

## Scope of Commercial Tuber Crops Cultivation in Goa

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### Introduction

Goa is an important small state of India having a total geographical area of 3, 61,113 ha which lies between 14°16" North latitude and 73°75" East longitude bound by the Arabian sea on the West, State of Maharashtra on the North and Karnataka on East and South. The climate is hot and humid with the temperature ranging from 18 to 35°C throughout the year. The annual rainfall ranging from 2500 to 3500 mm is received in about 100-120 days between June and October. The soils are predominantly red lateritic (73.40%) followed by alluvial and marshy soils (11.70%), sandy coastal soils (10.11%) and saline soils (4.79%). Majority soil series are coarse to medium textured with good drainage and poor water holding capacity. The pH of soil is 4.5-6.5 with medium available N and deficient available P and K.

### Area and production of vegetable crops

It is estimated that around 60% of the total cultivated area is under horticultural crops. But the area under

vegetable crops is less i.e. only 5% of the total cultivable area. The data for the past one decade shows that the area under vegetable cultivation declined from 7660 ha in 2001-02 to 5880 in 2010-11 (Table 1).

The productivity is also very low when compared to the national average of 15t ha<sup>-1</sup>. Presently, more than 85% of requirement of vegetables in the state is met from the neighbouring states like Karnataka and Maharashtra.

There are three main seasons of vegetable production in Goa

- (i) Rainy or *khurif* season : June to September
- (ii) Winter or *rabi* season : October to February
- (iii) Summer season : March to May

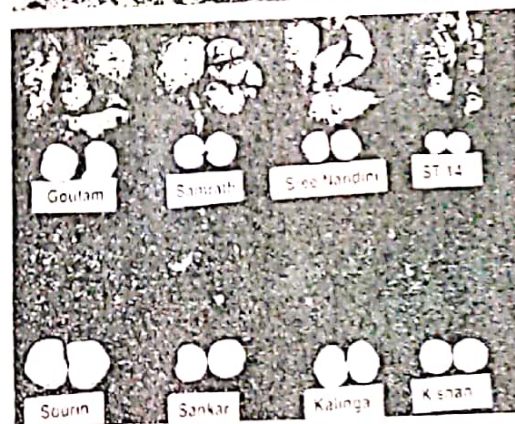
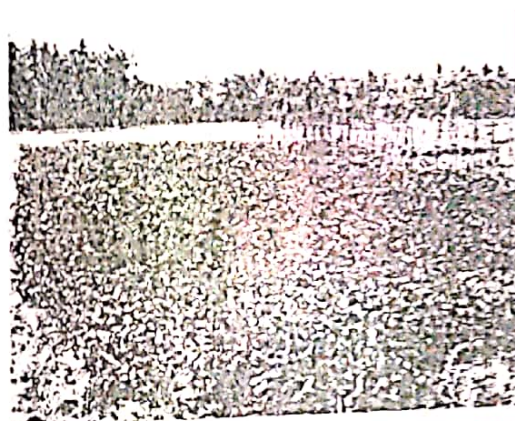
Table 1. Area and production of vegetable crops in Goa

Year	Area (ha)	Production (t)	Productivity (t ha <sup>-1</sup> )
2001-02	7,600	70,467	9.27
2002-03	7,600	70,467	9.27
2003-04	7,800	70,467	9.03
2004-05	7,800	74,725	9.58
2005-06	8,144	82,580	10.14
2006-07	8,213	84,290	10.26
2007-08	5,547	56,027	10.10
2008-09	5,703	57,603	10.10
2009-10	5,671	58,130	10.25
2010-11	5,880	60,472	10.28



Table 2. Major vegetable crops of Goa

Season of cultivation	Major vegetable crops
<i>Kharif</i> or rainy season (June-September)	Cucurbits (cucumber, ridge gourd, snake gourd, bitter gourd, pumpkin, ivy gourd), okra, chilli, elephant foot yam, <i>Dioscorea</i> , <i>Colocasia</i> and <i>Xanthosoma</i> etc.
<i>Rabi</i> or winter season (October-February)	Sweet potato, brinjal, amaranthus, vegetable cowpea, radish, knol khol, okra, pumpkin, chilli, onion, cluster bean
<i>Rabi</i> extended summer (February-May)	Amaranthus, okra, onion, vegetable cowpea, chilli



Sweet potato cultivation in paddy fallow and improved varieties evaluated in Goa

### Status of tuber crops in Goa

The area under all vegetable crops in Goa is hovering around 5,000 to 6,000 ha for the past one and half decade. As mentioned earlier, more than 85% of the demand is met from the import mainly from Karnataka and Maharashtra. Among the tuber crops cultivated, sweet potato is an important crop grown during *rabi* season after paddy with available residual moisture in the soil. Apart from sweet potato, other tuber crops viz., elephant foot yam, yams (greater yam, lesser yam and white yam), taro, tannia etc. are other tuber crops cultivated primarily during *kharif* season as inter crops in plantation or sole crop on hill slopes.

### Sweet potato

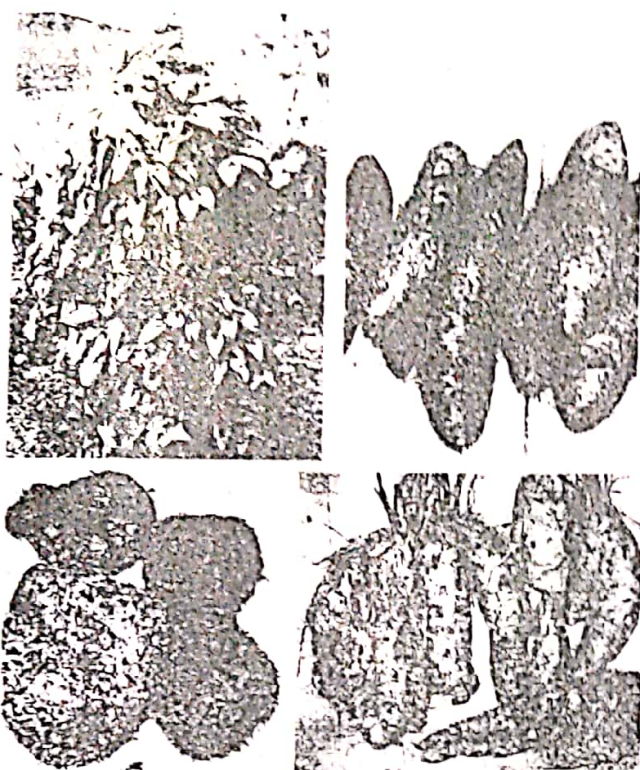
It is an important tuber crop cultivated predominantly during *rabi* season in rice fallow system with residual moisture and occasionally with protective irrigation. There are no named varieties of sweet potato in Goa. Local cultivar with white skin is highly preferred type for cultivation due to its consumer preference and high price. But studies on evaluation of improved varieties were taken up since the inception of institute.

Out of eight varieties evaluated during 2010-11, Sree Nandini, Goutam and Shankar performed better for tuber yield and quality under Goa condition. Technology

dissemination and standardization of location specific production technology in sweet potato is an important option for increasing the production and productivity of this crop in Goa. In this context, many high yielding varieties with improved nutritional quality were already available for the farmers to adopt in their field.

### Yams

The second most important group of tuber crops are yams comprising three yams viz., greater yam, lesser yam and white yam. Generally yam is cultivated during *kharif* (rainy) season on sloppy land. There are no named varieties available from Goa for cultivation. Predominantly local types are cultivated in Goa. There are no scientific studies conducted on its performance



Diversity in yam types cultivated in Goa



Elephant foot yam- an important tuber crop of Goa

in Goa. But it is one of the important group of tuber crops which need interventions in the form of improved varieties, production technologies to bring more area under this tuber crop.

**Elephant foot yam**

It is an important tuber crop which fetches premium price during the festival time like Ganesh Chaturthi. Elephant foot yam is generally cultivated as an intercrop in coconut and arecanut plantation in Goa. Generally, farmers grow local types of elephant foot yam and improved production technologies are not practiced by farmers. Hence, the production and productivity is low compared to other elephant foot yam producing states. But it is one of the important crops which need to be popularized among farmers as intercrop in plantation as well as sole crop in slopy area. There are improved varieties in this crop which has to be evaluated and promoted in Goa.

**Taro**

Taro is also an important tuber crop which fetches premium price among the consumers.

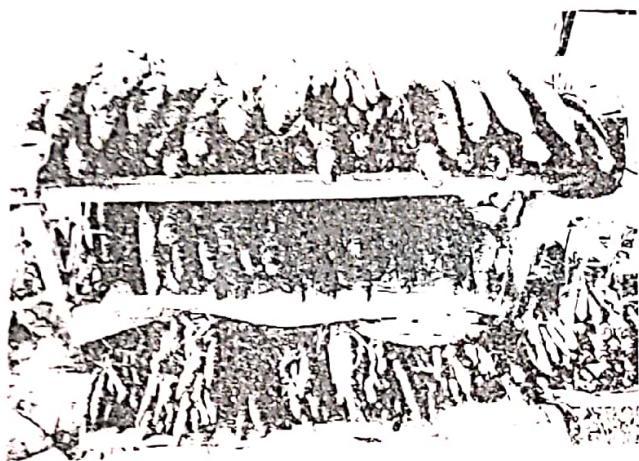
Mostly taro is not cultivated on large area, but wild types of taro are seen predominantly during rainy season. It needs to be collected, conserved and evaluated for commercialization in the existing cropping system. There are many improved varieties released from CTCRI and other SAU's which need to be evaluated under Goa conditions for its suitability and adaptability.

**Tannia**

Tannia (*Xanthosoma*) is cultivated on a limited area, hence fetches premium price in the market. It is also highly preferred by consumers for its taste.



Taro cultivation and its diversity in Goa



Taro (Madi) in Goa market

### Cassava

Cassava is one of the important crops suitable for Goa as sole crop as well as intercrop in coconut plantation. There are no local types available in this crop and also it is not commonly consumed by the local population. But the demand for tuber in the market is high due to large migrated population who consumes cassava. Farms have been developed for cassava cultivation for exporting to European countries in Goa.

An evaluation was undertaken with seven improved cassava varieties under coconut plantation. Among the varieties evaluated Sree Vijava, Sree Java, CMR-1 were better for tuber yield and quality.

### Strategy to promote tropical tuber crops in Goa

Tropical tuber crops including sweet potato, elephant foot yam, taro, yams, tannia etc. have the capacity to withstand adverse biotic and abiotic stresses. These crops are very important in the context of food and nutritional security and assume great relevance due to the ever increasing population. Hence, comprehensive strategy is required to promote these crops in Goa.

#### 1. Introduction of improved varieties

There are many high yielding varieties in the important tuber crops released mainly from public sector R&D institutions. Many of them possess salient quality parameter coupled with high yielding ability under marginal soil and other conditions. Hence, the first approach should be to introduce and evaluate its suitability for Goa conditions.

#### 2. Study on intercropping system; tuber crops in plantation crops

Extensive studies elsewhere in the county indicated that tuber crops are an important component of intercropping system for additional profitability. Goa has vast area under plantation crops viz., cashew, coconut, arecanut etc. Presently some progressive farmers have started cultivating tuber crops as intercrop in their plantation. But systematic study on different intercrops in the existing plantation



Cassava: An introduction in Goa

should be carried out and the outcome of the results has to be disseminated to the potential farmers for large scale cultivation of tuber crops.

### **3. Standardization of production technology for important tuber crops**

Sweet potato is an important tuber crop cultivated on sandy loam soils of Goa after the harvest of paddy. Study on different production technologies viz., fertilizer requirement, IPM strategy for sweet potato weevil management, spacing and other aspects has to be standardized to get higher production and productivity.

### **4. Post-harvest and value addition in tuber crops**

Post-harvest technology and value addition are important sectors in horticulture crops. Since most of the tuber crops are seasonal in nature, availability of produce during the off season is important. CTCRI has developed many novel value addition and by products from tuber crops. Those technologies have to be evaluated under local conditions for their commercialization. In addition, development of new value addition technologies as per the consumption of local people is an important strategy to promote these underutilized crops in Goa.

### **5. Awareness on the importance and significance of tuber crops in food and nutritional security**

Concerted awareness has to be created in the people's mind on the importance of tuber crops and its relevance in the existing cropping systems in Goa.

### **Conclusion**

There is great potential for tuber crops in Goa due to its low input requirement, tolerance to biotic and abiotic stress and minimal management practices for its crop growth and development. There are many tropical root and tuber crops cultivated, among them sweet potato, elephant foot yam, taro, tannia, yams, etc. are important with respect to Goa. Apart from its less management and high yield, it forms the important component of food and nutritional security of especially poor and marginal farmers. With all the above mentioned pros and cons, exploiting the potential of tuber crops for increased production and productivity would be an effective agriculture system for the vegetable deficient state like Goa. Important crops which are already under cultivation viz., sweet potato, elephant foot yam, taro, yams, tannia will form the basket of crops for intervention to improve its production. The immediate intervention which will result in significant change in production pattern would be large scale cultivation of tuber crops as intercrops in cashew, coconut, arecanut and other perennial crops followed by introduction of improved varieties in these crops.

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