

Case Study

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Badi Cultivation: Improving Nutritional Security of Marginal Farmer's - A Case Study of Kabirdham District, Chhattisgarh, India

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ABSTRACT

Over time, smallholder farmers have adjusted their planting patterns and farming calendar to the onset, duration and end of the rainy seasons. However, with increasingly changing rainfall patterns due to climate change, their planting patterns and farming calendar no longer match seasonal rainfall distributions, which often lead to crop losses which soon or later affect the nutritional status of the members of family of farmer. In such case situation Badi's located and developed near to house was able to mitigate not only daily additional livelihood but also as support to the nutritional requirement of the members of farmer's family. With the Convergence of MGNREGA, NRLM, state Horticulture department schemes Badi's are established at village that helps in nutritional security of the farm family and also supplement the needs of the vulnerable group (pregnant and lactating mothers and children below five years), to overcome the malnutrition and micro nutrient deficiency and other health consequences, it also improves the nutritional value chain by means of production, availability and stability.

Keywords

Badi, MGNREGA, NRLM, Nutritional security, Livelihood

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Introduction

Badi cultivation popularly called as "Badi" was a traditional farming practice to majority of rural farmer's in Kabirdham District of Chhattisgarh. This is a well-established system of land use where different crops, vegetables and fruit trees, are grown in combination with small ruminants and livestock. A judicious mix of crop as well as animal components like dairy, poultry, goatary, fishery, etc. suited to the given agro-climatic conditions not only

supplement the income of the farmers but also help in increasing the family labour employment. The farm wastes are better recycled for productive purposes in such integrated system (Singh, *et al.*, 2014).

The system of Badi cultivation helps to improve the resources of poor farmers and also meets several socio-economic, nutritional and ecological conditions which contribute to their better living and sustainability. Low input cost, stable yield every

year, application of simple technology, and intensive management practices are the main feature of Badi which helps to increase the nutritional and daily livelihood security of farm families (Panda, 2009).

Background Information of Study area

The intervention of Badi System was implemented in MGNREGA and State Horticulture Department under the aegies of Front line demonstration by Krishi Vigyan Kendra (KVK) IGKV Raipur undertaken in Barpelatola Village of Kawardha tehsil in Kabirdham District Chhattisgarh (Fig. 1). The selected village is located four km away from Kawardha, lack in basic amenities like electricity, drinking water, formal schools and colleges. The total geographical area of village is 160.32 hectares, out of which cultivated area is about 143.883 ha and fallow land about 17.00 ha. Main occupation is Agriculture and Vegetable growing using organic manure is prepared through traditional open pit method. It has a pond having an area of about 6.5 ha (Parida and Sinha, 2010).

It has a total population of 1,124 peoples and about 206 households with 27 SC households. Village is having children with age 0-6 is 201 making 17.88 % of total village population. Average Sex Ratio of village is 1025 which is higher than Chhattisgarh State average of 991. As per census 2011, Sex Ratio is 827 which were lower than Chhattisgarh average of 969. Problem of malnutrition was prevalent in study area affecting about 10% children registered in Anganwadi Kendra and can be clearly distinguished in the form of stunted growth, Anemia whereas about 12% lactating women were found Anemic in the village. Literacy rate was 51.35 % which were lower than state average of 70.28 % out of which male stands for 64.27 % as compared to female literacy rate of 39.33 %. Total number of workers was 651 with 337 female workers. Overall total number of Badi's observed were about 200 in the villages. Keeping in view, this poor socio-economic condition and climate vulnerabilities, target beneficiaries (all women) were selected for training, awareness and implementation of adaptation strategies/interventions.

Intervention Details: Government policy support for technology promotion and adoption and role of line Department

Badi system of farming was pivotal project by the government of Chhattisgarh. The selection of study area or called area of implementation was done initially by from block and then village level survey. Later on selection of farmers holding criteria of minimum land availability, irrigation facility and fencing facilities available. Leading role was done by State Horticulture Department in extension of technology through converging MGNREGA projects to utilize the manpower in enriching the Badi cultivation. Special support was provided to BPL Farmers with 75% subsidized for installation of Drip irrigation system nearly Rs.18, 000 for Badi cultivation based on three different land holding size: 500 sq. m, 500-1000 sq.m and more than 1000 sq.m.

Along with it electricity as well as irrigation support provided by one HP pump are provided to the farmers to encourage Badi system of farming. The main objectives of the Badi System were:

Prepare seedling depot of High yielding fruit and vegetable crops at Block level, so that farmers at village level can easily approach good quality planting material.

To empower the Self Help groups through Badi cultivation

Increase the Nutrition security of farm families through enriching Badi cultivation round the year.

Materials and Methods

Previously Badi cultivation was practiced in an unorganized manner, without any scientific base leading to low returns and poor quality production. There were only limited components mainly some vegetables only. Seen all these problems and technology gaps Krishi Vigyan Kendra Kawardha through its scientifically plan establishes homestead

gardens, so as to earn more profit as well as better nutritional security on same per unit area of land.

Along with crop components various other additional components like animals, mushroom, bee keeping, poultry etc were include in the frame of Badi systems to minimize the risk making SO, that the family will be more self-sufficient and independent (Table1).

Generally the size of a garden depends on the area available in the house compound. Before the actual layout the available area should be properly fenced.

The irrigation channel from the water source and path was so planned and preferred that it covers the whole area of the garden. Bunds were used for growing short heighted fruit plant to fulfill the family requirement. Small unit of medicinal garden is also establishing inside vegetable garden, Vermicompost and NADEP unit to recycle the farm wastes (Figure 2).

Results and Discussion

Results of the study were compiled and shown as table (Table 2). The mean sold quantity was found to be 2463.0 Kg per plot whereas percentage surplus was found to be about 44.78 % in total produce. Along with regular livelihood farmer's was also benefitted with nutrients security and was able to meet the nutritional demand as per recommendations of Indian Council of Medical Research for a normal male adult (Table 3).

Farmers Perception

Initially Smt. Pushpa Patel and 10 other women farmer got training and farm demonstration from KVK on year round cultivation of Vegetables, mushroom production, Vermicompost, pulse and oilseed production etc. She established her model at the household with the help of KVK. Initially KVK provides seeds of Vegetables, fruit crop planting material, mushroom spawn, and one Vermicompost unit. She works on her farm along with cereal and

pulse production and marketing of farm produce. Prior to the Demonstration by the KVK, crop production, vegetable production at village was very low, Production was meant only for household consumption. As a result of the demonstration, the lives of the farm families in the village Barpelatola has been now transformed. Focus was made on Off season vegetable cultivation with improved varieties of Okra, cowpea, Tomato, Brinjal, Chillie, Potato, pea, Rainy season production of cabbage and cauliflower, Cucurbits like Bitter gourd, sponge gourd, pumpkin, bottle gourd, and Tuber crops – colocacia and Amorphophallus, spice crops like turmeric, Ginger, off season Coriander cultivation and Mushroom production helps to increase their income. Every month she earns additional income of Rs. 5000 per month from Badi farming and Mushroom production. From 0.4 ha of Badi she earns Net profit of Rs. 74,000.

After the successful Badi establishment model at Pushpa's house, 10 other field demonstration are conducted by the KVK to scale up the existing Badi of the village. Participating farmers and farm women are trained on round the year Badi farming and improved pulse and oilseed production through training module.

Impact of technology with social, economic and environmental impact

Social Benefits

Badi farming creates employment generation for family member round the year, which help to minimize the input cost and provides more net profit along with the nutritional security to the family.

Ecological Benefits

Farmers used to grow fruits and vegetables under Badi farming in organic condition, which helps to improve organic carbon of the soil, minimize the crop damage due to insect- pest and disease attack, increase micro flora and fauna in the field, more diversified and less prone to disaster.

Table.1 Crop Suggested for Badi Farming

S.No	Area	<i>Kharif</i> season	<i>Rabi</i> Season
1	Sunny Space	Bitter gourd, Cow pea, Sem, Brinjal, Coriander. Chillie, Tomato, Cucumber, Okra, Amaranthus, Amorphophallus	Knol khol, Cauliflower, Cabbage, all solanaceous crops, Cluster bean, Palak, Radish, Amaranthus, Methi, Onion, Amorphophallus
2	House roof	All cucurbits	All Cucurbits
3	Trellis	Perennial-Ivy gourd, pumpkin, bitter gourd, bottle-gourd, ridge gourd, sponge gourd	Perennial-Sponge gourd, Ridge gourd, Bottle gourd
4	Land below trellis	Ginger, turmeric, colocacia,	Perennial leafy vegetables
5	Pond bank	Cucurbits	Water melon, Cucumber, Musk melon
6	Slightly Marshy land	Banana, mint	Banana, mint
7	On trees	Annual cucurbitaceous vegetables	Perennial-black pepper, Annual cucurbitaceous vegetables

Table.2 Total Marketable Surplus of Vegetable produced from Badi System of Farming

S.No	Crop	Mean qty produced (Kg)	Mean qty consumed(Kg)	Percentage Consumption	Mean qty sold	% Surplus
1	Tomato	260	200.00	76.9	60.00	23.07
2	Brinjal	470	210.00	44.6	260.00	55.3
3	Chilli	540	230.00	42.5	310.00	57.4
4	Cauliflower	409	190.00	46.4	219.00	53.5
5	Cabbage	390	195.00	50.0	195.00	50.0
6	Knol-khol	281	170.00	60.0	111.00	39.5
7	Cucurbits	370	220.00	59.4	150.00	40.5
8	Spinach	164	103.00	62.8	61.00	37.1
9	Colocacia	552	290.00	52.5	262.00	47.4
10	Okra	281	260.00	92.5	21.00	7.47
11	Radish	418	190.00	45.4	228.00	54.5
12	Sem	220	100.00	45.4	120.00	54.5
13	Cowpea	110	100.00	47.6	110.00	52.3
14	Mushroom	50.00	20.00	40.0	30.00	60.00
15	Banana	830.00	504.00	60.72	326.00	39.2
	Total	5345.00	2982.00	55.11	2463.00	44.78

Table.3 Comparative nutritional requirement met from Badi cultivation

Parameters	Per capita recommendation of vegetable as per ICMR (for normal male adult)	Per capita mean availability of nutrients (g/ person/day) through Badi cultivation	Excess /deficit (g/ person/day)
Energy(cal)	170	70	100
Protein(g)	17	8.0	9
Fat (g)	3.5	0.9	2.7
Calcium(mg)	750	350	400
Iron(mg)	25	18	7

Fig.1 Location map of Village Barpelatola in Kabirdham District in Chhattisgarh

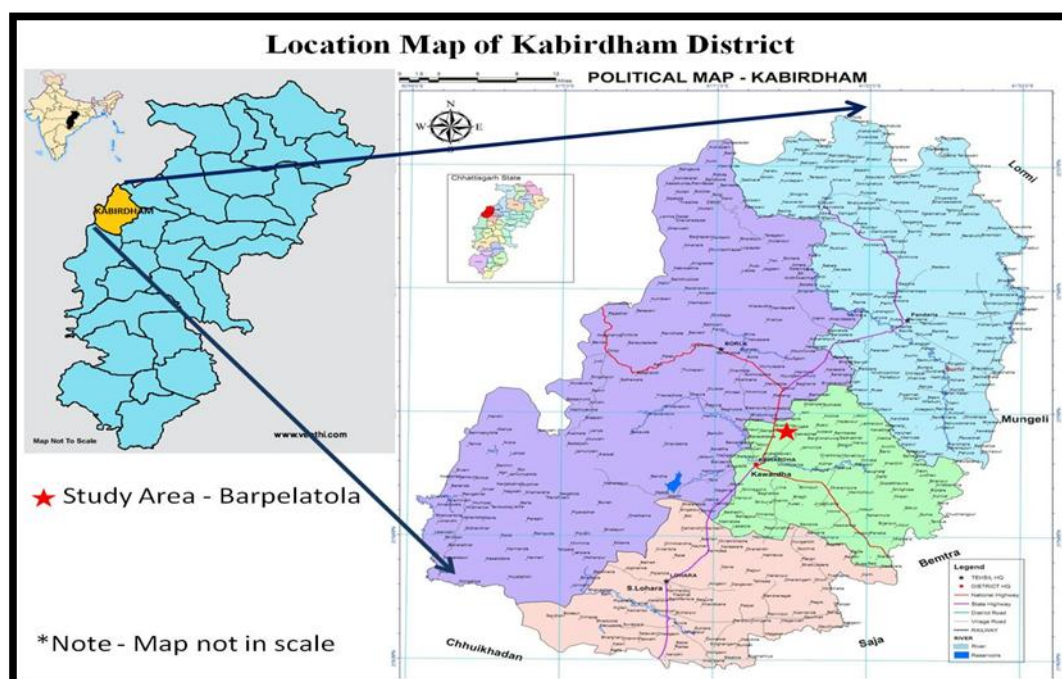


Fig.2 Layout of Kitchen Garden Designed by KVK Kawardha

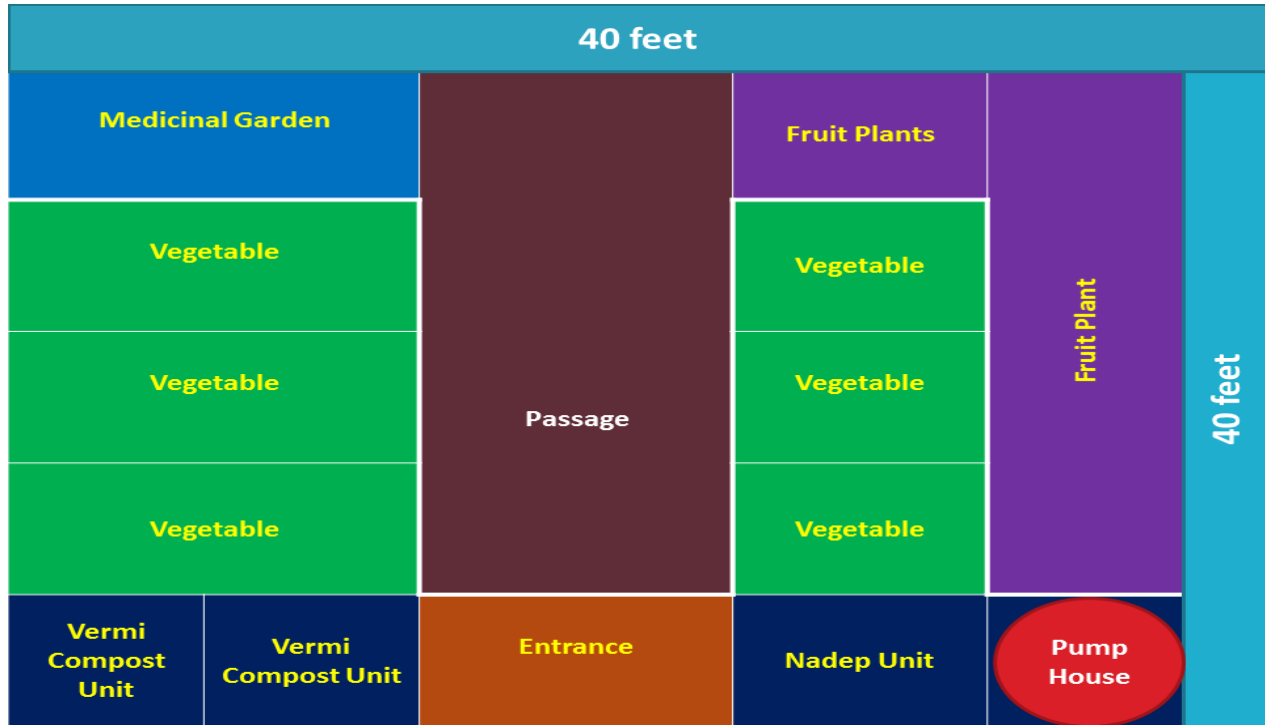


Fig.3 Badi Crop Demonstration at Village Barpelatola, District Kabirdham CG



Fig.4 Training of SHG on Mushroom production Training of SHG on Nutri Rich value added products



Fig.5 View of Badi of Pushpa Patel



Economic Benefits

The input cost is reduced, so net income increased. As income is diversified that is from different sub

system, risk is reduced. The income has time wise and source wise diversified i.e. the farmers is getting income throughout the year from different sources, which reduces the dependency on single system.

Health benefits

Farmers used to grow chemical free crops under Badi farming, which is more nutritive and makes families healthier and also provide self-satisfaction of crop production.

Horizontal Spread

Now the technology is adopted by 100 farm families by establishing Badi cultivation. Distant people also visited the farmer's field to adopt the technology.

Badi cultivation is important source of Farm family to create employment along with small amount of cash income. Apart from this it is clear that in most of the months in a year farmers were able to fulfill their daily requirement of fruits and vegetable. Through the increased intake of homestead vegetables and fruits, demand of Vitamin A and C were met along with fulfillment of iron and calcium. Thus, Badi cultivation helps to improve food security and reduce nutritional deficiency. However, nutritional education is crucial for mitigating deficiency and sustainability of vegetable gardening. The technology is recommended for widespread dissemination among the small farmers of the district by creating mass awareness through media,

line departments like Agriculture, Horticulture and NRLM members for successful implementation of the programme.

Thus, Badi cultivation helps in nutritional security of the farm family and also supplement the needs of the vulnerable group (pregnant and lactating mothers and children below five years), to overcome the malnutrition and micro nutrient deficiency and other health consequences. Further, it improves the nutritional value chain by means of production, availability and stability.

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