



Factors Influencing Farming Practices towards Nutrition Sensitive Agriculture in Southern Odisha

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HIGHLIGHTS

- The study indicates the critical role of nutrition sensitive agriculture in preventing malnutrition.
- There is a need of clear communication and alignment between policy makers and farmers.
- The respondents can change their attitude towards nutrition sensitive agriculture through proper education and intervention.

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ABSTRACT

In order to alleviate food and nutrition insecurity, nutrition-sensitive agriculture places a strong emphasis on integrating agricultural interventions with nutrition goals. Understanding how attitudes and perception influences the nutrition practices and dietary choices is crucial for effective nutrition sensitive agriculture. The study explores how household practices influence the nutritional outcomes and factors affecting nutrition sensitive agricultural interventions aimed at improving people's dietary patterns. This method seeks to enhance the quality and variety of diets in addition to increasing food production by acknowledging the connections between nutrition, agriculture, and health. Though there are varying perspectives and obstacles to overcome, nutrition-sensitive agriculture is generally seen favorably, with many acknowledging its potential to improve food systems. The present study was conducted in Gajapati and Rayagada districts of Odisha in 2024. Three blocks were selected from each district, totaling six blocks randomly, total of 20 respondents from each block selected by simple random sampling technique to form a total sample size were 120. Majority of respondents (53%) were having less favourable perception towards Nutrition Sensitive Agriculture with moderate (59%) attitude towards nutrition sensitive agriculture.

INTRODUCTION

In order to meet the global nutrition targets, governments, donor agencies, and development organizations nutrition-sensitive agriculture places a strong emphasis. Although nutrition-specific interventions are important, they are not enough to achieve these goals (Bhutta et al., 2013; WHO, 2024). Nutritious food is essential for health emphasizing the importance of teaching rural households about the need of nutrients for growth and wellbeing (Kumbhare et al., 2023). By addressing concerns of family food security, dietary

quality, income, women's empowerment, and global food availability, agriculture has a major impact on nutrition (Black et al., 2013). However, contributions from other sectors are equally critical.

Food availability, often measured through local food grain production, is central to food security, while food stability ensures consistent household access to adequate food (Jatav & Mubeena, 2023). Policies that support nutrition-sensitive agriculture should increase awareness regarding the health benefits of millets, stimulate the variety of recipes, and guarantee their availability through public distribution systems (Amrutha et al., 2024). Targeted nutritional

education programs for low-income farm women improve dietary practices and household food security (Dominic et al., 2023). Studies reveal gender disparities in diets, with males generally consuming more diverse and balanced food compared to females, who often have less nutritious diets (Vij & Mann, 2022). A bottom-up approach focusing on community and household levels provides better insights into food and nutritional security (Jairu et al., 2023).

In India, food security is evaluated through nutrient absorption, availability, and access. While cereal production is adequate, shortages in oilseeds and pulses persist. A multidisciplinary strategy is needed to address food insecurity, encompassing education, women's empowerment, safe water, sanitation, and nutritional diversity. Despite rising incomes and protective measures, food insecurity and malnutrition remain significant challenges, necessitating effective, people-focused policies (Dev & Sharma, 2010). Awareness programmes for education and outreach are essential for promoting awareness of sustainable farming practices and their implementation, which improve nutrition and food security (Mishra et al., 2024). The 66th National Sample Survey (2009–10) highlighted socio economic and regional disparities in rural food consumption. The bottom 20 per cent of households consumed less cereal (11.73 kg) than the national average, while wealthier groups ate more fruits, vegetables, milk, and pulses, with reduced cereal intake. Agricultural self-employed households consumed more milk and cereals. Religious preferences influenced cereal choices, such as Christians favouring rice and Jains and Sikhs preferring wheat. Larger families and marginalized groups, like scheduled castes and tribes, had less diverse diets, increasing malnutrition risks, with agro-climatic zones further shaping consumption patterns (Gupta & Mishra, 2014).

Food security depends on physical and economic access, with income, market access, and affordability playing key roles. Adequate food supply alone is insufficient; effective distribution networks are essential (Keding et al., 2013). In Karnataka's Vijayapura district, dietary diversity correlated with household size, education, income, and production diversity. Nutrition-sensitive policies, infrastructure investments, and modern technologies are crucial for improving diets, especially for children (Pingali & Sunder, 2017). Progress is hindered by barriers like illiteracy, limited training, and weak KVK-NGO interactions (Dagar & Upadhyaya, 2022).

METHODOLOGY

The research was conducted in the Gajapati and Rayagada districts of Odisha, using a simple random sampling method with a total sample size of 120 participants. Gajapati has 7 administrative blocks. In the Gajapati district, three blocks—R. Udayagiri, Gumma,

and Rayagada were selected by simple random sampling out of the seven blocks based on nutritional vulnerability. Subsequently, from Sabarapalli, Phatachanchara, and Parimala villages from R. Udayagiri block; Tibi Singh, Linga, and Munising from Gumma; and Kaithapadar, Dambapur, and Hirapur from Rayagada. Twenty respondents sampled from each block, resulting in a total of 60 respondents for the district. Similarly, in the Rayagada district, three blocks—Rayagada, Muniguda, and Gunupur—were selected randomly. Three villages from Pitamahala, Manikajhola, and Bishnuguda from Rayagada; Sakata, Munikhola, and Kaliarpeta from Muniguda; and Regada, Laba, and Sirijholi from Gunupur were selected randomly resulting a total 60 respondents in Rayagada district. So the total number of respondents under study is 120.

Data collection was conducted through personal interviews with farmers using a structured interview schedule. Prior to this a pilot study was conducted for discussing with progressive farmers, extension officers and financial institution officials. This information helped for selecting and finalizing the variables to prepare interview schedule. Various scales and scoring methods developed by previous researchers were employed with slight modifications. Perception and attitude toward nutrition-sensitive agriculture were considered the dependent variables. Independent variables were measured using 3-point, 4-point, and 5-point scales developed by different researchers, while dependent variables were assessed using a 3-point scale (Agree = 1, Disagree = 2, Neither Agree nor Disagree = 3), as developed by Junuthula et al., (2022).

In total, the study included 19 independent variables and 4 dependent variables tailored for farm families. Data collected were categorized, organized, and analyzed to meet the study's objectives. Mean, standard deviation, frequency, percentage, correlation coefficient, regression analysis and other statistical methods were used using the OPSTAT (Operational Statistics) online open-access software. A perception and attitude index, calculated using a specified formula, was utilized to examine the factors influencing farming practices toward nutrition-sensitive agriculture in southern Odisha. The analysis focused on respondents' perceptions and attitudes toward promotional activities, such as government policies or schemes, training programs, workshops, support from NGOs or FPOs, and household nutrition practices.

RESULTS

Cultural beliefs, socioeconomic status, and level of education in the study field are some of the variables that influence how people perceive nutrition-sensitive agriculture. It is observed that in Table 1 majority of (74.1%) respondents choosing a diet with a lot of fresh fruits and vegetables in good for one's health, eating

Table 1. Item-wise Perception of respondents towards Nutrition Sensitive Agriculture

Statements	Percentage
Choosing a diet with a lot of fresh fruits and vegetables is good for one's health	74.11
Eating variety of foods is good for one's health	60.00
Choosing a diet with lots of staple foods (rice, rice products, wheat) is not good for one's health	45.00
Consuming animal products (Fish, egg, meat) daily is good for one's health	54.12
Consuming dairy products and nuts is good for one's health	50.00
Refined grain (rice, wheat flour) contains more vitamins than unrefined grains	41.72
Advertisement are very reliable source of getting nutritional information	54.13

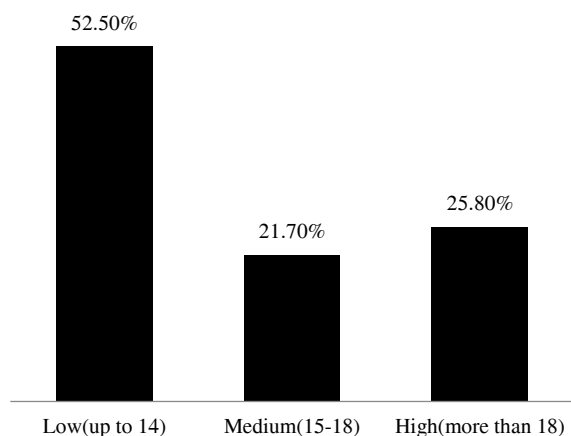


Figure 1. Overall Perception towards Nutrition sensitive agriculture

Table 2. Attitude towards Nutrition sensitive agriculture

Statements	Percentage
Do you want to know Nutrition Sensitive Agriculture	29.16
Have you attended any training program	38.33
Have you thought Crop diversification is required	43.33
Is the farmers and rural people are adopting nutrition sensitive practices	28.33
Have you thought the integration of nutrition education and awareness campaign is required	34.16
Do you think policy makers, extension personnel should promote and support Nutrition Sensitive Agriculture	48.33
Your general attitude towards Nutrition Sensitive Agriculture	35.00

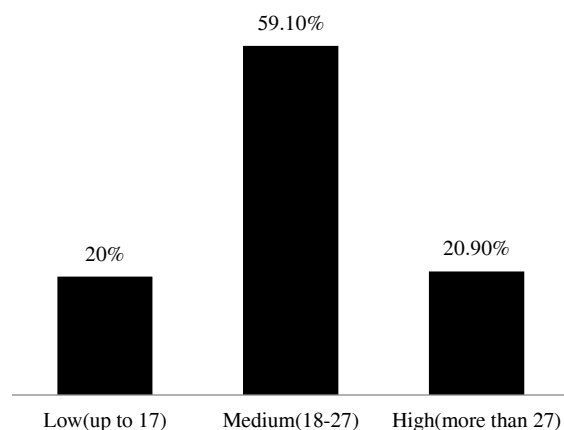


Figure 2. Overall Attitude towards Nutrition sensitive agriculture

variety of foods is good for one's health (60%), choosing a diet with lots of staple foods(rice, rice products, wheat) is not good for one's health (45%), consuming animal products (Fish, egg, meat) daily is good for one's health (54.1%), consuming dairy products and nuts is good for one's health (50%), refined grain (rice, wheat flour) contains more vitamins than unrefined grains (41.7%), Advertisement are very reliable source of getting nutritional information (54.1%). From figure-1 it is observed that majority of respondents were having low level (52.5%) of perception, followed by high level (25.8%) and moderate level (23.7%) of perception towards Nutrition Sensitive Agriculture.

It was observed that majority of respondents were having moderate to low level of attitude towards nutrition sensitive agriculture. In Table 2 do you want to know nutrition sensitive agriculture? (59.1%), have you attended any training program? (28.3%), have you thought Crop diversification is required? (37.5%), Is the farmers and rural people are adopting nutrition sensitive practices? (40%), Have you thought the integration of nutrition education and awareness campaign is required? (45%), do you think policy makers, extension personnel should promote and support nutrition sensitive agriculture? (36.7%), your general attitude towards nutrition sensitive agriculture? (43.4%). In Figure 2 majority of (59%) of respondents were having moderate level of attitude, followed by low level (21%) and high level (20%) of attitude towards Nutrition Sensitive Agriculture.

In Table 3, majority of (57.5%) respondents were having low level of household nutrition practice, followed by medium level (22.5%) and high level (20%) of household nutrition practices towards Nutrition Sensitive Agriculture.

Relationship of Independent variables with perception, attitude and house-hold nutrition practices about nutrition sensitive agriculture

The link between the scores of the selected independent variables and the degree of perception, attitude, and household nutrition practices was examined using the null hypothesis and the

Table 3. House-hold nutrition practice towards Nutrition sensitive agriculture

House-hold nutrition practice	Percentage
Who has control over the nutrition in your family	28.33
Who purchase and collect food	26.66
Food preference given by	20.00
Who prepare meal	22.51
Who manage water source	24.16
How many meals per day do you eat	26.66
If you skip meals what meal(s) do you usually skip	18.33
Purpose of skip any meal	22.51
Portion size of your meals	29.16
Take any Multivitamin/ food supplement	23.33
How often do you snack	22.51
Preferred meal choice	23.33

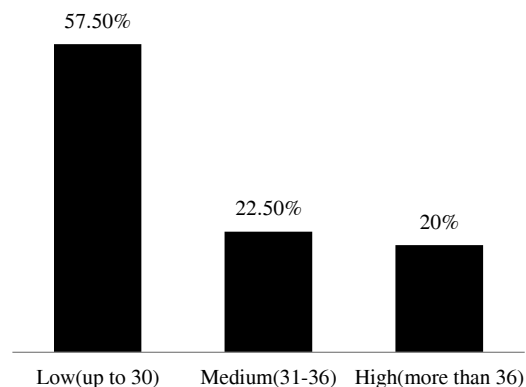


Figure 3. Overall House-hold nutrition practice towards Nutrition sensitive agriculture

Table 4. Relationship of independent variables with perception and attitude about nutrition sensitive agriculture

Independent Variable	Correlation coefficient of Perception	Correlation coefficient of Attitude
Age	0.042 ^{NS}	0.008 ^{NS}
Gender	0.202*	-0.069 ^{NS}
Caste	-0.130 ^{NS}	-0.302**
Types of farmer	0.337**	0.456**
Education	0.390**	0.505**
Family Size	-0.066 ^{NS}	-0.085 ^{NS}
Nutrition deficiency	-0.262**	-0.243**
Nutrition status	0.224*	0.298**
Housing Condition	0.347**	0.451**
Crop Calendar	0.060 ^{NS}	0.112 ^{NS}
Meals taken yesterday	0.301**	0.337**
Food source	0.109 ^{NS}	0.217*
Preference of Food	0.280**	0.412**
Primary source of Income	-0.279**	-0.108 ^{NS}
Annual income	0.305**	0.400**
Asset Possession	0.439**	0.598**
Outside contact	0.498**	0.665**
Information seeking Behaviour	0.386**	0.520**
Extension media contact	0.552**	0.672**

** = 1% level of significance; * = 5% level of significance

Table 5. Regression analysis with perception about nutrition sensitive agriculture

Independent Variable	Coefficients	Standard Error	t Value	Significance
Profile variable				
Age	-0.086	0.046	-1.860	0.065
Gender	-1.217	0.894	-1.361	0.176
Caste	-0.388	0.529	-0.733	0.465
Types of farmer	0.129	0.681	0.190	0.850
Education	1.053	0.663	1.589	0.115
Family Size	0.227	0.273	0.833	0.407
Nutrition deficiency	-0.383	0.282	-1.359	0.177
Nutrition status	0.524	0.634	0.826	0.410
Household-dynamics				
Crop Calendar	0.021	0.020	1.094	0.276
Meals taken yesterday	-0.023	0.212	-0.106	0.916
Food source	-0.141	0.881	-0.161	0.873
Preference of food group	0.049	0.158	0.311	0.756
Socio-economic variables				
Housing Condition	0.222	0.190	1.164	0.247
Primary source of Income	-0.474	0.153	-3.099	0.002
Annual income	0.466	0.776	0.600	0.549
Asset Possession	0.175	0.140	1.255	0.212
Social variables				
Outside contact	0.355	0.266	1.336	0.184
Information seeking Behaviour	-0.192	0.188	-1.023	0.308
Extension media contact for advice	0.270	0.141	1.921	0.057
Constant	15.680			
R ²	0.5052			

empirical hypothesis. The correlation coefficient (r) was calculated and the result was shown in Table 4. Table 4 describes that perception, attitude and house-hold nutrition practices about nutrition sensitive agriculture is highly significant and positively correlated with types of farmer, education, housing condition, meals taken yesterday, preference of food, primary source of income, annual income, asset possession, outside contact, information seeking behaviour, extension media contact at 1 percent significant level and perception is positively significant with gender, nutrition status, primary source of Income and attitude is positively significant with food source at 5 percent significant level. But nutrition deficiency is highly significant and negatively correlate with perception 5 per cent significant level and caste, nutrition deficiency is highly significant and negatively correlate with attitude at 5 per cent significant level and gender, caste is negatively significant with house-hold nutrition practices at 5 per cent significant level and nutrition deficiency and primary source of income is highly significant and negatively correlate with house-hold nutrition practices at 1 percent significant level.

Factors influencing farming practices towards Nutrition Sensitive Agriculture

The multiple regressions (Table 6) could explain only 75.47 percentage of the variability in influencing the factors influencing

Table 6. Regression analysis with attitude about nutrition sensitive agriculture

Independent Variable	Coefficients	Standard Error	t Value	Significance
Profile variables				
Age	-0.092	0.043	-2.118	0.036
Gender	0.757	0.841	0.900	0.370
Caste	1.022	2.548	0.401	0.689
Types of farmer	-0.115	0.640	-0.180	0.858
Education	1.641	0.623	2.632	0.010
Family Size	0.454	0.257	1.770	0.079
Nutrition deficiency	-0.126	0.265	-0.475	0.636
Nutrition status	1.265	0.597	2.121	0.036
Household-dynamics				
Crop Calendar	0.045	0.018	2.474	0.015
Meals taken yesterday	-0.007	0.199	-0.034	0.973
Food source	0.094	0.829	0.114	0.910
Preference of food group	0.141	0.149	0.948	0.345
Socio-economic variables				
Housing Condition	0.383	0.179	2.138	0.035
Primary source of Income	-0.140	0.144	-0.976	0.331
Annual income	0.677	0.730	0.928	0.355
Asset Possession	0.403	0.131	3.069	0.003
Social variables				
Outside contact	0.700	0.250	2.795	0.006
Information seeking Behaviour	-0.177	0.177	-1.001	0.319
Extension media contact for advice	0.379	0.132	2.860	0.005
Constant	7.947			
R ²	0.7547			

farming practices towards Nutrition Sensitive Agriculture among 19 variables. The variables age, gender, caste, types of farmer, education, family size, nutrition deficiency, nutrition status, housing Condition, crop Calendar, Meal taken yesterday, food source, preference of food, primary source of income, annual income, asset possession, socio-economic variables, information seeking behaviour, outside contact, extension media contact are helpful in increasing the factors influencing farming practices towards Nutrition Sensitive Agriculture.

DISCUSSION

The data gathered from two districts to know the factors influencing farming practices towards nutrition sensitive agriculture Majority of respondents were having low level (52.5%) of perception, followed by high level (25.8%) and moderate level (23.7%) of perception towards Nutrition Sensitive Agriculture. Majority of (59%) of respondents were having moderate level of attitude, followed by low level (21%) and high level (20%) of attitude towards Nutrition Sensitive Agriculture. Majority of (57.5%) respondents were having low level of household nutrition practice, followed by medium level (22.5%) and followed by high level (20%) of household nutrition practices towards Nutrition Sensitive Agriculture. Many nutrition outcomes are improved when agricultural programs are packed with interventions that target a variety of direct and underlying determinants of nutrition, including income, food availability and access, micronutrient adequacy, gender equity, and knowledge, practices, and use of nutrition, health, and hygiene-related services. Possible interventions include promoting the production of nutrient-dense crops (leafy greens, pulses, and millet) in addition to basic cereals, concentrating policy on increasing the variety of household diets, and directing extension services towards women and children, who are more susceptible to malnutrition. Incorporating nutrition education into agricultural training modules includes teaching farmers about kitchen gardens and bio-fortified crops to improve household nutrition, teaching them about post-harvest handling, processing, and marketing of nutrient-dense foods, and using gender-sensitive approaches to design training that empowers women farmers and recognises their role in household food decisions. The study was carried out under certain limitations of time and resources available with researchers, covering only selected Gajapati and Rayagada districts. Some personal, nutritional status, economic, situational and psychological characteristics other than those included in this study might be affecting the accessibility, availability, and absorption of nutrition-sensitive interventions by farmers.

CONCLUSION

The Perception, Attitude, and Household Nutrition Practices Index revealed that 52.5 per cent had a low perception level, 59 per cent showed a moderate attitude level, and 57.5 per cent had low household nutrition practices. The results emphasize how crucial nutrition-sensitive agriculture in preventing malnutrition and its connection to farming practices, though interpretations of this concept may vary among farmers and policymakers. Greater funding and supportive legislation are required to promote nutrition-sensitive agriculture, with governments, international organizations, and

NGOs playing critical roles in providing resources and technical support. Strategies such as crop diversity, increasing dietary diversity, and educating farmers about the nutritional value of various foods are essential to improve dietary habits and promote nutrient-rich farming practices for better nutrition outcomes. Farmers should be encouraged to cultivate crops high in nutrients such as fruits, vegetables, legumes and millet. Extension officials should provide farm advice along with nutrition messages.

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