

O/o Dir. P.A.B., M/o W.C.D.  
 Dy. No. 1804  
 Date 27-02-2020

O/o JS (ASC), M/o W.C.D.  
 Dy. No. 2416  
 Date 24/02

secy.wcd@nic.in 3

Email

**Note on Model Nutrition garden**

Secretary, M/o W.C.D.  
 Dy. No. 468039  
 Date 19/2

**From :** Ashok Kumar Singh <aksicar@gmail.com>

Wed, Feb 19, 2020 10:40 AM

**Subject :** Note on Model Nutrition garden

2 attachments

**To :** secy wcd <secy.wcd@nic.in>

Sir,

As desired, kindly find attached herewith a note on Model Nutrition garden and Work done on Nutri Sensitive Agriculture by KVKs of MP and Chhattisgarh

With regards,

**Dr. A.K. Singh**

Deputy Director General (Agricultural Extension)  
 Division of Agricultural Extension  
 Indian Council of Agricultural Research  
 Krishi Anusandhan Bhavan-I, Pusa  
 New Delhi - 110 012 INDIA  
 aksicar@gmail.com  
 09582922324(M)  
 011-25843277(O)

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— **Work done on Nutri Sensitive Agriculture by KVKs of MP and Chhattisgarh.doc**  
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World Bank Project Unit (GPMU)  
 Dy. No. 2974  
 Date 27/2/2020

JS ASC  
 Ms. Mona  
 24/2/20  
 Dir (PAB)

20/2/20  
 C/PI

# NUTRITION GARDEN

ICAR-IIHR, Bengaluru

Fruits and vegetables play an important role in the balanced diet of human beings by providing vital protective nutrients. In order that the requisite quantity and kind of fresh fruits and vegetables are available every day to a family, it is advisable to have nutrition garden to grow them in the premises of the house or near the schools. Best quality of the fresh produce can be had from one's own nutrition garden as the time interval between the harvest and the consumption becomes the least. A diet rich in fruits and vegetables has been shown to prevent cancer, neurological disorders and allergies. Nutrition garden by self can offer fresh and chemical free fruits and vegetables.

**Points to be considered:** The land available within the compound wall of the residential building is quite ideal to layout the garden, though it can be away from the residence. A model nutrition garden generally consists of growing vegetables, fruits, spices and medicinal plants by integrating in most beneficial manner. The size of the garden depends on the area available near the residence, the time available for its care, and requirement of fresh produce of a family.

- Before laying out the nutrition garden, the available area should be properly fenced.
- Vine or trailing type of crops like cucurbits and beans can be trained on the fence.
- Three sides of the fence can be made to trail cucurbits during summer and rainy season, peas in winter and fourth side for perennial beans.
- Preferred shape of the garden is rectangular compared to square ones. Southern and western side of the area is to be reserved for vegetables so that it will be receiving maximum sunlight.
- Northern side is utilized for fruit plants. The bunds created to separate main plots can be used to grow root crops like radish. High and low pergola may be prepared by using bamboo and GI wire to grow crops like spine gourd, snake gourd and other creepers. The area between perennial crops will be used to grow short duration shallow rooted annual vegetables or spices like garlic, green leafy vegetables, coriander.
- While selecting fruit trees, dwarf types with quick yielding capacity has to be selected. One or 2 trees of following fruit crops/perennial crops can be planted in the garden: Papaya, guava, Aonla, Acid lime, banana, West Indian cherry, pineapple, fig, butter fruit, dragon fruit, carambola, passion fruit, drumstick and curry leaf. Other fruit crops, which are of dwarf in nature and develops small/medium canopy and can be included based on preference.
- Some of the medicinal and spice crops like Centella, Doodapatre (Coleus), Chakarmuni, Pudina (Mint), Brahmi (Bacopa), Ginger, Turmeric can to be included in the nutrition garden.

**Following direct seeded vegetables** can be grown in nutrition garden. Their yielding period from sowing date is given in the parenthesis to plan the sowing cycle so that continuous crop can be harvested:

Bhendi (60-100 days)

Beans (45-65 days)

Cowpea (60-90days)

Radish (40-50days)

Carrot (90-100days)

Beetroot (50-60 days)

Knol-khol(60-70days)

Leafy vegetables (40-60 days)

**September to November:** Radish, Garden pea, capsicum, carrot, chilli, tomatoes, lettuce, broccoli, cabbage, watermelon and legumes.

**February to March:** Brinjal, watermelon, musk melon, ash gourds, bitter gourd, ridge gourd, pumpkins and cucumbers.

**June to September:** Bhendi, chilli, legumes, onion, gourds, brinjal and tomato

Leafy vegetables are short duration crops and can be grown in all the seasons.

Perennial vegetables like drumstick, curry leaf and Indian spinach are available throughout the year.

**Following transplanted vegetables** can be taken in the nutrition garden. Their yielding period from the day of transplanting is given in the parenthesis.

Tomato (60-135 days),

Green chillies(60- 150 days),

Brinjal (60-150days),

Cabbage (55-70 days),

Cauliflower (55-65 days).

However, cultivation of vegetables is bound by the season, which needs to be taken care while planning planting schedule.

**Selection of Varieties:**

For better performance select a variety which is resistant or showing field tolerant to important diseases and insects. Also choose varieties according to the season in which they need to be grown based on their performance.

**Tomato:**ArkaRakshak, ArkaSamrat, ArkaAbhed

**Okra:**ArkaAnamika, ArkaAbhay, Arka Nikita

**Brinjal:**ArkaKeshav, ArkaNeelkant, Arka Anand

**Cowpea:**ArkaGarima, ArkaSuman, ArkaMangala

**Dolichosbean:**ArkaSambhram, ArkaVistar

**French Beans:**ArkaKomal, ArkaSuvridha and ArkaAnoop, Arka Arjun

**Chilli:**ArkaMeghana, ArkaHaritha

**Onion:**ArkaKalyan, ArkaNiketan

**Amaranth:**ArkaSamraksha, ArkaArunima

**Palak:**ArkaAnupama;

**Coriander:**ArkaIsha

**Pumpkin:** ArkaSuryamukhi, Chandan,

**Raising seedlings in plastic trays:** Each flat or protray having 98 cells are used for raising seedlings of tomato capsicum/ chilli, brinjal, cauliflower and cabbage. Cocopeat fully fermented by the use of organic manure and enriched with biofertilizers is the ideal media for filling the trays. About 1-1.25 kg coco-peat is required to fill one tray. Seeds are sown in the cavity and sown trays are stalked one over other till sprouting is observed. After sprouting, the trays are spread in nethouse and irrigated daily depending on the weather conditions. The seedlings of 20-25 days old in cabbage, cauliflower, tomato and 30-40 days in chilli, capsicum and brinjal are ideal for transplanting and better crop establishment.

**Crop cultivation:** It is always better to follow organic method of crop cultivation in the nutrition garden or if not possible safe method or Integrated method has to be adopted, relying less on synthetic chemicals for nutrient supply and plant protection. Organic sources for plant nutrition are: Compost, Farmyard Manure, vermi-compost, Coco-peat, Oilcakes like neemcake, green manure crops, Panchagavya, Jeevamrutha, AMC, Bio-fertilizers.

**Organic Pest and Disease management practices:** A combination of practices is necessary, since no single practice is effective for all diseases that threaten production of a given crop.

Some of the plant protection measures that can be followed in organic farming are listed below:

Use of resistant vegetable varieties wherever available, Seed treatment with *Pseudomonas fluorescens* or *Trichoderma harzianum* or *Trichoderma viride* at the rate of 1-2g/100g seeds, Follow crop rotation using at least one legume in a cycle of one year, Keep out weeds which harbor insects and diseases, Irrigate early in the morning to reduce time plants are wet, Remove and dispose of diseased plants, Turn under crop refuse as soon as harvesting is completed, Nursery beds are to be covered with 40 or 50 mesh nylon net cover to prevent insect vectors transmitting virus diseases.

### **Small-scale mushroom unit**

A small scale mushroom unit can also be established which can give about 15 kg mushroom per month

### ***Bio agents and permitted sprays for disease management***

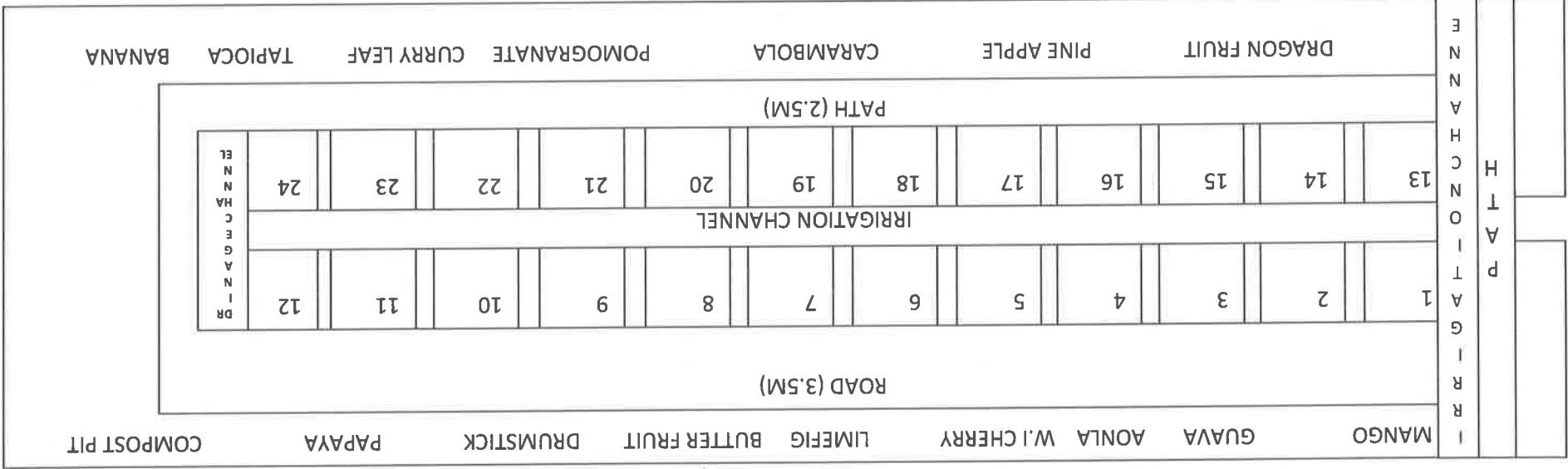
- *Trichoderma harzianum* (10 g/l), *Trichoderma viride*, *Pseudomonas fluorescens* (10 g/l), *Bacillus subtilis* (10 g/l), Control powdery mildew- Sulphur, Control fungal disease - Bordeaux mixture

### ***Bioagents and Botanicals for management of insect pests***

- *Beauveria bassiana* (10 g/l), *Verticillium lecanii* (10 g/l), *Metarrhizium anisopliae* (10 g/l), Neem soap (10 g/l), Neem oil (8ml/l), Neem seed powder Extract (4%), Pongamia oil (8ml/l), Pongamia soap (10g/L), NPV, *Bacillus thuringiensis*, on certain insects such as cabbage worms. Grow trap crops like marigold, mustard and chrysanthemum

One or two compost pits may be dug in the shady corner of the garden to compost all the garden and household wastes. Irrigation can be provided by hand watering, Hose pipe, Water can, Drip/micro System.

**DIMENSION: 37.5mX14.0m: AREA: 525sq.m**



Plot number 1-24 is of the size 5m X2m for growing different seasonal vegetables, medicinal and spice crops

**Layout plan for a small sized nutrition garden**

# **Nutrition Sensitive Agriculture through Nutri-SMART Village in Madhya Pradesh & Chhatisgharh**

## **Background**

Nutrition Sensitive Agriculture (NSA) places nutritionally rich food, dietary diversity and food fortification at household level in the centre for holistic nutritional security of the communities. NSA ensures food production in adequate quantity and quality to meet the dietary requirements of populations in a sustainable manner. The approach also stresses the importance and social significance of the food and agricultural sector for supporting rural livelihoods. The overall objective of NSA is to make the food system better equipped to produce good nutritional outcomes. NSA is envisaged to contribute in improving health outcomes, through production of diverse, safe and nutrient-rich food as well as income generation that can facilitate access to health services, reducing contamination of water sources, and through the application of labour- saving technologies. This goal could be achieved through a novel concept of Nutri SMART Village establishment for building Nutrition Sensitive Agriculture in India.

## **Nutri-SMART Village – a novel concept to address malnutrition**

- Nutri-SMART village (NSV) having planning for secured food availability, meeting nutrient requirement of all households of different age and physical condition for making them nutrition sufficient and healthy citizen.
- This is a scientific approach based on the concept “You grow what you eat”.
- NSV is a crop plan-led nutritional security concept so that the nutritional gap could be reduced by minor adjustment in the dietary plan.
- It advocates the traditional recipe based “Poshan Thali” which will not only remove the deficiency rather will address the social health from chronic diseases.
- NSV is the unique architect for nutrition-sensitive agriculture which could be practiced in Kitchen garden, roof garden for nutrition supplementation. In nutshell, NSV could be considered a “minilab” for showcasing precise nutritional security through using available resources by proper motivation, nutritional literacy & attitudinal change

## 7-Steps for establishment of Nutri-SMART Village

7 steps for establishment OF Nutri-Smart villages are as under:

**Step-1- Pre-assessment of nutritional status of households.**

- A** Anthropometric methods (ICMR & WCD ,Govt of MP)
- B** Biochemical, laboratory methods (ICMR & GoI)
- C** Clinical methods (ICMR & GoI)
- D** Dietary evaluation methods (Nutritionist &ANM,WCD )

**Step-2- Diet survey of Smart village.(Individual food intake survey methods)**

**Method-1**

**Retrospective intakes  
Questionnaire- based**

**Dietary History  
Food- Frequency  
24- hour Recall**

**Method-2**

**Current intakes**

**Dietary Records  
Chemical analysis of  
duplicates**

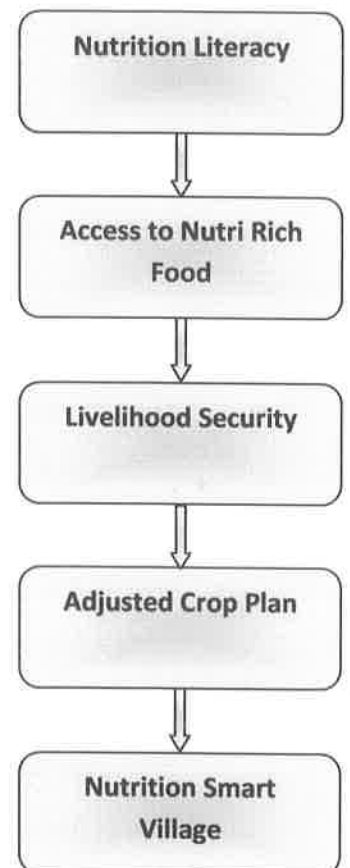
**Step-3- Seven days food diary**

**Step-4- Nutritional requirement of households**

**Step-5- Nutrient Supplementation Sources**

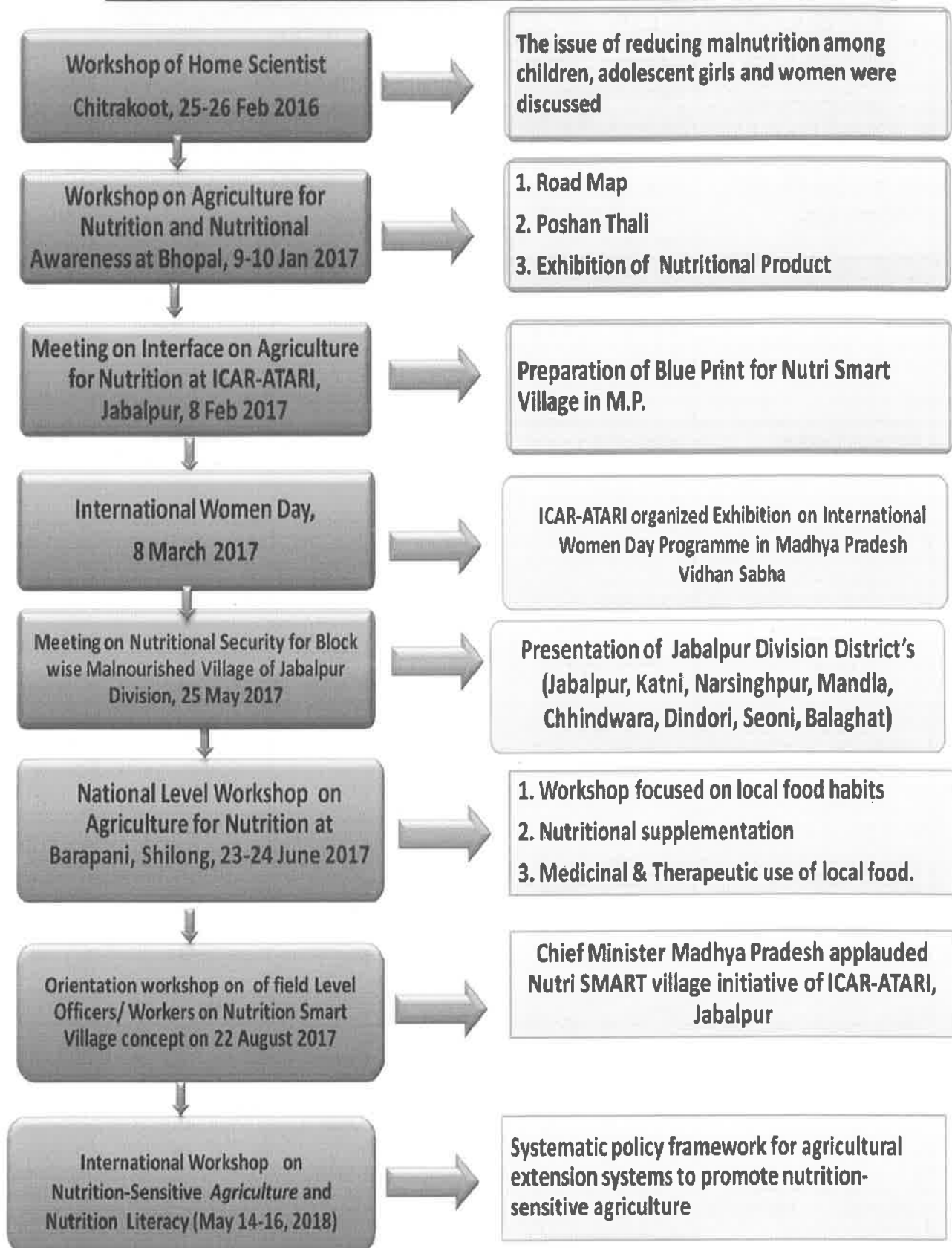
**Step-6- Crop Plan for Nutritional Availability**

**Step-7-Confirmatory assessment of nutritional status of the  
intervened households.**





**Steps to be implemented by ICAR-ATARI, Jabalpur in the collaboration with WCD Department, M.P.**



# Food Diversity in Districts of MP & CG

Agro-Climatic Zone	District	Crops	Local Recipes
<b>Chhattisgarh Plains</b>	Balaghat, Bilaspur, Raipur, Durg, Raigarh, Dhamtari, Janjgir-Champa	Rice, Maize, Gram, Groundnut, Lathyrus	ArbikePattekePatode, MungekiSabji, ChanbalkeLaddu,
<b>North Hills of Chhattisgarh</b>	Shahdol, Umaria, Dindori, Mandla, Anuppur	Paddy, Maize, Jowar, Groundnut, Gram, and Wheat	MahuakiPuri(Sohari), Khurmi, Fara, Thethari, Anarsa
<b>Grid Zone</b>	Guna, Gwalior, Morena, Ashoknaga, Shivpuri, Sheopur, Bhind	Wheat, Pearl millet, Maize, Sorghum, Barley, Green Gram, Black Gram, Red gram, Gram, Pea, Sesame, Mustard, Soybean	BajraTilTikki, BajraMethiPuri, Bajra Roti, BajrekeLaddu, BajrekaHalwa
<b>Kymore Plateau &amp; Satpura Hills</b>	Satna, Sidhi, Singarauli, Seoni, Jabalpur, Katni, Panna, Rewa	Wheat, Maize, Sorghum, Barley, Black Gram, Green Gram, Chickpea, Pigeon pea, Mustard, Soybean, Linseed, Sesame, Forest Crop	MahuakiPuri, AlsiTilkeLaddu, maize(Bhutte) kepakode, Sattu
<b>Vindhya Plateau</b>	Sehore, Bhopal, Raisen, Sagar, Damoh, Vidisha	Wheat, Chickpea, Green gram, Pigeon pea, Soybean, Groundnut, Lentil, Sesame, Sorghum	Dal Bada, Mande, Fara, Dubri, Thopa, Anblekikadhi
<b>Bundelkhand</b>	Datia, Tikamgarh, Chattarpur	Wheat, Barley, Sorghum, Bajra, Lentil, Green Gram, Pea, Soybean	Anwariya, Bafari, Besan Ki Puri, Maheri, Mande, Fara, Anblekikadhi
<b>Malwa Plateau</b>	Indore, Dhar, Dewas, Shajapur, Ujjain, Mandsaur, Ratlam, Rajgarh, Neemach, Agar Malwa	Maize, Barley, Chick Pea, Sorghum, Green Gram, Black Gram, Lentil, Mustard, Soybean, Linseed	Dal Bafra, BhuttekaKees, Poha, Jalebi, Garadukisabji, Butte kevyanjan
<b>Nimar Valley</b>	Khandwa, Khargone, Badwani, Burhanpur	Paddy, Wheat, Sorghum, Maize, Chickpea, Pigeon pea, Black gram Green gram, Soybean, Groundnut Linseed	Dal Dhokli, Dal Bati, Churma, Jowarki roti, AmadikiSabji
<b>Central Narmada Valley</b>	Narsinghpur, Hoshangabad (Bankhedi), Harda	Wheat, Soybean Pigeon pea, Sugarcane, Black Gram	Gannekeraskikheer, Dal Bati, Churma
<b>Satpura Plateau</b>	Chhindwara, Betul	Maize, Jowar, Green Gram, Black Gram	Jowarki roti, Makkaki Roti, Makkeke ante kaUpma

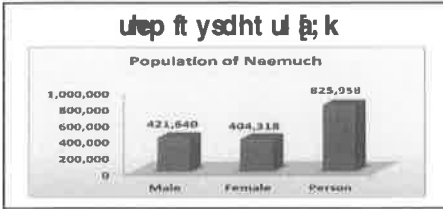
# Roadmap for Nutri-SMART Village of District Neemuch



दक्षिण भारत में जल संकट को दूर करने के लिए प्रयत्न  
 ग्रीन क्राफ्टिंग के माध्यम से



## दक्षिण भारत में जल संकट को दूर करने के लिए प्रयत्न



जल संकट को दूर करने के लिए  
 जल संचयन के माध्यम से  
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### Progress and Impact of Nutri-SMART Village



जल संकट को दूर करने के लिए



## Nutri-SMART Village in Madhya Pradesh and Chhattisgarh

- Total 57 districts covered by KVKs in Nutri smart villages and KVKs working in 57 Nutri smart villages (42 Villages of Madhya Pradesh and 15 villages of Chhattisgarh).
- KVKs are working on different themes for nutritional securities. Total 3129 activities were conducted and 46625 beneficiaries were benefited during last two year-
  - Innovative practices to promote nutrition-sensitive agriculture and food security
  - Value Chain and Village Trade related Issue
  - Improving Maternal and Child Nutrition
  - Nutrition Literacy
  - Capacity development of women institutions/SHGs/FIGs/FPOs

- **Bio-Fortified Crops used for nutritional security**

Crop	Bio Fortified Variety	No of District	No of Village	No of Beneficiaries
Wheat	Poshan Variety- 8663	03	09	42
	HI- 8759 (PusaTejas)	04	04	37
	HI-1605	02	02	22
Paddy	CR-310	02	02	15
Little Millets	JK-8	01	01	10
Maize	HPQM-1	06	12	47
Soybean	NRC-127	01	02	10

- **Nutritional Garden-**

- There is total **1737** Nutri-Gardens established by KVKs during last two year.
- KVKs are promoting the plantation of Drum sticks for mitigation of aneamia in farm family. They promote different varieties of Drum Stick- JKM-2, PKM-1, PKM-2.
- They also promote nutri-rich variety of different vegetables like tomato- Pusa Rohini, Green Pea -VRP-5, Arkil. Potato -Kufri Sindoori etc in nutritional garden.

- **Capacity Building Programme**

- There are **57 KVKs** work on Capacity Building Programme through Training Programmes, Skill development programmes, Workshop etc.
- There are **693 Training programmes** conducted by KVKs and **16930 beneficiaries** benefited.

- **Innovative approach**

- Nutritional garden with "SAAT DIN SAAT KYARI"
- Terrace Garden
- Multi layer Gardening

- **Kisan Mobile Sandesh (KMA)**

- Total **248 messages** related to Nutritional Security, Awareness, House Hold activities, Nutrition Gardening sent to **9.29 lakh beneficiaries** to **45928 villages** in **57 districts** during last two year.

- **Convergence with other Departments/organization**

- KVK heads meeting with district collector in their district to finalize the roadmap for Nutri Smart Village in collaboration with line departments of the district.
- Dept. Women & Child Development, Dept. of Farmer Welfare and Agriculture, Dept. of Animal Husbandry & Fisheries, Dept. of Horticulture, Health department, PHE, Dept. of Panchayat and Rural Development, UNICEF
- Database of 55313 Anganwadi workers of 30 districts are available in KVKs of Madhya Pradesh.



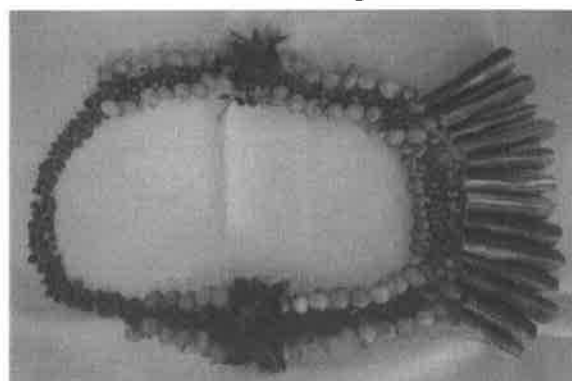
**"SAAT DIN SAAT KYARI"**



**Poshan Rangoli**



**Terrace Garden**



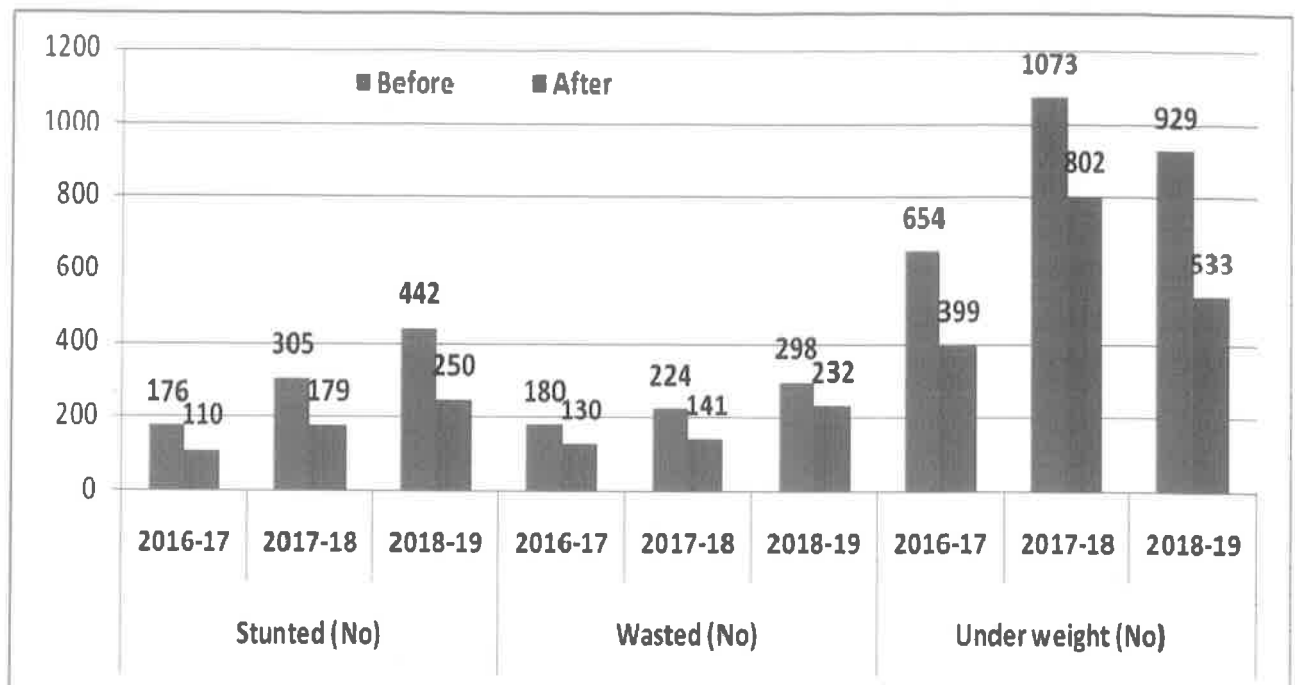
**Poshan Mala**

## **Impact of Nutritional Interventions**

Assessment of nutritional status of 0-5 years children and adolescent girls were carried out by the KVK scientists in collaboration with anganwadi workers of Women and Children Development Dept. before making interventions in the nutria-SMART Villages. After interventions the improvement in the nutritional status in children, adolescent girls and women are presented in subsequent tables.

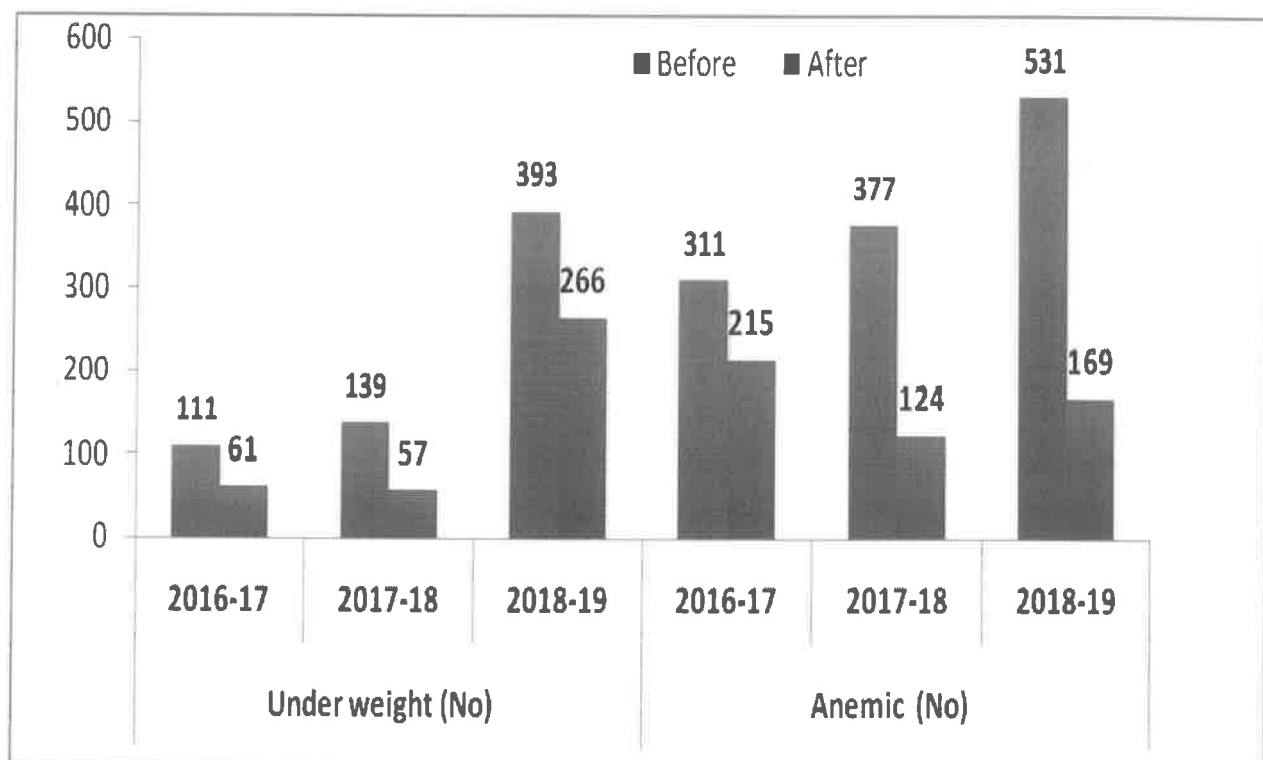
**Table 1: Nutrition Status of children: Before and after interventions**

Year	Malnourished children	Stunted		Wasted		Underweight	
		Before	After	Before	After	Before	After
2016-17	1010	176	110	180	130	654	399
2017-18	1602	305	179	224	141	1073	802
2018-19	1669	442	250	298	232	929	533



**Table 2: Nutrition Status of Adolescent Girls: Before and after interventions**

Year	Malnourished Adolescent Girls	Underweight		Anaemic	
		Before	After	Before	After
2016-17	422	111	61	311	215
2017-18	516	139	57	377	124
2018-19	924	393	266	531	169



## 1. Case Study of KVK Morena

<b>Demonstration of nutritional kitchen garden for nutritional security of farm women and their family members</b>	
<b>Season</b>	Kharif & Rabi 2018-19
<b>No. of trials</b>	30 Farm Women

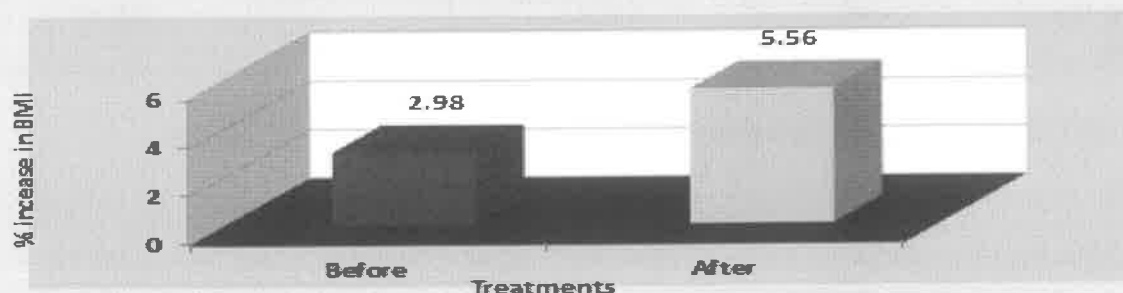
### Parameters

Technology	Yield (kg/unit area)	Per capita Consumption (gm/ day)	% change in Consumption gm/day	% RDA
Farm Women Practice	35-42.5	82	36.92	23.43
Recommended Practice	115-145	130		37.14

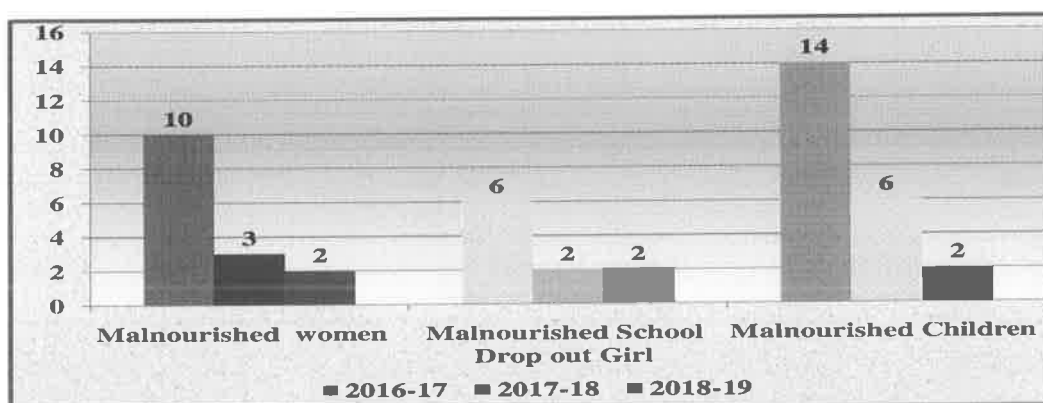
### Indicators

Nutrients	Consumption of nutrients/day		%RDA
	Before	After	
Energy	1897.15	2086.45	2225
Protein	29.45	39.75	50
Calcium	183.6	231.6	400
Iron	19.35	22	28
Vitamin C	12.55	21.5	40

Impact of nutritional garden on farm women



Impact on nutritional status in Model Nutri Smart Village



(Source: Department of Women & Child Development )

## 2. Case Study of KVK Neemach

### Assessment of Porridge (Durum Wheat) for nutritional security of farm women & their children

Details	No of Trails	Performance Indicator / Parameter		Nutrient Intake			
		Name of vegetable /Fruit /Product	Per capita Consumption gm / day	Energy (kcal)	Protein (gm)	Iron (mg)	Calcium (mg)
(FP) T1	05	-	-	-	-	-	-
(RP) T2	05	Porridge (Durum Wheat)	50	169.5	7.0	1.76	17.0

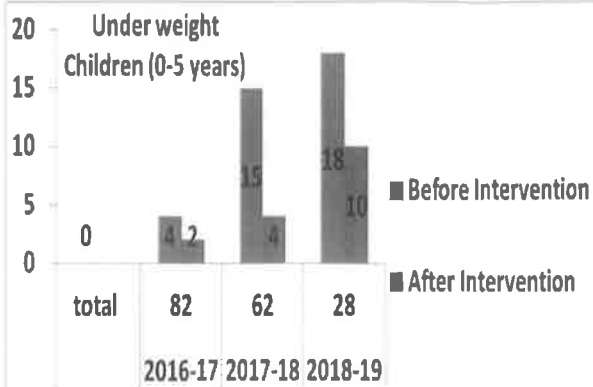
### Impact of Nutrition Garden on Production and Consumption of Vegetables

Technology	Vegetable Yield (Kg/unit area)	Per capita consumption gm/day	% change in consumption gm/day	% RDA
Farmers Practice	50-200	122.60	12.45	36.26
Recommended Practice	70-300	155.65		45.32

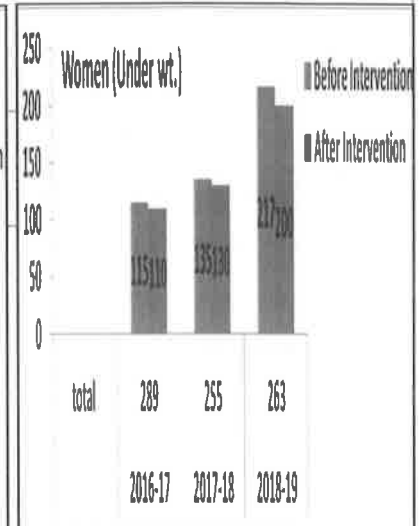
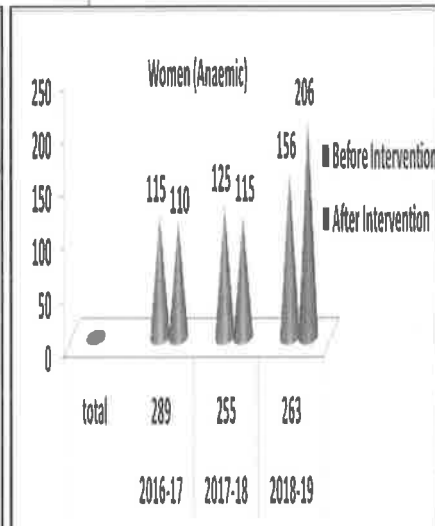
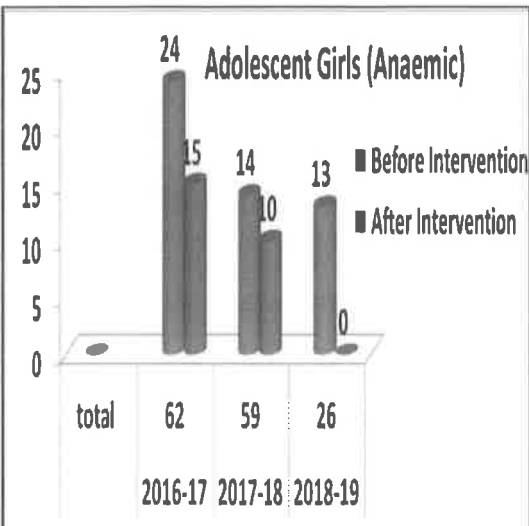
### Impact of Nutrition Garden on Consumption of Nutrients

Nutrients	Consumption of nutrients/day		RDA
	Before	After	
Carbohydrate	130.33	112.53	360
Energy	93.89	88.50	2425
Protein	81.12	84.32	60
Fat	119.48	75.90	20
Calcium	71.31	103.42	400
Iron	38.63	58.57	28
Vitamin A	24.89	74.99	2400





<b>Children (0-5 Yrs) wasted</b>			
Year	total	Before Intervention	After Intervention
2016-17	82	26	26



**Spread of Nutrition Garden in state of Chhattisgarh by KVK Kanker**

- First it was demonstrated at KVK Farm,



- Replicated in 10 Residential Schools



- Replicated in 80 residential schools (Ashram)



- Dissemination in whole district through training, demonstrations.



- Disseminations in whole state