

Scientific Backyard Kitchen Gardening in Hill Regions of Kandhamal for Household Food and Nutritional Security

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Bumper harvest of nutritious vegetables from backyard garden



Backyard kitchen gardening, popularly known as '*bari*' is a food production system by and for household members with emphasis on productivity and sustainability. Home gardens generally refer to the gardens occupying small area located near the residence; contain a high diversity of plants and whose production is supplemental rather than as main source of family consumption or income. The major aims of the backyard kitchen gardening include nutritional security of the family, creating provision for supplementary income, proper utilization of backyard area and enhancing scope of engagement of rural household women in horticultural activities. A multitude of crops presenting a multi-tier canopy configuration makes balanced utilization of environmental resources. The farming system ensures nutrient recycling and bio-mass waste management for improving the livelihood security of farm families. Backyard gardening is a common practices in tribal belt of Kandhamal district of Odisha. Scientific intervention like improved varieties, choice of crop, crop rotation, proper irrigation and drainage facilities, recycling of nutrients by vermicomposting, bee keeping, need based botanical insect-pest, disease and weed control and value addition of surplus produce of backyard garden will ensure household food and nutritional security of tribal families.

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Benefits of backyard kitchen gardening

- Ensures availability of fresh nutritious fruits, vegetables, roots and tubers to meet the balanced nutritional requirement of the farm families.
- Helps in augmentation of family income by sale of excess produce in local market
- Increase in knowledge level of farmers for the cultivation of diverse fruits, vegetables, roots and tuber crops.
- Enhanced participation of rural household women in the agricultural activities.
- Proper utilization of backyard land space leading to clean and healthy environment near the home.
- Reuse and recycle of household waste water and kitchen waste towards cultivation of plants in kitchen garden.
- Augmentation and conservation of biodiversity in the rural homesteads.

Planning of a backyard kitchen garden

- Careful planning is required to develop a productive and useful kitchen garden. The plan and layout of a kitchen garden depend on the availability of land area, labour, sunlight and water.
- Select the crop species according to their water and sunshine requirement.
- Short stature tree crops like papaya, banana, drumstick, curry leaf, etc. should be planted near homestead boundary in such a way that they should not hinder the efficiency of sun loving vegetable crops.
- Vegetables like radish, amaranthus, cabbage, cauliflower, brinjal, tomato, chilli etc. require open sunny space especially morning sun for better growth. Therefore, the vegetable plots should be prepared in eastern side.
- The partially shady area can be used to grow shade loving crops such as elephant foot yam, pine apple, ginger, turmeric, arrowroot etc.
- Creepers and climbing vegetables like bitter gourd, country bean, vine spinach, bottle gourd, cucumber, snake gourd, ridge gourd, pumpkin, ash gourd, spine gourd and yams can be judiciously planted along the fencing or in the beds with raised platforms.

Layout and features of a backyard gardening

Fence

- Farmers can grow live fence or erect barbed wire fence or GI net fence based on their requirement and affordability.
- Creepers and climbing vegetables like bitter gourd, country bean, bottle gourd, cucumber, snake gourd, ridge gourd, pumpkin, ash gourd, spine gourd and yams can be judiciously planted along the fencing.



Creepers and climbing vegetables on the fence

Perennial Plot

- Allot some plots along the fencing at one side at the rear end for perennial plants so that their shade does not affect the growth of other seasonal crops.
- Grow tree crops like custard apple, guava, papaya, banana, lemon, drumstick, curry leaf etc. in the perennial plots.



Plots along the fencing at one side at the rear end for perennial plants

Compost pits or vermicompost units

- Dug manure pits or install one Rhino vermi bed at the corners of the garden at rear end near the perennial plot.
- Use all available organic waste like crop residues, kitchen wastes, livestock wastes, weeds and farm generated organic waste for making compost.
- Snake gourd, ridge gourd, pumpkin, bottle gourd etc. can be grown near the pits and trained on trellis or pandals erected above the compost pit.



Low cost vermicompost unit

Paths and irrigation channels

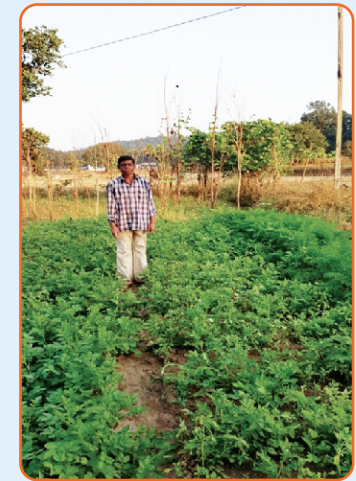
- Develop paths and irrigation channels in such a manner that they reach each part of the garden.
- Grow short duration crops like radish, palak, onion, coriander etc. along the paths and irrigation channels.

Seasonal plot

- After allocating land for the above features, the rest of the area can be divided into 10-15 beds for seasonal vegetable and/or field crops.

Cropping pattern and crop rotation in seasonal plots

- Grow more than one crop in a bed in a year in succession for judicious utilization of land, labour, nutrients, water and other natural resources.
- Vegetables may be sown or planted at different dates, preferably short duration crops first and later the long duration crops so as to ensure regular supply of vegetables.
- Select the vegetables according to season, choice of the family members and local market demand.
- Follow crop rotation to maintain the soil health.



Growing vegetables like okra, potato, raddish and carrots in seasonal plots

Recommended fruits, vegetables and tuber crops for backyard garden

Crop	Season/Sowing time	Method of planting	Popular varieties	Duration (days)	Spacing (in cm)
Vegetables					
Bhindi	Throughout the year	Dibbling	Arka Anamika	90-110	60x30
Amaranthus	April-July	Broadcasting	Utikal Mayuri	25-30	-
Palak	Oct-Dec	Line sowing	Arka Anupama	75-80	20x10
Garden pea	Oct-Nov	Line sowing	Arka priya, Arka Samporna, Arka karthik	90	45x30
Brinjal	June-July Sept-Oct	Transplanting	Arka kusumkar Arka Ananda Utikal Tarini	160-165	75x60
Chilli	June-July Sept-Oct	Transplanting	Arka Meghana Surajmukhi Utikal Abha	210-240	45x30
Capsicum	Sept-Oct	Transplanting	Arka mohini California wonder	150-160	45x45
Cabbage	Sept-Nov	Transplanting	Golden Arc Pride of India	105-120	60x45
Cauliflower	Sept-Nov	Transplanting	Pusa early synthetic Pusa katki Pusa Sharada	90-105	60x45
Carrots	Oct-Nov	Dibbling	Pusa Kesar, Pusa Rudhir	120	30x15
Radish	June-July Oct-Nov	Dibbling	Pusa Desi, Pusa Chetaki	100	30x15
Tomato	June-July Oct-Nov	Transplanting	Arka Rakshak Utikal Kumari	135-150	60x60
French bean	Sept-Nov	sowing	Arka komal Contender	90-100	45x20
Pumpkin	June-July April-May	sowing	Arka Suryamukhi	135-180	250x200
Ridge gourd	June-July April-May	Sowing in the pits along the fence	Utikal Trupti Pusa Nasdar	125	100-150
Bitter gourd	June-July April-May	Sowing in the pits along the fence	Pusa Domausami	140-150	100-150
Bottle gourd	June-July April-May	Sowing in the pits along the fence	Kashi bahar Arka bahar	135	100-150
Cucumber	June-July Feb-March	Sowing in the pits along the fence	Pusa Sanyog Japanese long green	120	60

Ash gourd	June-July	Sowing in the pits along the fence	Kashi Dhawal Kashi Ujjwal	140-150	300
Dolichos bean	Aug-Sept	Sowing in the pits along the fence	Arka jay	90-120	60
Onion	Sept-Oct	Transplanting	Agri Found Red Arka Bheem	145-150	30x10
Garlic	Oct-Nov	Dibbling	Agri Found White	9-100	15x10
Yard bean	June-July Sept-Oct	Sowing	Arka mangla	90-105	45x30
Cowpea	June-July April-May	Sowing	Arka Garima Utkal Manika	55-80	45x15
Tuber crops					
Greater yam	May-June	Tuber in pits	Odisha elite, Sree Kirthi, Hatikhoja	210-240	90x90
Elephant foot yam	May-June	Tuber in pits	Gajendra	180-210	90x90
Colocassia	May-June	Tuber in furrows	Muktakeshi, Telia, Topi, Sankhasaru	150-180	60x45
Sweet potato	July-August	Vine cutting	Gouri, Saurin, Kalinga, Gautam, Bhu-Sona,	110-120	60x20
Yam bean	Aug-Sept	Sowing	Rajendra Misirikanda	90	45x30
Potato	Oct-Nov	Tuber in ridges	Kufri Khyti, Kufri Lalima, Kufri Jyoti	70-90	50x20
Tree crops					
Drumstick	June-July	Limb cutting	PKM1, Co1, Local	Perennial	400
Castard apple	June-July	Grafts	Arka Sahar	Perennial	500
Guava	June-July	Gotte	Alhabad Safeda, Arka Rashmi	Perennial	500
Banana	June-July	Suckers	Banthala, Batisha, Champa, Pat Kapura	Perennial	150
Lemon	June-July	Gotte	Seedless lime	Perennial	400
Mango	June-July	Grafts	Amrapalli, Mallika, Baiganpalli	Perennial	500
Papaya	June-July	Seedlings	Red Lady, Pusa Nanha	Perennial	150

Integrated Crop Management

- Use quality seed and do seed treatment with suitable bio-formulations.
- Use well decomposed compost, FYM, oil cakes and vermicompost to meet the nutrient requirement of the crop.
- Go for organic residue mulching with the help of dry crop residues available in the farm site.
- Rotate the crops with leguminous crops to maintain soil health.
- Keep the crop free from weeds by using finger weeder at the early stage of crop growth.
- Use botanicals or bio-pesticides for need based insect-pest and disease control.



Sweet potato for multiple uses and mulching for better weed and water management in potato

Harvesting, consumption and marketing

- Harvest the produce in the backyard as per the daily requirements of the family.
- The surplus produce can be harvested at appropriate stage and sold out in the local market to fetch some additional income.
- Some vegetables can be utilized for value addition like jam, jelly, sauce, pickles and chips.

Some important criteria's to be taken care for backyard gardening

- Fruit plants and vegetable crops such as drumstick & curry leaf can be planted during monsoon (June-July) only.
- In case of fruit plants, the grafts/ seedlings can be procured from a reliable source and planted directly in their permanent positions.
- For vegetable crops like tomato, brinjal, chilli, cabbage, cauliflower, onion, it is required to raise the seedlings in homestead nursery.
- It is desirable to harden the vegetable seedlings before transplanting by withholding watering for last 2-3 days.

Table 2: optimum age of seedlings (days) suitable for transplanting

Brinjal	30-35
Tomato	25-30
Chilli	40-45
Onion	40-45
Cabbage	30-35
Cauliflower	30-35
Cucurbits (if polythene raised seedling)	25-30
Drumstick (annual drumstick PKM-1)	30-40

