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Nutri-garden for Combating Malnutrition and Climate Change

S. Priyadarsani, A.K. Nayak, R.Tripathi, Mohammad Shahid, S. Mohanty, S. Saha, B.B. Panda,
S.D. Mohapatra, D.R. Sarangi, Vijayakumar S, K. C. Maharana, M. Rajak,
Udaya Sekhar Nagothu and H. Pathak



भाकृअनुप-राष्ट्रीय चावल अनुसंधान संस्थान
ICAR - National Rice Research Institute, Cuttack



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Introduction

Nutri-garden acts as a single window for staying healthy, reducing environmental pollution, building community and enriching oneself with ocean of knowledge. Besides, it acts as a great measure to combat the effect of climate change by reducing the carbon emissions from the food waste, use of fertilizers, etc. Nutri-gardening gives a real sense of appreciation when you can see the bounty of your efforts.

Fruits and vegetables from nutri-garden are rich source of nutrients such as phytochemicals, antioxidants, vitamin C, vitamin A and folate as compared to the ones that have travelled several thousands miles to reach our plate. Moreover, this helps in reducing the amount of pesticides that is used in the commercial production of the produce which helps in protecting the soil health. Produce peels and waste can create a lot of green waste and takes up a lot of space in the garbage can. If recycled at the point of origin will form a good compost which is less expensive than buying fertilizers. Gardening may vitalize many new interests to learn more about botany, landscape architecture, photography, nutrition, and farmer's markets. This has immense potential to turn unsightly lands into attractive landscapes and earn money too.

Why Nutri-garden?

1. Indian diets are highly deficient in micronutrient
2. It is highly monotonous (cereal and potato centric)
3. Filthy surroundings are a common site

Hence, nutri-gardens may be regarded as a simple but innovative option to:

- Bridge the gap between the available resources and its utilization in a sustainable manner.
- Address issues like malnutrition
- Create additional revenue-generating opportunities for farmer communities, especially women
- Introduce healthy eating practices.

These nutri-garden plants selected for the target area include drumstick, lime, bael, mango, aonla, guava etc. that will ensure the nutritional security of the households in an environmental friendly way.

DRUMSTICK

The Moringa or Drumstick tree (aka Munaga, Muruggai, Muranka) is perennial, erect, slender, medium-sized with many arching branches. It has drumstick-like fruits, small white flowers and small and tear-drop shaped round leaves, which are cooked and eaten as vegetable.

Planting and care

- Soils types: loamy, sandy loam soils.
- Propagation: seed and branches.
- Pits measurement: 1ft x 1ft x 1ft at a distance of 2.5 m (summer months).
- Pits are filled with 2 kg FYM and soil.

Use

Preparations of fresh drumstick fruit, Drumstick powder, Moringa oil, Moringa seed, Moringa leaf powder, Moringa leaf, Moringa pickle, Moringa tea powder, Moringa fruit powder, Moringa seed kernel, Moringa cake powder and Moringa root, etc.

- To prepare a pulse preparation called sambar.
- Tender drumstick leaves, finely chopped, make an excellent garnish for any vegetable dishes, dals, sambars, salads.



Nutritional Information

- Richer content of Vitamin B and Vitamin C in drumstick leaves of 423 mg/ 100 gm and 220 mg/ 100gm can be a suitable protocol for dietary diversification planning.
- Store house of polyphenols as well as Calcium, Iron, folic acid, Riboflavin, vitamin C and beta-carotene.

LIME/LEMON

A lime is a citrus fruit, which is typically round, green in color, 3–6 centimetres (1.2–2.4 in) in diameter, and contains acidic juice vesicles. In India, citrus is cultivated over an area of near about 923.2 thousand hectares with an estimated production of 8607.7 thousand metric tonnes.

Planting and care:

- Take a lemon tree that is 2-3 years old and plant it in another pot or container.
- 8-12 hours of sunlight every day.
- While planting the plant, water the tree immediately and water it almost every day.
- Adequate drainage holes.
- In late winter, before the surge of growth, cut back some shoots to help shape the plant, and pinch out the tips of very vigorous growth.





Use:

- Lime is mostly consumed fresh.



- The ripe ones are consumed as fresh for dessert along with some ready to drink products such as squashes, juices, syrup, nectar, jam and jellies.
- The mango kernel flour is also used as a part of the wheat flour for making bakery products.



Nutritional information

- For 100 gm of mango, Calories- 60, Total fat- 0.4 g. Sodium -1 mg, Cholesterol- 0 mg, Potassium- 168 mg, Total carbohydrate- 15 g, Protein- 0.8 g.

AONLA/AMLA

Planting and care:

- Seedlings, grafts and buddings are used for planting.
- Amla is a subtropical plant and prefers dry climate.
- It is a hardy plant and can be grown in variable soil conditions.
- The crop can tolerate salinity and alkalinity. Planting is done during July-August with a spacing of 6 m x 6 m in pits of 1m x 1m or 1.25 m x 1.25m.
- No irrigation is required during rainy and winter season.
- Drip irrigation is appropriate which can save water up to 40-45%. The crop yields about 100 kg/tree annually.

Use:



- This herb can be eaten fresh, cooked or dried and put into capsules.
- It can be made into various value added products such as candies, amla powder, amla juice, pickles, amla murabba etc. which can fetch very high economic return in the Indian markets.



Nutritional information:

- For 100 g of fresh amla, Moisture 81.8%, Minerals 0.5 mg, Fiber 3.4%, Proteins 0.5%, Carbohydrates 13.7g, Calcium 50%, Iron 1.2 mg, Vitamin 600 mg, Energy 58 Kcal.

BAEL

Bael, the domestic fruit tree of India known as Bengal quince/Indian quince/golden apple/holy fruit/ stone apple is a deciduous tree with 6-8 meters in height with greenish white and sweet scented flowers with oblong and pyriform shaped fruits.

Planting and care:

- Plantation: Good sandy loam soil, sunny condition, warm humid climate with soil pH ranging from 5 to 8.
- Propagation through patch or ring budding as well as through seeds.
- Time of sowing of the seedlings is February to March or July to August.
- Budded planting distance of 8 m x 8 m and seedlings planted at a distance of 10 m x 10 m.



- Pits size, 90 cm x 90 cm x 90 cm and the blend of garden soil and 25 kg FYM, 1 kg of Neem oil cake and 1 kg of bone dust is filled in the dug.
- Fruiting period: 6 to 7 years after transplantation.
- Harvesting time: month of January when fruits start giving yellowish-green appearance.

Use:

- Bael fruit is mostly used as a fruit drink in the form of squash, nectar, RTS (Ready To Serve), etc.
- It is also available in other forms such as candy, toffee, pulp powder, and other eatable products.
- Bael extract oil has various medicinal properties.
- The roots, bark of the bael plant can be utilised as they constitute abundant health benefits.

Nutritional information:

- 100 gm of wood apple provides around 150 calories.

- This fruit is rich in dietary fiber, carbohydrate, fats and protein.
- Minerals like calcium, phosphorous, iron are present in it.



CAPSICUM

Planting and care :

- Capsicum requires well drained loamy soil rich in organic matter.
- Sowing period: September to February.
- Before growing in the main field, nursery raising is being done with the treated seeds in the bed with a spacing of 2.5 cm and then covered with top soil and paddy straw.
- On 20th day of sowing, 300 g of carbofuran 3G granules have to be applied in between the seedling lines across the bed, the soil has to be stirred and then the beds are irrigated.
- For transplanting the 40-45 days old seedlings onto the main field, ridges and furrows are made 45 or 60 cm apart with seedling spacing of 30 cm.
- Irrigation is carried out on 10 days interval and specific cultural practices are also being carried out. Harvest fully matured green fruits before ripening.
- Yield: 15 tonnes/ha in 150-160 days.



Use :

- Capsicum fruits and peppers can be eaten raw as salads or cooked in mixed dishes.
- They are suitable for stuffing with fillings such as cheese, meat, or rice.
- It is also used as very high value ready to eat products such as sauces, jams, powder, flakes etc.
- They are also frequently used both chopped and raw in salads, or cooked in stir-fries or other mixed dishes.
- They can be sliced into strips and fried, roasted whole or in pieces, or chopped and incorporated into salsas or other sauces, of which they are often a main ingredient.





- Pickled or marinated peppers are frequently added to sandwiches or salads.
- Frozen peppers are used in stews, soups, and salsas.
- Extracts can be made and incorporated into hot sauces.
- Additionally, dried bell pepper powder is also used as a food colorant in some bakery products.

Nutritional information:

- Bell peppers are 94% water, 5% carbohydrates, and negligible fat and protein.
- They are rich sources of vitamin C, containing 97% of the Daily Value (DV) in a 100 gm reference amount.
- Red bell peppers have more vitamin C content than green bell peppers.
- The vitamin B6 content of a bell pepper is moderate (17% DV), with many other micronutrients present such as calcium, potassium, sodium etc.



Published by :

Director

ICAR-National Rice Research Institute, Cuttack-753006, Odisha

Phone : 91-671-2367768-783 (EPABX); Fax : 91-671-2367663

Email : director.nrri@icar.gov.in, crrictc@nic.in; Website : <http://www.icar-nrri.in>