



WHO ICDS-SNP Optimization Tool

A tool to cost-effectively enhance and diversify the provisions of Supplementary Nutrition Programme (SNP) under the Integrated Child Development Services (ICDS)





INTRODUCTION

The nutrition supplementation program (SNP) through Integrated Child Development Services (ICDS), Anganwadi centers offers "take-home-rations" (THR) and "hot-cookedmeals" (HCM) to children. It is challenging to meet the recommended nutritional values, including fat and essential micronutrients within budget constraints. Hence, an optimization tool using mathematical modeling is developed to create tailored provisions for each state's needs, considering local food preferences and cost. This tool will help policymakers make informed decisions about nutrition and food policies, providing improved nutritional provisions for the ICDS beneficiaries, including severely acute malnourished (SAM) children.



The tool allows the user to optimize for the required beneficiary separately for THR and HCM.

To understand the existing provisions of the nutrition supplementation program (SNP) for various age groups (6 months to 3 years, 3 years to 6 years, pregnant, and lactating women), detailed data was collected from all states of India.

Data covered:



The collected information included details about the current practices such as the weekly menu, "take-home-rations" (THR) packets provided for different age groups, budget allocation for each group, list of fortified food items, market prices during different seasons, and nutrition and budget guidelines for all states. The nutrient composition for the ingredients used in the recipe was from IFCT 2017.

MORNING SNACK & HOT-COOKED MEAL

Objectives

- The main focus of the optimization process is to find the most cost-effective solutions within the allocated ICDS budget for each beneficiary including SAM children while the menu meets the nutrient guidelines set by ICDS.
- The optimization process is carried out with a budget of 8 RS. for children and 12 RS. for pregnant, lactating women, and SAM children.

Recipe Selection									
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Dal_and_other_pulse_based_recipes > Fruits >	۲	 Recipe Selection This page allows you to add the desired recipes including 							
Side_dish > Pulse_based_recipe >		Hot Cooked Meals and Morning Snacks							
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	2	Solutions							
Frequently Selected Additional Foods		Weekly Menu							
Cocond_country (2)									
Curd Croundrut_chutney									
Mint_chutney Tomato_chutney									
Are there foods which you compulsorily want to provide in the hot cooked meals ? Note: The valence floats will be part dyour results									
□ Egg □ Milk									
Milk_powder									

- The HCM recipes collected from the field were made consistent in terms of raw ingredient quantities and serving sizes. Users have the flexibility to add new recipes or ingredients to the database at any time, allowing them to use these additions for optimization purposes within the tool.
- Users can opt to use fortified ingredients such as oil, rice, whole wheat flour, salt and milk.
- The option to add side dishes and accompaniments to the model leads to a more diverse diet plan.

	Build your 6-day cyclic menu	•	Customized Menu (5/6)	1
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Results

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The radar chart displays the ratio of nutrient intake to the recommendations.



The pie chart illustrates the proportion of each food group in the daily diet.



Advanced results, such as food group contributions towards nutrients and costs, as well as food group-wise ingredient contributions, are displayed using stacked bar diagrams.



Cost calculations of the optimized menu are provided for an individual's daily, weekly, monthly, and yearly basis.

Average Nutri	ents Met per Da	v					
402.9 Denergy (Kcal)	13.7 Septem (g)	21.2 Fet fail	6.8 Dietary Fibre (g)	56.1	1.9 Znc mal	2.7 Fe Iron Img)	113.0 Wamin A (mog)
67.3	0.3	0.2	O.1	3.3	0.3	84.0	8.6 () Vitamin C (mg)

The average nutrient intake per day is represented using three colors: green indicates meeting more than 60% of the recommended value, orange signifies meeting 30-60% of the recommended value, and red indicates less than 30% of the recommended value.

£Y	ENERGY	PROTEIN	FAT	PE RATIO	FE RATIO
	400 Kcal	13.7 g	22.6 g	14.0	51.0
	400 Kcal	13.5 g	21.5 g	14.0	48.0
3	406 Kcal	13.5 g	26.2 g	13.0	58.0
4	400 Kcal	13.9 g	24.6 g	14.0	55.0
5	400 Kcal	13.5 g	14.7 g	14.0	33.0
6	412 Kcal	14.2 g	17.6 g	14.0	38.0

Weekly nutrient analysis is depicted through a line chart, showcasing variations in macro-nutrient intake throughout the week, along with fat energy and protein energy ratios.

Policy makers can leverage this information to make decisions on subsidies for commonly used nutrient-dense ingredients.

TAKE HOME RATION

Data

- The tool for THR is built for whole foods and blended premixes for each beneficiary and SAM children.
- The nutrition requirements taken into account are based on the ICDS guidelines, specifically for Energy, Protein, and Fat.



- The user can opt between fortified and unfortified ingredients for oil, rice, whole wheat flour, salt and milk.
- During the data collection phase, the price assigned to each ingredient was derived as an average from the market survey for that State. For the subsidized ingredients, their respective subsidized prices were used.
- The user can verify and change the cost of ingredient if required.

Age Croup Selection Type of THR Whole Foods Age Croup 6 Months - 12 Months 1 Years - 6 Years Nutrient Recommendations © ICDS Price Verification Nutrient Recommendations Price Verification Nutrient Recommendations

To optimize the nutrient allocation as per ICDS guidelines, linear programming is employed. An optimization model is built for two types of THR, namely whole foods and blended premix.

Objectives

Results

- The ratio of the nutrient intake to the recommendation is displayed in the radar chart.
- The pie chart tells the proportion of each of the food groups in a daily diet.



Packet Details per Day					
FOOD NAME	QUANTITY (GM)	COST FOR QUANTITY	COST PER KG		
Wheat_whole	43.0	0.09	2.0		
Bajra	10.0	0.30	30.0		
Soybean_brown	25.0	0.72	30.0		
Egg_duck_whole_raw	25.0	2.00	80.0		
Whole_milk_powder	5.0	1.85	370.0		
Oil	5.0	0.90	180.0		
Sugar	5.0	0.20	40.0		
Total	118.0	6.06			

The model suggests cost effective and diverse THR products for all beneficiaries.

Cost calculations of the optimized provisions are provided for an individual's daily, weekly, monthly, and yearly basis.





The average nutrient met per day has been given in 3 different colors where green indicates more than 80% met, orange indicates 50-80% met and red indicates less than 50% met.

MEET OUR TEAM



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Explore our data tools