

Cultivation of cassava/Tapioca (*Manihot esculenta Crantz*) in India

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Cassava (*Manihot esculenta Crantz*), a popular industrial root crop, it is one of the main sources of calories for people in many tropical regions of the world. It is mostly cultivated in the tropics for its starchy roots. It is the fourth most important source of calories in human diet in tropical regions of the world. This crop has the potential to produce more food per unit area, capacity to stand with adverse biotic and abiotic stresses and adaptability to the conditions of drought and marginal lands. The crop has been cultivated in India for more than a century. Cassava was introduced into India by the Portuguese when they landed in the Malabar region, presently part of Kerala state during the 17th century, from Brazil. The crop is known by many different popular names **Cassava, Mandioc, Manioc, Manihot, Yuka, Kahoy** etc.in different countries.

Importance

Though cassava was primarily introduced as food crop in India, two centuries ago, recent efforts on post harvest utilisation technologies for converting them into value added products have changed the status of cassava from a food crop to that of a commercial crop. It is estimated that 40% of the total production in Kerala is used for human consumption whereas in Tamil Nadu and Andhra Pradesh only 10-12% is used for the same. Cassava is consumed in the form of baked/cooked tubers, fried chips, across the southern India. Cassava is also used as animal feed. Cassava is used as raw material for a number of processed products such as starch, sago, liquid glucose, chips, flour etc. Modified starch, carboxy methyl starch, cationic starch, oxidized starch and pregelatinized starch are being produced using cassava starch. Dextrins (yellow and white), liquid adhesives, ethanol and sweeteners are other products prepared from cassava starch.

Indian Production of TAPIOCA (2017-18)

Sr. no.	States	Production(000Tonnes)	Shares
1	Tamil Nadu	2,862.14	57.90
2	Kerela	1,725.98	34.92
3	Andhra Pradesh	192.15	3.89
4	Nagaland	79.32	1.60
5	Meghalaya	36.24	0.73
6	Assam	28.87	0.58
7	Karnataka	13.99	0.28
8	Madhya Pradesh	4.29	0.09
9	Arunachal Pradesh	0.08	0.00

Source:National Horticulture Board (NHB)

Area, production and productivity of cassava in India

Though cassava is grown in about 101 countries, it is encouraging that India ranks first in the world for productivity of cassava with 27.92 t/ha as against the world average 10.76 t/ha. However, India ranks fourth in Asia and 14th in the world for area and third in Asia and 7th in the world for the production of cassava roots. However, India accounts for just 1.30% of area. Although cassava is cultivated in India in 13 states, major production is from the southern states of Kerala, Tamil Nadu and Andhra Pradesh.

Cassava production technology-

Soil and Climate Cassava can be grown on many types of soil, but a friable fertile, well-drained sandy loam is considered better than heavier types. A hardpan layer below the surface layer is thought to be desirable because it tends to prevent the development of the tuberous roots at too great depths.

The cassava crop is grown between 30°N and 30°S with more than 750 mm rainfall and an annual mean temperature greater than 18-20°C. A small proportion of cassava is grown near the equator in South America and in Africa at altitudes up to 2000 mm. It requires a warm climate free from frost for at least 8 months.

Varieties: Varieties like Co 2, Co 3, CO (TP) 4, MVD 1, H 165, H 226, Sree Vishakam (H.1687), Sree Sahaya (H.2304), Sree Prakash (S. 856), Sree Vijaya, Sree Jaya, Sree Pekha, Sree Prabha, Co (Tp) 5, H - 97, H - 165, H - 226 and Sree Harsha are the popular varieties of cassava.

Propagation: Cassava is propagated from stem cuttings as the tubers do not produce buds. Stem cuttings should only be taken from plants which are free from disease, are at least 10 months old and have borne tubers. The cuttings should be taken from hardened stems leaving at least 30 cm (11.8 in) of stem intact in the ground. The stem can be severed using a sharp knife, secateurs or saw and each cutting should have 1-2 nodes and be approximately 20 cm (7.9 in) long

Planting: Stem cuttings are planted in furrows and covered to the depth of 24 inches. Planting the cuttings vertically has been found to be better than slanting or horizontal methods. Dipping the basal end of the cuttings in *Azotobactor* gives higher yield. The ideal spacing for branched-type cassava is 90 × 90 cm and for the non branched type 75 × 75 cm. In both types, retaining only two shoots is best for increasing yield.

Manuring and Fertilization: Initially, cassava should be fertilized with about equal amounts of nitrogen, phosphorus and potassium. However, if the crop is grown continuously for many years, the N-P-K balance will need to be modified to compensate for the removal of nutrients, especially potassium, in the harvest. That can be done using compound fertilizers that are high in K, N and relatively low in P. It has been recommended to apply 12.5 tons of FYM, 120 kg of N, 60 kg of P and 180 kg of K/per hectare (12). The application of 100:100:100 kg NPK/ha was also found to be significant with respect to tuber number and weight.

Irrigation: In India, cassava is grown as a rainfed crop. First irrigation is given at the time of planting. Life irrigation is given on the 3rd day followed by once in 7–10 days up to 3rd month and once in 20 –30 days up to 8th month.

Diseases and Pests :Cassava is susceptible to bacterial blight, being attacked by *Cercospora henningsii*, *Cercospora viscosae*, *Erwinia carotovora*, and *Phoma* sp. Cassava mosaic virus disease, namely, Tottikappa and Kalikalan, were reported from India . A number of insect

pests causing serious losses of cassava products such as Mites, White fly, **Spiralling whitefly**.

Harvesting and Handling: Irrespective of the variety grown, crop is harvested between 7th and 8th month of crop age because factories do not purchase tubers harvested after March. Due to early harvest of the tubers, starch content in the tubers is obviously at a lower range. Factory owners are of the opinion that tubers harvested after March have more fiber content and less starch. Plant is uprooted manually and tubers are removed and kept in gunny bags to transport to factories.

Cassava is cured at relatively high temperature and humidity. Then curing is done at 25-40°C and 80-85% relative humidity. Under these conditions, suberization occurs in cassava in 14 days and a new cork layer forms around wounds in 35 days. Curing of cassava roots delays the onset of primary deterioration and reduces both secondary deterioration and moisture loss.

