# VEGETABLE CULTIVATION

## INTRODUCTION

Goa is bestowed with agro-climatic conditions that are best suited for tropical vegetables. About 7500 ha of area is cultivated under vegetable crops in the State. The local production of vegetables meet a meagre part of the State. The State's production of vegetables is about 65,000 tonnes, while the combined demand for domestic and the tourist population is estimated to be 1,50,000 tonnes. This shows the vast demand for vegetable cultivation in the State. However, the State's vegetable production has not made much headway in the production of some popular vegetables, mainly due to climate, dominated by heavy rains, high cost of labour, and lower productivity of some of the vegetables. The cultivation scenario could be changed by proper planning of cultivation, use of high yielding varieties, and proper nutrient supplementation to the crops. Vegetable crops in Rabi season needs adequate and assured water and quick means of transport for success. Various incentives are available with the Government for cultivation of vegetables. If facilities exist and proper crop plan is worked out, the vegetables described below could be tried for commercial success in Goa.

## 1. CABBAGE : Local Name – KOBI

This is a winter season vegetable in Goa. The thick overlapping, smooth leaves covering terminal bud is known as 'Head'. The 'Head' differs in size, shape and colour.

## VARIETIES

I. **Golden Acre :** The variety is early with uniform solid round heads. Head is clear white.

ii. **Pride of India:** Early duration round-headed variety, each head weighs 1-1.5 kg.

Several seed companies have their own varieties with excellent performance. These companies have developed several hybrid varieties with high productivity and marketability.

**SEED AND SOWING :** The cabbage is cultivated as winter season crop. Seedlings can be planted from October to January in Goa. About 50-75 gms of

seeds are required per 1000 $m^2$ area. The seedlings should be raised in the nursery bed. They get ready for transplanting after 4-6 weeks after sowing. To avoid damage by occasional rain in September/October in Goa, the seedlings could be protected by raising them under polyhouse condition. The seedlings are ready for transplanting, when they have 3 to 4 leaves.

The land for planting is prepared by ploughing 2-3 times. The seedlings could be planted in lines at spacing of 45-60 x 45-60 cms. Closer spacing should be adopted for short duration varieties. While broader spacing should be observed for long duration varieties. Transplanting should be done preferably in the evening. Cabbage is planted in flat beds of 1 mt. width upto 10 mt. in length.

**MANURES AND FERTILIZERS:** Like most of the vegetables, cabbage is heavy feeder and grows best in soils which are enriched. 3-5 tons of organic manure like compost should be added to the soil 2 weeks before planting. The compost should be mixed well with the soil by ploughing. The fertilizers are needed to boost the growth. First dose of 30 kg. of 10:26:26 for 1000$m^2$ could be applied to the soil at the time planting. Second dose of 6-8 kgs. of urea could be given as top dressing, after one month of planting. 40 kg. of 15:15:15 or 19:19:19 with 2 kg of urea for top dressing could also be applied instead of 10:26:26.

**OTHER CARE :** The vegetable requires frequent irrigation for the growth. The water should not stagnate in the field. First irrigation should be given immediately after transplanting. The irrigation interval between two applications should be one day and could be extended to once in two days, if the soil has sufficient moisture holding capacity. Heavy watering should be avoided at the time of maturity of the heads. A shallow hoeing could be done to loosen the soil and to remove weeds. Earthling up should be done after one month of planting to support the growing plants.

**HARVESTING :** The heads start forming after about one and half month by curling of the leaves. The heads are harvested when they are about 3 months and full size. If they are not harvested in time, they burst or loosen leaving them unfit for marketing. The early varieties get ready for harvest within 70-90 days, while long duration varieties take about 100-120 days to get ready for harvest. About 850 kgs. of heads would be harvested from 1000 $m^2$ of area.

## 2. KNOL KHOL : Local Name - GADDO, NABH.

This is winter growing vegetable in Goa, which is rich in minerals like calcium, magnesium, phosphorus, sulphur, sodium. The stem of this vegetable gets swollen above the ground which is used as vegetable.

**VARIETIES :**

i. **Early White Vienna :** This is leading variety with green leaves, light green and smooth stem knob. The flesh is creamy white, with delicate flavour.

ii. **Purple Vienna :** The stem knob is purplish externally and greenish white inside. The leaves have purple petiole and midrib.

Other varieties of Knol Khol are King of North and White Vienna.

**SEED AND SOWING :** Knol Khol is planted through seedlings. Seedlings can be planted from October to February in Goa. About 100 gms. of seeds are sufficient to cover 1000 $m^2$ of area. The seedlings could be raised in nursery beds from August to January. Well-grown seedlings of 4-5 leaves are selected for planting. The planting should be done on flat beds like for cabbage at a spacing of 30 cms x 30 cms. Planting should be done preferably in the evening and should be immediately followed with irrigation.

**MANURES AND FERTILIZERS :** Knol Khol grows best in soils, which are rich in nutrients with plenty of organic matter. About 3-5 tons of organic manures should be added to the soil two weeks before planting. The manure could be thoroughly mixed with the soil by two-three diggings. Like in cabbage 30 kg. of 10:26:26 or 40 kg of 15:15:15 or 19:19:19 could be applied at the time of planting. Top dressing with urea @ 5 kg where 10:26:26 is used and 3 kg where 15:15:15 is used should be adopted. The fertilizer should be applied in a band along the row 15 cms away from the plant.

**Other Care :** Shallow inter cultivation done occasionally helps in better aeration to roots and control the weeds. Slight earthing up also helps in better support to the plants. The regular irrigation is a must for proper development of the stem knobs. Too much water may result in root rot and should therefore be avoided.

**Harvesting :** The Knol Khol is harvested when the enlargement of the stem attains marketable size of 6-10 cms diameter, when they are tender and before turning fibrous. Two to three harvests could be done in a week, which would avoid the stem knob from getting fibrous. The Knol Khol is harvested by uprooting the root portion is cut off keeping tender leaves intact. About 800-850 kgs of Knol Khol could be harvested from 1000 $m^2$ area.

**Diseases and Pests of Cabbage/Knol Khol :**

**i. Damping off :** This disease is seen in early stages of growth, mostly in seedlings in nursery. The seedlings rot at the collar region and die. Drenching of the nursery beds with 1% copper oxychloride solution, two weeks before sowing of the seeds could control the disease. Trichogramma biocontrol agent can also be used for seed treatment before sowing. Avoid water stagnation in nursery.

**ii. Blackrot :** The margin of leaves turn yellow. The veins become dark and main stem becomes discoloured. The disease could be avoided by proper crop rotations and spraying 0.01% agrimycin.

**iii. Mustard Sawfly :** The pest is a minute black fly that lay eggs inside leaf tissues. Caterpillars feed on leaves and seedlings. Spraying ecofriendly neem based pesticide can control the pest. Malathion 0.02% can also be used to control this pest.

**iv. Aphids :** Greenish or black aphids damage leaves by sucking cell sap from them. The affected leaves get curled and plants die. The pest can be controlled by 0.02% D.D.V.P. or malathion.

**3. RADISH : Local Name - MULO**

Radish is a root vegetable, rich in vitamin A, B and C. This vegetable has also medicinal properties. It can be also grown in monsoon in Goa by giving adequate protection.

**VARIETIES :**

**i. Japanese white long :** The variety is of 50 days duration. The roots are uniformly white and 25-30 cms long. They are cylindrical, smooth and mildly pungent.

**ii. Pusa Himani :** This variety is of 60-65 days duration and grows in winter. The roots are stout and about 30 cms in length.

**iii. Arka Nishant :** This variety matures in 45-50 days. The roots are medium sized about 25 cms long, white and crisp. They are pleasant in smell and free from early bolting and pithiness.

iv. **Pusa Reshmi :** The roots are white, tapering and medium.

v. **Local types :** The roots are short and tapering. Medium pungency and short duration of 40-45 days.

**SEED AND SOWING :** About 800 gms of seed is required per 1000$m^2$ area. The seed is sown directly in the field 1-1.5 cm deep on the ridges. Raised beds can also be used for planting radish. The spacing between two ridges is about 30-35 cms, while 15 cms distance is allowed between two plants in a row.

The soil should be thoroughly prepared for better growth of the roots. The loose soil also helps in easy uprooting of the radish for harvesting. The sowing can be done any time between October to February.

**Manures and fertilizers:** About 3-4 tons of organic manure should be added to soil at the time of digging. The organic manure should be incorporated atleast about 8 days before seed sowing. The fertilizer like 19:19:19 or 15:15:15 should be applied at the time of sowing @ of 40-50 kg per 1000 $m^2$. The fertilizer could be applied in furrows between two rows in flat beds. Top dressing with urea could be done when roots just start forming. 8 kgs of urea could be used for this purpose.

**Other Care :** Regular irrigation is must for radish. The irrigation can be given when leaves start drooping. Too much water may lead to infection and rotting of the roots. Mild earthing up also helps in better growth of the roots, if done during the roof formation stage. Earthing up also helps in preventing discolouration of the roots due to exposure to sun.

**Harvesting:** Radish are harvested when the roots are just tender before fibre development. Delay in harvesting may result in pith formation of the roots and make crop unsuitable for market. Radish is harvested after about 40-45 days of planting, depending upon the varieties. The yield in radish is fairly high and about 1.5 - 3 tons of radish can be harvested per 1000 $m^2$ area.

**Pests :**

i. **Aphids :** Soft bodied green insects are found on the lower side of the leaves, which suck the cell sap. This result in stunted appearance to the plants and poor leaves formation. Spraying of Dichlorvos (1.5ml per litre of water) or neem based pesticides helps in controlling this pest. No spraying should be done within 15 days before harvest.

**ii. Semi looper :** This green caterpillar eat away the leaves when they are tender. The growth of the plant gets affected. This pest can be controlled by DDVP or neem based pesticides as in aphids.

No diseases are noticed to cause severe damage except root rot which can be avoided by proper drainage, proper aeration of the soil and judicious use of irrigation water.

## 4. BRINJAL : Local Name - VAINGIN

It is one of the most popular vegetables of Goa, which can be grown throughout the year.

**VARIETIES :**

**i. Agasaim local :** The fruits are oblong and light purple in colour with grey violet streaks near calyx. It is very popular all over the State.

**ii. Agasaim round :** The fruits are round in shape with deep purple colour.

**iii. Hybrid Varieties :** Several hybrid varieties have been developed by seed companies. These varieties are heavy yielder and have good marketable qualities.

**SEED AND SOWING :** The brinjal is cultivated by transplanting the raised seedlings. About 40-45 gms of seed is sufficient to cover 1000 $m^2$ area. The seeds are sown on raised beds or in seed pans. They are transplanted when they are about 15 cms tall after about 30-35 days of sowing. The seed should be treated with carbendazin and sown about 1 cm deep. The rows of seeds should be 10 cms apart. The seedlings are transplanted at a spacing of 75 x 60 cms.

**MANURES AND FERTILIZERS :** The brinjal requires about 70 kg of 19:19:19 per 1000$m^2$, besides about 3-4 tons of compost. The compost should be incorporated in the soil before transplanting. The fertilizer should be applied in 3 split doses at the time of planting and at the end of the 1st and 2nd month.

**OTHER CARE :** Timely irrigation at interval of two days and regular tilling of soil should be taken up for good growth of the crop.

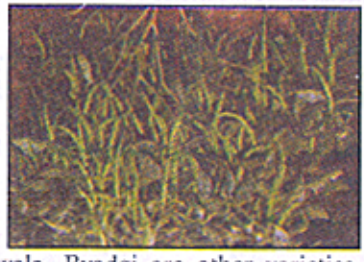
**HARVESTING :** The fruits are harvested when they attain maximum size and colour. The fruit should be harvested before they start loosing their lustre.

About 2 tons of brinjal could be harvested from 1000 $m^2$ area. The harvesting cycle continues for about 3-4 months.

## 5. CHILLIES : Local Name - MIRSANG

Chillies are used to add pungency to the food. The pungency is due to a substance called capsaicin. Chillies can be grown in any time of the year, but best time for transplanting chillies in Goa is February and June.

### VARIETIES :



Locally different strains of chillies are cultivated. However, khola chillies of Canacona dominate in the market, especially for its pungency and colour. Aldona chillies are also important. A variety of hybrid types have been developed by different companies which are high yielder, and have the specific use for colour, pungency, drying green chillies, etc. Konkan Kirti, Pusa Jwala, Byadgi are other varieties.

**Seed and Sowing :** Chillies are planted through seedlings. About 50 gms of seeds are required to plant 1000 $m^2$ of area. Seeds are sown on raised seedbeds and are transplanted after about 1-1½ month. About 8 x 1mt. seedbed is required for raising the seedlings for 1000 $m^2$. Apply 30 kgs of compost to the soil for good growth. The seedlings are planted at a spacing of 50 x 60 cms in well prepared field.

**Manures and Fertilizers :** The soil should be enriched with 2-5 tons of compost for 1000 $m^2$ area, thoroughly mixed with the soil before planting. 50 kg of 19:19:19 or 15:15:15 should be applied in two doses at the time of planting and at the end of the month. 15 kgs of Urea should be applied for top dressing one and half month after planting.

**Other Care:** Chillies should be irrigated in case of failure of rain or in dry season. Proper soil moisture helps in better retention of flowers and fruits. Mulching should be practicsed for water conservation.

**Harvesting :** Chillies can be harvested when green or could be allowed to ripen for making dry chillies. About 1000 kg of green chillies could be obtained from 1000$m^2$ under rainfed condition while 1500 kgs could be harvested under irrigated condition.

## DISEASES AND PESTS OF BRINJAL/CHILLIES :

**Leaf Curl :** This is more prominent in chillies. The leaves curl upward, they get wrinkled and reduced in size. Plant becomes stunted. The disease is caused by virus and could be prevented by regular spraying of neem based pesticide.

**White Fly/Thrips :** These are small insects which feed on underside of leaves in large numbers. They suck the sap and leaves curl. Plants remain stunted. The insects could be controlled by spraying monocrotophos 1.5 ml in one litre of water. The curly shoots could also be pruned in such cases.

## 6. BITTER GOURD : Local Name - KARATIN

Bitter gourd is extensively cultivated for its bitter, ridged and warty fruits. It is good against rheumatism and diabetes. The crop is generally grown in monsoon but could be also grown in summer if proper irrigation is provided.

## VARIETIES :

Besides the local varieties, Coimbatore long which is whitish green and heavy bearing can be grown in rainy season. Arka harit is smoother variety with less seeds and medium sized dark green fruits. Other hybrid varieties developed by seed companies are heavy yielder and have good marketable qualities. The fruits are large and attractive green in colour with spines.

**Seed and Sowing :** About 500 gms of seed is required for 1000$m^2$ area. 3-4 seeds are dibbled on mounds in monsoon or in basins in summer at a spacing of 1.5 mt. x 1.5 mt. The seedlings are allowed to be trailed on bower of bamboo or other material.

**Manures and Fertilizers :** About 5 kgs of compost should be incorporated in each mound or basin before planting of the seed. 100 gms of 19:19:19 or 15:15:15 should also be added to each hill at the time of sowing. About 25 gms of urea should be applied to the plant before flowering and after about 25 days of planting.

**Other Care :** Irrigation is required in dry spell. The plants can be mulched to avoid water stress. Proper prophylactic measures should be take to avoid problems of the pests. Fruits fly lure traps should be kept to reduce fruit fly infestation.

**Harvesting :** Harvesting should be done when fruits are tender and seeds are soft. Fruits upon ripening turn unfit for vegetable. About 900-1000 kgs of fruits can be harvested from 1000$m^2$ area.

## 7. RIDGE GOURD : Local Name - GHOSALI, DODGIM

Ridge gourd is the most popular variety of vegetable in South India and is easiest to grow among the gourds. It is common vegetable in Kharif and can also be grown in summer.

### VARIETIES:

**i. Coimbatore-1 :** The fruits are 60-70 cms long and weigh about 300-400 gms each. It takes about 60-70 days to get the first picking and plant survives for 125 days.

**ii. Jaipur :** The fruits are medium size with well defined ridges. The crop gets ready for harvest after 3 months.

**iii. Hybrid:** These varieties developed by seed companies are vigorous in growth. Fruits are uniform, bright green, firm with attractive stripes and suitable for long transportation.

**Seed and sowing :** About 400 gms of seed is required for sowing 1000 $m^2$ area. The seeds are dibbled in place like in bitter gourd. The creeper is allowed to grow on bower made up of bamboos and sticks.

**Manures and Fertilizers :** The plant should be provided with manures at each hill as in case of bitter gourd. The fertilizer doses for the ridge gourd is also same as that for the bitter gourd.

**Other Care :** The plot should be kept clean with frequent hoeing and weeding. Too deep digging may damage the roots and should be avoided. The regular irrigation is must for the crop grown is summer.

**Harvesting :** The fruits start getting ready for harvesting after about 2 months after planting. The tender fruits are harvested within a period of 15 days after the opening of the flower. The fruits become spongy and unfit for any use if not harvested at tender stage. About 1 ton of fruits can be harvested from 1000 $m^2$ area.

## 8. CUCUMBER - Local Name TOUSHIM

The cucumber is used raw in salad or cooked as vegetable. This is one of the major vegetable of commercial importance. It is mainly grown in rainy season. However, its cultivation in summer is slowly picking up in the State.

### VARIETIES :

**i. Sheetal :** This variety has been developed by Konkan Krishi Vidyapeeth and is recommended for summer planting.

**ii. Local types :** The cucumber generally grown in Goa belongs to local types. The fruits are white or green with white stripes and medium in size. The seeds are soft and fruits are tasty. The fruits are borne after 30 days of planting.

**iii. Hybrid :** Several hybrid varieties have been developed. Some of them have good taste, soft skin and seed and excellent for the salad purposes. The yields are also higher. The fruits are bitter free and has long shelf life.

**SEED AND SOWING :** 50 gms of seed is required for covering 1000 $m^2$ area. The seeds are sown on soil mounds at a spacing of 1.5-2 mt. x 2 mt. One to two seeds should be dibbled at each place. Two vigorous seedlings may be retained after 10 days and the other seedling should be thinned out. The seedlings can be trailed on ground or on bamboo bowers or the branches.

**MANURES AND FERTILIZERS :** The crop should be properly manured with organic manures and fertilizers in similar way as that of bitter gourd. Top dressing should be done with urea about 4 weeks after planting.

**OTHER CARE :** The irrigation should be properly arranged in summer. Micro sprinklers for irrigation are beneficial to improve humidity and fruit set. Mulching at the base of the plant is very helpful in conserving nutrients and water in the soil. Mulching the entire field with dry leaves or spreading of the dry branches of the trees in the field helps in better growth and set of the fruits. Care should be taken not to damage the roots during weeding.

**Harvesting :** The crop start yielding after about 30-40 days of planting. It should be frequently harvested when tender at interval of 2-3 days. About 1000 to 1500 kgs of fresh fruits could be harested from 1000 $m^2$ area.

## DISEASES & PESTS OF CUCURBITS

**i. Red Pumpkin Beetle :** It is a serious pest of cucurbits. They eat the space of leaves between the veins. These beetles can be hand picked and destroyed. Spraying with DDVP @ 1.5 ml per litre of water can also control this pest.

**ii. Fruit Fly :** These flies puncture flower base or the tender fruits and lay eggs into it. The eggs hatch and feed within the fruit. This causes deformity or rotting of fruits. The flies can be best trapped in the pheromone trap where the lure attracts the flies, which are killed in the pesticide solution. The trap avoids spraying and use of harmful pesticides on the fruits. The affected fruits should be destroyed.

**iii. Aphids :** These small soft bodied insects suck the cell sap from the lower surface of the leaves. Spray of endosulfan 2 ml per litre of water can control this pest. Neem based pesticide is also helpful.

## 9. SPINACH : Local Name - PALAK

This is predominately leafy vegetable. The compact rosette of leaves prior to elongation of seed stocks is main part of the vegetable. It is cheap source of vitamins A, B and C.

**VARIETIES :** Palak has limited varieties, which are in cultivation in India. Some varieties are Virginia Savoy and Early smooth leaf.

**SEED AND SOWING :** Palak is generally grown in winter. The leaves become thinner and longer as temperature goes up in summer. The plant also flowers early in summer. In rainy season, leaves of palak may get decomposed. Palak can be sown from November to March in Goa. Sowing is done in rows 25 cms apart and seed is placed about 2 cms deep. The crop is raised on flat beds of size 1 m x 5 m. The crop can be harvested regularly if sowing is done at regular sequence. Seed germinates in 10 days. 2 kgs of seed is sufficient to cover 1000 $m^2$ of area. Seed sowing can also be done by broad-casting provided proper thinning taken up. However, weeding and inter cultivation gets difficult in broad-casted area.

**MANURES AND FERTILIZERS :** The yield of palak depends on the healthy growth of the leaves. The soil therefore should be enriched with organic

manures/compost at the rate of 3-4 tons per 1000 $m^2$. The manure should be properly incorporated in the soil before sowing seeds. 50 kgs. of 19:19:19 or 15:15:15 should also be applied to the soil at the time of the sowing of seed. 10 kgs of urea should be applied for top dressing after one month of sowing.

**OTHER CARE :** More irrigation is essential soon after sowing of seed to ensure better germination. Subsequent irrigation should be given after every two days. Sprinkler irrigation may not be suitable for palak cultivation. The soil in between two rows should be raked to make it loose. The weeds should be uprooted to avoid any competition with the main crop.

**HARVESTING :** The crop gets ready for first trimming after one month of sowing. Subsequent cuttings can be done after every 15 days. About four such cuttings are possible after which plants are uprooted for new planting. The second plot should be ready for harvest after the uprooting of first one. About 600 kgs. of green leaves are available per 1000 $m^2$ of area which should be marketed when fresh. Care should be taken to harvest healthy and tender leaves for better returns.

## 10. AMARANTHUS : Local Name - TAMBADI BHAJI

It is the most common vegetable grown in Goa for its tender red leaves and stem. It is highly nutritious vegetable rich in iron.

**VARIETIES :** Red coloured Agasaim type of amaranthus is preferred in Goa. However, new varieties viz $CO._1$, $CO._2$ are also available which are high yielders but green in colour.

**SEED AND SOWING :** Amaranthus grows well in Goa from October to May. Rainy season may damage the seedlings. In summer this vegetable tends to be more fibrous and less succulent. The amaranthus is very sensitive to water logging. Seed is sown by broadcasting on flat beds of 1 mt x 5 mt. The beds should be prepared by repeated digging and clod breaking. The seed should be sown shallow by broad - casting. About 200 gms. of seeds are required to cover 1000 $m^2$ of area. The seedlings should be thinned out to the facilitate free growth of the plants.

**MANURES AND FERTILIZERS :** Amaranthus requires plenty of organic manures as in other leafy vegetables. 3-4 tons of compost or FYM should be added per 1000 $m^2$ of area at the time of land preparation. 20 kgs. of 19:19:19 or 15:15:15 should also be used at the time of land preparation. A light dose of urea can also be supplemented.

**OTHER CARE :** Regular watering to maintain soil moisture is helpful to get luscious crop of amaranthus. However, do not allow water stagnating in the field during irrigation to prevent rotting of plants. Weeding is essential for better growth of the crop.

**HARVESTING :** Amaranthus is harvested by pulling out the seedlings when tender. The seedlings turn fibrous if not harvested in time. Amaranthus could also be harvested through cuttings. Cuttings could be regularly harvested. About 1000 - 1200 kgs. of amaranthus vegetable could be harvested from 1000 $m^2$.

## 11. CLUSTER BEANS : Local Name - GUAR, CHIDKI MIDKI.

Cluster beans is a hardy vegetable crop which is grown for its green vegetable pods. It is a warm season vegetable and grown in kharif and rainy season.

**VARIETIES :** Several number of varieties are available. Prominent amongst them are:

**i. Pusa Sadabahar :** This is a high yielding variety, which grows with single stem. The tender pods are 12-13 cms long. The first picking is possible after about 55-60 days of sowing.

**ii. Pusa Mousami :** This is branching type variety suitable for rainy season. The pods are light geen 10-12 cms long and first harvest is possible after 70 days.

**iii. Pusa Navbahar :** It is erect growing variety with good quality pods. The yields are very good.

**SEED AND SOWING :** The crop is sown 45-60 cms. apart in rows with 30 cms between plants. Planting is done in June for kharif and in February for summer. 1.5-2 kgs. of seed is required for 1000 $m^2$ of area. The seeds are dibbled 2-3 cms. deep which germinate within a week.

**MANURES AND FERTILIZERS :** Being a leguminous crop, it does not require much manuring. However under irrigated condition, fertilizer dose of 25 kgs of 10:26:26 fertilizer per 1000 $m^2$ is helpful for good yields. 2-3 tons of compost should be added to 1000 $m^2$ area to get succulent pods with less fibre.

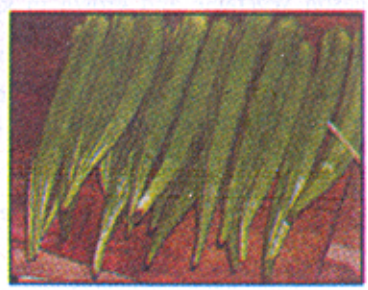
**OTHER CARE :** The crop requires regular irrigation at 2-3 days interval depending on soil type. The field should be weeded to avoid any competition with main crop.

**DISEASES AND PESTS :** The cluster beans require protection from pests and diseases. The bacterial blight is a serious disease in which inter venal tissues in leaves turn yellow and later dry. Brownish discolouration also takes place on the stem and plant break at this point. Use of disease free seed and solarization of the soil before planting helps to reduce the disease infestation.

**HARVESTING :** The green, tender and non-fibrous pods are hand picked for vegetable purpose. The yields of green pods vary between 600-800 kg. per 1000 $m^2$ area.

## 12. BHENDI/OKRA/LADY FINGER : Local Name -BHENDE

This is a most common vegetable, which can be grown in Goa from March to October. The crop does not grow well in Winter.



**VARIETIES :** Being an important commercial vegetable, several varieties have been developed by researcher in Government or private sectors. The prominent amongst them are Pusa Savani, Punjab Padmini, Arka Anamika, Prabhani Kranti. Several hybrid varieties with excellent fruit quality, disease resistance and high yielders have been developed.

**SEED AND SOWING :** 1/2 kg of seed is required to cover 1000 $m^2$ of area. The crop is sown at a spacing of 60 cms x 30 cms. The sowing is done on the ridge in monsoon. Sowing during summer can be done on beds or ridge. This crop does well in summer under irrigated condition.

**MANURES AND FERTILIZERS :** The manure requirement of Bhendi is 5 tons of compost at the time of soil preparation for an area of 1000 $m^2$. Chemical

fertilizer to the extent of 25 kgs of 15:15:15 or 20 kgs of 19:19:19 should be applied to the soil at the time of sowing. The fertilizer is to be placed along the rows. Top dressing with urea can be done after 30 days of sowing to boost vegetative growth especially in summer.

**OTHER CARE :** The summer crop needs irrigation twice in a week while rainy season crop may need water only if drought persists. Mulching can be adopted for rainy season crop. Weeding should be done in time. A light earthing up is also helpful for better growth.

**DISEASES AND PESTS :** The crop is susceptible for yellow vein mosaic virus, where entire leaf turns yellow. Such plants if noticed should be removed and destroyed. Occasional spraying of Dichlorvos 1.5 ml in one litre of water should be taken up if pest infestation is noticed. However, care should be taken not to harvest fruits upto 6-8 days after spraying.

**HARVESTING :** Tender pods are harvested at an interval of 3-4 days. The right stage of harvesting can be seen by breaking tips of few fruits. The tender fruits break while mature ones do not. The delay in harvesting even by one day results in development of fibre in fruits which is unsuitable for vegetable. The crop gets ready for harvesting after about 50 days of sowing and crop can be harvested upto 70 days, depending upon variety grown. About 1000-1500 kgs of fruits could be harvested from each 1000 $m^2$ area.

## For Technical Guidance and Further Details Please Contact

### The Zonal Agricultural Office of your Taluka

| | | | |
|---|---|---|---|
| Pernem | 2201291 | Mapusa | 2262368 |
| Margao | 2715005 | Bicholim | 2362128 |
| Tiswadi | 2285329 | Quepem | 2662116 |
| Valpoi | 2374246 | Ponda | 2312119 |
| Sanguem | 2604253 | Canacona | 2643066 |

or

Dial Toll Free Kisan Call Centre No. 1551
(Time : 6.00 a. m. to 10.00 p.m.)