

## Reasons for farmers choosing Elephant Foot Yam in Kovvur Mandal, West Godavari, Andhra Pradesh, India

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### ABSTRACT

*Amorphophallus paeoniifolius* (Dennst.) Nicolson or Elephant Foot Yam is an important edible tropical tuber crop, grown for its starchy tubers. Generally propagated through corms. A field study was conducted during August 2014 -February 2015 at selected villages namely Aurangabad, Chidipi, Ravulapadu of Kovvur mandal West Godavari District, to know why people continue to cultivate elephant foot yam in their field areas. The results revealed that nearly 90% of the respondents replied that this crop is beneficial and most choicely to the formers hence formers were growing this crop in their field areas.

**Key words:** Edible, Starchy tubers, corms, Kovvur Mandal, Beneficial crop

### INTRODUCTION

Traditional agriculture was initiated since Indian civilization, when tribal communities learned knowledge of agriculture from Rushi or sage lived in forest areas by constructing their shelters known as Ashram. Rushies possessed more practical experience and they encouraged natives to cut and burn forest area and cultivate crop on land, which gave them high crop yield for their sustenance and also useful for improving their living standards (M. N.Lohi et al., 1993). The stage of cultivation came very late when a high level of social and cultural evolution took place. In Ancient India man believed in many superstitions, myths, spirituals, taboos, etc. associated with agriculture. The primitive society always laid emphasis on traditional knowledge belonging to agriculture which they passed from generation to generation (D.K Kulkarni and M.S. Kumbhojkar 2003, P.V. Patil and D.K.Kulkarni 2011).

The West Godavari district is one of the nine coastal districts of Andhra Pradesh State, with its headquarters at 'Eluru'. It is located between North Latitudes 16° 51' and 17° 30' and East Longitudes 80° 50' and 81° 55'. The total geographical area of the district is 7,795 sq. km constituting 2.84% of the total area of the state. Agriculture is the main stay of population in the district. The district enjoys tropical humid type of climate with oppressive summer season and good seasonal rainfall. The different type of soils encountered in the district are red soils, black cotton soils, deltaic alluvial soils and coastal sands. The red soils are seen mostly around Chintalapudi, Koyyalagudem, Nallajerla and southeast Polavaram villages. They are permeable and well drained to moderately well drained. The black cotton soils are encountered in around Eluru, Nidadavolu and Tanuku areas. Deltaic alluvial soils are very deep and highly fertile. These are seen mostly in around Polavaram, Kovvur, and Nidadavolu and Tanuku areas. The coastal sands are seen occurring as patches in the south west and southern most parts of the district.

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#### Horticulture Prospective In West Godavari District:

West Godavari District remains latent for growing various Horticultural crops like Cashew, Mango, Coconut, Oil Palm, Banana, Cocoa, Citrus, Sapota, Guava, Vegetables, spices like Pepper, Flowers, Medicinal and Aromatic plants. Due to available resources like land, irrigation and other infrastructure facilities, there is a vast scope for the development of Horticulture in this district. The District is a front running

producer of a variety of Horticulture wealth. Horticulture crops are growing in an area of 1, 39,781.00 hectares out of the net-cropped area of 3.86 Lakh Hectares constitutes 36.01%. 85% of the Horticulture crops are grown in 24 upland Mandals and 15% in 22 delta areas. West Godavari Districts stands first in Oil palm and Cocoa both in area and production. The details of area particulars under different Horticulture Crops in West Godavari District are given in Table-1.

**Table-1. Details of area particulars under different Horticulture Crops in West Godavari District**

| Sl. No    | Crop                    | Area in Ha. |
|-----------|-------------------------|-------------|
| <b>I</b>  | <b>Fruits</b>           |             |
| 1         | Mango                   | 8412.00     |
| 2         | Lemon/lime              | 3720.00     |
| 3         | Guava                   | 960.00      |
| 4         | Banana                  | 9460.00     |
| <b>II</b> | <b>Plantation Crops</b> |             |
| 1         | Oil Palm                | 56860.07    |
| 2         | Coconut                 | 21561.00    |
| 3         | Cashew                  | 18731.00    |
| 4         | Cocoa                   | 12563.00    |
| 5         | Betelvine               | 183.00      |

#### Major Field Crops In West Godavari District:

According to 2009-2010 of district agricultural contingency of West Godavari, the foremost growing crop is Paddy with an area of 328.6 ha (both Kharif and Rabi seasons). Second crop which was majorly cultivated after paddy is Maize (47.7 ha of area), next major crop is Black gram (29.9 ha of area), Tobacco (VFC) (25.0 ha of area), next Sugarcane (20.3 ha of area), Ground nut (6.2 ha) Sunflower (4.1ha) Tobacco (Natu) (4.1ha), Green gram (2.4ha) and etc... Coming to the horticultural fruit crops major cultivated crop is Cashew with an area of 40.4 ha and then Mango with 17.5 ha, Banana with 13.1 ha Lemon 2.5 ha. Majorly growing vegetable crops are Chillies with an area of 3.6 ha and Brinjal 1.1 ha of area.

*Amorphophallus paeoniifolius* (Dennst) Nicolson, also known as elephant foot yam is one of the important vegetable tuber crops of family Araceae, native of south East Asian countries. Due to its high production and export potential it has emerged as a commercial crop in India with good economic returns to farmers. Because of high market demand it is being extensively cultivated in different parts of India (Misra et al., 2001). Due to the presence of high content of starch the *Amorphophallus paeoniifolius* has gained a status of cash crop (O' hair and asokan1986). In India it is grown mostly in WestBangal, Andhra Pradesh Karnataka, Kerala, Maharashtra, Tamil Nadu, Punjab, Bihar, Assam and Odisha. In Andhra Pradesh over 3,439 ha of area under this crop which yields 100,829 Mt (unpublished statistics from department of agriculture/horticulture of various states 2008-09). Elephant-foot yam has several

medicinal benefits and widely used in Indian medicine including Ayurveda, Siddha and Unani. Corm is prescribed in bronchitis, asthma, abdominal pain, emesis, dysentery, enlargement of spleen, piles, elephantiasis, diseases due to vitiated blood, rheumatic swellings. In addition to starch the tubers are also source of, vitamins and minerals (Bradbury and Holloway 1988), and play a vital role in food security and are the important staple or subsidiary food for a large population (Ramanandam et al. 2008; Quaye et al. 2009). The main objective of this study is, instead of many major crop and even tuber crops with good investment and returns why people of west Godavari continue to happily cultivate elephant foot yam in their field areas.

## MATERIAL AND METHODS

#### Study area:

West Godavari District is one of the 13 districts, in the Coastal Andhra region of Andhra Pradesh, India. The region has a tropical climate similar to the rest of the Coastal Andhra region. Kovvur is a town, municipality and mandal in West Godavari district, in the state of Andhra Pradesh, India. It is situated adjacent to the west bank of the Godavari River. Kovvur is an important town in West Godavari District due to its location on the sacred banks of River Godavari. Kovvur is located at 17.0167°N 81.7333°E. It has an average elevation of 11 Meters (36 Feet).

#### Field study:

Field survey was carried out during August 2014 – February 2015 to collect information on the traditional cultivation of elephant foot yam crop in villages of Kovvur mandal, West Godavari district, Andhra Pradesh. We selected some of the villages namely Aurangabad, Chidipi, Ravulapadu, of Kovvur mandal. In these villages the cultivation of elephant foot yam was very high that's why we chose these villages among Kovvur Mandal as study site .At each study site we interviewed farmers about the cultivation practices, farmer's evaluation of various tuber crops, consumption of elephant foot yams, and the participation of women in the cultivation and utilization. The participation of women in the cultivation and utilization of elephant foot yams were classified as follows: no of participation, similar participation of women to that of men, and dominance by women.

## RESULTS AND DISCUSSION

#### Economic value:

Widely held of the defendants answered that elephant foot yams were not important to their domestic economy, probably due to the high availability of grain crops (e.g., rice and corn) and other tuber crops (e.g. Cassava and sweet potatoes). Among other tuber

crops, sweet potatoes and cassava were commonly cultivated in West Godavari district. The initial investment of cultivation of this particular crop (i.e. import of seed lots, transportation, and labour cost) is about Rs. 93,450 (T. Srinivas and S. Ramanathan 2005) in our interested area, cultivation cost of several major crops is Rice-Rs.74,039, maize –Rs.69,508, banana-Rs.56,000, etc. By the observations we conclude that the initial investment of elephant foot yam is very high rather than rice, maize and banana (Table-2)

**Table-2. Evaluation of various crops investment and crop duration**

| Name of the crop   | Cost of cultivation RS | Crop duration | Economics RS |
|--------------------|------------------------|---------------|--------------|
| Rice               | 74,039 (2013-14)       | 120 -130 days | 2 6,000/hec  |
| Maize              | 69,508                 | 66-95 days    | 30,000/-     |
| Banana             | 56,000                 | 365 days      | 44,000/-     |
| *Elephant foot yam | 93,450                 | 180-240 days  | 1,07,000/-   |

\*The crop can be harvested depending upon the market feasibility.

Elephant foot yam harvesting process is more easy and farmer's choice. Whenever the market feasibility is not preferable, farmer can post pone harvesting of elephant foot yam, and the corms of elephant foot yam can be stored in the soil up to 8-12 months.

Both men and women are involved in the cultivation process of elephant foot yam. Males participate in the process like import of seeds, cutting of seed, watering, applying fertilisers and harvesting process. After meticulous analysis it is noticed that women participation is high compared to men in the process like plantation, weeding, cooking. For instance weeding is common in the field and it is suggested to clearing the weed in regular intervals and in this act, the total participation of women is more than the men (Table3).

#### Cultivation method:

Bulk of the plaintiffs responded that elephant foot yams have been cultivated since aged times because of the crop duration is (6-8 months) so to get good yield within short period of time. Some of the respondents replied that this crop is cultivated since from their forefathers' time and they have some kind of love and affection towards this crop and they have no special reason for cultivation of this crop. Weeding is a common practice in the cultivation of this crop. Several farmers remove weeds by hand and some farmers apply weedicides. Pests and diseases are also very less except collar rot disease which often occurs. (Table 4).

**Table-3. Participation of men and women in the cultivation and utilization of elephant foot yam**

| Activity                      | Men | Women | Difference in Effort |       |
|-------------------------------|-----|-------|----------------------|-------|
|                               |     |       | Men                  | Women |
| Import of seeds               | 06  | 0     | 06                   | -     |
| Ploughing                     | 06  | 0     | 06                   | -     |
| Corm cutting                  | 06  | 0     | 06                   | -     |
| Adjusting pieces              | 0   | 10    | -                    | 10    |
| Plantation                    | 0   | 20    | -                    | 20    |
| Watering                      | 06  | 0     | 06                   | -     |
| Weeding                       | 0   | 20    | -                    | 20    |
| Manuring                      | 06  | 0     | 06                   | -     |
| Harvesting                    | 20  | 0     | 20                   | -     |
| Clearing of corm              | 0   | 20    | -                    | 20    |
| Peeling and cleaning          | 0   | 26    | -                    | 26    |
| Cooking time & Cocking method | 0   | 26    | -                    | 26    |

No of respondents n=30.

Amorphophallus is propagated through corms. Before planting, during the month of December, the corm is cut into sets of 750-100 g. each bearing a portion of central bud. Transplants of 100 g size for planting at a closer spacing of 63cm apart in the furrows. After one or two ploughings, Ridges and furrows were made at 73 cm apart during December. Planting material is placed vertically in the furrows. Fertilizers 40 kg N, 60 kg P<sub>2</sub>O<sub>5</sub> and 50 kg K<sub>2</sub>O / ha are applied after 45 days of planting. This is followed by digging interspaces and light earthing up. Tubers start sprouting after 2-3 months. The crop matures in 6-8 months after planting indicated by yellowing followed by complete drying of the pseudostem.

#### Harvest and consumption:

Farmers harvested corms in the dry season after the leaves had decomposed and the corms had entered dormancy. Suttle (1996) stated that dormancy is an indicator of the time for harvest of most of tuber crops. Underground corms are harvested with pick axe or by digging when the top is completely withered and fallen. Crop will be ready for harvest in 8-9 months after planting. However on better market price, tubers can be harvested six month onwards. Average yield is 30 - 40 t/ha.

Elephant foot yams are usually prepared after peeling and slicing by steaming for 1 to 2 hr. The storage of corms in cool and dry areas is not common because the farmers believe that the taste changes quickly during storage. Farmers usually do not eat a heavy lunch. Elephant foot yams are consumed between meals as a snack with brown or white sugar, and with or without ground coconut flesh. (Santosa E et al 2002).

**Table-4 Selection of crops by farmers for easy cultivation and maintenance**

| Crop         | Labour input                             | Pests and diseases                                                                                                                                                                     | Water requirement                                                                                                                                     | Harvest                                                         |
|--------------|------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------|
| Rice         | Needs more labour input than other crops | Sheath blight, Rice ,blast Bacterial blight ,Bakanae, Brown spot ,Narrow leaf spot, Grassy stunt, Bacterial leaf streak ,Stem rot Tungro, Stem borers Leafhoppers & plant hoppers etc. | 1300 -1500mm/anum                                                                                                                                     | Kharif – October-December<br>Rabi – march - April               |
| Maize        | More labour                              | Pink Borer, Shoot fly ,Stem Borer, Termites, Turcicum leaf blight, Turcicum leaf blight, Common rust etc.                                                                              | 600-900mm/anum                                                                                                                                        | Kharif September-October<br>Rabi February -April                |
| Banana       | Less                                     | Root stock/rhizome weevil, stem bore (, thrips, banana beetle), banana aphid. panama wilt, anthracnose, leaf spot, shoot rot , and viral diseases etc.                                 | 1,800 – 2,000 mm per annum                                                                                                                            | After nine months, the bananas are harvested while still green. |
| Elephant yam | Less                                     | Amorphophallus is free from major pests and diseases except collar rot caused by Sclerotium rolfsii.                                                                                   | Amorphophallus is mainly grown as a rainfed crop. During periods of late receipt of monsoon, a light irrigation is given during early stages of crop. | Usually July - August                                           |
| Potato       | Less                                     | Colorado Potato Beetle Flea Beetle Aphid Wireworm Early Bligh Late Bligh Mosaic Virus                                                                                                  | 500 to 700 mm                                                                                                                                         | early July- usually by late August                              |

### Factors leading to the cultivation of elephant foot yams:

- ✚ Soil is most suitable for this crop
- ✚ 6-8 months crop
- ✚ Labour input is less
- ✚ Pests and diseases are less
- ✚ Water requirement is less
- ✚ Application of fertilizers is somehow little when compared to other crops
- ✚ Market feasibility is not preferable, farmer can postpone harvesting of elephant foot yam, and generally the corms of elephant foot yam can be stored in the soil up to 8-12 months.
- ✚ More profitable crop

### Conclusion

Based on the above factors it is concluded that cultivation and production of foot yam in this West Godavari District is better than any other crop. Good yield, good market value and long storage period are encouraging factors for the farmer to grow this tuber crop in West Godavari villages.

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### Conflict of Interests

Authors declare that there is no conflict of interests regarding the publication of this paper.

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