#### **ORIGINAL ARTICLE**

# Addressing Issues of Malnutrition in Children through Public Nutrition using Local Resources of Agriculture and Land Use: Evidence from the Field Based Evaluation Study in Uttar Pradesh

Nemthianngai Guite<sup>1</sup>, Samik Ghosh<sup>2</sup>, Aniruddha Brahmachari<sup>3</sup>

<sup>1</sup>Assistant Professor, Department of Social Work, University of Delhi, <sup>2</sup>Programme Coordinator-MEL, <sup>3</sup>Manager-MEL, Monitoring Evaluation Learning (MEL Division), OXFAM India, New Delhi, India.

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# **Corresponding Author**

Address for Correspondence: Nemthianngai Guite, Assistant Professor, Department of Social Work, University of Delhi

E Mail ID: guitemahal@gmail.com

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#### **Abstract**

**Introduction:** Public Nutrition refers to work in the interest of the public; with the participation of the public; and with all sectors involved in society, not just the health sector, nor mainly the health sector, though for the benefit of population health and nutrition. Action outside of the health sector, particularly with regard to food systems is required, such as capacitating women in agriculture and land use for increased vegetable production. **Rationale:** Adopting public health approach, an evidence from a field project wherein the evaluation study was conducted by Oxfam India (a leading non-profit organization), and where the authors coordinated and documented field evidence through conducting end line evaluation study is discussed in this paper, in order to highlight the achievement of women farmers in ensuring food and nutrition security by strengthening low cost vegetable production in Shaharanpur and Pilibhit, Uttar Pradesh. **Objective of the study:** To assess the success and impact of measures adopted under the project in order to enhance the capacity and skills of women vegetable farmers in sustainable farming practices.

Materials and Methods: Purposive Non Probability Sampling adopted to include key set of stakeholders, which includes 100 women vegetable farmers, 8 NGO and 5 government officials respectively drawn from Shahjahanpur and Pilibhit district of Uttar Pradesh. The methods which were used to gather quantitative and qualitative data for the study were: In-depth Interview, Focused Group Discussion (FGD), Case Studies. Results: Child nutrition is positively and independently associated with increased vegetable production through agriculture and land use by women in the villages. It enhanced the nutritional status of women and improved the health status of their family members as well. Conclusion: The public nutrition approach will make it possible to increase the impact of current initiatives which aim to reverse the course of the major nutrition problems, but, above all, and on a more positive note, to promote nutritional security and health. It is by consolidating this approach that in the medium term and in the local context, the emergence of a string of measures such as the evaluated project can be envisioned.

#### Key Words

Public Nutrition; Agriculture land use; Malnutrition; Women empowerment.

#### Introduction

Although the agriculture, health, and nutrition sectors all seek to improve human well-being, agriculture has rarely been explicitly deployed as a tool to address nutrition and health challenges. With agriculture moving higher on the global agenda, in

part because of volatile food prices, there is growing recognition that it is an opportune time to bring together the agriculture, nutrition, and health sectors and unleash the potential of agriculture—as a supplier of food, a source of income, and an engine for growth—to sustainably reduce malnutrition and

ill-health for the world's most vulnerable people. Despite efforts to improve nutritional status worldwide, there are still almost one billion people who suffer from food insecurity, and 26% of underfive children who are malnourished globally (FAO 2009)<sup>1</sup>. The majority of the undernourished people live in rural areas in developing countries (Smith et al. 2005)<sup>2</sup>, mainly in sub-Saharan Africa and south Asia, with an estimated 4 million deaths annually in sub-Saharan Africa from under nutrition. While agriculture has the potential for improving the nutritional status of farming households in these regions, there has, until recently, been limited research and work done on these links and how this might be successfully achieved. The field of public nutrition tries to address the gaps by targeting research, training and intervention. In line with health promotion (WHO, 1986)<sup>3</sup>, it focuses not only on an assessment of the problems and the analysis of their determinants but also, and above all, on the concerted action required by civil society, the private sector and the government to solve them. This leads to analyzing and recommending policies and programs which target the environment, social inequity and living conditions, as well as the empowerment of individuals to adopt healthy food habits and to exercise better control over their health generally.

According to the World Health Report by WHO, 2003<sup>4</sup>, the nature and magnitude of nutrition related problems and the seriousness of their consequences, demand a clear departure from "business as usual". In spite of the tremendous amount of biological knowledge accumulated over the last decades, there is worldwide ever more obesity, diabetes and cardiovascular disease, while food insecurity is rampant and micronutrient deficiencies are slow to decline. Nutrition-related problems contribute significantly to the burden of morbidity, incapacity and mortality in the world. Malnutrition is directly or indirectly involved in half of childhood deaths in developing countries (Pelletier DL. 1994)<sup>5</sup>. It is important to understand how to prevent these problems to accelerate their resolution in a globally sustainable manner; this is the thrust of public nutrition.

Thus, a number of disciplines outside the traditional health sector are called upon to resolve them: agriculture and food sciences, for example, as well as economics, political science, education, communication and other disciplines of the social sciences. Effective intervention programs and policies must be based on a sound analysis of the causes or determinants of the problems and of the ways in which they interact. They also require a solid evidence-based corpus of data on the relevance and effectiveness of the proposed programs and policies. Identifying public nutrition as a unified field and recognizing the potential gains that can be made through public nutrition approach, Oxfam India (a leading non-profit organization) coordinated and implemented along with partner NGO, Vinoba Sewa Ashram (VSA) in Uttar Pradesh, the project on strengthening women farmers in low cost vegetable production with the objectives to enhance food and nutrition security of women and children by capacitating women farmers in low cost vegetable production. The project also aims to recognize women farmers at state level through institutional strengthening and advocacy. And also by developing and strengthening power in the market for women vegetable producers.

# **Rationale of the Project**

Strengthening Women Farmers in Sustainable Low cost Vegetable Production (SWFSLVP) project is a path breaking and comprehensive programme to achieve due recognition for women farmers. The women farmers in Shahjahanpur and Pilibhit districts of Uttar Pradesh are having significant role in agriculture but still their contribution unrecognized, unrewarded and unacknowledged. A women farmer has largely been marginalized as far as recognition to their contribution is concerned. therefore there should be focused interventions to bring changes in the society where the women farmer are recognized and acknowledged while accessing the right as a farmer and rewarded as a coowner on the assets and products with equally responsible for a sustainable livelihood. Women small land holders play an important role in vegetable cultivation as vegetable cultivation is a very labour intensive process being excelled by women farmers; does not necessarily required

ploughing by bullocks or tractors; and could be taken on a very small land holding or in kitchen garden. Despite the fertile land, the status of farmers depending on it for livelihood is not great. There have been several issues that need to be addressed to strengthen the livelihood of the farmers in the region. Land holding is in the name of men, which deprives women farmers from accessing credit and benefits of other government schemes. There are large numbers of landless families who cultivate cash crops/vegetables on land taken on lease at unjust conditions. They also do not have access to institutional credit and other government facilities. Most of the farmers are not aware of improved agricultural practices resulting into inappropriate use of seed, manure, fertilizers and pesticides. The vegetable productivity of the area is lower than national average which is mostly due to improper package of practices. Besides, there is also limited access to inputs quality seed/fertilizers/pesticides. Above all the farmers are unorganized and hence not having their voice in the market

**About the Project:** The SWFSLVP project in Shahjahanpur district and Pilibhit district was initiated in 2008-09 by Oxfam India in collaboration with partner NGO Vinoba Sewa Ashram. The project covers a total of 1928 households in 41 villages of Shahjahanpur and Pilibhit (912 women farmers, covering 130 and 177 hectare of land for vegetable cultivation in Shahjahanpur and Pilibhit respectively). In Pilibhit district all the 16 villages comprise of Bengali farmers migrated from Bangladesh in 1971. They were dependent on the little land allocated to them by the government. In Shahjahanpur, the project is focused towards the betterment of women from Dalit, Muslim and Other Backward Caste from 25 villages.

## **Activity Highlights**

- To support collective marketing and renting of agricultural equipment.
- Promotion of seed banks managed by women farmer groups for easy access to quality seeds.
- Promotion of a district level federation of women farmers for collective advocacy with the government.
- Providing business development support through trainings on marketing, entrepreneurial skills, costing, pricing, and negotiation skills. Development of Standard Operating Procedures for collection, storage and transportation.

- Support for market linkages, business development, and conducting federation meetings. Developing business plans for both federations.
- Promoting and strengthening Vegetable Producer Groups (VPGs) of women farmers for production and marketing of vegetable products; and to increase their bargaining capacity in the input and output market.
- Capacity building and training of these producer groups on sustainable vegetable production, as well as effective marketing of produce.
- Facilitating linkages with banks for credit; and with the horticulture department for seeds and other inputs.
- Providing information on government agricultural schemes and facilitating convergence with these schemes.
- Establishment of zero energy cool chambers for storage of vegetables for longer periods.

# Aims & Objectives

Oxfam India commissioned end project evaluation implemented by VSA (SWFSLVP Project) to assess the success and impact of measures adopted under the project, to enhance the capacity and skills of women vegetable farmers in sustainable farming practices. In the contrast it tried to document the problems and difficulties faced by women vegetable farmers in challenging the negativity prevalent in the family and society that deprived them the rightful recognition of their hard work. The study also intended to discover the problems and challenges faced by NGO and government officials in the implementation of project.

The main aims and objective of the evaluation study of Oxfam and VSA's vegetable farming project was -

- ► To assess the success and impact of measures adopted under the project in order to enhance the capacity and skills of women vegetable farmers in sustainable farming practices.
- At the same time it tried to document the problems and difficulties faced by women vegetable farmers in challenging the negativity prevalent in the family and society that deprived them the rightful recognition of their hard work.
- ► The study also intended to discover the problems and challenges face by NGO and government officials in the implementation of the project.

# **Material and Methods**

Purposive non-probability sampling was undertaken on a key set of stakeholders which included women vegetable farmers, NGO and government officials. Only those women farmers were selected who are currently a member of Vegetable Producer Groups (VPGs) formed under the SWFSLVP project. The total number of respondents selected for the present study was:

- ► Women Vegetable Farmers: The size of sample taken for the women vegetable farmers was 100 (60 from Shahjahapur and 40 from Pilibhit) in all the clusters combined.
- ▶ NGO Officials: The total sample size of NGO officials was 8.
- ► Government Officials: The total sample size of government officials involved in the implementation of the project was 5.

Pre-informed consent obtained from the respective respondents for participating into the research study to comply with ethical norms. Mostly primary data was used for the analysis and the tools used for data collection were interview schedules, FGD guides and case studies. Data was coded and organized into a codebook. Coded data was tabulated and transferred to a master table for analysis. Transcripts were prepared of the responses by women vegetable farmers, recorded for the purpose of case studies. These transcripts were translated from Hindi language to English and used for the study verbatim. The main aim for carrying out the FGD was to understand the nature of participation of women vegetable farmers in SWFSLVP and the involvement of VSA in the program. It was conducted to explore and assess the diverse points ranging from land ownership pattern to income, SHGs, capacity building trainings, marketing business development issues and strategies.

Under the study **12** case studies have been recorded to explore and understand complex issues pertaining to transformations in the lives of women vegetable farmers after becoming part of the program. It also tried to represent on women economic leadership and changes occurring in their decision-making ability. It also tried to ascertain the challenges faced by them, their future plans and aspirations.

#### Reculte

A baseline study was conducted on the nutritional status of women vegetable producers in the project area. Some of the key findings that emerged were that most of the women were homemakers, and worked on their own fields as unpaid labour. The average income per household per month was very low at INR 5120. Nine percent (9%) of the total population was suffering from malnutrition and 73.2% of the women reported that they cook either vegetable or pulses and not both. The intake of pulses was twice or thrice weekly and the major part of the daily diet constitutes cereals either in form of roti or rice.

At the end of the project it was decided to apply some measurement index for documenting significant impact sustained. An end line evaluation study and report of the project was commissioned by Oxfam India to assess the impact and provide key suggestions for strengthening the project.

**Building capacity**: The study found that the project was successful in building capacity of women vegetable farmers for low-cost vegetable farming. The awareness levels of most of the farmers about organic manure, compost, insecticides and pesticides have increased. The project has been successful in providing training on making NADEP compost, vermi compost pits, conducting exposure visits, and setting up demonstration plots.

**Strengthening Institutions**: The project was also able to strengthen institutions to give due recognition to women vegetable farmers. It has successfully managed to form Vegetable Producer Groups (VPGs) in all the villages and encourage women to begin vegetable farming using low-cost sustainable technologies. These VPGs are running very effectively, meetings are held regularly, and members also attend these meetings regularly. In a step to further strengthen women vegetable farmers of Pilibhit and Shahjahanpur district, Oxfam India in collaboration with Margdarshak NGO has been able to successfully established federations of women vegetable farmers associated with the project. The main idea behind formation of such federations was to build strong linkages between produce and the market. In 2013, first women vegetable farmer federation was established in the region. Around 50 per cent of the women vegetable farmers associated with VPGs under the project have become part of these federations. Currently, there are total 1850 members in the federations. This strategy of the project further reflected the pathway of controlling food prices and purchase. The link between agricultural policy and food prices, involving a range of supply-and-demand factors that affect the prices

of various food and nonfood crops, which, in turn, affect the incomes of net sellers and the ability to ensure household food security (including diet quality) of net buyers. Through the VPGs model approximately 2500 women farmers have been organized. They are encouraged for regular savings and credit activity along with their main role of sustainable farming. It is a step towards institution building for better bargaining power and reduced dependence on money lenders. The number of VPGs formed under the project is 250, spanning across 21 villages.

**Enhancing nutritional status:** The project conducted a study to assess the food & nutritional status of women farmers in the project area in light of the increased income from vegetable farming as planned. An external expert conducted the study. The survey was conducted with 300 women farmers. The survey revealed that before the project intervention the women were basically housewives or working on their own fields as unpaid labours and after they became project beneficiary, nearly 90% of them adopted vegetable growing as their occupation. 17.4% of the women reported that they never get the chance to have milk or curds, thereby meaning every 6<sup>th</sup> women is deprive of milk, and the total 52 women out of 300 never drink milk. 73.2 % of the women reported that they cook either vegetable or dal not both hence pulses intake is twice or thrice weekly not more. 22.8% reported that the cost of pulses is very high and they eat it occasionally only. Missing milk and dal from daily diet defeats the purpose of balanced diet. Cereals either in form of roti or rice constitutes the daily diet. As the survey was done during winter season approximately 59.2% of them reported intake of green leafy vegetable at least weekly. 9% reported for never eating this because of their dislike towards green leafy vegetables. 54.8 % reported daily other vegetable consumption And 26.1 reported weekly. Nearly 50% of the women never take fruits. Those who reported fruit intake was mainly those fruits which are in their orchards or very cheaply available in the village. About 30% of the surveyed population is vegetarian. 2.1 % eats egg but not any other meat. 12% reported of taking egg daily as they had hen at their house. 25.1% reported having eggs weekly. 30.3% take egg occasionally. Nearly 50% of population takes meat/fish occasionally and 18.1% take it weekly as they reported that it is very costly and they cannot afford it quite often, but they wish to. Sugar was mainly taken in tea or mixed with curd. Use of gur (jaggary) was reported by most of the respondent.

Economic Leadership and strengthening power: The project intervention highlights that there is a significant increase in the land taken on lease by women vegetable farmers. While only 20 per cent of women farmers were doing farming on leased land in 2007-08, currently the percentage has gone up to 24. There is also a drastic change in the utilization of land for the purpose of vegetable farming in Shahjahanpur and Pilibhit districts. The farmers using 1-2 Bighas of land for vegetable cultivation has risen to 33 per cent from 17 per cent in 2007-08.

There are also significant changes taking place in the production of vegetables in the region. Currently more than 30 per cent of the women vegetable farmers are producing more than 50 quintals of vegetables, while the number stood at only 5 per cent in the year 2007-08. There is an enormous change in the pattern of vegetable production as well, as 20 per cent of women vegetable farmers stated that vegetable farming is fetching them INR 30,000 – 50,000 annually while this figure stood at only 6 per cent in 2007-08. It also shows that in the current period 8 per cent and 5 per cent of women vegetable farmers have annual production values between INR 1,50,000 - 2,00,000 and above 2,00,000 respectively.

In terms of family decision making, 87 per cent of women vegetable farmers feel that after joining the project, they have more control over financial matters. As many as 85 per cent women vegetable farmers acknowledged that their ability to negotiate has immensely improved after becoming part of the project. Substantial number (71%) of women vegetable farmers responded that credit has become more accessible to them due to the efforts made under the project. A significant number (71%) of them have gained full market access, while 33% of women vegetable farmers still lack easy and swift access to the market. Very high (95%) proportion of women vegetable farmers reported that the level of their public participation has improved drastically. Similarly, majority (90%) of them reported about an increase in the self-confidence.

Another achievement of the project was establishing coordination and convergence among various schemes run by the government. The analysis of interaction with each stakeholder reveals that the project approach was sound and all efforts were

made to instill a sense of power in women vegetable farmers. This has been done by establishing seed banks, a resource center, easy credit availability from banks, providing training for business development, and increasing market access

#### Discussion

# AGRICULTURE AND NUTRITION: EVIDENCE FROM THE FIELD BASED EVALUATION STUDY

Global evidence has led to the development of a theoretical framework that presents seven key pathways linking agriculture and nutrition (Gillespie, et al, 2012 in Annexure 1). While it is possible to argue that the project addresses each pathway in certain ways, the inter-sectoral collaboration of the project in addressing the achievement of the project towards its objectives is described below.

The strategy adopted for building capacity of the women farmers by giving them trainings and exposure to techniques of low cost vegetable production reflected the pathway of own production to consumption. Own agricultural production leads to adequate food consumption, which further enhanced the nutrient intake and produced desired child nutrition outcomes. Agriculture as a source of food, the most direct pathway by which household agricultural production translates into consumption (through crops or livestock cultivated by the household).

The pathway adopted through strengthening institutions also reflected women's workload to maternal energy use. Women employment or engagement in agriculture through VPGs leads to positive investment of energy and subsequent effects on child nutrition and health through the lifecycle, including during pregnancy.

The project also enhanced the nutritional status of women and their families in the area. Majority (96 per cent) of the women vegetable farmers reported an improvement in the nutritional status and personal health. Similarly, majority (96 per cent) of women vegetable farmers interviewed mentioned about considerable improvement in the nutritional status of their family. The availability of surplus vegetables has enabled women farmers to include those in their regular diet. These vegetables have provided them necessary vitamins and minerals to remain healthy. Moreover, the improved economic condition has also given them the opportunity to spend money on health and in securing a balanced diet. The overall nutritional status and personal

health of women vegetable farmers and their family members has improved significantly. This reflected the pathway of income to food purchase wherein the income can be either through wages earned by agricultural work or through the sale of agricultural goods. Basically agriculture as a source of income is spent on purchasing diverse nutritious foods, which result in balanced nutrient intake and healthy child nutrition outcomes.

The project is encouraging and helping women vegetable farmers to realize their true potential. It is also facilitating in the transformation of their economic status, as well as that of their families. The strategy of the project adopted to build economic leadership reflected the pathway of women's control of income to resource allocation. Women's control of household income and their ability to influence household decision-making and household allocation of resources for food, health, and care comes only through achieving economic independence.

#### Conclusion

This project shows that women farmers from Shaharanpur and Pilibhit effectively link agricultural activities to nutrition outcomes. This is a powerful combination of pathways to achieve nutrition outcomes but is not unique in its application. What sets the project apart is its simultaneous focus on market access through institutional strengthening to enhancing nutritional status of women and children by empowering women to have economic independence necessary to strengthen power in decision making process. The activity oriented its intervention toward low cost vegetable production, promoting indigenous methods and techniques to increase vegetable production, encouraging dietary diversity, and generating revenue. At the same time, the project has worked to create a system—the VPGs network—that can provide improved seeds, extension services, agricultural services, and nutritional products. In addition, the importance of VPGs in empowering women in agriculture cannot be overstated.

#### Recommendation

Learning outcomes of this project are diversified. This project has evidenced to make recommendations on public health approach. Working for people requires working with people under various public health programs and schemes. It requires meaningful convergence with various

stakeholders, different tiers of society and other enabling institutions as undertaken in the projects. Decision making for women's self guide reiterated that choices women make regarding agriculture production and accessing market depends on capacity enhancement and power transformation through collective leadership. It is in true sense a complex procedure to adhere sustainable practices in one place. But the collective action at micro level of project implementation portrays unique combination of nurturing values in food security, equitable income distribution and improved health seeking behavior with a core approach found effortful.

# Limitation of the study

The evaluation study for the project could explore only at limited cluster of project operation.

# Relevance of the study

The project provides important lessons regarding the broader institutional linkages that ensure that agriculture-nutrition integration can be effectively implemented. The project also consults with, and draws extensively on, government agricultural research facilities and both regional and local experts. The project has reached out on both sides of the agriculture – nutrition equation to ensure that its interventions are as coordinated as possible. The public nutrition approach makes it possible to increase the impact of current initiatives which aim to reverse the course of the major nutrition problems, but, above all, and on a more positive note, to promote nutritional security and health.

#### **Authors Contribution**

First author, lead and conducted the evaluation study of the project in Shajahanpur and Pilibhit district of Uttar Pradesh. Second author, designed study frame and methodology and reviewed analysis, written reporting. Third author, reviewed study reports, contributed in documentation.

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# **Annexure**

#### **ANNEXURE 1**

As adapted from Stuart Gillespie<sup>6</sup>, et al, 2012, there are seven key pathways between Agriculture and Nutrition, from which we can draw a relation with the project.

#### Pathway 1: Own Production - Food Consumption

Own agricultural production—food consumption—nutrient intake—child nutrition outcomes

 Agriculture as a source of food, the most direct pathway by which household agricultural production translates into consumption (through crops or livestock cultivated by the household)

#### Pathway 2: Income - Food Purchase

Income (agricultural or nonagricultural)—food expenditure—food consumption—nutrient intake—child nutrition outcomes

 Agriculture as a source of income spent on purchasing diverse nutritious foods, either through wages earned by agricultural workers or through the sale of agricultural goods

# Pathway 3: Income - Healthcare Purchase

Income (agricultural or nonagricultural)—nonfood expenditure—healthcare expenditure (cost)—health status—child nutrition outcomes

• Agriculture as a source of income spent on nonfood items, particularly health, either through wages earned by agricultural workers or through the sale of agricultural goods

# Pathway 4: Food Prices - Food Purchase

Supply and demand factors (policies, taste, incomes)—relative prices of various food items—food expenditure

• The link between agricultural policy and food prices, involving a range of supply-and-demand factors that affect the prices of various food and nonfood crops, which, in turn, affect the incomes of net sellers and the ability to ensure household food security (including diet quality) of net buyers

# Pathway 5: Women's Time Use - Care Capacity

Female employment in agriculture—time use/caring capacity—child nutrition outcomes

 Women's time use, and subsequent ability to manage the care, feeding, and health of young children alongside agricultural work

#### Pathway 6: Women's Workload - Maternal Energy Use

Female employment in agriculture—energy expenditure—maternal and child nutrition outcomes

 Women's workload and work-related energy expenditure, and subsequent effects on child nutrition and health through the lifecycle, including during pregnancy

# Pathway 7: Women's Control of Income - Resource Allocation

Female employment/resources —female socioeconomic power—household expenditure (food/health)—intrahousehold allocation—maternal and child nutrition outcomes

• Women's control of household income and their ability to influence household decision-making and household allocation of resources for food, health, and care