

Transforming Diets in Low-Income Communities:

The Impact of Public-Private Partnerships and Nutrition-Sensitive Interventions in Assam's Tea Estates

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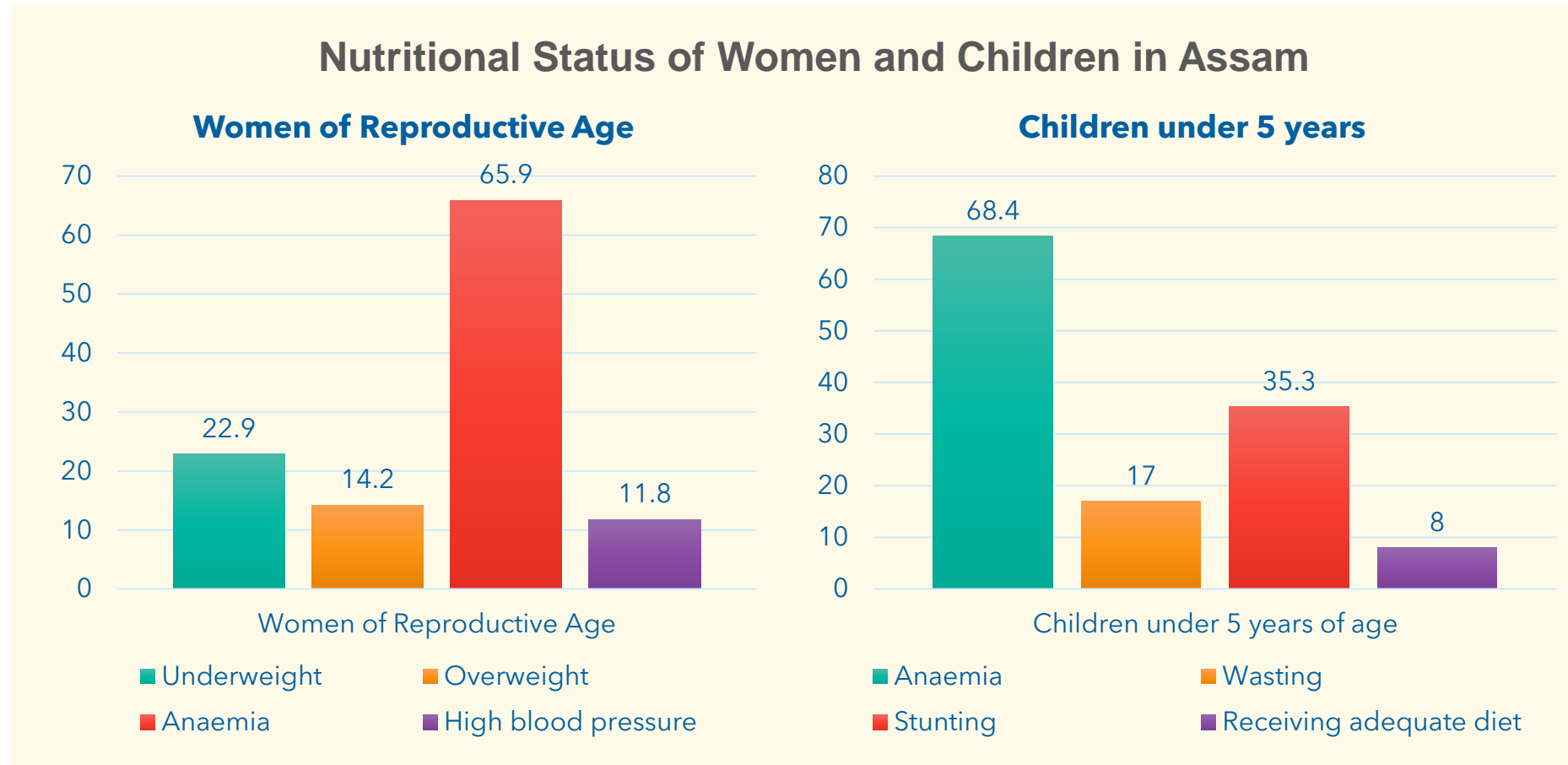
Workforce Nutrition
Global Alliance for Improved Nutrition (GAIN)

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The Problem

The Indian tea industry is a major private employer, especially in Assam, where the tea sector provides over a million jobs, predominantly held by women (ages 26-45). Despite the industry's economic importance, severe nutrition challenges persist among tea workers and their families.



Underlying Causes



According to **formative** research conducted by GAIN, the underlying causes for nutritional status are-

- Limited dietary knowledge, resource constraints, and systemic inequalities.
- High reliance on calorie-dense but nutrient-poor foods.
- Seasonal income fluctuations that increase food insecurity especially during non-harvest periods and natural calamities
- Affordability and accessibility to nutritious food

To address these challenges, the Global Alliance for Improved Nutrition (GAIN) in collaboration with Ethical Tea Partnership (ETP) and 7 tea leading companies initiated a **workforce nutrition programme in 110 tea estates covering 7 districts of Assam, India**. The programme was co-implemented by the Indian Tea Association, Ecociate Consultants Pvt Ltd and Dharmalife Foundation

Programme Objective:

To improve nutritional outcomes among tea workers and their families by:

- Improving dietary diversity
- Improving consumption of targeted nutritious and healthy foods (fruits, vegetables and fortified oil)

Two-prolonged approach was taken focusing on:

Demand Side:

Behaviour change communication (BCC): Increasing knowledge **and willingness to change** around **consumption of** nutritious and healthy diets

Supply Side:

Improving access, availability and affordability of selected nutritious and healthy **foods**

Research Focus and Key Questions

Evaluation Conducted by: IPE Global Research Pvt. Ltd., Third-Party Evaluation Agency

Objective of the study:

- Evaluate the success of the program in improving dietary habits of tea workers through increased consumption of local vegetables and fortified oils.

Research Questions

1. Consumption Habits

- Has there been a change in tea workers' and families' consumption of fruits, vegetables, and fortified oils?
- Has this shift improved overall diet quality, measured by dietary diversity?

2. Knowledge & Awareness

- Have tea workers and their families gained knowledge and awareness about nutritious diets and healthy food choices?

3. Food Availability

- Has the availability of fruits, vegetables, and fortified oils on the estate improved due to the project's supply-side interventions?

Program Approach

Aim: Improve demand, access and consumption of safe and nutritious foods

Access
Sustainable market
mechanisms

Door-to-Door Sales by
Dharma Life Entrepreneurs

Sustainable Last Mile Delivery to
Neighbourhood retail shops
(Healthy Line Shops (HLS))

Demand
Intensive Behaviour Change
Campaign for nutrition

- Street Plays
- Cooking Demo
- Cooking Competitions
- Home visits
- School Games

Reach: Over 160,000 workers in 110 estates covering 7 districts of Assam

Focused Behaviour Change Models

Delivery of 4 key messages through multiple activities

Messages

1. Consume Balanced Diet
2. Consume Seasonal Fruits & Vegetables
3. Use fortified oil for cooking
4. Handwash with Soap*

Activities

Community Engagement and Mobilization

- Street Plays
- Cooking Demo
- Cooking Competitions

Targeted

- Home Visits for pregnant women and nursing mothers
- Nutri-Game for primary school children

The BCC model is **uniform** across all implementing partners – **Dharmalife, Indian Tea Association and ETP***

* Handwash model based on Unilever implemented in Dharmalife estates

Improving availability through innovative access models

Dharmalife Entrepreneurs (DLE)

Local Women Entrepreneurs – creating awareness and door to door sale of nutritious food products.

Local Women as Nutrition Champions

- Women aged 20-45 years from tea estates are selected and trained in sales and behavior change activities
- Known as "Nutrition Champions," - generate awareness of nutrition and hygiene and serve as access points for nutrition services.

Product basket included

- **Nutritious foods** - Fortified oil & Double fortified salt, Pulses, Soya chunks.
- **Other Products** – sanitary napkin, soaps, solar lights, induction cooktops, health drinks, etc.

Healthy Line Shops (HLS)

Transforming neighbourhood retail shops into access point for nutritious food, known as Healthy Line Shops

Linking up selected shops with the aggregator/transporter at the supply hub.

Aggregator procures stocks from the wholesaler at supply hub

Aggregator delivers stocks of nutritious food at the retailer's doorstep. This was non-existent before.

Food demanded and purchased by tea workers and their families

Subsidization of transportation cost for moving stocks to the point of retail.

Evaluation Methodology and Sample Selection

Study Design-

A Pre-Post Cross-Sectional Design (with Mixed Methods) was used to measure the changes in the outcome & impact level indicators between the baseline & endline

Sampling Strategy:

- **Quantitative Sample:** 990 tea workers from 66 clusters (using multi-stage sampling).
 - **Sampling Stages:**
 - 30 tea estates randomly selected from 36 participating estates.
 - Divisions selected within estates, totaling 66 divisions.
 - 15 worker households per division.
- **Qualitative Sample:** 20 Key Informant Interviews (KIIs) and 10 Focus Group Discussions (FGDs) with workers.

Inclusion Criteria:

Female respondents were selected, who were:

- Age: 18-49 years
- Working status: Working as estate worker/farm worker/smallholder farmer, or her husband/other family member working as estate worker/farm worker/smallholder farmer
- Household Responsibility: Responsible for household food preparation & feeding

Data Collection Locations

- **Regions:** 33 tea estates across Dibrugarh, Jorhat, Tezpur, and Tinsukia in Assam.
- **Survey Timeline:** Baseline survey (Feb-Mar 2021) and Endline survey (Mar-Apr 2023).

Coverage

Coverage	Baseline	Endline
Total Clusters	66	57
Tea Workers	989	871
Focus Group Discussions – Workers	10	10
Key Informant Interviews – GAIN and Implementation partners	3	6
Key Informant Interviews – Tea Estate Staff	10	10
Key Informant Interviews – Retail shop owners	16	16

Data Collection and Analysis

Data Collection Methods

- **Household Surveys:** Quantitative data from female tea workers (ages 18-49) responsible for household food prep.
- **Monitoring Mechanisms:**
 - Weekly and monthly operational calls.
 - Customized monitoring app for real-time tracking of sales and behavior change activities in Healthy Line Shops.
 - Traditional methods, such as Excel sheets and stock registers, for capturing sales data.
- **Ethics:** Approved by the Sigma Institutional Review Board

Data Analysis Techniques

- **Statistical Methods:**
 - Descriptive statistics for covariate analysis.
 - Chi-square tests for categorical variables and t-tests for dichotomous variables.
- **Propensity Score Matching:**
 - Logistic regression to match participants (1:1) between baseline and endline.
 - Quality check using likelihood ratio test and pseudo-R-squared comparison.
- **Outcome Metrics:**
 - Dietary diversity (Minimum Dietary Diversity for Women - MDD-W).
 - Food insecurity (Food Insecurity Experience Scale - FIES).

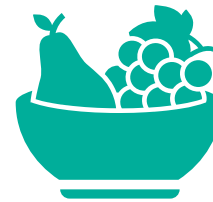
Result of awareness and access (1/2)

Key Outcomes and Impacts



Increased Consumption of Targeted Food Groups:

- **Fortified oil** consumption rose by **20%**.
- **Vitamin A-rich vegetables and fruits** consumption increased by **36%**.
- **Dark green leafy vegetables** consumption increased by **30%**.



Improvement in Dietary Diversity:

- Proportion of women meeting **minimum dietary diversity** rose by **28%**.
- **Average dietary diversity score** (DDS) increased from **4.5 to 5.9**, with notable increases in DGLVs, vitamin A-rich foods, dairy, and nuts.



Awareness and Availability:

- **Awareness of fortified oil** rose significantly (from **68.2% to 82.9%**).
- **Fortified oil availability** improved, with endline **availability at 96%**.

Results of two access models (2/2)

Success of Access Models

Healthy Line Shops (HLS):

Centralized hubs for nutritious food access and community interaction.

Sales of nutritious items grew 8-fold; contributed to increased household dietary diversity.

Reached ~12,000 households with a broad product range and steady availability of healthy foods.

Door-to-Door Sales by Dharmalife Entrepreneurs (DLE):

Provided direct access to nutritious foods and tailored recommendations to **6,942 Households**

3-fold increase in sales over the last six months, with fortified oil use increasing by 50%.

Generated livelihoods for **78 women entrepreneurs** with an average income of **INR 8,891 per month**.

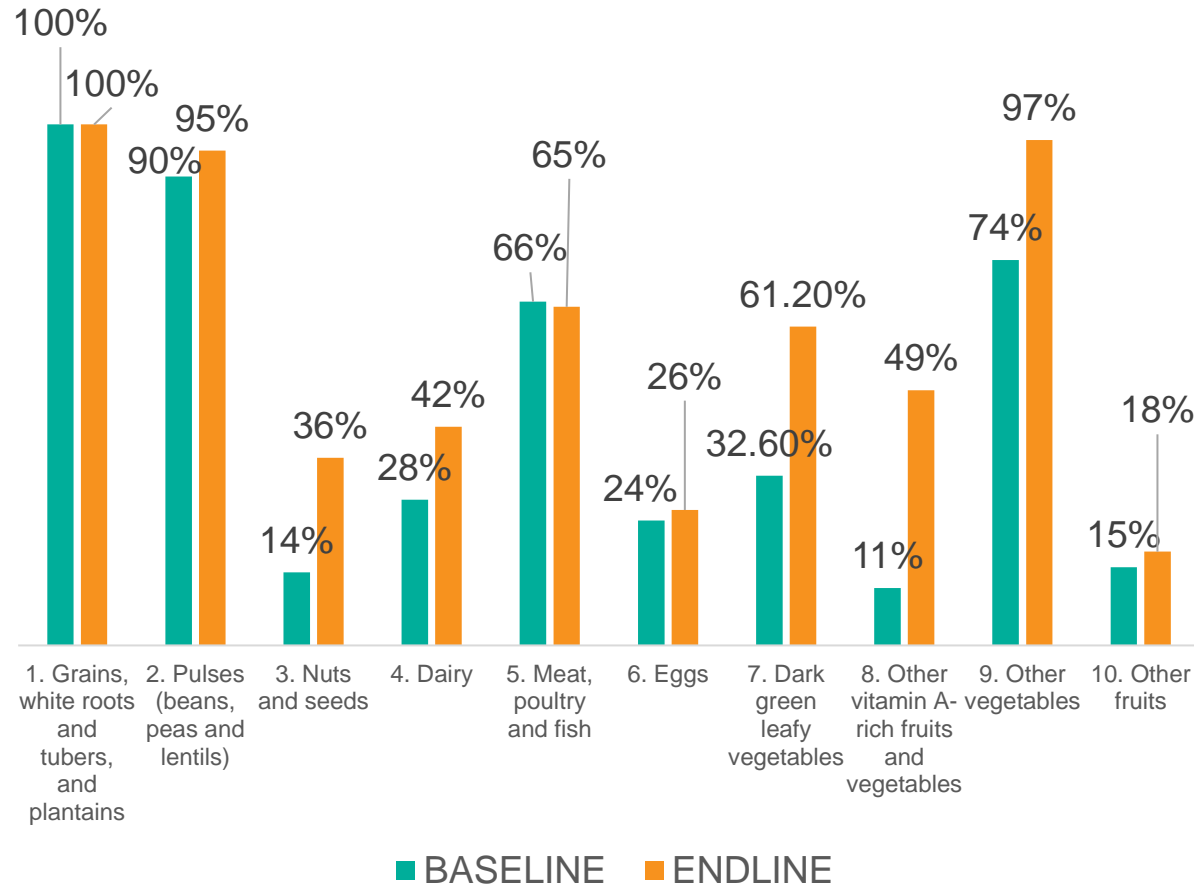
Comparative Effectiveness:

HLS reaches a larger audience, while DLE offers personalized engagement.

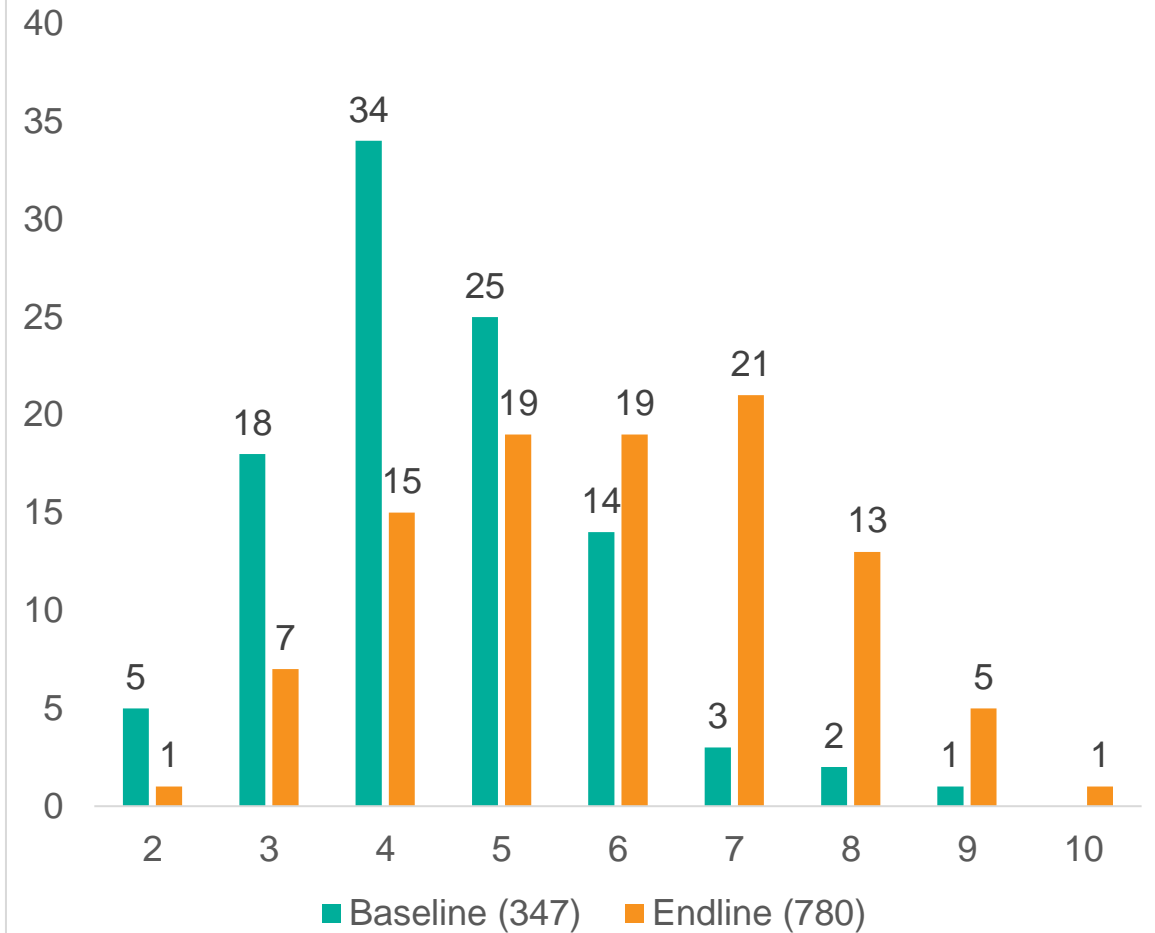
Both models successfully shifted consumer preferences toward healthier diets.

Impact on Consumption

Number of food groups consumed yesterday (out of ten groups)



Proportion of Food groups consumed yesterday



Recommendations for Scaling Up

Expansion to additional supply chains and regions	Integrating various access model for comprehensive coverage	Sustainability and Community Empowerment
Scale to other tea-growing regions, adapting to local dietary needs and supply chains.	Leverage HLS for community-wide access , utilizing DLE for targeted household-level engagement.	Collaborate with local farmers to strengthen supply chains.
Integrate regionally available produce for affordability and diversity.	Introduce mobile HLS units to enhance reach in geographically dispersed communities.	Include income-generation activities (e.g., micro-gardening) for added income and food security.
		Invest in capacity-building initiatives, enabling local stakeholders to sustain dietary improvements and nutrition education post-program

The dual-model approach exemplified by combination of behaviour change activities in combination with supply side interventions demonstrates a scalable pathway for fostering improved dietary practices and advancing the nutritional well-being of tea communities, with implications for broader application across low-income, agricultural communities globally.

Thank you

Impact

Consumption

(1) Improved consumption of targeted nutritious foods

Consumption of Targeted Food Groups:

- **Increase in fortified oil usage:** Overall (57.0% to 70.0%, $p < 0.05$).
- **Significant increases in dark green leafy vegetables (DGLVs) and vitamin A-rich foods:**
 - Overall increase in DGLV consumption: +28.6%.
 - Vitamin A-rich foods: +45.6% in DLE model, +30.2% in HLS model.

Dietary Diversity:

- **Average Dietary Diversity Score (DDS):**
 - Increased from 4.52 to 5.90.
 - DLE: +1.5, HLS: +1.69.
- **Minimum Dietary Diversity for Women (MDD-W):**
 - **Increased by 30.1% overall** (from 47% to 78%).
 - DLE model: +46.8%, HLS model: +38.0%.

Access

(2) Improved availability of targeted nutritious foods

Access via HLS and DLE Models:

- **Healthy Line Shops (HLS):**
Sales of nutritious products grew from INR 166,759 to INR 2,427,457 (March 2022 - April 2023).
- **Door-to-Door Sales (DLE):**
Sales increased from INR 250,787 (April 2023) to INR 693,531 (August 2023).

Demand

(3) Improved understanding of the importance of a healthy diet

Awareness of Nutritious Foods:

- High baseline awareness (90%) about seasonal fruits and vegetables.
- Significant increase in awareness of fortified oil (from 68.2% to 82.9%, $p < 0.05$).

Sources of Information:

- Key sources: Family (49.9%) and friends (71.3%).
- Program Interventions (by endline):
 - Cooking competitions (32.3%)
 - Cooking demonstrations (56.3%)
 - Home visits (54.8%).