**Proponent** (name/institution)

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| **Dr Dheeraj Singh, Dr M K Chaudhary, Dr Chandan and Dr Aishwarya Dudi , KVK CAZRI Pali** |

**Title for the example (case study) presented**

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| **Nutri-gardens for food and livelihood security in arid zone** |

**Country context/location** (national/sub-national; urban/rural)

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| The project was launched in 500 households in different villages of Pali district in Rajasthan India. |

**Food Security and Nutrition (FSN) context and underlying drivers affecting FSN**

(i.e. conflict, climate variability and extremes, economic slowdowns and downturns, COVID-19 or measures to contain it, and/or persistent poverty and inequality)

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| There is widespread poverty, food insecurity and under-nutrition in India. The household level data on calorie intake indicates that the average calorie consumption among population in India is declining over the last twenty years. Considering the parameters of economic and social development, India’s undernourished population is continually on the rise and the situation has worsened with the spiraling inflation witnessed with regard to food prices. Even though with the government effort India is in a row towards achieving food security but still there is a large population suffering from undernourishment, and starvation. So the concern for nutritional security is the need of the hour.Vegetables are recognized as the most important source of micronutrients. Vegetable consumption can play an important role for eradicating micro-nutritional deficiencies. The inadequate supply of vegetables, particularly during the off-season, higher market price and lesser awareness regarding their consumption are key factors that limit the vegetable consumption rate in India. The per capita vegetable consumption in India (86 g/day) is far below the ICMR’s recommendation (300 g/day). One way to achieve this goal is through nutri-garden or kitchen garden. Home gardens are a part of agriculture and food production systems in many developing countries and are extensively used as an answer to ensure food and nutritional security in the circumstances of a global food crisis. Vegetable based nutri-gardening is important especially in rural areas where people have limited income-earning opportunities and poor access to markets. Nutri-gardens are an important source of food and income for poor households in rural and peri-urban areas. Thus it helps in increasing the nutritional status and income of people. |

**Type of food system / key characteristics of the food system component considered** (please describe the challenges, inter-linkages, and complementarities among the food system's components)

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| In arid zone the key challenge is availability of fruits and vegetables all the year round. The home based nutri-gardens can enhance food and nutritional security in many ways, most importantly through Direct access to a diversity of nutritionally rich foods; access to healthy diet that contains adequate macro and micro nutrients; food provision during seasonal lean periods. It will help in conservation of the local species of vegetables besides savings on food bills an income from sales of garden products.Apart from these, nutri-garden provide multiple social benefits such as enhancing food and nutritional security, empowering women, promoting social justice and equity, and preserving indigenous knowledge and culture. Studies reported that due to inadequate consumption of vegetables, micro-nutrients deficiency especially iron, vitamin A and iodine are prevalent in the developing world. The challenge of rising vegetables consumption is a major concern for health professionals. Vegetables are rich in nutrient and vitamins hence help combat malnutrition through dietary diversity. Dietary diversification balances the diet by enhancing the supply of essential micro-nutrients leading to improved health, such as improving functions of the whole body, disease prevention, and delayed disease progression, enhanced thinking ability and increased efficiency. Intake of vegetable can enhance in micro-vascular reactivity, better cognitive performance, decreased risk of colorectal cancer, reduce the risk of overweight, coronary heart disease, and reduced risk of kidney disease. In cities, the vegetables reaching the market contain high amount of pesticide residues, it is of special interest to the consumers to grow their own vegetables for domestic consumption. Pesticides applications for disease and insect-pest management are discouraged in the nutrition gardens. |

**Combined goals of the policies, investments and/or interventions described** (a, b and/or c)

(a) Strengthened resilience to external shocks and stresses (e.g. climate, conflict, economic, COVID-19)

(b) Address underlying structural causes of hunger and malnutrition (e.g. poverty, inequality)

(c) Sustainably transforming food systems to lower the cost of nutritious foods and/or improve the affordability of healthy diets

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| The projects originally addressed (b) structural causes of hunger and malnutrition and sustainably, and (c) transforming food systems to lower the cost of nutritious foods and/or improve the affordability of healthy diets. |

**Key characteristics of supporting policies, investments and/or interventions**

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| **Objectives of school nutrition garden**1. To help in addressing malnutrition and micro nutrient deficiencies by consumption freshly grown vegetables.2. To give women and children first- hand experience with nature and gardening.3. To enhance the knowledge of women and children regarding nutritional aspects vegetables and harmful effect of junk foods.**Need of nutrition gardens**Nutrition garden brings lot of advantages; some of them are as under:1. Nutrition gardens are good for leaning: they are highly practical and direct form of education, where women and children can learn how to grow good food, which not only improves health, but also provide opportunities for livelihood and increase self- sufficiency. Apart from practical skills in agriculture and horticulture, gardens are living laboratory for the study of environmental issues and life sciences.2. Nutrition garden are good for women and children’s health and education: Good diet are essential for cognitive abilities which help in learning. Children who eat well are likely to learn well. Nutrition garden are not just for food, but for better eating. School nutrition garden can make a direct and immediate improvement in children’s diet. They can provide fruit and vegetables, rich in vitamins and minerals, add nutritional value to mid day meals, increase the variety that is so important for health and growth, and help children to appreciate and enjoy this variety.3. Nutrition garden improve the environment: respect for the immediate environment begin from the home – and also at school. The school ground have elements of the natural environment, the built environment and the social environment: earth, plants and trees, insects and wildlife, sun and shade; water supply and sanitation facilities, parts and fences, buildings and shelters; places for recreation and study, social life and contacts with the outside world. Children’s awareness of these, and the way they learn to treat them, will help them to grow into responsible adults.Nutri- gardens are good for the earth: organic gardening conserves the soil, protects the environment and works with nature rather than against it.it is a method of growing food that relies on the earth’s natural resources, such as land, sun, air, rainfall, plants, animals and people. It uses natural methods to keep the soil fertile and healthy and to control insects, pests and diseases. Organic methods can help keep our water sources clean and free of chemicals. It is also safer for children because are no dangerous chemicals.5. School nutrition garden promotes life skills: children grow with the garden. Life skills are personal and social capacities such as managing work, planning and organizing, taking responsibilities, working well together, understanding what one is doing, explaining it, taking pride in it and learning from experience. Including life skills in the garden curriculum means giving as much attention to growing children as to growing plants. It affects all activities and approaches. |

**Key actors and stakeholders involved in the development and implementation of the example provided** (please also describe to what extent a multi-stakeholder and participatory approach has been adopted)

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| Technical assistance, training, provisions of seeds manure etc were obtained in convergence with various line departments/ agencies like Krishi Vigyan Kendras, Department of Agriculture/ Horticulture, Food & Nutrition Board, State Agriculture Universities, neighboring families etc, schools also adopted the twinning model and work together with other schools. Teachers, students, cook cum helpers, members of school management committee, parents of the children, community members, scientists of KVKs were involved for the preparation of site, crop cycle, layout of the school nutrition garden, procurement of seeds, manure etc.* Scaled up the practice of kitchen gardens to promote increased consumption of diverse and nutrient-rich foods through convergence under the National Nutrition Mission or POSHAN Abhiyaan.
* Capacity-building on kitchen gardens were incorporated as part of training curriculum of community health workers/anganwadi workers under the Ministry of Women and Child Development’s flagship programme of ICDS. This will enhance their knowledge on benefits of nutrition gardens and raise awareness in the community.
* The Village Health and Nutrition Day, a Government of India initiative to improve access to health and nutrition services, was utilised to raise awareness on nutrition gardens, and also demonstrate how the food grown can be introduced in the daily diet.
* An alignment with Ministry of Rural Development initiative of Deen Dayal Upadhyaya Grameen Kaushalya Yojana to promote rural livelihood to help build skills on developing kitchen gardens for better economic opportunities and income generation.
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**Are there important linkages of interventions in the food system with other systems?** (e.g. the health systems, environmental systems and/or social protection systems)

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| Nutri garden is a multidimensional effort to reduce malnutrition. Nutri garden not only ensures food and nutrition security as well as food safety. Nutrition garden is an indigenous and sustainable solution to malnutrition and can demonstrate desired changes in the nutrition scenario in the country if integrated with the existing government system such as ICDS. In nutrition context, A nutrition garden is a habitat from which we get nutritionally rich fruits, vegetables and food from livestock source. Nutri-garden is intended for proper utilization of backyard or front yard space around house to support the dietary requirement of a family. Vegetables are grown according to seasons by utilizing the locally available wastes. Once prepared, it can be used for a long period for fulfilling the daily needs. The primary objective is to fulfil the nutritional requirement of the family. It fulfills the body needs in form of carbohydrate, protein, fiber or roughage, fats, vitamins and minerals. A nutri-garden is technically developed to fulfill the requirement of family consumption in the form of vegetables, fruits and animal proteins, and is purely organic in nature. Nutri-garden is based on diversity in terms of vegetable, fruit, spices cultivation and livestock rearing (Mixed farming approach), and focuses more on soil fertility enhancement in organic approach which is targeted for long-term aspect.One of the easiest ways of ensuring access to adequate macro and micronutrients is to produce and consume different kinds of vegetables from the garden. Kitchen gardening is the easiest way of growing desirable fruits and vegetables on our own piece of land. It can be grown in the empty space available in the backyard of the house or a group of women can come together, identify a commonplace or land and grow the desired vegetables, fruits, etc. This can benefit the women and community as a whole. Home-grown vegetables are organic, low cost and could be totally free from chemicals and pesticides. Kitchen garden is sometimes called backyard or home garden. These gardens have an established tradition and great potential for improving household food security and alleviating micronutrient deficiencies. Most importantly, it gives direct access to diverse nutritionally rich vegetables. It also increases the purchasing power through savings on food bills.This is especially important in rural areas where people have limited income-earning opportunities and poor access to markets. Gardens are also becoming an increasingly important source of vegetable supplies and an additional income resource for poor households in peri-urban and urban areas. |

**Highlight key innovative and/or transformative changes in the specific food system as a result of the policies, investments, and/or actions leading to improved FSN** (please note that “transformative change” refers to innovative, pro-active changes away from “business as usual”)

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| The project brought significant changes in the food system which are highlighted as under * Before intervention the targeted population consumed only 75 gm veggies per day while after intervention, they are consuming 225 gm veggies per day.
* Per person requirement of vegetables is fulfilled by nutri garden; 76.5% in kharif season, 127.5% in rabi season and 58.33 per cent in jayad season as per recommended by ICMR 2012.
* After establishing nutri garden they are having different type of seasonal vegetables and fruits in their diet therefore found significant difference in availability of nutrients ie +30.35 mg iron, +36.32 mcg beta carotene, +140 mg Vit C, +32.61 mg calcium, 15.49 mcg folic acid etc.
* By selling the remaining vegetables after consumption, they are earning an annual of 5983 Rs. that was zero before intervention.
* Due to the availability of vegetables from the nutri garden, the women are also saving an annual savings of 5800 rupees.

**Availability of vegetable before and after intervention**

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| **Before intervention****(gm / day/capita)** | **After invention****(gm/day/capita)** | **Difference****(gm/day/capita)** |
| **75** | **225** | **150** |

**Comparative production and income status of nutri garden (year 2019-20)**

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| **Crops**  | **Production** **(Kgs)** | **Consumption** **(Kgs)** | **Sales** **(Kgs)** | **Net income (Rs.)** |
| **Rabi**  |
| Amaranthus  | 17.95 | 10.77 | 7.18 | 143 |
| Brinjal  | 24.56 | 14.06 | 10.5 | 210 |
| Tomato  | 16.47 | 8.27 | 8.19 | 245 |
| Spinach  | 31.45 | 20.45 | 11.0 | 330 |
| Coriander  | 13.90 | 5.40 | 8.5 | 350 |
| Fenugreek  | 24.50 | 14.50 | 10.0 | 500 |
| Chillies  | 8.50 | 5.50 | 4.0 | 160 |
| Bottle gaurd | 32.30 | 15.50 | 16.8 | 336 |
| Sogri  | 16.45 | 3.45 | 13 | 520 |
| **Kharif** |
| Brinjal  | 28.50 | 12.45 | 16 | 320 |
| Tomato  | 15.60 | 10.10 | 5.50 | 160 |
| Spinach  | 22.45 | 10.45 | 12 | 240 |
| Coriander  | 3.50 | 1.50 | 2 | 120 |
| Chillies  | 4.75 | 1.25 | 3.50 | 140 |
| Bottle gaurd | 32.50 | 15.50 | 17 | 340 |
| Ridged gaurd | 22.50 | 10.50 | 12 | 480 |
| Tinda  | 18.45 | 8.45 | 10 | 400 |
| Kachri | 30.70 | 6.30 | 24 | 960 |
| Ganwarfali  | 25.50 | 12.50 | 13 | 520 |

**Average economic benefit through selling of vegetables in market**

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| **Before intervention****(Rs./ year)** | **After invention****(Rs./ year)** | **Difference****(Rs./ year)** |
| **-** | **5983** | **5983** |

**Average annual saving of each family before and after intervention**

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| **Before technology intervention****(Rs.)** | **After technology invention****(Rs.)** | **Saving**  **(Rs.)** |
| **7300/-** | **1500/-** | **5800/-** |

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**Highlight challenges faced** (any sort of trade-offs, and how these were managed) **and/or efficiencies gained as a result of the best practice presented** (e.g. win-win situations)

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| Challenges: * The rural women of Pali district have lack of knowledge about health and nutrition and balanced diet for human being. They have not particular knowledge about dietary pattern for mother and supplementary feeding for children. They have very less knowledge about micro nutrients and its importance for human body and rich sources of these. So that they were not interested in setting up nutri garden.
* Saline water is available in most of the villages of Pali district. This is the biggest problem in growing fruits and vegetables in nutri garden.
* They were having limited vegetables and fruits and restricted for growing these local varieties.
* They have very less knowledge about medicinal plants and were not interested in growing and consuming of these like aloe vera, lemon grass, giloy etc.
* Barely approved to grow moringa in their garden.
* If they are not visited on time, then they stop paying attention to their nutri garden.
* They were learned effectively about value addition of fruits and vegetable and use these practices regularly and prepare pickle, sauce, syrup, juices, dried vegetables etc and store in their home for off season.
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**Key lessons that can be learned from your case** (both positive and negative) **and whether these could be applicable in other contexts with similar characteristics**

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| * Nutri-Gardens are an effective tool to share information on healthy diets,food ,nutrition and good health practices
* Women inclusion is crucial to promote healthy diets within the families and women are the major players in this project,
* Capacity building added to the generation of extra income which ensured livelihood security also.
* A person does not change himself until he realizes its importance, so it is very important to bring awareness about the subject. For this, it is necessary to organize subject-based training, goshthi, meetings etc. after that start main program.
* Person learns more by watching, so inspire the target group with live methods like method demonstration, on farm trial, front line demonstration etc.
* Message should be present in interesting way.
* Timely evaluation and follow up is must for success of any programme.
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**Summary of key messages**

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| To date, the project has reached 546 people (92% women) and has benefitted more than 4765 households. The project is fulfilling nutrient deficiency and ensuring food security and has had a great impact on the lives of women, pregnant women, and children by improving their nutrition. Greater attention to the nutritional properties of food and better hygiene practices also results in better health for the entire population. It is necessary to plan the program properly for any program to be successful hence awareness creation understanding about the importance of the topic is most important. Involvement of organizing members till the end is required for the success of any programme.  |