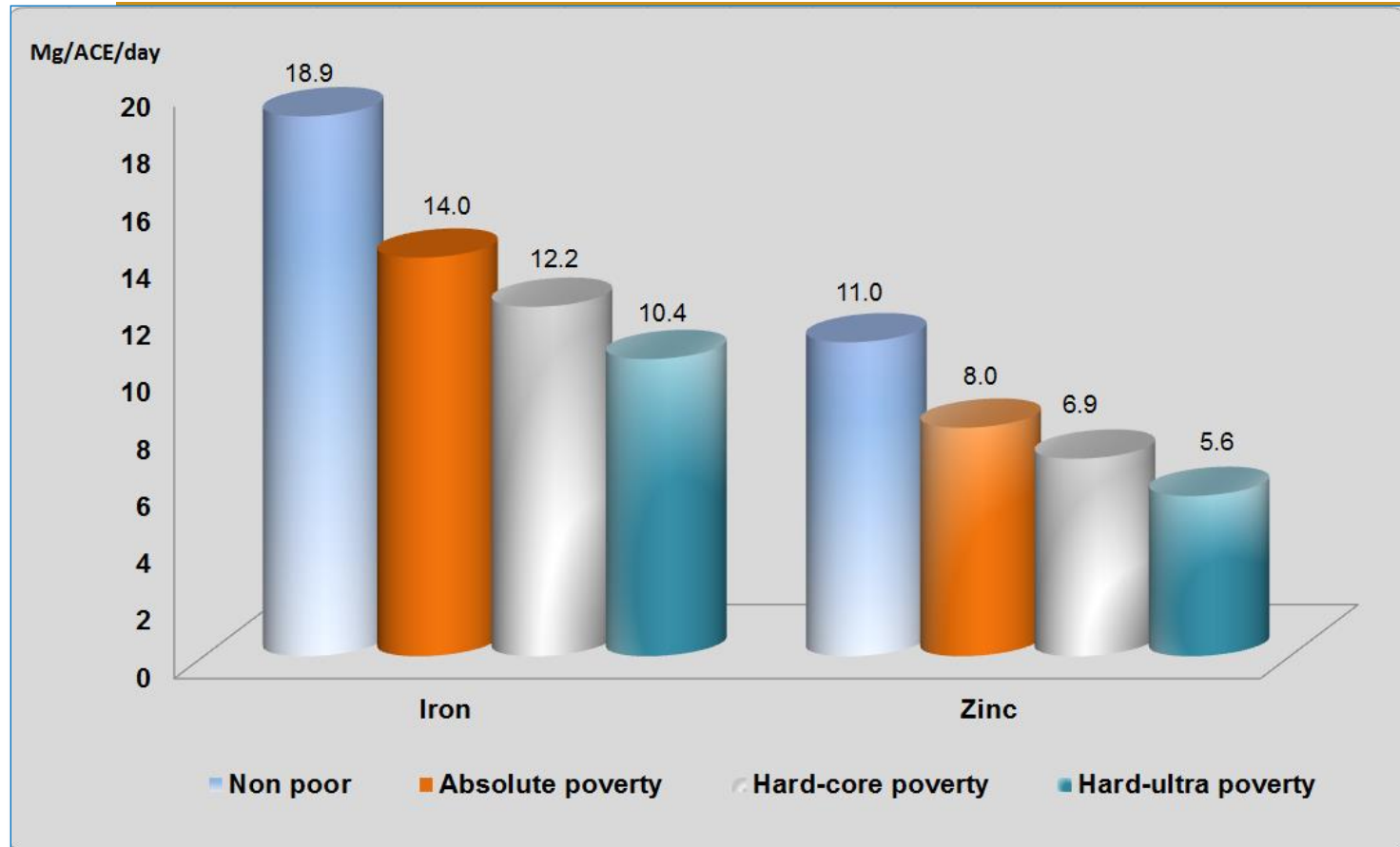
Daily needs per ACE: 21.3 mg of Iron

Main Food Sources of Zinc (mg/ACE/d) – National

Food Groups	Zinc (mg/day)
Rice	6.4
Vegetables	1.9
Meat	1.4
Wheat flour & products	1.2
Pulses	0.9
Fish	0.5

Daily needs per ACE: 8.8 mg of Zinc

Mean Intakes of Iron and Zinc by Poverty Status (mg/ACE/day)



Daily needs per ACE: 21.3 mg of Iron and 8.8. mg of Zinc

Population with Inadequate Intakes of Vitamin A, Iron and Zinc

	Vitamin A ¹ (%)	Iron ² (%)	Zinc ¹ (%)
National	77	36	42
Sector			
- Urban	80	33	44
- Rural	77	37	41
Poverty Status			
- Non poor	69	25	29
- Absolute poverty	83	40	45
- Hard-core poverty	88	49	58
- Hard-ultra poverty	92	61	77



LIMITATIONS

- Use of HCES, non-dietary data, for dietary purposes
- Assumptions for intra-household food distribution based on pre-established factors (e.g. ACE)
- Does not address nutrition of pregnant, lactating and young children
- Potential for over-estimation of consumption due to over-reporting, wastage and/or stockpiling



CONCLUSION

- Apparent intakes of foods and selected micronutrients were successfully estimated with the 2010 HCES of Bangladesh
 - We were able to assess inadequate intakes of specific MNs (vitamin A, iron and zinc)
 - A particular strength of the data was the inclusion of foods eaten away from home
- The results could guide the identification of vulnerable populations that could be targeted for:
 - micronutrient fortification
 - supplementation programs or,
 - other types of interventions



THANK YOU!!!



Questions?
Comments?