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TCI TARINA

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TARINA District Fact Sheet on Dietary Diversity

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Introduction

This fact sheet presents the status of dietary diversity—for women and households—in four districts of eastern India: Munger (Bihar), Maharajganj (Uttar Pradesh), Kandhamal and Kalahandi (Odisha). These figures are based on primary survey of 3,600 households, as part of the TCI–TARINA program (See Box 1).

A diversified diet is one that ensures the intake of an adequate amount of calories, proteins, minerals, and vitamins by an individual. It is important because no one food or crop can provide all the nutrition that is required by the human body.

Dietary diversification is an intermediate outcome for attaining nutritional security. A diversified diet is one that ensures an adequate intake of micronutrients along with minimum calorie requirements (calorie sufficiency) for an individual. The focus on micronutrients is relevant, given that an inadequate dietary intake is an immediate cause of micronutrient malnutrition, which in turn results from a deficiency of key minerals and vitamins in the diet (e.g., nutritional anemia that results from an inadequate intake of iron). Figure 2 highlights the complex relationship between dietary diversity and nutritional outcomes. Individual-level nutritional outcomes are influenced by the intake of nutritious, diverse diets and factors in the surrounding environment that enhance the absorption of nutrients from the diet into the human body. The intake of a diverse diet in turn is influenced by household-level access to nutritious foods and intra-household allocation

Box 1: The TARINA Program

The TARINA program The Technical Assistance and Research for Indian Nutrition and Agriculture (TARINA) is an initiative led by the Tata–Cornell Institute for Agriculture and Nutrition (TCI) at Cornell University. The TARINA Baseline Survey (TBS) was conducted in 2017. It collected extensive village-, household-, and individual-level metrics across 3,600 households in the four program districts (see Figure 1): Munger (Bihar), Maharajganj (Uttar Pradesh), Kalahandi and Kandhamal (Odisha). Data on household-level agricultural practices, seasonal food availability and access, and water, sanitation, and hygiene (WASH) was supplemented with individual- level dietary diversity for women, food frequency, infant and young child feeding (IYCF), and anthropometry for women and children under age five.

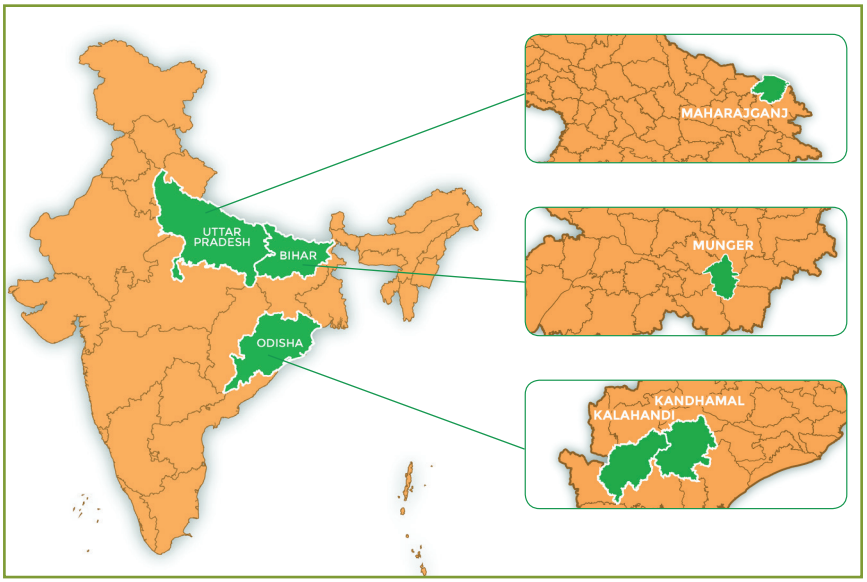


Figure 1. TARINA field locations: States and districts

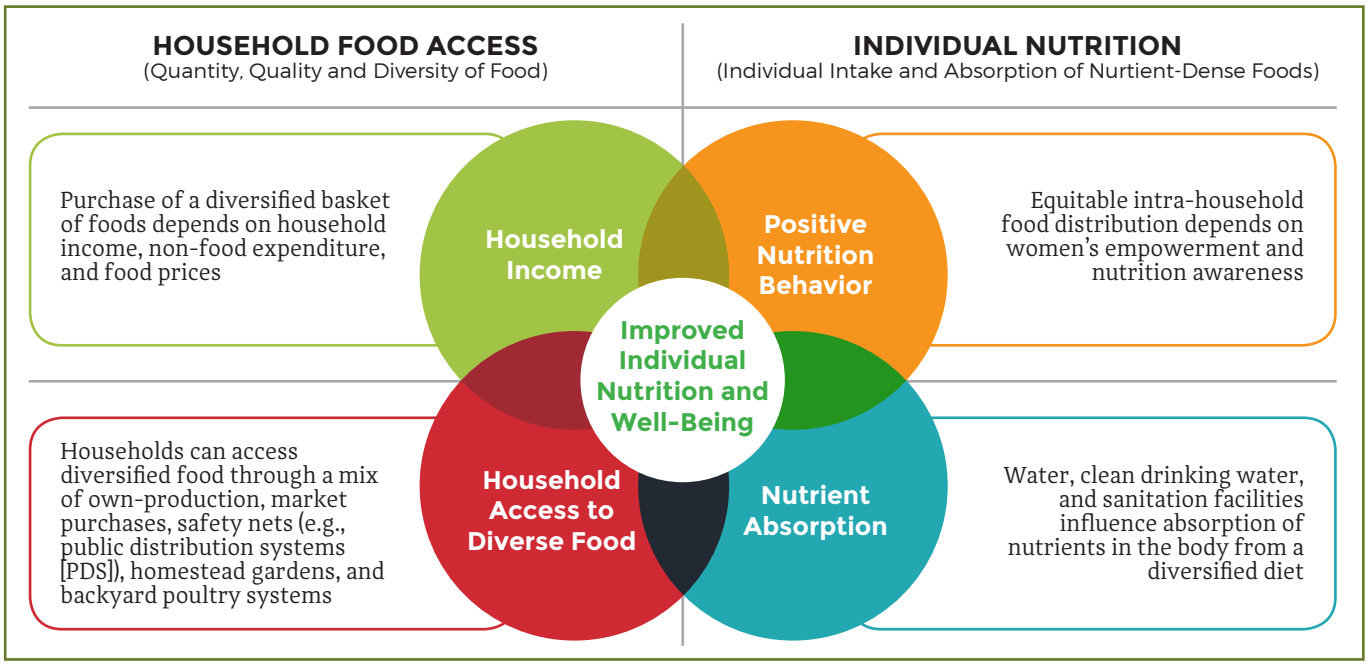


Figure 2. Dietary diversity and nutritional outcomes

of these foods among individual household members, especially among women and children.

In this fact sheet, we use dietary diversity scores to assess the intake of diversified diets by women and households (i.e., by any member of the household). A dietary diversity score is computed as a simple count of the number of food groups consumed by a target population over a given recall period. We use the Food and Agriculture Organization of the UN (FAO) recommended food groups (see Table 1) and a 24-hour recall period to compute the Minimum Dietary Diversity for Women score (MDDW) and the Household Dietary Diversity Score (HDDS) in our analysis. Accordingly, the MDDW and HDDS are computed on 10-point and 12-point scales, respectively, with a higher score indicating a more diverse diet. For the purpose of our analysis, we modified the food group classification for the HDDS to an 11-point scale, since meats and fish/seafood were included together as one food group. The MDDW has been validated as a measure of nutrient adequacy in

Food Groups for Minimum Dietary Diversity for Women	Food Groups for Minimum Dietary Diversity for Women
1. Grains, white roots and tubers, and plantains	1. Root and tubers
2. Pulses (beans, peas, and lentils)	2. Pulses/legumes/nuts
3. Nuts and seeds	3. Cereals
4. Dairy	4. Milk and milk products
5. Meat, poultry, and fish	5. Meat/fish
6. Eggs	6. Eggs
7. Dark green leafy vegetables	7. Vegetables
8. Other vitamin A-rich fruits and vegetables	8. Fruits
9. Other vegetables	9. Oil/fats
10. Other fruits	10. Sweets
	11. Spices/ beverages

Table 1. Food groups for computing dietary diversity scores

women (FAO and USAID 2016). The HDDS on the other hand is used more as an indicator of a household's economic access to food.

Delineating women's dietary status from that of their households is important for two reasons. It is traditionally believed that there is a gender bias against women in intra-household food allocation. This manifests in women eating last and consuming smaller portions. However, a lower dietary diversity score of women vis-à-vis their households need not necessarily reflect the consumption of fewer food groups by women. It is possible that such a difference is the result of differences in the number and classification of constituent food groups that are used in the construction of the MDDW and HDDS.

Women's dietary diversity

Women in our sample consumed 4 out of 10 food groups in the previous 24-hours (Figure 3). Women's dietary diversity scores in Bihar (Munger) and Uttar Pradesh (Maharajganj) are one food-group less, on average, than those of women in Odisha (Kandhamal and Kalahandi). This difference is due to a greater proportion of women consuming meat/fish/poultry, eggs, green leafy vegetables, vitamin A-rich fruits and vegetables, and other fruits in Odisha, as compared to Bihar and Uttar Pradesh. Given that the survey collected data in the postharvest season (March–April), we expect that these months offer the best-case scenario for intake of diverse diets relative to other times of the year.

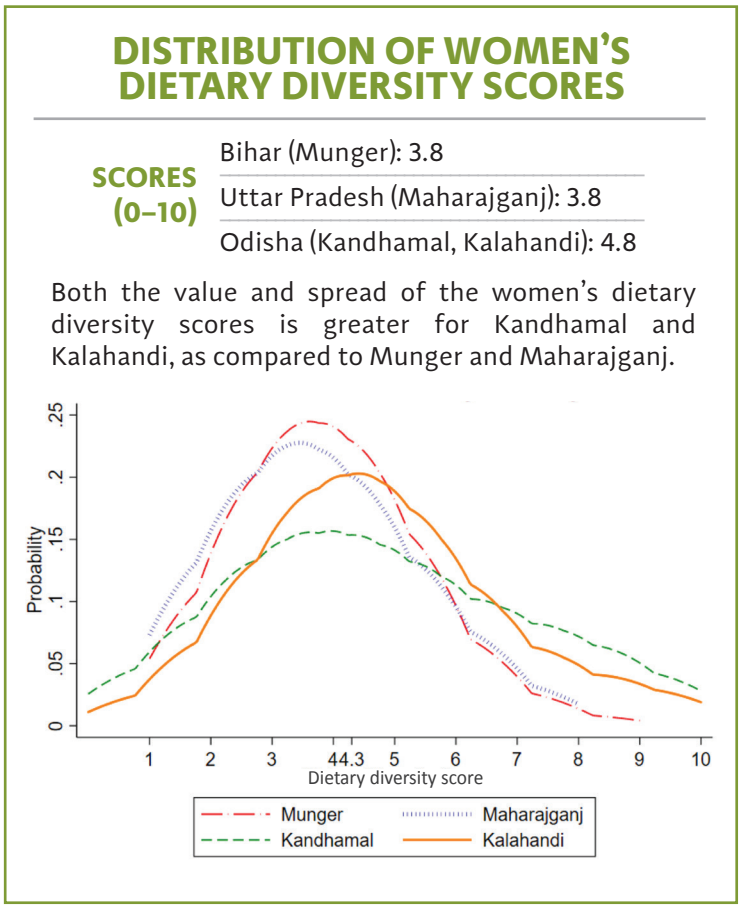
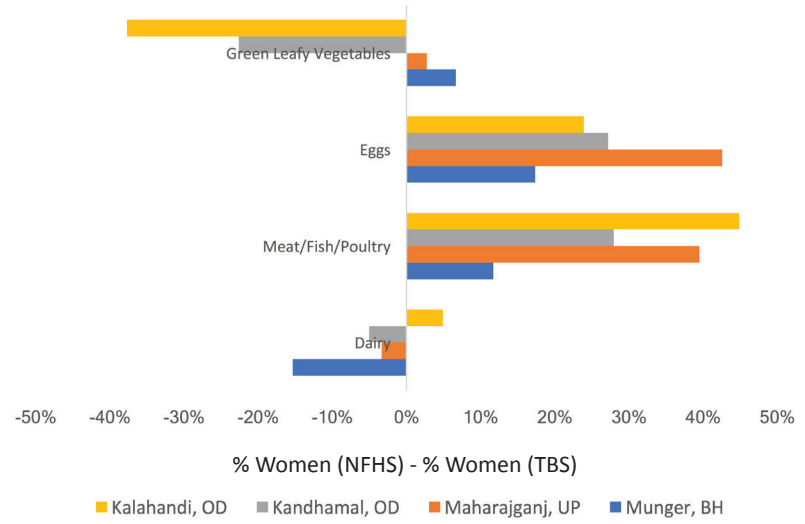


Figure 3. Distribution of women's dietary diversity scores across TARINA districts

A look at the disaggregated food-group data indicates that across districts, women's diets predominantly consist of cereals and pulses. Their intake of micronutrient-rich foods, like green leafy vegetables, vitamin A-rich fruits and vegetables, eggs, and meat/fish/poultry is very low (Figure 4).

Figure 4. Composition of women's diets

DIFFERENCE IN THE PROPORTION OF WOMEN'S DIETARY CONSUMPTION ACROSS FOOD GROUPS



A comparison of our data with the National Family Health Survey (NFHS 2015–16) in Figure 5 indicates that the NFHS statistics overestimate the consumption of eggs and meat/fish/poultry by women in all districts. On the other hand, our results seem to overestimate the consumption of green leafy vegetables in Kalahandi and Kandhamal and to overestimate the consumption of dairy products in Kandhamal, Maharajganj, and Munger.

Figure 5. Comparison of women's dietary consumption between TARINA Baseline Survey data and National Family Health Survey data

DISTRIBUTION OF HOUSEHOLD'S DIETARY DIVERSITY SCORES

SCORES (0–11)

Bihar (Munger): 6.0

Uttar Pradesh (Maharajganj): 5.7

Odisha (Kandhamal, Kalahandi): 6.0

The distribution is fairly similar across districts with some small differences. Munger has the highest proportion of households around the mean score. Maharajganj and Munger have very similar distributions for scores more than 6.

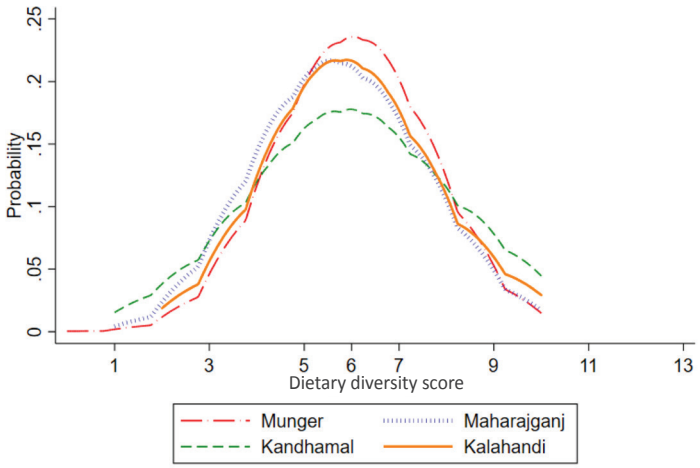


Figure 6. Distribution of household dietary diversity scores across TARINA districts

Household dietary diversity

At the household-level an average of 6 food groups out of 11 were consumed in the previous 24-hours across districts (Figure 6).

A look at individual food groups indicates that households are predominantly consuming cereals, tubers/roots, and pulses/legumes. Their consumption of meat/fish products and eggs is very low (Figure 7).

Our results are similar to estimates from the NSSO's food-expenditure data on consumption of cereals, tubers/roots, pulses/legumes, vegetables, and eggs. However, the proportion of households who reported having consumed fruits (Munger and Maharajganj), meat/fish products, and dairy products is lower in our sample.

Key findings

1. Cereals and pulses form the staple diet for women and households across districts.

2. Household dietary diversity scores are similar across districts.

3. Women's intake of micronutrient-rich foods is very low (below 30%) in all four districts.

Figure 7: Composition of household diets

4. Women in Odisha have more diverse diets than those in Bihar and Uttar Pradesh. This is being driven by a difference in the consumption of micronutrient-rich foods that are important for improved nutritional outcomes.

5. On average women consume 4 food groups while households consume 6 food groups. This does not necessarily reflect a gender bias in intra-household food allocation, as the MDDW and HDDS are based on different scales.

6. NFHS-4 data (2015–16) underestimates women's consumption of eggs and meat/fish/poultry in all districts.

7. Comparison to NSSO (68th Round, 2011–12) household-level data and NFHS (4th round, 2015–16) individual-level data needs to be viewed in light of a difference in the recall period, method of estimation, and time of data collection (seasonality).[1]

Recommendations

Recommendation 1: Household income as a pathway for increased access to nutritious foods

1.1 Need for a crop-neutral agricultural policy - India's agricultural policy needs to move away from focusing on staple grains and toward promoting the diversification of production to non-staples (such as vitamin A-rich vegetables and fruits, animal-source foods). This means reorienting the current price support policies, input subsidies, and procurement policies away from rice and wheat.

1.2 Investing in markets - It is important to link smallholder farmers to markets and value chains for non-staples. To do this requires investing in market infrastructure, like roads and transportation, that determine market access, as well as the promotion of farmer–producer organizations that are able to better negotiate the transaction costs of market activities.

1.3 Disseminating new information - If farmers are to diversify toward new crops and/or participate in related markets, then they need information on best practices for cropping and sale, as well as training in the use of new tools and technologies.

Recommendation 2: Ensuring household access to nutritious foods throughout the year

2.1 Ensuring market access and supply of affordable food - It is important to invest in rural market infrastructure to allow households to access markets. This becomes relevant as households rely, to varying degrees, on purchased foods for their consumption needs. At the same time, market access also needs to be ensured for sellers to ensure that there is a supply of diverse, nutritious foods available in the markets across seasons. This requires value chains and infrastructure such as transportation and cold storage facilities. In addition to availability, a household's ability to purchase foods depends on food prices. This is especially true for

[1] The National Sample Survey Office (NSSO) data is based on a 30-day recall of food consumption expenditure at the household-level. The NFHS data is based on a 24-hour recall of food consumed by women; however, it includes only four food group classifications that overlap with the MDDW groups we use in our analysis: eggs, meat/fish/poultry, green leafy vegetables, and dairy products.

micronutrient-rich foods, like meats that typically cost more.

2.2 Diversification of the public distribution system (PDS) - The basket of foods being supplied through the PDS should be diversified to include non-cereals like pulses and other foods.

2.3 Addressing Seasonal Food Deficits - At the household level, the promotion of kitchen gardens and backyard livestock systems offer a way to ensure access to diversified fruits, vegetables, and animal- sourced foods throughout the year.

Recommendation 3: Positive nutrition behavior for equitable intra-household food distribution

3.1 Women's empowerment - Women's empowerment is vital to ensure equitable intra-household food allocation. Women's input in agricultural decisions and their control over income from sale of crops and/or wage employment can determine availability of nutritious foods for the household from own-production as well as markets. Women's status is also important for intra-household distribution of food according to the nutritional requirements of each member of the family. Women have a better overall status in egalitarian, tribal communities (as in Odisha), relative to patriarchal communities (as in Uttar Pradesh and Bihar).

3.2 Leveraging womens' institutions for improving nutritional awareness - Women are also the primary persons involved in food preparation, so awareness about the seasonal availability of nutritious foods and best practices for cooking/ processing foods can influence the choice of foods that are prepared and the method of preparation, so as to retain the nutritional content of those foods. Self-help groups can be used as a platform for rolling out such behavioral change communication campaigns.

3.3 Labor-Saving Technologies to Reduce Women's Drudgery in the field - The time women have for food preparation is also influenced by their overall time use divided between agricultural and non-agricultural activities. In order to reduce women's drudgery in agriculture, labor-saving technologies, like Direct Seeder for Rice (DSR) and transplanters, can be provided.

Recommendation 4: Nutrient absorption for improved health outcomes

4.1 Water, sanitation, and hygiene - Water, Sanitation, and Hygiene (WASH) are crucial in determining maternal and child health outcomes, as they can influence the absorption of nutrients from the diet. It is important to ensure universal access to clean drinking water and sanitation facilities, along with hygienic food storage, processing, and preparation practices to ensure food safety.

Recommendation 5: Enhancing the use of dietary diversity scores

5.1 Adapting the scale of measurement to allow comparisons between MDDW and HDDS - The MDDW and HDDS differ with respect to the classification of their constituent food groups and the number of food groups used to construct each score. This makes it challenging to compare women's diets to those of the households to which they belong. A first step in addressing this difference can be in recomputing of the scores using the same food groups, or comparing the proportion of women who consume the food groups that are common across both the MDDW and HDDS.

5.2 Short, but more frequent recall period - The choice of a 24-hour recall period ensures that respondent error is minimized, since it focuses on foods consumed in the previous day, with suitable prompts for different times of the day. However, since a 24-hour recall cannot account for day-to-day variations in consumption of foods, an alternate methodology can involve the collection of 24-hour recall data with increased frequency—

either 3 consecutive days or repeating the 24-hour recall in different quarters or seasons of the year.

5.3 Complementary data - In places where households rely on market purchases for foods (whether exclusively or together with reliance on own-production), it becomes important to complement data on dietary diversity with diversity of foods available in local markets (e.g., market diversity score) or, at the very least, to collect information on the source(s) of foods consumed. Again, the richness of such data will benefit from frequent rounds of data collection.

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