

Ginger



Introduction :

Ginger (*Zingiber officinale* Rosc.) is an important commercial crop grown for its aromatic rhizomes which is used both as a spice and a medicine. Ginger of commerce is the dried rhizome. It is marketed in different forms such as raw ginger, dry ginger, bleached dry ginger, ginger powder, ginger oil, ginger oleoresin, gingerale, ginger candy, ginger beer, brined ginger, ginger wine, ginger squash, ginger flakes etc. Ginger is the rhizome of *Zingiber officinale* Rosc., a herbaceous perennial belonging to Zingiberaceae, and is believed to be native of south-eastern Asia. It is propagated through rhizomes. The rhizomes put forth erect, leafy stems, 30-90 cm in height. The base of the leaves sheathe the stem. The leaves are dark green, 15-20 cm long, narrow, lanceolate and with a prominent midrib. The flowers are small, yellowish, speckled, each with a purple speckled lip and borne on a spike. When the plants are about 9 months old, the green leaves turn yellow.

International scenario :

The major ginger producing countries are India, China, Nigeria, Indonesia, Bangladesh, Thailand, Philippines, Jamaica etc. It is also grown in Australia, Fiji,, Brazil, Sierra Leone and Japan. United Kingdom, United States, Japan and Saudi Arabia import large quantities of ginger. Nigeria ranks first with respect to area under ginger covering about 56.23 % of the total global area followed by India (23.6%), China (4.47%), Indonesia (3.37%) and Bangladesh (2.32%). India ranks first with respect to ginger production contributing about 32.75% of the world's production followed by China (21.41%), Nigeria (12.54%) and Bangladesh (10.80%). Asian countries lead in the supply of ginger in the world market. Japan and USA are the major importers. China has the major

export share. India exports mainly in the form of whole and dry ginger. Indian dry ginger is known in the global market as ‘Cochin Ginger and ‘Calicut Ginger’. Cochin Ginger is considered as one of the best in the world. China, Nigeria and Thailand are competing with India in the recent past in the world market. Australia is the world leader in value added products. India has 50% share in oil and oleoresin trade.

National scenario:

The state wise area, production and productivity of ginger is given in Table 1.

Table 1. Statewise Area, Production and Productivity of of ginger in India (2005-06)

State	Area (ha)	Production (MT)	Productivity (MT/ha)
Andhra Pradesh	2160	16460	7.62
Andaman & Nicobar	200	1800	9.00
Arunachal Pradesh	4814	33326	6.92
Assam	18180	123990	6.82
Bihar	808	1208	1.50
Chhattisgarh	1330	1320	0.99
Gujarat	2840	39170	13.79
Himachal Pradesh	2040	14570	7.14
Jammu & Kashmir	38	44	1.16
Karnataka	8280	10850	1.31
Kerala	12226	56288	4.60
Madhya Pradesh	5760	7240	1.26
Maharashtra	1308	1254	0.96
Manipur	2240	3700	1.65
Meghalaya	1865	21500	11.53
Mizoram	4530	38070	8.40
Nagaland	1870	21500	11.50
Orissa	15810	30640	1.94

Rajasthan	100	180	1.80
Sikkim	6683	35634	5.33
Tamil Nadu	660	12735	19.30
Tripura	1364	2895	2.12
Uttar Pradesh	830	2370	2.86
Uttarakhand	1871	27138	14.50
West Bengal	7694	13953	1.81
TOTAL	105501	517835	4.91

Source : Spices Board

Ginger produced in India, goes for domestic consumption and only a small quantity is exported. But in other producing countries domestic consumption is less and export is more. The global demand for Indian ginger is high on account of its lemony flavour. India earned a foreign exchange of around Rs.40 crores during 2005-06 (Table 2) through ginger exports in various forms (Table 3) . Finest quality of ginger *i.e.*, Cochin Ginger which has extensive demand in the world market is cultivated in Kerala.

Table 2.Export of ginger from India

Year	Quantity (tonnes)	Value (Rs.lakh)	Average price realised (Rs./ kg)
2001-02	6464.00	2311.47	35.76
2002-03	8461.00	2396.59	28.33
2003-04	4696.00	2275.45	48.45
2004-05	13000.00	5950.00	45.77
2005-06	7250.00	4075.50	56.21

Source :SYMSAC IV

Table 3. Item -wise export of ginger from India

Qty. - Tonnes

Value - Rs. lakh

Forms of ginger	1998-99		1999-2000		2000-01		2001-02		2002-03	
	Qty	Value	Qty	Value	Qty	Value	Qty	Value	Qty	Value
Ginger dry	5789.20	3399.90	2838.50	2254.10	2757.50	2072.80	3181.20	1606.30	2938.20	1381.80
Ginger fresh	2268.40	292.30	5838.60	791.10	3346.70	464.20	2716.60	281.20	4527.50	402.40
Ginger powder	625.40	366.10	245.50	208.40	183.80	145.10	566.40	424.00	995.70	552.40
Ginger oil	14.70	424.50	9.60	340.30	10.20	370.50	16.80	521.70	15.80	413.10

Source :SYMSAC IV

4. Organic farming :

Organic farming is a crop production method which encourages sustainable agriculture by enhancing the biological cycles in nature. It is targeted at producing healthy, nutritive, pollution free food maximising the use of on farm resources and minimising the use of off-farm resources. It seeks to avoid the use of chemical nutrients and pesticides. The guidelines for organic farming of spice crops is enclosed in Annexure 1

5. Organic production:

5.1 Climate and soil

Ginger grows in warm and humid climate. It is mainly cultivated in the tropics from sea level to an altitude of above 1500 MSL and it can be grown both under rainfed and irrigated conditions. For successful cultivation, ginger requires a moderate rainfall at the sowing time till the rhizomes sprout, fairly heavy and well distributed showers during the growing period and dry weather for about a month before harvesting. Ginger thrives the best in well drained soils like sandy or clay loam, red loam or lateritic loam. A friable loam rich in humus is ideal. However, being an exhaustive crop it may not be desirable to grow ginger in the same site year after year. It thrives well under partial shade, though it is also grown on a large scale in open areas.

Ginger can be cultivated organically as an inter or mixed crop provided all the other crops are grown following organic methods. It may be intercropped with shade-giving plants, e.g. banana, pigeon-pea, tree castor and cluster bean (guar). Ginger is grown as a mixed

crop, in coconut, young coffee and orange plantations on the west coast. At higher altitudes in Himachal Pradesh, ginger is intercropped with tomato and chilli.

5.2 Rotation

Under irrigated conditions, ginger is rotated with plantain, turmeric, onion, garlic, chillies, other vegetables, sugarcane, maize, ragi and groundnut. Under rain-fed conditions, it may be grown once in 3 or 4 years in rotation with tapioca, sweet-potato, yam, chilli and dry paddy. Being an exhaustive crop, it is desirable to include a leguminous crop in rotation with ginger. Ginger-banana legume or ginger-vegetable-legume can be adopted

5.3 Buffer zone

In order to cultivate ginger organically, a buffer zone of 25 to 50 feet is to be left all around the conventional farm, depending upon the location of the farm. The produce from this buffer zone belt shall not be treated as organic. Being an annual crop, the conversion period required will be two years.

5.4 Land preparation

While preparing the land, minimum tillage operations may be adopted. Beds of 15 cm height, 1 m width and of convenient length may be prepared giving at least 50 cm spacing between beds. Solarisation of the beds is beneficial in checking the multiplication of pests and disease causing organisms. Solarisation is a technique by which moist beds in the field, are completely covered with polythene sheets and exposed to sun for a period of 20-30 days. The polythene sheets used for soil solarisation should be kept away safely after the work is completed

5.5 Planting material

Carefully preserved seed rhizomes free from pests and diseases which are collected from organically cultivated farms can be used for planting. However, to begin with seed material from high yielding local varieties may be used in the absence of organically produced seed materials. Seed rhizomes should not be treated with any chemicals.

5.6 Varieties

Several varieties are grown in different parts of India. China and Rio-De-Janeiro are the two imported varieties of ginger. Other

important varieties grown are Maran, Assam, Himachal, Kuruppampadi, Wynad Local, Suprabha, Suruchi, Suravi, Himgiri, Varada, Mahima, Rejatha etc. The best varieties suited for different products are as under

Varieties	
High dry ginger	Maran, Nadia, Karakkal
High oleoresin	Ernad Chernad, China, Rio-De-Janeiro
High volatile oil	Sleeva Local, Narasapattam, Himachal
Green ginger	Rio-De-Janeiro, China, Wynad Local, Maran, Varadha

5.7 Planting

At the time of planting, apply 25g of powdered neem cake and mix well with the soil in each pit. Ginger is planted in rows, 25 cm apart at distances of 20-25 cm within the row. In the case of the irrigated crop, ridges are made 40-45 cm apart and planting is done in shallow pits on top of the ridges at distances of 22-30 cm. Bits of seed-rhizomes weighing 20-30 g each and having at least one bud are planted at the given spacing. While planting, seed rhizomes mixed with well rotten cattle manure or compost mixed with Trichoderma (10 g of compost inoculated with Trichoderma) may be put in shallow pits and covered with a thin layer of soil and levelled. About 600 - 1000 kg of seed-rhizomes are required to sow one acre of land. Higher seed-rates are used for planting at higher altitudes. Sowing is done in April-May in South India and a little later in North India. Sowing by the middle of April in the south and by the first week of May in the north gives higher yields.

The irrigated crop is watered immediately after sowing. The beds of the rain-fed crop are covered with leaf mulch as protection against sun and heavy rains and for consequent enrichment of organic matter in the soil. In some areas, farmyard manure is used as mulch. Seeds of cluster-bean, pigeon-pea or castor are sown on irrigation channels on the corners of the raised beds for shade. The shoots emerge in 10-20 days.

5.8 Irrigation

Proper drainage channels are to be provided in the inter rows to drain off stagnant water. Irrigation is given at varying intervals of 4 - 10 days as and when required.

5.9 Cultural practices

Mulching ginger beds with green leaves is an important operation in ginger. Apart from being an organic manure, it helps in soil and water conservation. Mulching may be done with green leaves thrice in ginger, once immediately after planting @ 4 to 5 tonnes /acre to enhance germination, increase organic matter, and conserve soil moisture and prevent washing of soil due to heavy rains. It is repeated @ 2 tonnes /acre at 40th and 90th day after planting preferably at the time of weeding, hoeing and earthing up. Use of Lantana camara and Vitex negundo leaves as mulch may reduce the infestation of shoot borer. Cow dung slurry or liquid manure may be poured on the bed after each mulching to enhance the microbial activity and nutrient availability.

Two weedings are generally given to the crop. The first weeding just before the second mulching and repeated depending on the intensity of weed growth. The weeded material may be used for mulching. If necessary weeding is to be repeated a third time. Plants are earthed up once or twice.

5.10 Manuring

Ginger requires heavy manuring. Application of well rotten cow dung or compost @ 2.5 to 3 tonnes / acre may be made as a basal dose while planting the rhizomes in the pits. In addition, application of neem cake @ 800 kg / acre is also desirable.

5.11 Plant protection

5.11.1 Pests

Shoot borer is the major pest infesting ginger. Regular field surveillance and adoption of phytosanitary measures are necessary for pest management. It appears during July -October period. Spot out the shoots infested by the borer and cut open the shoot and pick out the caterpillar and destroy them. Spray neem oil (0.5%) at fortnightly intervals if found necessary. Light traps will be useful in attracting and collecting the adult moths.

5.11.2 Diseases

Soft rot or rhizome rot is a major disease of ginger. While selecting the area for ginger cultivation care should be taken to see that the

area is well drained as water stagnation pre-disposes the plants to infection. Select seed rhizomes from disease free areas since this disease is seed borne. Solarisation of soil done at the time of bed preparation can reduce the fungus inoculum. However, if the disease is noticed, the affected clumps are to be removed carefully along with the soil surrounding the rhizome to reduce the spread. *Trichoderma* may be applied at the time of planting and subsequently if necessary. Restricted use of Bordeaux mixture (1%) in disease prone areas may be made to control it as spot application.

5.12 Harvesting and curing

The crop is ready for harvesting in about 8 to 10 months depending upon the maturity of the variety. When fully mature the leaves turn yellow and the pseudo stems begin to dry. Rhizomes are lifted either with a digging-fork or with a spade. They are cleaned of roots and adhering soil particles.

The green ginger is soaked in water to facilitate the removal of the skin. The skin is scraped off with pieces of sharpened bamboo. The scraped produce is washed and dried in the sun for 3 or 4 days and hand-rubbed. It is again steeped in water for two hours, dried and then rubbed to remove all the remaining bits of the skin. Sun-drying also bleaches the produce. Peeling should be done with great care and skill. The essential oil which gives ginger the aromatic character is present in the epidermal cells and hence excessive or careless scraping will result in damaging these cells leading to the loss of essential oils. Steel knives are not used as they are found to stain the produce. Storage of dry ginger for longer periods is not desirable. The yield of dry ginger is 15-25 percent of the fresh ginger depending upon the variety and location where the crop is grown. Burning of sulphur for processing ginger is not allowed.

5.13 Preservation of seed

The rhizomes to be used as seed material should be preserved carefully. Indigenous practices like spreading layers of leaves of *Glycosmis pentaphylla* being followed by farmers can very well be adopted for this purpose. In order to get good germination, the seed rhizomes are to be stored properly in pits under shade. For seed material, big and healthy rhizomes from disease-free plants are selected immediately after harvest. For this purpose, healthy and disease-free clumps are marked in the field when the crop is 6 - 8 months old and still green. Seed rhizomes are stored in pits of convenient size made in the shed to protect from the sun and rain. Walls of the pits may be coated with cow dung paste. Seed rhizomes are stored in these pits in layers along with well-dried sand/saw dust (i.e. put one layer of seed rhizomes, then put 2 cm thick layer of sand/saw dust). Sufficient gap is to be left at the top of the pits for

adequate aeration. Seed rhizomes in pits need inspection once in twenty days to remove shriveled and disease affected rhizomes. Seed rhizomes can also be stored in pits dug in the ground under the shade of a tree provided there is no chance for water to enter the pits. In some areas, the rhizomes are loosely heaped over a layer of sand or paddy husk and covered with dry leaves in thatched sheds.

5.14 Yield

The average yield of green ginger is estimated at about 6 to 10 tonnes per acre. The recovery of dry ginger varies from 16 - 25 per cent.

6. Linkages :

Spices Board supports production, processing, certification and marketing of organic spices. Board has also programmes to encourage production of organic ginger in the North Eastern States. Assistance is provided for organic cultivation of ginger in certain select states. Spices Board has been designated as one of the agencies empowered to accredit certification agencies.

Spices Board is also implementing the scheme for Export Oriented Production during the XI Plan where in assistance is being provided for promotion of organic ginger under various programmes as indicated in **Annexure II**.

7. Financial aspects :

7.1 Sale price

The farm gate price of wet ginger has been considered at Rs8.00 per kg .

7.2 Cost of cultivation

The cost of cultivation for organic ginger is Rs. 44400/- per acre. The detailed cost of cultivation is given in **Annexure -III**.

7.3 Margin

The percentage of margin / down payment to cost of development prescribed is 5, 10 and 15% for small, medium and large farmers respectively. The rest of the cost of development will be provided as bank loan. Margin considered in the present model is 10%.

7.4 Bank loan

Bank loan of 85 - 95 % shall be available from the financing institution. Bank loan considered in the model is 90%.

7.5 Rate of interest

The rate of interest to be charged to the ultimate borrower would be guided by RBI guidelines issued from time to time. However, the ultimate lending rate has been considered as 12 % for working out the bankability of the model scheme.

7.6 Security

Banks are guided by RBI guidelines issued from time to time in this regard.

8. Conclusion :

The net income from organic cultivation of ginger is Rs.14800/-. The activity is technically feasible, financially viable and bankable.