GENDERING TRIBAL FOOD SECURITY: A CASE FROM INDIA

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ABSTRACT

Gender and food security are interdependent and essential components for the "Zero Hunger" goal. For addressing the hunger challenge, women's access to resources, effective participation in household decision-making, income-earning opportunities, and awareness about food and nutritional choices are much more significant than literacy levels and health status. Moreover, tribal women have a greater challenge due to their decreasing access to forests, higher exposure to malnutrition and inadequacies of public food security programmes. Therefore, policies aiming at food security needs effective gendering, not only in food production but also in government sponsored schemes for zero hunger. This paper highlights the food security status of tribal households in Uttar Pradesh, the most populated state with second largest hunger population. It aims to contribute to the empirical literature on the gender dimension of food policy and integrated food systems. The paper uses binary logit models to highlight the gender aspect of the food security challenges in tribal households. Households with effective involvement of women in decision-making and income generation, individual spending power, higher formal education, and association with self-help groups, have lesser food and nutritional insecurity probabilities.

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1. INTRODUCTION

Gendering seeks to analyse a problem with a bottom-up approach (Kaiser, S. 2012). It is related to socialising and implementing any activity according to the dominant gender norms. Gendering is increasingly significant for food security challenges because women not only are the providers of food but also suffers the most in case of shortages and unavailability. Moreover, across social groups, women (girls, & mothers in the households) bear a more significant proportion of the challenge (OXFAM 2019). In low-income regions, 60-80 per cent of food-related activities (from production on farms to kitchen preparation and household distribution) are the females' responsibility. Thus, the food security challenge for women is not only limited to lower self-consumption but also managing the food and nutritional levels of the entire household. For tribal communities, in the last four decades, not only have gender relations become inequitable, but their vulnerability has widened in terms of food insecurity, malnutrition, access to resources, livelihood opportunities, health and violence. Food security has evolved in terms of its definitions and determinants, yet has remained a development challenge, equally affected by market forces and government intervention (Prosekova, A.Y. & Ivanova, S. A. 2018; IDS: 2014; Vyas, V.S. 2000; Asterik, V.P. 1999). To a greater extent, government interventions have overlooked women as the key instrument in ensuring effective delivery and nutritional security for the household and the community. Market forces target women as independent buyers and focus more on becoming friendly and sensitive towards their preferences and needs. Market forces are essential because food price volatility primarily affects the poor and vulnerable populations and the prevalent food systems through the demonstration effect and income effect. Market forces, thus, impact the food and nutrition security of vulnerable households. Government intervention is the other side of the same coin regarding food security. It ensures food availability and access for vulnerable households and provides a policy framework for ensuring lower levels of hunger and better absorption of food by the households. The recent cause of concern has been the rising trend of nutrition-deficient diets and increasing levels of malnutrition.

Women, being the crucial participant in food production, provision and preparation, and their limited access to productive resources contrast, become a significant determinant for food security. Further, the status and empowerment of women are affected by access and equity issues in society within the

changing economic structure. It has been a near-universal fact that if societies invest in gender equality and female empowerment (equal access to and control over education; healthcare, technology, resources, markets and decision-making), the economic transformation and development process becomes faster and equitable (USAID). Empirical studies deal with gender issues from two perspectives. One is female farmers' status, productivity, access to resources and markets, and discrimination. Another female empowerment and intrahousehold distribution of food in poor and low-income households lead to female and child malnutrition. One of the missing links in the existing literature is the role played by women as household managers in maintaining food security. In other words, the gender dimension of food security is becoming more critical as the national food security mission expands from food to nutrition security. The gender dimension here refers to the active decision-making powers, education and spending power and awareness about child and self-nutrition with the female members of the household. Case studies and field surveys-based literature reveal that tribal populations with sufficient food stocks, permanent income sources and land are comparatively better at coping with selected mainstreaming risks and vulnerabilities, but not necessarily food security vulnerabilities. Moreover, gender dimension of food security revolves around gender discrimination and gender inequality in terms of access to food, adequacy of food and intra-household food distribution.

Furthermore, empirical studies dealing with tribal food insecurity and malnutrition levels are limited to extremely poor and backward regions of selected states. Uttar Pradesh though does not have extreme poverty situations, but malnutrition levels and multidimensional poverty levels are extremely high. In the context of zero hunger goal, the state has a paradoxical situation of largest foodgrain production with highest levels of child malnutrition and anaemic women. Moreover, tribal population has a marginal presence in the state and therefore remains least investigated in the development research. Recent research has incorporated the questions related to the suitability of a targeted/packaged approach rather than a uniform policy approach for faster progress towards achieving sustainable development goals (SDG) in general and SDG 2 (Zero hunger) and SDG 5 (Gender Equality) in specific for tribal and indigenous population. Determinants of tribal food security is one of the under examined research question. Several possible questions can emerge in this context. How far the food security situation is explained by the land size and land ownership for the tribal household size? Does male and female land ownership affect food security status? Whether cropping pattern in tribal regions

is increasingly nutrition sensitive or nutrition deficient? Majority of the literature available on tribal food security challenges focuses on the income levels, land, cropping pattern, access to public distribution system and decreasing dependence on forest. There are further critical questions which remain less examined. For instance, how does female decision-making affects household food security give the context of decreasing dependence on forests? How far public distribution system is supplementing the growing nutritional deficits in the tribal areas? What are the challenges and shortcomings in the ongoing universal food security programmes in the country?

This paper discusses the food security challenges faced by the tribal households of Uttar Pradesh. The discussion emerges from the survey of 210 tribal households from the Lakhimpur Kheri and Sonbhadra districts. Differences in the malnutrition status of male and female children 0-60 months of age and gender equality based on household decision-making, earning status, formal education and SHG activities are the two dimensions taken up in the study. There are two hypotheses for the study. First, there is a significant difference between male and female child malnutrition status in the tribal household. Second, household food security positively depends on income levels, land size, household spending and access to food. Three important conclusions emerged from the study's detailed personal interviews and field observations. First, there is an urgent need to make the food security programme gender friendly. Second, there can be improvements in nutritional outcomes only when food literacy and food governance in the tribal areas get integrated into the food distribution policies. Thirdly, gender discrimination in nutrition, though not a typical pattern in tribal food culture, increases with decreasing access to forest-based food and non-vegetarian diets.

2. BRIEF LITERATURE REVIEW ON GENDERING TRIBAL FOOD SECURITY

Tribal food insecurity and malnutrition have emerged as one of the many development paradoxes (Bang, A. 2020; LANCET 2021). It is a paradox arising from mainstreaming the tribal and indigenous population (Tagade, N. 2012; Das & Saha, 2016; Jerath et al., 2021). The impact of mainstreaming is visible through increasing literacy levels, household income, employment opportunities, decreasing mortality rates, discrimination, and poverty levels. This integration process needs a long-term approach through a more significant focus on creating awareness and cultural adaptation (FAO: 2010, UNICEF

2019). The Global Nutrition Report (2020) highlights that moving ahead from the global and national level progress, local or cross-sectional food and nutritional insecurity are increasingly worrisome. Food security is at a critical juncture because malnutrition levels among males, females and children are the highest in majority of the tribal communities. For instance, 70.7 per cent of the tribal households are in the lowest two wealth quintiles (GOI 2021b). Mortality rates are not the highest, but stunting (43.8 percent) and wasting (27.4 percent) prevalence along with underweight (45.3 percent) is the highest with the lowest percentage of dietary diversity (20.6 percent) and minimum acceptable diet (8.1percent) for children in the age group of 6-23 months (pp. 317). A few decades back, tribal communities were forest dwellers dependent on natural resources for their livelihood and living. In the last four decades, their dependence on forests and natural resources has decreased, with an increasing reliance on public provisions. High levels of malnutrition in the tribal population across age groups are significantly determined by low-income levels, literacy, disease burden, open defecation and improper source of drinking water, lack of awareness, taboos and cultural practices, to mention a few, among many reasons. In addition, gender and food security are another set of interdependent factors for this mainstreaming process (Esterik, V. P. 1999; Kadilya, S. et al., 2012; Aryal et al., 2021). Women in tribal societies have experienced a significant shift from being dominant to a vulnerable position with the mainstreaming of tribal development. This further accentuates their demand for and dependence on public provisions related to their livelihood and dietary needs, nutritional intakes, primary health care, household amenities, and different entitlements for household well-being. Further, this dependence and vulnerability have positively scaled up because of displacement from forests, landlessness, atrocities, social biases, irregular allocation of public expenditures, income disparities, and distressed migration. Nevertheless, government, civil society, and international organisations initiated specific interventions contributing to tribal development. Microfinance, self-help groups, urban migration, and primary education are the four significant factors in the gradual socio-economic development of tribal populations across India (Xaxa, 2004; Gomati, 2008; Burman, 2012). The Central and the State Governments administer various programmes and interventions to minimise the problem, though tribal-specific schemes are very few (Aijaz, R. 2017; Rampal, P. 2021). Moreover, many development and social intervention programmes, funded by international agencies, are implemented for tribal regions (World Bank 2014). Lack of regular and systematic data on the fund allocations and utilisation is one of the biggest policy challenges for tribal development programmes (GOI: 2013;

2018; 2019; 2020).

The final "Decade for Action" regarding SDG-2 faced a setback due to the widespread CORONAVIRUS Pandemic. There are several factors affecting the explicit and hidden hunger (Kimura, 2013; Gödecke et al., 2018, ILO:2020, World Bank:2021, United Nations: 2020). Prevalence of hunger has been increasing across regions and social groups despite expanded food security networks in worst affected Asian countries including India. National Food Security Program has remained inadequate in terms of consistency and therefore needs a comprehensive approach for the tribal communities (Dev, M. 2018; GOI: 2018; Saigal & Srivastava: 2020; Koshi & Chandra: 2021). Common factors identified in the literature are changing patterns in food production, declining agricultural productivity, increasing risks and shocks in agricultural activities, unstable food prices, low per capita income, forced changes in staple diets and food habits, feminisation of agriculture, climatic and natural hazards, widening economic disparities, marketisation and commodification of food security and several others. Off late burden of anthropometric failure, due to 'nutrition deprivation', in children has been the biggest challenge, particularly, for the vulnerable population groups and in the poorest regions of the country (Adhikari, T. et al.,2020). Multilevel (a. Household, b. Village or Community and c. District) Logistic Regression Models are used to analyse the children and mothers' data available from the NFHS fourth round to establish that, in India, tribal children have a larger likelihood of undernutrition, and malnutrition burden than non-tribal children. The researcher through an extensive modelling finds anthropometric failure interacting with correlates like, household poverty, low level of mother's education, inadequacies in public service delivery in an elevated manner among various socio economic and demographic variables. The study also finds high degree of variance across all multi levels for undernutrition prevalence. Some of the important findings from the study supports the larger need for tribal specific policies than a uniform policy and larger focus on the gender differences of malnutrition burden.

Theoretical as well as empirical studies always emphasize upon the strong correlation between gender inequality and food insecurity. The authors flag wide policy and research issues in in gender-just food and nutrition interventions in India. The vast body of literature available on the challenges and pathways of food security and nutrition reveals that the tribal population, being the most minor proportion of the population, is mainly studied in a cross-sectional framework. (Agarwal B. 2015; Roy N. et.al. (2017); Asher & Shattuck 2017;

Pandey V. et al. 2016; Agarwal B. et al. 2018; Ghale Y. et al. 2018). These studies discuss the pathways of food security as well as potential and limitations of Gender Equality (SDG 5) and some other SDGs (SDG 1, 2, 13, 14, & 15), on household food security, where women have an instrumental role to play. Women and food security are analysed from three dimensions. First, as the food producers, mainly the small and marginal farm producers. Second, women as the consumer and food manager at the household level. The third and very significant dimension is the institutional mechanisms affecting the potential and limitations of women in the above mentioned two roles. Asher & Shattuck 2017; Ghale Y. et al. 2018 adopts a qualitative approach to elaborate on the impact of women's decision making on different dimensions of food security. They have emphasized on the gender sensitive food policies and programmes to strengthen the instrumental role played by women. The brief discussion indicates that gender dimensions of food security and role of women's decision-making needs more investigation at the household level. More importantly, tribal food security is dominated by the per capita income and backwardness arguments and therefore focusses on states like Chhattisgarh, Orissa, and Jharkhand. Food security in Uttar Pradesh is largely analysed in the context of poverty across social categories instead of decision making at the household level. Consequently, food insecurity is observed as the outcome of poverty rather than decision making and gender dimensions.

Hypothesis formulation for the present study: the above literature review indicates that agricultural productivity, women's access to food, literacy levels and health status significantly affect the food security status of the household and malnutrition levels in children. None of the studies include women's decision making as an explicit determinant for food security status or child malnutrition. Therefore, the present study proposes three major hypotheses in the study. First null hypothesis states that availability and access to food supply is the major determinant of food security for tribal households. The second null hypothesis states that women decision making does not affect the probability of households getting food secure. The third null hypothesis states that women decision making does not affect any parameter of malnutrition in the tribal households..

3. OBJECTIVES, AND RESEARCH METHODOLOGY

The paper adopts quantitative approach to analyse the relationship between gender decision making and nutritional outcomes in tribal households. The paper delineates the food and nutritional status and its determinants for the tribal

households through a primary survey of 212 households. The detailed research methodology, adopted in the paper, has been explained into three sections, viz, sampling design, measurement of food and nutritional security and LOGIT estimations with test of significance. a tool of positivist paradigm.

3.1. Data and Sampling Design

Multistage Purposive sampling technique is used to select two districts and four villages from the four development-blocks, two each from the selected districts (see Box-1). Tribal households in Uttar Pradesh are minimal in numbers and they have their locational advantages and disadvantages. Lakhimpur Kheri is the largest district in the State, located in the Terai Region of the foothills of the Himalayas on the Nepal Border. Tharu tribe is the specific tribal group living inside the dense forest area of Dudhwa National Park situated in the District of Lakhimpur Kheri. Lakhimpur Kheri has the smallest share, only 0.6 per cent of the tribal population (53,375 as per the 2011 Census), but is dominated by a homogeneous tribal community, i.e., Tharus, with significant dependence on forests, land and water but primarily controlled by the Forest Department and Border Security Force.

Sonbhadra is the second-largest district in Uttar Pradesh. It is located in the Southeast of the U.P., sharing borders with four states: Bihar, Madhya Pradesh, Jharkhand and Chattisgarh. It is a hilly region with a dense forest where different tribal communities, such as Gond, Baiga, Khaiwar, and PVTGs, live. Sonbhadra has the most extensive mineral resources and mining industries in the State. Sonbhadra has the highest share, 20.67 per cent of the tribal population (3,85,018 as per the 2011 Census), with heterogeneous tribal communities. The vulnerabilities and risks have increased with declining dependence on forests and land resources due to increased industrial activities.

3.2.   Measurement of Food and Nutritional Security

The primary survey is conducted through structured questionnaire based on the Food Insecurity Experience scale developed by the Food and Agriculture Organisation, United Nations and the SPANDAN Questionnaire, developed by the Indira Gandhi Institute of Development Research, Mumbai. These questionnaires are extensive survey instruments, capturing a vast scale of information including socio-economic background of the households, quantity, quality, and diversity of food consumed by the respondents at the household. Given the limited possibility of covering the complete questionnaire with the

selected sample in tribal villages, as their out-of-pocket expenses on food grains and necessary food items like pulses, milk and dairy products cooking oil, fruits and vegetables are not a regular activity, questions on Food Insecurity Experience were included.

More importantly, women in low-income, agrarian households, as well as deprived or underprivileged households play a critical role in balancing three dimensions of food security: a) from production on the family-owned plot, b) food distribution between sale and self-consumption and c) food allocation within the household. Thus, the role of females in household decision-making is crucial not only for the nutritional outcomes of children but also for the overall status of food security in the household. There has been a great discussion going on in the existing food security literature related to the objective vs subjective and experiential measurements of food security at the household level (ADB, 2013; Westerweel & Samwel, 2014; Maitra & Rao 2017; Gupta & Mishra, 2020, Gebre, et, al. 2021). There is a growing focus on subjective food security measurements, particularly for low-income households. There are several reasons, such as a low level of education and training, a low level of fixed assets and their limited availability, a more extensive dependence on government provisions, and loosely defined income and expenditure boundaries.

Therefore, the present paper also adopts the subjective measurement approach. The status of perceived food security depends on the direct question about the food security status and the seven essential questions used in the FIES survey mentioned above. The status of food security at the household level has been categorised into three groups, viz, Food Secure HHs, Food Insecure HHs and Transitory Food Insecure HHs, following the discussion in Gebre, G.G. et al. (2021) and Maitra, C. & Rao, D.S.P (2017). Further, the four critical nutritional outcomes for the selected sample were calculated from the collected height, weight, and age data of mothers (212 respondents) and 329 children (total children up to the age of 5 years), which includes 160 boys and 169 girls).

3.3. Estimations and Test of Significance

The gender dimensions of food security and malnutrition status of the child are captured through a set of questions (mothers as respondents), identifying the role of women in decision making, assessment of household problems, their individual income, spending and employment status and their education and health status. After normalisation and tabulations, the collected field data were

used to estimate the Chi-Sq value and odds ratio. The chi-square Test was used to determine if there are significant gender differences in male and female child malnutrition. Moreover, the test is also used to analyse the association between selected categorical variables. Significant results at the 5 per cent level have been reported in the chapter, although several combinations of data estimations were carried out.

Further, two Binary Logistic Models have been developed to explain the factors associated with food security. All the households are grouped into two categories: food secure=1 and food insecure=0 for both models. The dependent variable takes 1 for food-secure households and 0 for food-insecure households. The first is the partial model, including independent variables only related to women's decision-making, individual spending and awareness about child and self-nutritional needs. The second binary logit model is the complete model that considers all the other covariates and women's empowerment-related variables. Similarly, two Binary Logistic Models have been developed to assess the relationship between malnutrition status (any malnutrition=1 and no malnutrition=0, separately for stunting, wasting and underweight) and mother's decision-making. In the full models for any and no malnutrition, along with the three-decision-making mentioned above variables, we have also considered a few child-related variables (children's age, gender, and whether they suffered from fever or diarrhoea), mother's characteristics (education, Underage Marriage, BMI and earning status), employment status of father and some household characteristics-related variables (food security, agricultural land holdings, sanitation).

4. RESULTS AND FINDINGS

Results and findings are presented in two sections. The first section analyses the food security status of the surveyed tribal households in Uttar Pradesh into four important dimensions, food availability, access, absorption and nutritional security. The second section presents the results and finding from the LOGIT estimations carried out on the survey data.

4.1. Tribal Food Security in Uttar Pradesh: An Overview of The Tribal Households

Uttar Pradesh, which is the most populated state in India, remains as the second lowest performer on most parameters of SDGs (see Table 1). The tribal population is expected to lag behind their counterparts at the All-India level as

well as state level (GOI 2021a). Uttar Pradesh, has a much smaller share of the tribal population, concentrated in 12 out of 75 districts. Despite being a minority population subset, the development indicators reveal the existence of the majority of development disadvantages faced by the tribal population in most states (World Bank 2014; Mani S. et al. 2017). For instance, in the NFHS-IV survey, 45.9 per cent of tribal households were falling in the poorest wealth category. The literacy rate is 55.68 per cent, with a male-female literacy gap of 24.1 per cent. The poverty ratio in the State has decreased significantly from 49.8 to 27.1 during 2009-2012 , however, deprivation according to household amenities, public services and professional and technical education is still among the highest. Food security outcomes in the tribal communities are improving marginally. Less than 50 per cent of the tribal population have BPL coverage, 60.7 per cent of tribal females are anaemic, 45.9 per cent of men are underweight, and 54.9 per cent of children are stunted. Therefore, a detailed investigation of food and nutritional security status is vital to highlight the underlying factors for realising the SDG goals.

Table 2 provides a brief description of the sample characteristics. The median family size Of the surveyed 212 households, is 5 (mean value 5.89) with total 329 children up to 59 months. 79.2 per cent of households depend on agriculture and allied activities, and 23.5 per cent are cultivators or farming households. The remaining 55.3 per cent of the agriculture-dependent households are marginal or landless households, dependent on the farm and casual labour as their primary income source. Seventy-five percentiles of the households have a monthly income of Rs.5000. In contrast, the joint family monthly income is Rs. 30000. There are 18.9 per cent of the respondents who are either not aware of the size of the monthly cash income earned by their husband, or they sell their foodgrains stock every time they need cash. 50 per cent of the surveyed females (mothers of at least one child up to 5 years of age) are occupied only 24 hours a day in household work and family care, and only 2.3 per cent (5 in count) have a paid job. 51.2 per cent of the households have proper water and sanitation facilities within their house premise, which is less than 92 per cent of households, as reported in the Block level Statistical Bulletin (2019), Government of Uttar Pradesh. Further, set of 18 questions is analysed to elucidate the status of food security/ insecurity for the households for a shorter duration of time and also the changing pattern of the food systems in the tribal households. It reveals that for the tribal households, availability and access are not significant concerns for their food security status. There is no gender discrimination regarding food intake except for pregnant females. Their food

security status depends significantly on the absorption/utilisation and nutrition dimension.

4.1.1. Availability of Food and Food insecurity in selected Tribal Households

For the tribal households, food security status varies with the season of crop sowing (extreme deprivation) and harvesting (abundance). Food availability is specifically affected by land size and family size (Mahadevan & Saurdi, 2012; Dimitri, C. & Rogus, S. 2014), but both variables show a positive relationship in the present study. The availability of land and land size in the present study do not appear to be significant factors for tribal food security (through the Chi Sq Test). The households explain two possible reasons. Higher land size leads to higher sales of agricultural cereals produced in the market, a shift towards cash crops, and thus higher levels of food and non-food expenditures and bank deposits for the family. Another reason is the higher family size land density, along with the majority (63.8 per cent) of the households having 0.5-1.00 hectares of land and 14 per cent being landless.

During the survey, 33.9 per cent of respondents had not faced any food insecurity in the last seven days or last six months as they possessed sufficient rice and wheat stock, 30.6 were food insecure, whereas 35.4 per cent of the households were transitory food insecure. Sixty-nine per cent of the households are predominantly vegetarian, whereas the rest are preferably non-vegetarian households. Given their dietary pattern, the availability and quality of fish, chicken, and other flesh food play a vital role in balancing their diet. The village heads categorically mentioned that 10-12 years back, there was a larger availability of fish and other meat products given the availability of water bodies, and the animal husbandry activities supported through self-help group formation. Among the surveyed households, more than 57 per cent could not get the preferred or appropriate quality of food again, indicating a food shortage. During the field survey, food grains, pulses, cooking oil, ghee, milk, sugar, and several other stocks or availability were also calculated, which show no significant relationship with food security status. This is due to two crucial factors. One, when the total food stock of their more prominent joint family is considered, it appears significant, but as the total farm production is distributed among the family units, the food security decreases, and thus, PDS plays a vital role for these tribal households. However, government food security schemes appear in these villages with a temporary approach, as a one-time distribution

program. A forced shift in the food pattern is clearly visible, given the dominance of cereal distribution in the PDS, ICDS, and MDM programmes. The consumption of cereals dominates nutritional intake, explained as "staple grain fundamentalism" Jose, S. (2019) and "Hidden Hunger" Kimura, A.H. (2013), even though household preference for food items such as bread, snacks and many other, from the market, is consistently increasing.

4.1.2. Availability of Food and Food insecurity in selected Tribal Households

National Nutrition Monitoring Bureau (NNMB) Survey-IIIrd Round (2008-09) revealed that for tribal communities, the mean intake of major foodstuffs and nutrients is below the Recommended Daily Allowances (RDA) by the Indian Council of Medical Research. It has been observed through the National Sample Survey (NSS) consumption data that mean consumption for the schedule tribes was 54 per cent lower in the districts where they are a minority. Physical access (forest-based availability), income levels, market access, and road density are found as significant determinants of food choices in general and fruit and vegetable consumption in particular, for different social groups (Dimitri, C. & Rogus S. 2014; Bajpai, B.K. 2020; Chaudhary S. et al. 2020). Thus, the established norms of calorie intake and dimensions of food security differs for tribal population from the non-tribal population.

Access in the surveyed households depends on the household income, ease of food access for women in the household (i.e. distribution through PDS shops or Aanganwadi centres, women's control on food collection from the forest, ponds or growing in the homestead garden or interhousehold sharing), intrahousehold distribution and gender equity. The average income in the surveyed villages comes out to be Rs.4485.4 among the 212-household level, ranging between Rs. 2000-3000 to Rs. 10000 per month. Adequacy of food is reflected in the frequency of eating of major food groups. Every household member consumes rice or wheat according to their choice, rice and rice-based items being their staple diet. Along with rice, vegetables are an essential component of their daily diet. 40-42 per cent of households use locally cultivated fish and vegetables for every meal. Pulses are consumed once a week if available or when distributed through the ANM (Auxiliary Nursing Midwifery) centres. The consumption of pulses is higher for children and older members of the family. The frequency of food consumption data in the field survey showed that most of the households consumed milk, fruits, meat, fish, and eggs, as per availability in a week or a

month or when visitors/relatives arrived in the family. This consumption mainly depends on the level of income, mother's education and earning status. Weekly consumption of non-veg items (eggs, fish, chicken, or meat) is lower among females. It depends on festivals/ family functions, surplus home production, and poultry and fish cultivation opportunities for the females of the households. As a coping strategy for the shortage of cash income or food, milk, eggs, fish and chicken are always used as a medium of exchange; hence, less availability and low frequency of consumption always exist.

4.1.3. Absorption of Food and Food insecurity in selected Tribal Households

The third important dimension of food security is the Absorption/Utilisation and Quality factors. These depend on the cultural/customary habits and practices; availability of safe drinking water, sanitation facilities, LPG (liquified petroleum gas) cylinder, storage capacity of the household and storage practices in the household; public services for mother and child health care; and general health care access. 48-50 per cent of the households do not have a functional (i.e. along with water connection) sanitation facility and are still dependent on open defecation. Similarly, 50-60 per cent of the families need a safe drinking water source or place of water for cooking purposes because of contamination issues. Water contamination is one of the biggest health problems in Sonbhadra. These two factors are gender-specific, given the more considerable impact on female health and social status. The lack of proper drainage systems across households affects the water quality and waterborne and bone diseases in families across age groups. Only 26.9 per cent of the HHs have LPG connections, and the refilling cost is higher than usual due to a lack of transport options and limited supply frequency. Therefore, all the households still use woodfires (gathered through the forest by females with the permission of the Forest Department) to cook their food. LPG is used only during the rainy season or for boiling water in winter. Females can manage cooking activities with a maximum of 2-3 LPG cylinders annually. Absorption of food in tribal households significantly depends on the storage capacity and practices. Given that 70 per cent of the houses and 95 per cent of the kitchen sheds are made of mud and wood (kutcha houses), food quality gets affected, and lack of education of the household members often leads to consumption of lower quality food.

4.2.4. Status of Nutritional Security for tribal population in Uttar Pradesh

Nutritional insecurity appears to be more prominent for the surveyed tribal

households. It is believed that they always have enough food to eat. However, there are challenges related to health, productivity, and availability of introductory public provisions like water, electricity, sanitation, transport and many more, which forces them to compromise on food quality and diversity, leading to severe stunting and underweight in their children (Vishwanathan et al.; G., 2020) Thus, malnutrition in linked with unfavourable socio-demographic factors and quality of food rather than availability of food. The three critical Anthropometric measurements, viz, stunting, wasting and underweight are present in Table 3-5 for the surveyed tribal children. 64.6 per cent of mothers and 75 percent of the children, between 0-60 months of age, were registered as anaemic in the primary health centre records in the villages. It can be inferred that the prevalence of underweight increases with an increase in the age of the child in the community. It is essential to observe a 50 per cent or slightly higher prevalence of severe stunting in the selected tribal villages in Uttar Pradesh. Stunting prevalence is 2.2 per cent higher in male children than in girls. In terms of underweight for the surveyed children, the prevalence of severe underweight for boys is 7.5 per cent and 11.24 per cent for girls. However, the prevalence of Underweight with SD<-2 increases to 11.25 per cent for boys and 26.04 per cent for girls. The difference between the underweight prevalence between girls and boys is significantly different, as indicated by the Chi-Square values.

The important point for further investigation is the vast differences between stunting wasting and underweight prevalence (Jose, S. 2019). One primary reason behind these differences is food quality and absorption in the selected sample. In the available literature, the prevalence of child undernutrition depends on the mother's education, BMI, breastfeeding practices, and micronutrient supplements given to the children (Adhikari, T. et al. 2020). On the contrary, most surveyed mothers are in the normal BMI category, irrespective of their high anaemia levels. Studies have highlighted the prevalence of anaemia as evidence of the inter-generational prevalence of anaemia in tribal mothers and children (Kirby et al.; V., 2021). Poverty, food insecurity, prevalence of malnutrition, mother's health and socio-economic situations have been identified as significant variables using the bivariate and multivariate regression model on the NFHS IV data in the empirical literature.

4.2. Food Security and Role of Gender Decision-Making: Findings from the LOGIT Estimations

As discussed earlier, household food security is assumed to depend on several

factors. However, women, in the primary role of managing the same, particularly during any shock on income level or shortage of food, need effective ownership and control over resources. It has been established repeatedly that paid employment for women is the primary prerequisite in this context. For tribal households where 79.2 per cent of the surveyed women are not at all involved in income-earning activities or working on their own farms, their decision-making and control over resources become more crucial for food security. In tribal households' females can play a significant role only if there is effective improvement in their education level, earning status and decision-making. The binary logistics regression model (Table 6) with correlates related to women's decision-making and household characteristics reveals that the probability of food security for a household increases with female decision-making, individual spending power and earning status. It was also observed that females actively involved in SHG, or non-farm income-generating activities have yet to experience food shortage and nutritional insecurity for their children. Interestingly, households where the mothers are more aware of themselves, and their children's food or nutritional problems utilise the Aanganwadi services effectively but also have a higher chance of declaring themselves food insecure. Nevertheless, beneficiaries of the POSHAN programme are also more likely to be food-secured than those not availing of this scheme. However, this difference is statistically insignificant. Table 7-8 shows the crosstabs and chi sq value for female decision-making and earning status with the perceived food security levels. The reason for reported transitory food insecurity with decision-making may be due to household members' increasing compulsion of non-food expenditures. One of the important observations from the field survey, as well as the logistics regression model, is the considerable impact of female decision-making, spending power, education, and cash-earning options on food security for tribal households as well as lower malnutrition status of children. Moreover, it is significant in lowering the prevalence of wasting and underweight in their children. Only effective decision-making by women can affect stunting, as the prevalence is very high.

5. CONCLUSION AND POLICY RECOMMENDATIONS

The The adequacy of food and the idea of food security, at large, appears to have a different meaning for the policymakers and the tribal population. Tribal communities share their food stock, land and livestock much more than the non-tribal households. They have a community-dependent coping mechanism against hunger and food shortages. In the surveyed tribal villages, food security

for tribal households predominantly depends on the cultivated, wild and policy environment-facilitated food supplies.[xii] (Jerath, S.G. et al., 2021; Narayanan, S., 2019). Moreover, purchasing food items remains an occasional activity except when they migrate. Out of the selected 212 households, only 30.7 per cent reported their experience of food insecurity in the last six months and the week before the survey. 35.3 per cent of households reported transitory food insecurity status, whereas 33.9 per cent reported food security.

The food insecurity is not only because of the decreased availability of rice stock but also rising market prices of meat, fish, and vegetables. Land availability is a significant determinant of food diversity rather than food security. Land availability enables them to diversify the cropping pattern of cereal and cash crops, grow vegetables for self-consumption. In the binary logistics regression model estimation, land size above ten bighas only becomes significant, indicating the need for a gender-sensitive land and food distribution policies for the tribal communities. Public provisioning of food and basic household amenities significantly affects the malnutrition level, i.e. stunting and underweight (Vepa, S.S. et al. 2020). Findings for the four dimensions of food security repeatedly indicate the urgent need for gendering to improve the food and nutrition status of tribal children and women. Gendering requires larger participation of tribal women in the implementation and formulation of public distribution system at the local level.

National Family health survey data shows that the decision-making role of females in tribal households is comparatively more robust than other social categories. During the study, almost ten such decisions were analysed, and female agri-decisions were found significant for girls' weight for height ratio. Females participating in any type of decision at the household level significantly affects the height ratio among children. Females' involvement in household decision-making impacts the wasting and underweight prevalence of children and the food security levels of households. One crucial point to be noted here is that the decision-making of females is partial, without any ownership of resources or paid employment opportunities prevalent. 50 per cent of females are occupied with household activities, and 25 per cent of females are working on their own farms without any cash-earning activities. Females in the age group of 40-60 who have some involvement in livestock-related activities can manage the household's food security situation. Regarding food access, inefficiencies in the PDS system or POSHAN Abhiyan, need to be regularised and specified in terms of distribution of pulses, milk and dairy products, any nutritional

supplements. Community specific behavioural approach of food security must be incorporated in the public programmes.

Moreover, more gender-sensitive and gender-friendly policies for food distribution and nutrition intake provisions must be considered. Some of the mothers and the Aanganwadi workers believed that even if some packets (a mixture of multigrain or any such non-cereal food) were distributed, they were unaware of their cooking process, so they were forced to use it for animals. The distribution of cooking oil, pulses, crushed grain and milk powder is never used for consumption by females and children; instead, it is consumed in different forms by either family members or wasted. Nutritional security rather than food security, is a challenging issue, and tribal populations have some specific constraints. Thus, awareness programs and women's involvement in the public distribution may provide the desired results of ZERO HUNGER goal. The discussion with the female respondents and the tribal Head reveals that incentive-based food literacy and awareness workshops for adolescent girls and mothers (integrating food, health, education and technology) can effectively target stunting and undernourishment prevalent among the tribal population. Another critical area was exploring the possibility of local procurement of nutritive food items and redistribution as "Poshaahar", along with non-vegetarian food baskets, mainly fish or animal-based protein.

Limitation of the Study: the major limitation is the low awareness among the tribal households with respect to the norms of food and nutritional security which affects their responses. The present study is based on the survey conducted in the month of January to March 2020 in the selected tribal households. The chosen tribal households have a very small out of pockets expense on food items. Therefore, food security status has very less interaction with the per capita income and expenditure levels of the household. There is a further scope of quantifying the women's decision making and analysing the status of food security in terms of calorie intake by the individuals. A longitudinal study could further confirm the robustness of the results.

DISCLOSURE OF CONFLICT

The authors declare that they have no conflicts of interest.

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Box- 1. Sample Design: Selected State: Uttar Pradesh	
Selected Districts and the rationale (Total = 2 Districts)	
1. Sonbhadra	2. Lakhimpur Kheri
Located in South East of U.P.	Located in North of U.P.
Natural resources rich hilly area	Dense Forest Area in Dudhwa National Park
Border sharing with four states	Located in the Terai Region of the foot hills of Himalaya on the Nepal Border
2nd Largest District of U.P.	Largest District of U.P.
Selection of 2 Development Blocks from each District= Total 4 Blocks Highest Tribal Concentration (in rural areas) Blocks	

Village Selection (1 from each Block) = Total 4 Villages
    I.   Villages situated inside dense forest area.
    II.   More than 50 per cent, tribal population.
    III.   The village has a PHC and Government Veterinary Centre.
    IV.   Females with at least 1 child of less than 5 years of age
    V.   AAY card (white ration card)
    VI. ANM records	

1.a.i Majhauli(Dudhi Block) Selected Sample HHs: 41	2.a.i Parseya(Palia Block) Selected Sample HHs: 48
1.b.i Bhabhni(Babhni Block) Selected Sample HHs: 63	2.b.i Belapursua(Nighasan Block) Selected Sample HHs: 60
Total Sample Size=212 Tribal Households	

Table 1. Important Sub-Indicators for SDG-2 (Zero Hunger)					
	Target	India	Kerala	Uttar Pradesh	Schedule Tribes
Percentage of beneficiaries covered under National Food Security Act (NFSA) 2013	100	99.51	100	99.23	83.2
Percentage of pregnant women aged 15-49 years who are anaemic	25.2	50.4	22.6	51	54.67
Percentage of children under five years who are underweight	1.9	33.4	18.7	36.8	54.93
Percentage of children under five years who are stunted	6	34.7	20.5	38.8	51.74
Percentage of adolescents aged 10-19 years	14.2	28.4	9.1	31.6	70.08

who are anaemic				
Gross Value Added (constant prices) in agriculture per worker (in Lakhs/worker)	1.22	0.71	2.2	0.59
Rice and wheat produced annually per unit area in kilograms	5322.1	2995.2	2920.1	3158.5

(Note: "---" appears above in the GVA row and "2105.5" appears above in the Rice and wheat row, in an additional rightmost column.)

Source: SDG India, Dashboard 2020-2021, NITI AAYOG, New Delhi and Compendium of District Factsheets: Tribal Health and Nutrition, Based on NFHS-IV (2015-16) published by Ministry of Tribal Affairs, GOI, 2020.

Table-2. Descriptive Statistics from the field Survey			
	Median (Mean) Value	Range (min-max)	SD
Average family size (based on Ration Card members)	5.0 (5.89)	3-8	1.219
Family size based on the joint family system	10	3-48	6.540
Land Holding (in hectares) per household	0.48	0-5	2.953
Landless Households in numbers	32 (16 %)	--	--
Respondent mother as an earning member (in nos.)	15	--	--
Agriculture as Major Occupation for the respondent's husband	46.7% (99)	--	--
Non Farm as Major Occupation for the respondent's husband	10.8% (23)	--	--
Respondent's Husband in government service	05	--	--
Monthly Income (in Rs.) of the Husband	2000 (4486)	0-20000	9320.89
Extended Family Monthly Income (in Rs.)	12000 (22194.76)	1000-150000	22751.94
Households with proper sanitation facilities	51.6%	0-75%	
Households with proper drinking facilities	51.6%	0-75%	
Share of Food Expenditure in Total Expenditure	28	13-100	23.636
Share of Non-Food Expenditure in the Total Expenditure	72	0-87	23.636
Monthly Household food expenditure in Rs.	1000 (1615)	20-3300	2376.98
Largest item of monthly household expenditure in Rs.	1000 (1808.29)	00-3586	2761.34
Total availability of Rice Stock in the household for any six months (in Kgms)	215	0-1698	272.122
Total availability of Wheat Stock in the Household for any six months (in Kgms)	126	0-1900	228.536
Total availability of Pulses Stock in the Household for any six months (in Kgs)	3.0 (18.38)	0-78	71.426
Total availability of Cooking Oil Stock in the Household for any six months (in litres)	2.0 (9.42)	0-50	48.436
Total availability of Ghee Stock in the Household for any six months (in grams)	0.00 (170.89)	0-5000gms	664.750

Source : Field Survey conducted by the author

Z Score Range	Table- 3. HAZ (Stunting)					
	Total		Boys		Girls	
	Number of Children	Percentage of Children	Number of Boys	Percentage of Boys	Number of Girls	Percentage of Girls
<-3SD	**169**	**51.37**	**84**	**52.5**	**85**	**50.3**
-3SD to -2SD	**35**	**10.64**	**12**	**7.5**	**23**	**13.61**
-2SD to -1SD	31	9.42	13	8.13	18	10.65
-1SD to -0	30	9.12	17	10.63	13	7.69
0 to 1SD	24	7.29	13	8.13	11	6.51
1SD to 2SD	17	5.17	9	5.63	8	4.73

2SD to 3SD	11	3.34	4	2.5	7	4.14
>3SD	12	3.65	8	5	4	2.37
Total	329	100	160	100	169	100
Chi Square	Pearson chi2(7) = 6.9388 Pr = 0.435					

	Table- 4. WHZ (Wasting)					
	Total		Boys		Girls	
Z Score Range	Number of Children	Percentage of Children	Number of Boys	Percentage of Boys	Number of Girls	Percentage of Girls
<-3SD	34	10.5	13	8.2	21	12.7
-3SD to -2SD	24	7.4	10	6.3	14	8.4
-2SD to -1SD	34	10.5	14	8.9	20	12.1
-1SD to 0	57	17.6	23	14.6	34	20.5
0 to 1SD	69	21.3	40	25.3	29	17.5
1SD to 2SD	64	19.8	32	20.3	32	19.3
2SD to 3SD	27	8.3	18	11.4	9	5.4
>3SD	15	4.6	8	5.1	7	4.2
Total	324	100	158	100	166	100
Chi Square	Pearson chi2(7) = 10.3597 Pr = 0.169					

	Table- 5. WAZ (underweight)					
	Total		Boys		Girls	
Z Score Range	Number of Children	Percentage of Children	Number of Boys	Percentage of Boys	Number of Girls	Percentage of Girls
<-3SD	31	9.42	12	7.5	19	11.24
-3SD to -2SD	**62**	**18.84**	**18**	**11.25**	**44**	**26.04**
-2SD to -1SD	**113**	**34.35**	**57**	**35.63**	**56**	**33.14**
-1SD to 0	**76**	**23.1**	**39**	**24.38**	**37**	**21.89**
0 to 1SD	39	11.85	28	17.5	11	6.51
1SD to 2SD	4	1.22	3	1.88	0	0
2SD to 3SD	1	0.3	1	0.63	1	0.59
>3SD	3	0.91	2	1.25	1	0.59
Total	329	100	160	100	169	100
Chi Square	Pearson chi2(7) = 22.0592 Pr = 0.002					

Table-6. Odds ratio in the Binary Logit Model Estimations				
Correlates	Food Security	Any Stunting	Any Wasting	Any Underweight
Partial Model Psuedo R²	0.0129	0.0296	0.0251	0.201
Women involvement in any household decision making	1.1299	0.9606	0.5006***	0.8958
Female Individual spending	0.6824	0.3548**	3.4053***	0.5040**
Awareness about child and self-nutrition	1.6996***	0.6136**	1.9445**	1.1564
Full Model	0.2187	0.1842	0.1968	0.1731
Education level VIII-XII class	2.2506**	0.8619	2.4903***	0.6024
SHG activities	0.2596*	0.4806***	7.7032*	0.6204

Earning from Non Farm activities	0.2947***	0.9654	5.8174**	1.3589
Bank Deposit	2.115***	NA	NA	NA
Land Size	2.1689	0.9316	0.3218**	0.4270***
Husband with a regular wage	1.0953	0.4993	2.7835	0.4142
Female Child	NA	1.0628	1.7146	3.0624*
Sanitation facility	NA	0.4160**	0.7486	0.3910**

Note: significance level at 1 per cent*, 5 per cent** and 10 per cent *** otherwise insignificant.

Table-7. Household Decision and Food Security Status (%)				
Household decision	Secure	Insecure	Transitory Insecure	Total (N)
only wife	33.33	29.63	37.04	27
only husband	35.71	38.39	25.89	112
partially wife	31.51	19.18	49.32	73
Pearson chi2(4) = 12.4439 Pr = 0.014				

Table-8: Women Any Decision and Food Security Status (%)				
Decision	Secure	Insecure	Transitory Insecure	Total
No	35.71	38.39	25.89	112
Yes	32	22	46	100
Pearson chi2(2) = 10.8825 Pr = 0.004				