

MANAGE Internship Report - 2023-24

Impact Assessment of Nutrition Sensitive Agriculture Training Programs at Grassroot Level

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LIST OF SYMBOLS AND ABBREVIATIONS

et.al.	And other people
BMI	Body Mass Index
FAO	Food and Agriculture Organisation
FLD	Front Line Demonstration
FLS	Field Level Staff
GOI	Government of India
GHI	Global Hunger Index
ICAR	Indian Council of Agricultural Research
IFPRI	International Food Policy Research Institute
IFAD	International Fund for Agricultural Development
KVK	Krishi Vigyan Kendra
NFHS	National Family Health Survey
NHM	National Health Mission
NGO	Non-Governmental Organization
NFSM	National Nutrition Strategy Mission
NSA	Nutrition Sensitive Agriculture
MANAGE	National Institute of Agricultural Extension Management
MSL	Mid Senior Level
SAMETI	State Agricultural Management and Extension Training Institute
SDG	Sustainable Development Goals
SHG	Self-Help Group
ST	Scheduled Tribe
UNICEF	United Nations International Children's Emergency Fund
UN	United Nations
USDA	United States Department of Agriculture
WHO	World Health Organisation
WFP	World Food Programme

Impact Assessment of Nutrition Sensitive Agriculture at Grassroot level

Abstract

India eventually achieved food self-sufficiency following the Green Revolution led by Prof. M.S. Swaminathan, but nutrient deficiency gradually became apparent at the beginning of the twenty-first century. This was made visible by an upward trend in incidences of malnutrition, stunting, wasting, and other related conditions in India's rural settings. This is where nutrition-sensitive agriculture came into the equation. In essence, it is a food-based strategy for agricultural growth that places a focus on dietary diversity, fortification, and foods high in nutrients as the keys to overcoming malnutrition and micronutrient deficiencies. MANAGE, as part of the consultancy project with UN-FAO had developed two sets of training manuals- one for the mid-senior level officers and the other for the field level extension functionaries, in 2021-22. Since then MANAGE has institutionalized this concept and has been organizing training programs at MANAGE, and in collaboration with other State/ Central Govt. institutions, private institutions, collaborating partners etc. This study aims to understand the implementation of the learnings from NSA training attended by the participants, whether online, or in-person at MANAGE or organized by partner institutions as a MANAGE collaborative training program. Using the methodology of Survey Research, a questionnaire (google form) was developed in line with the objectives to understand the impact of the trainings imparted at the ground level and the constraints faced by the respondents in its implementation. Out of the 120 training participants contacted, 55 responded the provided google form. It was encouraging to know that the respondents had trained 12,665 farmers through 88 training programs conducted by them. Out of these trained participants, 47.0 per cent of them were women participants. The trainings imparted by MANAGE and its partner institutions were able to provide new knowledge and skills on crop nutritional needs, sustainable practices, microgreens, and malnutrition to 90.0 per cent of the respondents They in turn promoted nutrition sensitive agriculture on underutilized crops, nutrition gardens, importance of balanced diet, marketing opportunities of locally available nutritious crops, management of post-harvest losses and on-farm trials. by organizing training programs at

their respective locale. The respondents' follow-up survey revealed significant change in the food habits of the respondents and their family by diversifying their diet and food plates and also practicing nutrition sensitive agricultural practices. This was captured in terms of the success tales they acknowledged. Some of the major challenges faced by them included lack of experts, financial constraints, and organization's unresponsive attitude. A holistic, community-centric approach is needed to introduce bio-fortified crop varieties and promote local produce to combat the problem of malnutrition and micronutrient deficiencies.

Introduction

India is a developing country (an economy of \$3.75 billion) that primarily relies on agriculture, where the prime focus is on production and productivity, in order to feed its population of 1.4 billion. By 2030, hunger among Indians may become more severe due to climate change, according to International Food Policy Research Institute's Global Food Policy 2022 report (Times of India. 2023). Under nutrition, overweight, and obesity are all influenced by limited access to food, especially nutritious foods. For women who are of reproductive age, it raises the risk of premature births, childhood stunting, and anaemia. Especially in upper-middle-class and high-income nations, it is associated with obesity in women and overweight in school-age girls. (FAO, 2018).

In 2022, there were an estimated 148.1 million stunted children under five (22.3 per cent), 45 million wasted children (6.8 per cent), and 37 million overweight children (5.6 per cent) worldwide. While being overweight was slightly more common in urban areas, stunting and wasting were more common in rural areas. (FAO, 2023a). In addition to food security, the country also needs nutrition security. The global epidemic of hunger and malnutrition has spread around the world, wreaking havoc and negatively impacting several million individual health and livelihoods, especially in developing nations. Globally, 691–783 million people were estimated to be starving in 2022.

To live an active and healthy life, a person needs to eat a balanced diet that includes enough calories, the correct amount of essential nutrients, and the right proportion of food groups. (FAO, 2022) Globally, most nations have improved in terms of supplying food to their people, as evidenced by the Global Hunger Index (GHI), which shows improvement since 2015 when the SDGs were put forth, in light of the then-current circumstances and target for 2030. However, the present problem is to provide quality food (nutritionally dense) rather than quantity food. A major concern for the world's malnutrition includes deficiencies in specific micronutrients as well as excessive consumption of food; more than half of the world's population is malnourished: hunger, micronutrient deficiencies (wasting & stunting), overweight, and obesity frequently coexist (FAO, 2014). When each and every person has physical and financial access to enough, safe, nourishing food that satisfies their dietary needs and food preferences for an active and healthy life, one achieves food security. (1996 World Food Summit) In order to overcome malnutrition and micronutrient deficiencies, nutrition-

sensitive agriculture is a food-based approach to agricultural development that places a strong emphasis on dietary diversity, fortification, and foods high in nutrients. (FAO, 2014). In 2022, there was an estimated 148.1 million stunted children under five (22.3 per cent), 45 million wasted children (6.8 per cent), and 37 million overweight children (5.6 per cent) worldwide. While being overweight was slightly more common in urban areas, stunting and wasting were more common in rural areas. (FAO,2023a). Globally, 691–783 million people were estimated to be starving in 2022. Compared to 2019, the year prior to the global pandemic, 122 million more people went starving in 2022 (about 735 million) (FAO, 2023a). As a result, the case for restructuring agriculture to support better nutrition and health is well known, and it was included in the process that resulted in the establishment of the United Nations 2030 Agenda for Sustainable Development (UN, 2017). This transition may be seen at the regional level in the expanding number of programmes to assist national Governments in including nutrition into their agricultural investment plans, as demonstrated by the Comprehensive Africa Agriculture Development Programme investment plans (Rampa and van Seters, 2013).

Only focusing on production and productivity is inadequate because problems like malnutrition and starvation require attention. Beyond food security, the country also requires nutrition security. Over the years, mechanisms to address malnutrition in India have taken the shape of legislation and Mission Mode Projects (projects with a specified time table) under various Government Ministries. The National Nutrition Policy (1993), National Plan of Action (1995), National Health Policy (2002), National Nutrition Mission (2003), and National Health Mission (NHM) (2013) are among them. The latter provides iron supplementation, antenatal care, and postnatal care (Pingali and Abhram, 2019). Although Govt. initiatives to combat malnutrition in India have frequently been scattered and disorganized, more comprehensive policies and programmes have taken the stage in recent years, albeit with considerable limits. Two significant examples are the National Food Security Act (NFSA) and the National Nutrition Strategy Mission. The NFSA was established in 2013 to improve food and nutrition security, by providing access to high-quality food at reasonable prices (Desai and Vanneman, 2015). Nutrition Sensitive Agriculture (NSA) prioritizes nutritionally dense foods, dietary diversity, crop diversification, food bio/fortification at the household level to ensure communities' overall nutritional security. The link between agricultural production and nutrition is a crucial one that calls for a Nutrition Sensitive Agriculture sector (Pingali and Abhram, 2019). While a standard agriculture sector

includes food production, distribution, and consumption, a nutrition-sensitive agriculture sector additionally handles intra-household food distribution as well as people' absorption and intake of micronutrients (Pingali and Sunder, 2017). Currently, the central Govt. is also promoting and increasing the number of capacity building programs, awareness camps and trainings at field level across the length and breadth of the country, specifically on Nutrition Sensitive Agriculture. Spearheaded by the Ministry of Agriculture and Farmers Welfare, Govt. of India, National Institute of Agricultural Extension Management (MANAGE) has been pioneering at national as well as regional level in providing capacity building programs, awareness camps and trainings to Senior and Mid Senior Level Officers, as well as Field Staffs, in collaboration with other Govt organizations (ICAR, SAUs, SAMETIs etc.), private organizations and other partner institutions. On a broader view, in India the National Nutrition Strategy is being formulated from time to time to achieve a Kuposhan Mukht Bharat or malnutrition-free India and for this many impact assessment studies are taken up to mark the progress and neutralize the constraints.

Below table gives a list of the training programs conducted by MANAGE and its partner institutions since inception of the NSA concept in 2021 till conducting of this study.

Table No. 1: Background of the Study

Sr. No	Name of the training	Date	Days
1	Promoting Nutrition Sensitive Agriculture among Field level Women Extension officers in southern India	16/03/2021 to 20/03/2021	5 days
2	Strengthening Capacities for Nutrition Sensitive Agriculture and Food Systems- Integration of Nutrition into the trainings by Agricultural EAS Providers in India-MSL	28/02/2022 to 04/03/2022	5 days
3	Strengthening Capacities for Nutrition Sensitive Agriculture and Food Systems- Integration of Nutrition into the trainings by Agricultural EAS Providers in India-FLS	07/03/2022 to 11/03/2022	5 days
4	Nutrition Sensitive Agriculture for EAS Providers-MSL	01/08/2022 to 05/08/2022	5 days
5	Nutrition Sensitive Agriculture for EAS Providers-FSL	07/11/2022 to 11/11/2022	5 days
6	Nutrition Sensitive Agriculture	06/06/2023 to 09/06/2023	4 days
7	Strengthening Nutrition Sensitive Agriculture Capacities of Field Functionaries (FLS)	19/06/2023 to 23/06/2023	5 days

Many training programs, awareness camps and seminars, conferences etc. are being taken up, both at the national level as well as regional level, but still the impact and success or failure of these programs are not captured properly; and those captured are not sufficient to track the progress of NSA in enriching agriculture and food system nutritionally. Specifically, in India it is very handful and needs to be promoted and popularized through such impact study evidence based results, to convince all the stakeholders at all levels, to call them for action.

Capturing the impact and success of the trainings is necessary in understanding the possible impacts, identifying ways to avoid or reduce the constraints faced, assessing the improved outcomes for the farming/ rural community and providing reliable evidence on the impact of nutrition driven interventions for scaling it up.

This strategy acknowledges that food systems and agricultural practices have a significant impact on human health and that improving nutrition through agriculture is a prerequisite for accomplishing goals related to global development and food security.

Specific Objectives of the Study:

To assess the impact of NSA training programs conducted by MANAGE; the following objectives were carried out for the current study.

1. To understand the implementation and impact of the training programs delivered by MANAGE on NSA during 2021-23
2. To study the challenges or constraints faced by the trained officers at field level or organization level in promoting NSA

Limitations of the Study:

- NSA has recently gained its momentum, although it's been a while in conducting the various programs, still capturing the impact at such an early stage is bit difficult.
- The study of the impact assessment is the part of the internship which is of 2 months, which is another limitation in capturing the impact of the programs in reaching out to all the trainees.
- Since it is a questionnaire based survey study, proficiency and comfortability of the respondents in term of their responses varied.

Review of Literature

Shetty (2009) expressed in his study that many people in the developing world suffer greatly from poor food quality and a lack of variety in their regular diets, which has a significant negative impact on their quality of life, reduced economic productivity, and loss of life. One of the main reasons that food and nutrition security need to be integrated is the issue of micronutrient deficiencies, which is far more serious than hunger. In addition to providing the chance to raise crop yields and thereby increase food security, agriculture and biotechnology in agriculture additionally have the potential to improve food quality and thus contribute to nutrition and food security. The achievement of the targets set forth in the Millennium Development Goals will be eased by ensuring food and nutrition security.

Von Braun (2010) stated that it can be challenging to obtain desirable features through traditional breeding methods, but genetic modification has been successful in producing traits like disease resistance, higher nutritional value, and increased yields. In regions with limited development with extreme weather, agricultural pests, and various forms of malnutrition challenges, biotechnology may improve the productivity and equity of small farmers. Furthermore, it has the potential to mitigate environmental degradation through the development of high-yield cultivars that negate the need for chemical pesticides and eliminate the need for mechanical tilling.

Dwivedi et al. (2014) revealed that poverty, hidden hunger, malnutrition, and hunger all are linked to one another. Though hunger and malnutrition are thought to be primarily caused by poverty, rich individuals too have been found to be undernourished. Children and adults are susceptible to malnutrition in developing nations such as India, due to inadequate dietary intake, infectious diseases, inadequate care, and unequal food distribution within households.

UNICEF (2016) chronic diseases linked to diet are gradually becoming more prevalent among low- and even middle-income nations, where under nutrition and inadequate nutrition still exist. Around the world, under nutrition is the cause of 155 million stunted and 52 million wasted preschool-aged children, as well as over nutrition, which results in 41 million overweight children.

According to **FAO (2018)** climate variability and extremes are major contributor to the recent increases in global hunger and are also a major cause of severe food crises. The availability,

accessibility, use, and stability of food are all negatively impacted by changing patterns of climatic extremes and variability. In addition, these variables contribute to additional root causes of malnutrition linked to child care and feeding, healthcare services, and environmental health. Dietary deprivation in mothers, babies, and children can cause "metabolic imprinting" in the foetus and early childhood, raising the risk of obesity and non-communicable diseases linked to diet later in life. And the data that currently exists shows that during the last three years, the number of hungry people has increased, reaching levels, last seen ten years ago. It is currently estimated that the global population impacted by undernourishment, or chronic food deprivation, grew from about 804 million in 2016 to almost 821 million in 2017. The situation in most parts of Africa and South America continues to deteriorate, and in Asia, the decline in undernourishment that was frequent until recently, appears to be reducing. Achieving the SDG goal of ending hunger by 2030 may be extremely difficult to accomplish without greater efforts.

Tesfaye & Tirivayi (2018) found in their study that postharvest loss directly affects household welfare, food security, and nutrition because it reduces the amount of food available for consumption. Better storage technologies also lead to an increase in dietary diversity and a decrease in self-reported food insecurity and child malnutrition.

According to

Harris *et al.* (2019) revealed in their study, according to a national food price data, the overall cost of food has decreased, but over time, nutrient-rich foods have become more expensive than staple foods. While spending on fruits and vegetables, foods derived from animals, fats and sugars, and processed foods has increased over the past 20 years, spending on staple foods has decreased. These changes have been more pronounced in rural areas recently, but they are already more advanced in urban areas. Lastly, while under nutrition is gradually declining from extremely high levels and hunger is still present; there is an alarming absence of information regarding modern Zambian diets, and overweight and obesity as well as non-communicable chronic diseases are rising.

Singh *et al.* (2020) in his study in Haryana and Gujarat suggested that the individual dietary diversity of adults (men and women), adolescents and children in both the States, , was positively correlated with crop diversity. Furthermore, in Haryana, crop diversity was found to be the primary and secondary factors contributing to dietary diversity in adults and children, respectively.

Mahapatra et al. (2021) concluded in their study that malnutrition was more common in children living in districts with extremely high levels of vulnerability than in those with extremely low levels of vulnerability. The analysis revealed that when a child lives in a district deemed extremely vulnerable, their chances of experiencing stunting increases by 32.0 per cent, wasting by 42.0 per cent, underweight by 45.0 per cent, and anaemia by 63.0 per cent, in comparison to those in districts classified as very low. The spatial distribution of vulnerability and malnutrition also appeared to exhibit a high degree of clustering, according to the spatial analysis. It was discovered that the western and central regions of India were home to the majority of hotspots for child malnutrition and vulnerability.

Douyon et al. (2022) revealed in their study at Bamako that while food quality is adequate in urban centres, it is inadequate in rural areas. A review of children's nutritional status between the ages of 6 and 48 months showed that 30.0 per cent of the sample was nutritionally insecure (all forms combined).

Neeraja et al. (2022) stated in their article that non-staples high in micronutrients, like fruits, vegetables, pulses, and animal products, are produced at a higher rate than staple cereals, these non-staples are less affordable to individuals who have limited incomes.

Tay et al. (2023) revealed in their study that urban impoverished households may experience food insecurity because of being more vulnerable to multiple uncertainties, which limits their access to enough food that is sufficient, nourishing, and safe for a healthy lifestyle. Consequently, they are compelled to forfeit both food quantity and quality. And also claimed that food insecurity was more common during the rainy season than it was during the dry season. The high incidence of food insecurity indicated that, despite the small seasonal variations, it remains a significant public health concern in urban regions with limited resources. Similar findings of a higher prevalence of household food insecurity have been reported by earlier local studies carried out in low-income communities.

Research Methodology

This chapter describes the process that was used to conduct the investigation. It includes the tools and procedures used to collect the data, the method of sampling chosen, and an explanation of the techniques used to analyze the data. The present investigation “Impact Assessment of Nutrition Sensitive Agriculture Training Programs at Grassroot Level.” was conducted during the year 2023-24. The following headings describes the thorough investigation techniques and procedures used for this study:

3.1 Locale of the study:

This study was conducted on a national level, encompassing training participants from diverse regions of different States of India, trained during the years 2021to 2023, that constituted 155 trainees.

3.2 Sampling Procedure/Selection of the respondents:

Total 120 respondents were selected by using purposive sampling technique constituting of the trainees who participated in the training program during the year 2021-2023 on nutrition-sensitive agriculture (NSA), conducted both in offline and online modes by National Institute of Agricultural Extension Management (MANAGE) Hyderabad and its partner institutions in collaborative mode. Out of the 120 trainees contacted, 55 had responded and submitted the data through google survey forms. The respondents were agriculture officers and extension advisory service providers, who play key roles in the agricultural landscape of their respective States. These professionals were chosen as they had been trained by MANAGE on NSA and have significant impact in the implementation of agricultural policies, extension services, and dissemination of agricultural practices. Through this study, an attempt was made to understand and document the impact of such training programs on the respondents, their families and the farming community, in being influential to change the food habits, dietary diversity pattern etc.

3.3 Research Design:

A methodology approach known as "**Survey Research**" investigates research problems that haven't been thoroughly examined before. Primary and qualitative approaches are common in this type of research. For the current study ‘Survey research design’ method was used to delineate the effects and problems faced at grassroot level in delivering trainings on Nutrition Sensitive Agriculture.

3.4 Tools for data collection:

The primary data were collected using a questionnaire (Google form) developed in light of the objectives set, to help understand how effective were the trainings for the respondents in enabling them to transfer and apply the knowledge learnt at family and community level. So, in order to collect data, a Google form link was created and shared with the respondents through email addresses.

The image shows a Google Form interface. At the top, the title is "IMPACT ASSESSMENT OF NUTRITION SENSITIVE AGRICULTURE TRAINING (NSA) AT GROUND LEVEL". Below the title is a "Form description" field. The first question is "Email *", which is a required field. Below it, there is a validation message: "Valid email address". A note below the email field states: "This form is collecting email addresses. [Change settings](#)". The form is divided into sections: "General Information" (with a sub-section "Description (optional)"), "Name *", and "Email Address *". Each of these fields is a "Short-answer text" type.

Figure No. 1: Questionnaire (Google form) used for Data Collection

3.5 Data processing and statistical framework used for analysis of data:

Both qualitative and quantitative techniques were employed for analysis of the primary data collected from the respondents (trainees) during the study. A database management system in MS excel version was developed for data entry of the information collected. The data was analyzed for consistency checks, sorting of open-ended questions, cross checking as well as validating the data entry. The collected data was statistically analyzed by using simple descriptive statistics (averages, percentages); and the analyzed data was presented in tabular and graphic form for better interpretation.

Results and Discussion

This chapter unveils the insights gained from the collected responses, shedding light on the tangible outcomes of the entire study and also deals with the analysis and interpretation of the collected data, processed keeping in view of the objectives of the study. This also presents the facts and figures, giving a clear picture of the practical implications, transformations observed and engage in a complete discussion of the findings. As we traverse the results, we aim to unravel the extent to which the respondents have implemented the learnt skills into their locale with farmers and family members. The ensuing discussion will analyze these results in the broader context of nutrition-sensitive agriculture, addressing implications, challenges, and the potential avenues for further improvement.

Respondents Profile

Out of the 120 trainees contacted, 55 respondents had submitted the information. These fifty-five respondents represent 18 States of India, as indicated in the below map.

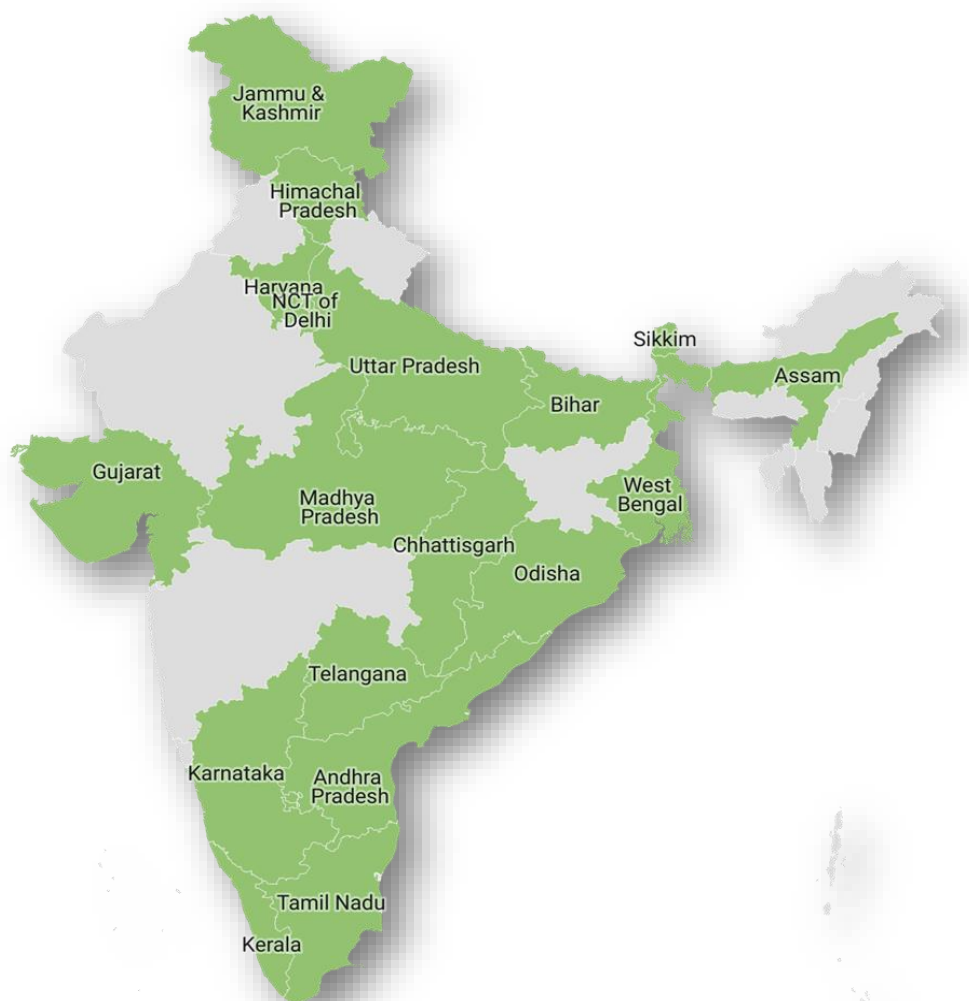


Figure No. 2: Geographical distribution of the respondents

These respondents represent a wide spectrum of geographical, cultural, socio-economic and agricultural backgrounds.

Table No. 2: Age profile of the respondents.

Sl No.	Age Profile	Frequency	Percentage
1	Up to 30 years	8	14.55
2	30 - 45 years	34	61.82
4	Above 45 years	13	23.63

The results of the survey indicate that the respondents were aged from 28 to 65 years, with an average age of 40 years. Out of this, majority of them (61.82 %) were aged between 30 to 45 years, while 23.63 per cent of the respondents were above 45 years followed by 14.55 per cent of the respondents aged below 30 years.

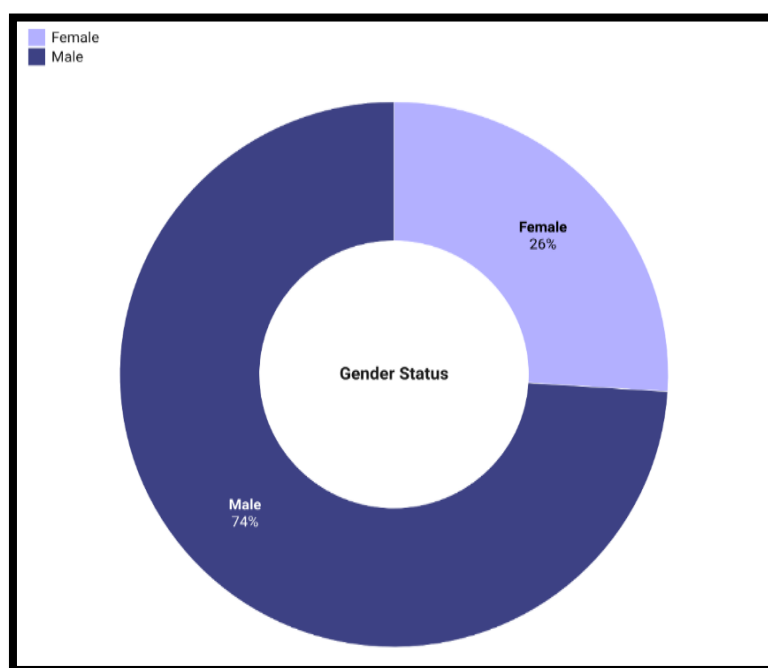


Figure No. 3: Gender distribution of the respondents

Among the respondents, **74.0 per cent** of them were female while **26.0 per cent** were male. **90.0 per cent** of the respondents were from Government organizations and **10.0 per cent** from private sectors. Respondent's occupation varied from being in Govt. line departments to SMS (Subject matter specialist) in KVKs (Krishi Vigyan Kendras) to Scientists in ICAR institutions, Professors in State Agriculture Universities and private institutions; with an

average experience in agricultural extension work of about 10 years, the highest being 33 years.

Table No. 3: Occupational orientation of the respondents

Sl No.	Occupational Orientation	Designations	Frequency	Percentage
1	Mid Senior Level (MSL)	Scientist, Assoc. Professors, Deputy Project Director(ATMA),	19	34.55%
2	Field Level Staff (FLS)	ATM, BTM, Technical Officer, SMS, ADA	36	65.45%

The trainings were imparted by MANAGE and its partner institutions on ‘Nutrition Sensitive Agriculture’ two categories of the respondents, Mid-Senior Level and Field Level Staff. The data suggests that majority of the respondents were Field Level Staff (65.45%) followed by Mid Senior Level (34.55%).

The trainings attended by the respondents were both in online mode **51.0 per cent** and offline mode **49.0 per cent**.

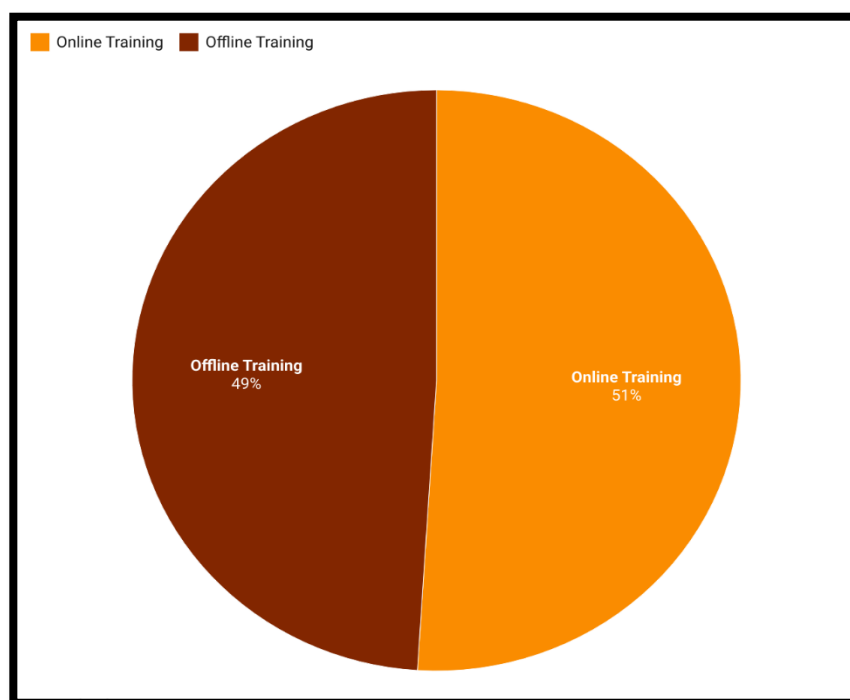


Figure No. 4: Mode of trainings attended by the respondents

Impact of NSA training imparted by MANAGE on the Respondents

i) On knowledge and Skill

Data regarding new knowledge and skills acquired by the respondents from the training programs on NSA reveals that majority (**90.24 %**) of them had acquired new knowledge and skills which they had made use of in further dissemination among extension functionaries, farmers, family etc. These skills ranged from understanding the nutritional needs of crops, implementing sustainable and nutrition-driven agricultural practices, importance of microgreens and value addition of foods, crop diversification and diet diversification, promotion of bio fortified varieties, establishment of nutrition kitchen garden, etc.

ii) On Diet Diversity of the Respondents' Food Plate

Upon the change in the trainees' food plate, **95.13 per cent** of the respondents responded positively that their food plate has diversified after gaining knowledge from NSA training, to improve the nutritional quality of the food. They have become more aware of maintaining diversity in their food plate like increased usage of microgreens, locally available foods like moringa, started following balanced diet chart. So now this has improved the required nutrients in their daily diet.

iii) Respondents' Family Food habit

When asked about specific changes in food habit in their family, majority (**89.59 %**) of the trainees' positively responded about changes in food habits after attending the training program e.g. consuming locally available colourful seasonal fruits and green leafy vegetables and having good portion of millets frequently in their diet; buying organic food products.

Impact of NSA to Nutritional Security among the Farming Community

On enquiring about the changes brought in the organization with respect to NSA, all the respondents revealed that many significant changes were implemented in their organization to promote Nutrient-Sensitive Agriculture (NSA). Sensitization efforts have been pivotal, encouraging participants to adopt nutrition-sensitive agricultural practices. To further extend the reach of NSA initiatives, additional extension activities were planned. This includes establishment of an herbal garden/ nutrition garden, awareness programs and training were conducted. In alignment with the International Year of Millets 2023, an initiative in SAMETI (State Agricultural Management and Extension Training Institute), Tamil Nadu was taken to

modify the menu, substituting 80.0 per cent of the food items based on millets and pulses, showcasing a practical integration of NSA principles into daily practices. Training programs on NSA were organized, emphasizing inclusion of nutrient-rich food items in packed lunches or meals during various programs. Discussions among Scientists and staff were centred around incorporation of more fruits and vegetables into daily diets, fostering a culture of nutrition awareness within the organization. The knowledge gained was shared with colleagues and co-workers, contributing to a collective understanding and commitment to NSA concept. A model nutri-garden was developed at ICAR-KVK, Ramanathapuram premises, and extended to farmers' fields through Front-Line Demonstrations (FLD), creating a tangible impact at the grassroots level.

Group discussions were organized to highlight the importance of NSA in daily life, garnering undisputed agreement on the necessity for healthy diet planning. As nutrition-sensitive agriculture aims to improve not only food production but also the nutritive well-being of communities, contributing to a more sustainable and resilient food system. When asked about the ways NSA can contribute to improve nutritional security in farming community, the trainees consensually responded that:

- NSA practices has the potential to improve the nutritional status of farmers and their families.
- It can help to address under-nutrition in rural areas by enhancing self-reliance on local resources.
- These practices can certainly improve nutritional status in farming communities by adding diversity in food basket, by cultivating nutrition-rich foods including microgreens.
- Incorporation and diversification of native crops as well as bio fortified crops into the traditional cropping system will cater the additional nutrient requirement.

Furthermore, by educating rural women, one can encourage them to prepare nutritious meals that include fruits, vegetables, protein, iron-rich foods, and foods from all the food groups to the extent possible. Extension and advisory service providers can encourage farmers to sell only a portion of their wholesome products rather than the entire crop in lieu of money.

Awareness Programs/ Trainings conducted by the respondents

Data was collected to understand the no. of training programs organized by the respondents after attending the trainings on NSA. It was found that **73.17 per cent** of the respondents **conducted 61 trainings** under various training modules learnt i.e.

- Role of Agriculture and Allied Sectors in Food and Nutritional Security,
- Role of EAS in promoting Nutrition-sensitive agriculture (NSA),
- Importance of Balanced Diet,
- Basics of Nutrition and Prevalence of Malnutrition,
- Nutrition Sensitive value chain & marketing opportunities,
- Understanding Nutritional Problems,
- Understanding Key Nutritional Indicators,
- Promotion of locally available nutritious crops,
- Promotion of locally available nutritious crops,
- Strategies for popularization of bio-fortified crops,
- Importance of Bio fortification to combat malnutrition,
- Nutrition sensitive value chain & marketing opportunities,
- Recommended Practices to make agriculture Nutrition Sensitive,
- Gender inclusive agriculture and nutrition,
- NSA and Food Systems in Practice-options for interventions,
- Facilitation for Extension Functionaries, Management of Post-Harvest losses,
- Importance of collaborations and linkages for promoting NSA,
- Essential Hygiene Actions (EHA) and Nutrition,
- Understanding your Organization for integration of nutrition into Agriculture &
- Gender and Nutrition Sensitive Agricultural Practices

The trainings conducted by the trainees ranged from one to nine days for both male & female farmers, students, extension workers as well as para extension professionals.

On the other hand, **26.83 per cent** of the respondent had not conducted any training program or other extension activities on the modules; but had delivered talks on the topics of the module on different occasions. **75.60 per cent** of the respondents agreed that they had observed some positive changes in trainees' practices, whom they had trained, such as;

1. Now there is more understanding and awareness about dietary diversification, hygiene,
2. identification of food groups, and their role.
3. Consumption of vegetables, fruits, nuts, and millets had increased.
4. Farm women became aware of the importance of quality, nutritious food rather than just being quantity driven.
5. They now are giving importance to nutrition-rich fruits, vegetables, nuts, and millets as part of their regular meals.

Trainees were much curious and frequently inquired about vegetables seeds for their kitchen garden. Most of the farmer trainees reported that now their farming practices have become more diverse, so are their food plates, after attending the trainings. The respondents had noticed a positive change in eating habits and portion sizes. Usually, after every training program extension personnel; collected feedback and observed that some of the Anganwadi workers established nutrition gardens in their Anganwadi centres, and almost 15 trainees were practicing terrace gardening.

Approaches and Methodologies used for Knowledge & Skill Dissemination

The innovative approach for disseminating NSA practices involved a multifaceted strategy. Practical discussions, live examples, and visuals were employed for food processing and value addition. Various methods such as demonstrations, PowerPoint presentations, training sessions, and the dissemination of NSA practices were extended to the undergraduate students during the RAW (Rural Agriculture Work Experience) Programme, through visits to innovative farmers' fields, establishment of demonstration plots for nutritious backyard gardens, and awareness campaigns using social media.

I. Webinars

18.0 per cent of the respondents conducted online webinars for their stakeholders with an average number of participants of 70, the highest being 290.

II. Traditional Training Methods

45.0 per cent of the respondents organized trainings on field and through online mode with an average participation of 60 participants per program. It was encouraging to know that in

each of the training program conducted, the consistency of women participants were more than 50.0 per cent.

III. *Farmer Field Schools (FFS)*

In case of farmer field school for farmers, **22.0 per cent** of the respondents organized it with an average of 61 participants, the highest number being 235.

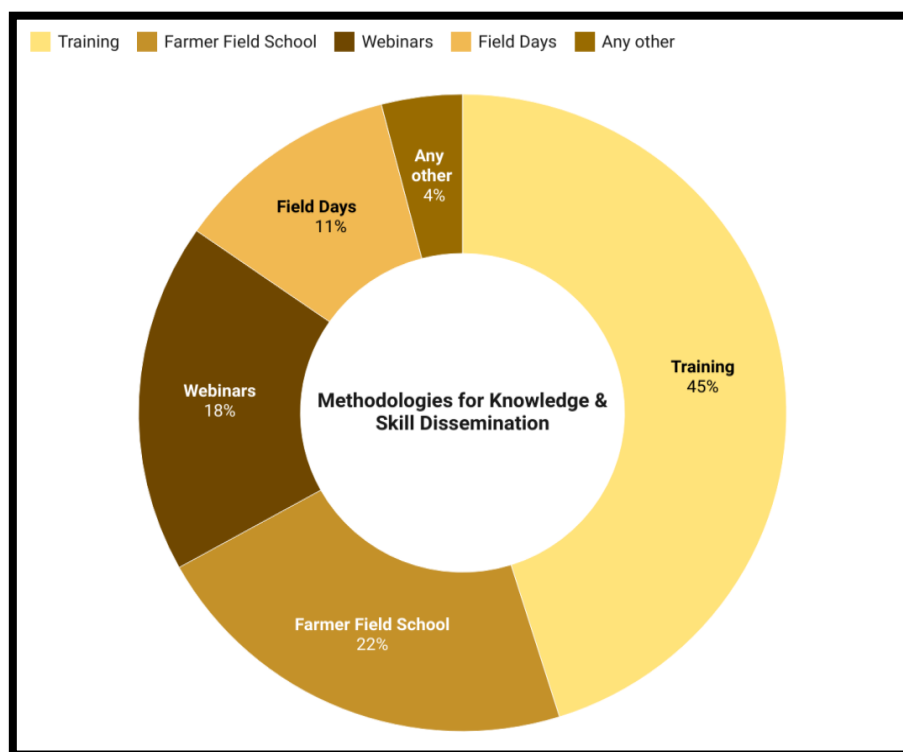


Figure No. 5: Methodologies for Knowledge and Skill dissemination used by Respondents

IV. *Field days*

In the survey conducted it was found that only **11.0 per cent** of the respondents conducted field days, with total number of participations reached up to 9340 (including male and female).

V. *Any other*

Apart from the above-mentioned, many of the respondents reported that after the training received, they created mass awareness programs in schools for students, at homes for elders, also organized Kishan Chaupal & Kishan Gosti and regular visits to villages. During the

survey, respondents also reported that they conducted exhibitions as well as millet based food cooking competitions and other promotional events for a broader sensitization. One of the respondent has also applied for a project on Nutrition Sensitive Agriculture.

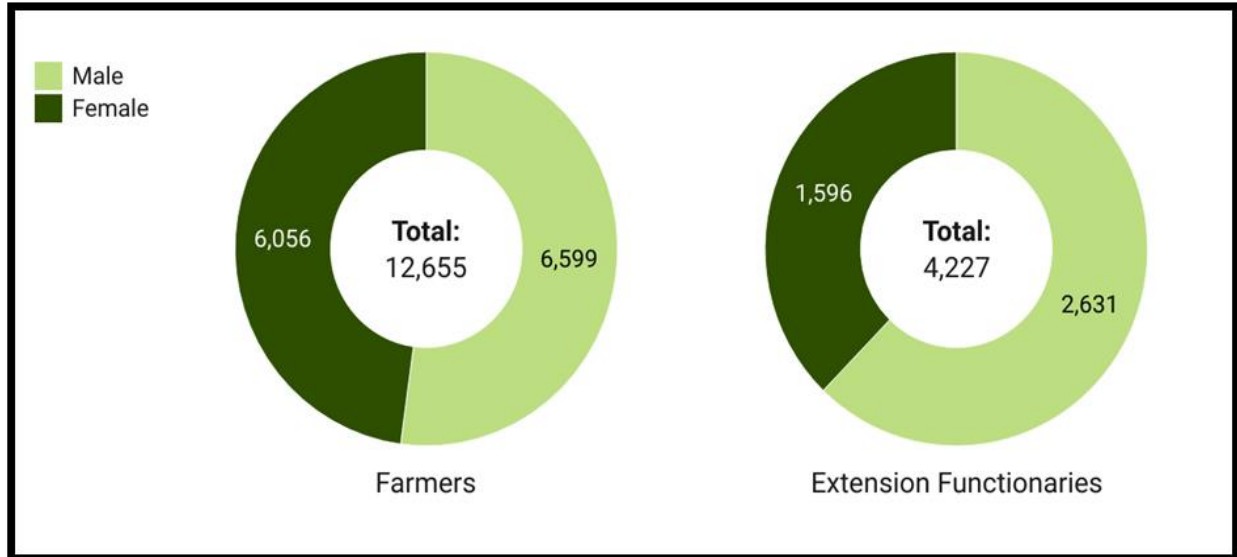


Figure No.6: Trained farmers and Extension Functionaries by the Respondents

It was encouraging to know from the respondents that through the acquired knowledge and skill gained during the trainings from MANAGE, they had trained nearly **12,665 farmers/participants**, out of which the **female participation rate was 48.0 per cent** and **male participation rate was 52.0 per cent**.

The respondents when surveyed about total no. of extension functionaries reached out through training programs, reported 4,227 comprising of 2631 (**62.0 %**) **male** and 1596 (**38.0 %**) female extension functionaries

Follow up Study by the Respondents

Of the total respondents, **36.59 per cent** of them agreed that they had conducted follow up study after organising the training programs to find out whether the usefulness of the imparted trainings related to NSA.

- a) Whether farmers started following NSA practices and practicing crop diversity?
- b) Was there any change in their food plate and personal hygiene and sanitation or not?

The methods used for conducting follow-up studies were field visit, home visit, feedback form, post evaluation test and documentation of success stories. Majority (**63.41 %**) of the respondents reported that they had not conducted any follow up study after conducting the trainings. While answering to the extent to which respondents have applied the knowledge and skill gained from the NSA training at the field level Majority (**53.60 %**) of the trainees reported that the respondents had applied the learnt knowledge and skills to a medium level. while **39.08 per cent** and **7.32 per cent** of the respondents reported to have applied at high and low level respectively.

Impact of Programs Organised by the Respondents

i) On trainees' food plates

Majority (**68.30 %**) of the respondents felt that the farmer trainees actually had modified their food plate after being trained on NSA.

- a) There was a notable interest among the farmers in growing microgreens, reflecting a conscious effort to enhance dietary diversity.
- b) It was observed that some of the farmers had started eating locally available underutilized crops like Moringa. Elephant yams, Lotus stem.
- c) Farmers also started utilizing indigenous foods after understanding its significance.

The shift towards nutrition sensitivity is evident from various initiatives of the farmers that encouraged them towards consumption of nutrient-rich foods to address micro-nutrient deficiencies. These include inclusion of nutri-rich locally available vegetables like moringa, kitchen gardening at home, and a preference for local seasonal fruits and micro greens. **31.70 per cent** of the respondents reported that they did not observe any specific changes in food plate of the farmers

ii) Agricultural practice and approaches

Majority (**63.42 %**) of the respondents significantly observed the impact of extension services that they disseminated to the farmer trainees and beneficiaries, as was reflected through positive changes in both nutrition and agricultural practices. Trainees had actively embraced diversified agricultural techniques, including cultivation of a variety of crops such as, millets, traditional rice, and nutri-rich local vegetables. Beyond agriculture, impact extends to nutrition practices, with the trainees demonstrating a greater understanding of balanced diets. But **36.58 per cent** of the respondents did not find any significant impact at ground level.

Addition of New Training Module other than the Current Module

To further improve the trainings on NSA, **41.47 per cent** of the respondents suggested

- I. to prepare need-based module with a focus on commodity specific production practices, processing, and utilization such as fruits & vegetables, microgreens and millets;
- II. to provide services like financial and marketing assistance.
- III. to creating value chain for nutritive foods.
- IV. demonstration of crop diversification on farmer's field.
- V. more trainings on 'Underutilised crops to improve the nutritional status of the local community.
- VI. formulation of low-cost nutritious diet and value addition can enhance nutritional status.

Whereas **58.53 per cent** of the respondents had no suggestions to further improve the trainings on NSA

Organisational Support to Conduct NSA Programs

In response to the question regarding organizational support for conducting NSA programs, **76.14 per cent** of the respondents reported that all the necessary support or resources (technical and financial support, infrastructure availability for training, vehicle, projector, funds, demonstration units, services for resource persons, technical assistance, supply of vegetable seed packets) were provided by their organisation for effective conduct of trainings (online and offline) and FLD programs regarding NSA/Crop diversification, both for officials and farmers separately at ground level. While **23.86 per cent** reported they didn't get adequate support and resources.

Addition of NSA to institutional Annual Training Calendar

44.0 per cent of the respondents reported that they have included 88 training programs all together to their organisation annual calendar after attending the training from MANAGE on NSA, their organisations had included several topics in their annual training calendar viz.-

- a) microgreens and its value addition
- b) need based NSA trainings
- c) promotion of bio-fortified varieties for nutritional security

- d) FLD and Training's on establishment of nutrition garden
- e) awareness program on crop diversification
- f) awareness on millet cultivation, processing, value added product & nutritional significance of millets
- g) nutrition awareness weeks
- h) training on food processing and post-harvest management' like preparation of jam, chutney and pickle from locally available fruits
- i) distribution of chicks, finger lings and cages for hen and slatted goat through NICRA scheme to improve the nutritional status of the beneficiaries

56.0 per cent of the respondents reported that they will include it in their next annual calendar for the year 2024-25 as they attended the training in the year 2023, therefore they are still in the planning and preparations for organizing trainings programs on NSA.

Promotional Activities for Locally Available Nutritious Crops

To enhance awareness about nutritional requirements and to promote the consumption of fruits, vegetables, and underutilized crops, several multifaceted approaches adopted at the organisation and field level.

- Through training programs and front-line demonstrations, the focus has been on establishing nutrition gardens, value addition in agricultural produce, and on-farm trials related to nutrition and health interventions, millets, kitchen gardens, and the promotion of bio fortified varieties of the crops such as Ragi, Maize, and rice.
- Additionally, efforts were made to increase market access and opportunities, thereby improving smallholder incomes in dryland areas.
- Expert lectures were delivered to farmer trainees, emphasizing the importance of fruits and vegetables in the diet, promoting locally available bio-fortified crop varieties, and managing post-harvest losses while encouraging value addition.
- The importance of NSA is shared through Block extension officers, creating a holistic and impactful approach to addressing nutritional challenges.
- Awareness programmes, front-line demonstrations, and extensive training sessions were conducted to disseminate knowledge about the significance of locally available nutritious crops.
- The establishment of nutrition gardens (KVK, Shimla, Himachal Pradesh) and on-farm trials on interventions related to nutrition and health were the pivotal components of our initiatives.

- Agriculture diversification is being actively pursued, with the expansion of pulse cultivation as both a sole crop and in mixed crops with cereals.
- The cultivation of Moringa, leafy vegetables, and millets is being promoted, to enhance the nutritional profile of local diets.
- Minor vegetable promotion schemes, including distribution of kitchen gardening kits, fruit plants, and nutri-garden kits, were implemented.
- Events like Nutri-thali competitions and recipe contests featuring indigenous foods have not only celebrated local culinary diversity but also encouraged their integration into daily diets.

Documentation of Success stories from the respondents:

A notable revelation emerged from the survey, indicating that **22 per cent** of the respondents have actively documented success stories in their respective areas for promotion of Nutrient-Sensitive Agriculture (NSA). These success stories validate the positive impact and effectiveness of NSA practices.

Success story-1:

Harvesting success: Inspirational Journey of Manonmani Devi

Name: Mrs. Manonmani Devi Occupation: Farm women

Achievements:

Mrs. Manonmani Devi, a determined farmer, faced significant challenges due to limited resources, proper knowledge, and traditional rice-based farming methods that heavily required irrigation. Through the training received from Krishi Vigyan Kendra (KVK), she learned about NSA concept and organic farming techniques, including composting and bio-pesticides. Realizing the high water demands of rice cultivation, Mrs. Devi decided to diversify her farming practices by moving towards vegetable growing. Implementing these new methods, she transformed her farm and successfully transitioning to a more sustainable and profitable agricultural model. She is now producing high-quality organic microgreens and vegetables daily which supplemented her income to good extent. Her success not only improved her livelihood but also inspired neighbouring farmers to adopt sustainable practices. Today, Manonmani Devi is a respected role model in her community, championing organic farming and sustainability.

Success story-2:

Cultivating Change: Journey from Traditional Farming to Integrated Success

Name: Shri. Ram Babu Occupation: Farmer

Achievements:

Sri Ram Babu was a traditional grower of paddy and seasonal vegetables. Although he had a good amount of land but couldn't earn as he should with respect to the land. Additionally, the issues with irrigation and untimely cyclones strained him time to time. After receiving training from the Asst. Director Agriculture office regarding Integrated Farming System, he started practising. He has diversified his farming system including 5 enterprises in his current farming system i.e Paddy, Vegetables, Dairy, Poultry and Fishery. He is now making an income of 4-5 lakhs in net profit, which has transformed his life and has become an inspiration for other farmers too.

Challenges faced in organising Nutrition Sensitive Programs

Organizing activities and programs on Nutrient-Sensitive Agriculture (NSA) at the organizational level comes with its share of challenges.

1. One significant hurdle faced by many respondents was timely availability of experts and scientists, which impedes smooth execution of NSA or any other extension activities.
2. Limited attention and support of higher authorities for promoting nutrition through agriculture extension activities, weakens the popularization of NSA concept and programs.
3. Notably, the responsiveness of officials within the organization varies, with not all stakeholders seriously engaged at the same level in implementation of NSA activities.
4. Financial constraints pose another challenge, as unavailability of funds hinders seamless execution of the planned activities.
5. Moreover, expectation of free vegetable seeds from farmers and farm women also is a practical challenge, implying need for resource allocation and budget considerations.
6. An overarching issue observed is that while individuals often acquire knowledge about NSA, the actual implementation on the ground remains a challenge, indicating a gap between awareness and practical application.
7. One prominent barrier is the low adoption of NSA practices due to a pervasive lack of awareness regarding NSA, diet diversity,

8. Unfavourable attitude of the farmers towards innovative technologies like bio-fortified crops climate smart agriculture etc., further complicates the promotion of NSA at the grassroots level.

While, it is worth noting that **49 per cent** of the respondents did not face any challenge at organizational level to organize activities/ programs on NSA.

In case of specific challenges, adoption, knowledge, and understanding of Nutrient-Sensitive Agriculture (NSA), **73.17 per cent** of the respondents reported that

1. one of the primary concern is value addition and effective marketing of NSA crops and products.
2. Educational challenges, particularly in terms of convincing farmers to shift from age-old practices and their reluctance to embrace change, contribute to slow adoption of NSA concepts.
3. A persistent issue was unwillingness among farmers to adopt NSA practices, deep rooted, age-old agricultural practices and for better income mind set.
4. Farmers practicing mono-cropping are slow to change their dietary habits, which also is a challenge in diversifying agricultural practices.
5. Unavailability of planting material or seeds for bio fortified crops, and processing of millets.
6. Convincing farmers, creating awareness, and slow pace of change are some of the major challenges.
7. One of the respondent reported that due to unique agro-ecological conditions in Jammu and Kashmir, the agricultural activities are limited to specific crops & present a challenge in introducing the relatively new concept of NSA.

Whereas **26.83 per cent** of the respondents reported that they did not face challenges regarding this aspect.

Collaborative activities with other organizations

When surveyed regarding active collaboration with other organizations or agencies engaged in nutrition, agriculture, and health, **53.66 per cent** of the respondents agreed that they collaborate with other organisations including National Institute of Nutrition (NIN), National Institute of Agriculture Extension Management (MANAGE), Indian Institute of Millets Research (IIMR), and National Agri-Food Biotechnology Institute (NABI Mohali), Collaborations with local agencies, Agriculture department, Karnataka State, Dr. B. R. Ambedkar Development Corporation Limited, and Women and Child Welfare department

were also mentioned by few of the respondents There exists collaborative network also with crucial sectors, like Agriculture, Horticulture, Veterinary services, National Bank for Agriculture and Rural Development (NABARD), Mission Shakti, and Odisha Livelihoods Mission (OLM). Partnerships with Integrated Child Development Services (ICDS), District Agriculture Office (DAO), and Anganwadi centres contribute significantly to the synergy of efforts in promoting nutrition and health. Engagement with Non-Governmental Organizations (NGOs), ICDS field staff, and the provision of Mid-Day Meals by schools collaboration with JEEVIKA, Krishi Vigyan Kendras (KVKs), Agricultural Research Stations (ARS), District Agriculture Offices, State Health Mission (SHM), to conduct activities to promote nutrition sensitive agriculture. Whereas **46.34 percent** of the respondents reported that they didn't collaborate with any organisations for promotion of NSA activities.

Suggestions from the study:

Based on their extensive field experience, **29.26 per cent** of the respondents reported that there are specific training needs and areas for further development within the context of nutrition-sensitive agriculture.

1. A crucial requirement is the need for training programs, coupled with on-field demonstrations, especially for introducing new bio-fortified crop varieties.
2. Front-line demonstrations play a pivotal role in showcasing the benefits and viability of these crops, fostering a practical understanding among farmers.
3. Emphasizing the importance of food preservation techniques is another vital aspect identified during our field experience. So training programs focussed on food preservation can significantly contribute to minimizing post-harvest losses and ensuring a sustainable supply of nutritious produce.
4. Furthermore, promoting local fruits and vegetables, along with value-added products, is recognized as an essential avenue for enhancing dietary diversity and encouraging the consumption of nutrient-rich foods.
5. To address the nutritional aspects comprehensively, there is a recognized need for detailed training on nutritional security. This includes imparting knowledge on specific nutritional benefits of bio-fortified varieties and their potential in addressing malnutrition.
6. Providing more training on chemical-free cultivation methods, including preparation of organic inputs, are identified as areas of growth.

These initiatives align with the broader goal of promoting sustainable and environmentally friendly NSA practices. By addressing these training needs and areas for further development; they can aim to foster a more resilient and nutritionally enriched agricultural landscape because such initiatives can empower farmers to cultivate a variety of crops that cater to diverse nutritional needs. Majority (**71 %**)of the respondents felt that ongoing initiatives and efforts are sufficient but proper implementation is required to ensure NSA at ground level to combat food and nutritional insecurity while **29 per cent** differed from the opinion.

To promote the concept of Nutrient-Sensitive Agriculture (NSA), **46.34 per cent** of the respondents suggested that:

- Collaboration with academic institutions like SAUs and CAUs can enhance the skills and knowledge of those involved in agriculture at the grassroots level.
- Training for faculty in emerging NSA technologies ensures that educators are equipped with the latest information, disseminating better and effective agricultural practices.
- Aligning crop choices with market values and providing information about financial requirements can guide farmers in making economically viable decisions.
- In regions like Kashmir, it is recommended to provide free seeds of nutritious crops to farmers, encouraging widespread cultivation.
- Making available the training modules on different facets of ‘Nutrition Sensitive Agriculture’ in the local language, easy to understand, at the block level would greatly strengthen promotion of NSA concept among farmers.
- Advocacy efforts to bring NSA concepts to the field level involve implementing policies to promote bio-fortified crops, sustainable agriculture practices, etc., before reaching out to the farmers.
- It is suggested that exclusive training programs be designed for farmers, incorporated into schemes of Central and State Government.
- Advocacy for hands-on-practice along with exposure visits to successful NSA based enterprises can effectively convey the significance of the concept to the farming community.
- These suggestions collectively contribute to a comprehensive strategy for promoting and implementing Nutrition-Sensitive Agriculture in various agricultural settings.

Summary

- Out of 120 trainees, 55 responded to the questionnaire from 18 Indian states: Uttar Pradesh, Bihar, Andhra Pradesh, Tamil Nadu, Karnataka, Chhattisgarh, West Bengal, Kerala, Jammu & Kashmir, Telangana, Assam, Madhya Pradesh, Sikkim Himanchal Pradesh, Gujarat, New Delhi, Maharashtra, and Odisha. Which provided respondents from a diverse range of geographical, cultural, and socioeconomic backgrounds.
- The survey found that the majority of trainees aged between 28-65 years, with an average age of 40, were trained by MANAGE on Nutrition Sensitive Agriculture, with the majority being Field Level Staff (65.45%) and Mid Senior Level (34.55%).
- The training program provided a significant skill set for respondents, with 90% stating they gained new knowledge on various aspects such as understanding crop nutritional needs, implementing sustainable practices, promoting microgreens, and addressing malnutrition.
- After attending the training, 95.13% of respondents expressed positive attitudes towards a diverse food plate, following a balanced diet chart, including micro greens, sprouted grains, fruits, leafy vegetables, raw vegetables, and protein-rich foods, ensuring all necessary nutrients are included.
- Over 90% of respondents reported changes in family food habits after attending the training program, including increased awareness of nutritious food, dietary plans, and balanced diets.
- The majority of respondents have implemented significant changes to promote Nutrient-Sensitive Agriculture (NSA), including sensitivity efforts, promoting millets and diverse meals. Scientists and staff are promoting nutrition awareness by incorporating more fruits and vegetables into daily diets.
- A model nutri-garden has been developed at ICAR-KVK and extended to farmers' fields through Front-Line Demonstrations.
- Extension and advisory service providers reported they can encourage farmers to sell only a portion of their wholesome products.
- Scientists and staff are promoting nutrition awareness by incorporating fruits and vegetables into daily diets
- 73.17% of respondents organized training programs on knowledge and skills in extension work, with 61 trainings conducted on various modules.

- 75.60 per cent Respondents observed positive changes in trainees' practices, including increased awareness about dietary diversification, hygiene, quality food groups, and increased consumption of vegetables, fruits, nuts, and millets.
- 18% of respondents conducted online webinars, with an average of 70 participants. highest number being 290 for each respondent.
- The survey revealed that 45 per cent. of respondents conducted trainings for their participants, with an average of 60 participants per respondent. Where women participants were more than half.
- A farmer field school for farmers was organized by 22 per cent of respondents, with an average of 61 participants, with the highest number being 235.
- Only 11 per cent of respondents conducted field days, with a total participation of 9340.
- Overall, 12665 farmers were trained by respondents in various events, with 48 per cent female participation and 52 per cent male participation.
- Overall, 2631 were male and 1596 were female extension functionaries, were trained resulting in a total of 4227 participants.
- 63.41 per cent stated they have not conducted any follow-up studies after organizing training programs.
- The majority 53.06 per cent of respondents reported moderately applying the knowledge and skills gained from NSA training at the field level followed by 39.02 per cent very much.
- The majority 68.30 per cent of respondents felt that farmer trainees modified their food plates after receiving training on NSA.
- The survey revealed that 63.42 per cent of respondents found the extension services they are providing to farmers trainees and beneficiaries to be significantly impactful.
- 44.9 per cent respondents reported that they had added 88 numbers of training modules all together.
- The organization has implemented various strategies to promote the consumption of underutilized crops, such as fruits, vegetables, and millets, to combat malnutrition. These include front-line demonstrations, trainings, and exposure visits. The focus has been on establishing nutrition gardens, value addition in agricultural produce, and on-farm trials related to nutrition and health interventions. The initiative also aims to increase market access and opportunities, improving smallholder incomes in dryland areas. Expert

lectures have been delivered to farmer trainees, emphasizing the importance of fruits and vegetables in diets.

- A notable revelation emerged from the survey was that 22 per cent of the respondents have actively documented success stories where trainee's efforts not only made her family healthier and also inspired others to do by setting an example for everyone else in the area.
- Nutrient-Sensitive Agriculture (NSA) is a crucial topic in agriculture, but its implementation is hindered by various challenges. These include the lack of experts and scientists, limited attention from higher authorities, and varying levels of responsiveness within organizations. Financial constraints, lack of free vegetable seeds, and a gap between awareness and practical application also pose challenges.
- At the grassroots level, low adoption of NSA practices is a major issue, with farmers often resistant to adopting bio-fortified crops. The trend of mono-cropping in rural areas, driven by the Minimum Support Price (MSP) provided by the Government of India, adds to the complexity.
- The cultivation of nutrition-based crops faces marketability and feasibility issues, impacting the economic viability of these activities. Limited knowledge, smaller landholdings, and ignorance among rural women contribute to the hurdles faced in promoting NSA.
- Additionally, infrastructure limitations and reliance on traditional knowledge in farming communities further hinder the transition to NSA practices.
- To overcome these challenges, a holistic and community-centric approach is needed. Challenges include the need for value addition and effective marketing of NSA-produced crops, educational challenges, and the unavailability of organic inputs, low yields, and water scarcity.
- Some of the major obstacles included crop diversification, marketing of produce, cost-benefit ratio, traditional techniques, and hesitation to change, low awareness, and economic factors.
- The survey revealed that 53.66% of respondents actively collaborate with other organizations in nutrition, agriculture, and health, including the National Institute of Nutrition, Management of Agriculture Extension and Training, Indian Institute of Millets Research, and NABI Mohali. Partnerships extend to local agencies, Karnataka State, and other sectors. Collaborations also extend to Integrated Child Development Services,

District Agriculture Offices, and NGOs. However, 46.34% of respondents did not collaborate with other organizations.

- The study reveals that there are specific training needs and areas for further development in nutrition-sensitive agriculture. Training programs and on-field demonstrations are crucial for introducing new bio fortified crop varieties, promoting food preservation techniques, and promoting local fruits and vegetables. Further training on chemical-free cultivation methods and organic input preparation is also needed. Currently, 70.74 per cent of respondents believe ongoing initiatives are sufficient to ensure NSA at the ground level.
- To promote NSA, 46.34 per cent suggested initiating nutrition education programs in schools, creating nutri-gardens, implementing dehydration techniques, and collaborating with academic institutions.
- Aligning crop choices with market values and providing financial information can guide farmers in making economically viable decisions.
- Advocacy efforts should involve implementing policies to promote NSA practices and bio fortified crops.
- Incorporating exclusive training programs into schemes under the Government of India and state government initiatives, and organizing more training programs to reinforce knowledge and skills required for successful implementation.

Conclusion:

The training program provided a significant skill set to respondents, with 90% stating they gained new knowledge on various aspects such as understanding crop nutritional needs, implementing sustainable practices, promoting microgreens, and addressing malnutrition. The respondents' organizations have also implemented various strategies to promote the consumption of underutilized crops, such as fruits, vegetables, and millets, to combat malnutrition. The focus has been on establishing nutrition gardens, value addition in agricultural produce, and on-farm trials related to nutrition and health interventions. Among the major challenges faced in implementing NSA programs lack of experts and scientists, limited attention from higher authorities' financial constraints and varying levels of responsiveness within organizations were under the light. To overcome challenges in NSA implementation, a holistic and community-centric approach is needed. Training programs and on-field demonstrations are crucial for introducing new bio-fortified crop varieties, promoting food preservation techniques, and promoting local fruits and vegetables.

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Appendix -I

Questionnaire for the study

Objective 1: To understand the application of the training programme on “Nutrition Sensitive Agriculture (NSA) conducted by MANAGE and its impact at field level.

❖ General Information

- Name.....
- Age.....
- Gender:
Male Female
- Designation.....
- Organisation.....
- Years of Experience in current job
- Years of Experience in Agriculture/Extension Work.....
- Email Address.....
- Mobile number.....
- Address.....
- When did you attend the training program.....?
- Organisation from where you attended the training.....
- Duration of the training program.....
- Mention the name of the collaborating institution, if any.....
- Mode of Training Attended
Online Off-line

❖ Practical application of Nutrition Sensitive Agriculture Training

- Are there any new skills you acquired to build your capacity regarding nutrition-sensitive agriculture through the training you received?
Yes/No
If yes, please specify 1..... 2..... 3.....
- Did your food plate become dietary diverse after receiving training program on NSA?
Yes/No
If yes, please specify 1..... 2..... 3.....

- Have you brought any specific change in food habits in your family after attending the training program?

Yes/No

If yes please specify1.....2..... 3.....

- What changes did you bring in your organization related to NSA?

1..... 2..... 3.....

- How can NSA practices contribute to improve nutritional security in farming community?

1..... 2..... 3.....

❖ **Awareness Programs/ Trainings conducted:**

- Did you conduct any training program on any topic from training module to apply the knowledge and skills in your extension work?

Yes No

If yes, then mention the topics on which Training was conducted?		1.
		2.
		3.
1	Number of trainings conducted	
2	Who were the target group?	
3	No. of days	

- Have you observed any change in the trainees practice after this training?

Yes No If Please/mention?

Events organized on NSA-			
1	<u>Webinars</u>	Yes / No	Online/ Offline
	Number of Participants attended	Male..... Female.....	(Total)-
2	<u>Farmer field schools</u>	Yes / No	Online/ Offline

	Number of Participants attended	Male..... Female.....	(Total)-
3	<u>Trainings</u>	Yes / No	Online/ Offline
	Number of Participants attended	Male..... Female.....	(Total)-
4	<u>Field days</u>	Yes / No	Online/ Offline
	Number of Participants attended	Male..... Female.....	(Total)-
5	<u>Any other</u>.....	Yes / No	Online/ Offline
	Number of Participants attended	Male..... Female.....	(Total)-

	Total No. of farmers/extension functionaries trained by you so far on NSA:		
1	Farmers		
	Number of Participants attended	Male..... Female.....	(Total)-
2	Extension Functionaries		
	Number of Participants attended	Male..... Female.....	(Total)-

- **Innovative approach used for dissemination of NSA practices, if any.....**
1.....2.....3.....
- Did you conduct any follow up study after organising the training programs?
Yes No
If Yes, Please Specify
1.....2..... 3.....
- To what extent have you applied the knowledge and skills acquired from the NSA training in your field work?

Not at all Somewhat Moderately Very Much Completely

❖ **Changes Observed on Farmer’s Field:**

- Did they modify their food plate after being trained on NSA?

Yes No

If Yes, Please specify what modifications did you observe?

1..... 2..... 3..... 4.....

- Did you observe any significant impact on the trainees/ beneficiaries of your extension services, on their nutrition and agricultural practices, after receiving training?

Yes No

If yes, please describe these impacts.

1..... 2..... 3..... 4.....

- Is there any other topic or areas you can suggest in context to nutrition-sensitive agriculture, to further improve the trainings on NSA?

Yes No

If yes, please specify

1..... 2..... 3..... 4.....

- Did your organisation provide adequate support and resources (e.g., materials, tools, technical assistance) to organize NSA trainings/ programs effectively?

Yes No

If Yes, Please Specify

1..... 2..... 3..... 4.....

- Any topics that your organisation has included in the training calendar or annual action plan on NSA, after attending this training?

1.....2.....3.....

- How many programs on NSA did you include in your annual training calendar, after attending this training? (You may add information from the year after attending the training)

1	2020-21	
2	2021-22	
3	2022-23	
4	2023-24	

- What are the priority areas/ topics of the activities conducted to make agriculture nutrition sensitive, in your organization?

1..... 2..... 3..... 4.....

What activities did you carry out so far, to promote locally available nutritious crops?

1..... 2..... 3..... 4.....

- Did you **document any Success Story** related to NSA in your area?

Yes No.

If Yes, Please Specify.....

Objective 2: To understand the challenges /constraints faced by the officials at field level/organization level in promoting NSA.

- What challenges do you face to implement/promote knowledge on NSA at grass root level?

1..... 2..... 3..... 4.....

- What challenges do you face to organize activities/ programs on NSA at organizational level?

1..... 2..... 3..... 4.....

- What challenges did you observe among the farmers in adoption of NSA practices?

1..... 2..... 3..... 4.....

- Are there any specific challenges related to knowledge and understanding of NSA concepts among farmers or beneficiaries you work with?

Yes No

If yes, please specify

1..... 2..... 3..... 4.....

- What was the main challenge or barrier you faced from the farmers in advocating them to go for crop diversification on their farms?

1..... 2..... 3..... 4.....

- Do you actively collaborate with other organizations or agencies involved in nutrition, agriculture, and health?

Yes No

Please mention the names of the organization/ agencies

1..... 2..... 3..... 4.....

- From your field experience, do you feel that there are any additional training needs or areas where you can further benefit for development in the context of nutrition-sensitive agriculture?

Yes No

If yes, please specify

1..... 2..... 3..... 4.....

- **Suggestions** if any that may be useful to promote the concept of NSA

1..... 2..... 3..... 4.....

Appendix- II

Pictures of the NSA training program conducted at MANAGE, Hyderabad







