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Quality Planting Material Production of Elephant Foot Yam through Farmers Participatory Approach in the Tribal Belts of Kerala

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Abstract

Multiplication and distribution of quality planting materials of tuber crops is one of the major limitations for the undue delay in the spread of high yielding varieties among the farmers. An attempt was made to involve tribal farmers of Attappadi region of Palakkad and Wyanad districts of Kerala for quality planting material production of elephant foot yam, one of the tropical tuber crops attaining commercial status nowadays. The programme was implemented under the project on Development of tuber crops financed by Govt. of Kerala during 2013-14 and 2014-15. Fifty tribal famers were selected from Agali panchayat of Attappadi, Palakkad and Amblalavayal panchayat of Wyanad. Quality planting materials of variety Gajendra, were distributed to 50 beneficiary farmers for covering an area of 10 cents each, thus covering a total of 2 ha in each location. Multiplication was carried out under the direct supervision of ICAR-CTCRI scientists under rainfed conditions. Farmers got an average yield of 3-5 kg per plant by planting 500g seed corms. Based on random sampling, an average corm yield of 42.5 and 60.12 $tha^{-1}$was estimated at Agali and Ambalavayal respectively. Keeping aside 20% of the produce for own planting and home consumption, rest was available for disposal among the neighboring farmers and nearby areas for planting. The area expansion possibility was estimated based on the seed supply chain over a period of three years. It was projected to cover an area of 1000 ha with the improved variety Gajendra, within a period of three years, if the seed chain goes successfully.

Key words: Elephant foot yam, planting material, participatory approach, tribal farmers

Introduction

In the recent past, economic importance of tuber crops has risen up considerably as food, feed, fuel and future crop and therefore the demand for quality planting material has also increased. Elephant foot yam is one among them gaining importance as a commercial crop in many states in India.

In cereals, the planting material multiplication ratio is 1:140 or even above, while in elephant foot yam, it is 1:2 or 1:3.Normally, elephant foot yam (EFY) or *Amorphophallus* is cultivated by using corm pieces (setts) cut from the seed corm or whole corms of small size. So invariably farmers have to keep aside a share of their produce for seed purpose.Corm setts weighing about 750 g to 1 kg is the normal planting material in EFY (KAU, 1996). However, use of such a large quantity of planting material as seed corm results in low multiplication ratio and less availability of planting materials of improved varieties. This low multiplication ratio is mainly responsible for the undue delay for the released high yielding varieties to reach the farmers.

The underground stem tuber, or corm is extensively used as a favourite vegetable by millions of people in India. It is a popular vegetable among the people of Kerala, Tamil Nadu,Andhra Pradesh, West Bengal, Odisha, Uttar Pradesh, Gujarat etc. Farmers grow many local cultivars varying in yield levels, cooking quality and acridity. Improved varieties like Gajendra, presently the leading

commercial variety in other states of India with high yield, good cooking quality and less acridity, released by AICRP on Tuber crops , ICAR-CTCRI is now getting attention among the commercial farmers of many states including Kerala. However, the availability of quality planting material remains to be a constraint for popularisation of this variety. So, an attempt was made to involve tribal farmers of Attappadi region of Palakkad and Wyanad districts, two major tribal tracts of Kerala, for quality planting material production of elephant foot yam, variety Gajendra. Indirectly, the programme aimed at improving the livelihood security, increasing income from farming and generating employment opportunities to the tribal farmers. The programme was implemented under the project on Development of tuber crops financed by Govt. of Kerala.

Materials and Methods

Two tribal dominated panchayats of Kerala viz., Agali in Attappadi region of Palakkad district and Amabalavayal of Wyanad district were selected for implementing the programme. At Agali, the programme was implemented during 2013-2014 and at Amabalavayal, it was implemented during 2014-2015. A total of 50 beneficiary famers were selected from each of the two locations with the help of Krishi Bhavan, State Department of Agriculture, Govt. of Kerala.

Quality planting material of variety Gajendra, 250 kg for covering an area of 10 cents of each beneficiary using 500g seed corm size, thus covering a total of 2 ha was distributed in each district. Two skill based training programmes on scientific cultivation practices including organic farming, mini sett planting (James George et al, 2004), seed treatment, plant protection measures, harvesting and storage of seed corms, seed standards were organized in each district. Scientists and experts visited the fields periodically for giving technical advices on intercultural operations, remedial measures for incidence of collar rot, rouging of unhealthy plants etc. The crop was raised under rainfed conditions, wherein an average of 2000- 2500 mm is received every year. At Attappadi, most of the farmers resorted to organic and at Ambalavayal, an integrated approach was followed to meet the standard nutrient requirement of 100- 50- 150 kg/ ha. Financial assistance was given to farmers taking into account the cost of cultivation and the land development work if any, required. In each location, corm yield was recorded at the time of harvest at 10 months after planting.

Results and Discussion

Based on the random sampling, an average corm yield of 42.5 and 61.5tha^{-1} was estimated at Agali and Ambalavayal respectively. Corm yield varied between 2.8-4.1 kg per plant at Agali with an average yield of 3.45 kg per plant. At Amablavayal, corm yield was more promising with an yield ranging between 3 and 7 kg per plant with an average yield of 4.87 kg per plant. Amorphophallus is not a common crop in the homesteads of Attappadi, whereas Wyanad chena, the local cultivar is commonly cultivated by Ambalavayal farmers. The improved variety along with better management conditions and the efforts of dedicated farmers resulted in a better harvest from Wyanad. Corm yield of 12-15 kg per plant was recorded by some of the progressive farmers.

Planting material multiplication

Based on the analysis of corm yield data recorded from different panchayats, a projection on the quantity of planting material produced as well as its possible area expansion over a period of three years is given in Fig 1 and 2.

Keeping aside 20% of the produce for own planting and home consumption, the rest was available for disposal among the neighboring farmers and nearby areas for planting (Table 1). The area expansion possible was estimated based on the seed supply chain over a period of three years. It was projected to cover an area of 1000 ha with the improved variety Gajendra, within a period of three years, if the seed chain goes successfully. It was

Table 1. Planting material multiplication

Elephant foot yam	Agali	Ambalavayal
Average corm yield per 10 cents	1.3725 t	2.405 t
For 50 selected units (2ha)	85 t	120 t
20% (home use)	17 t	24 t
Corms available as seed material	68 t	96 t
Area expansion possible (2nd year)	10.88 ha	15.36 ha

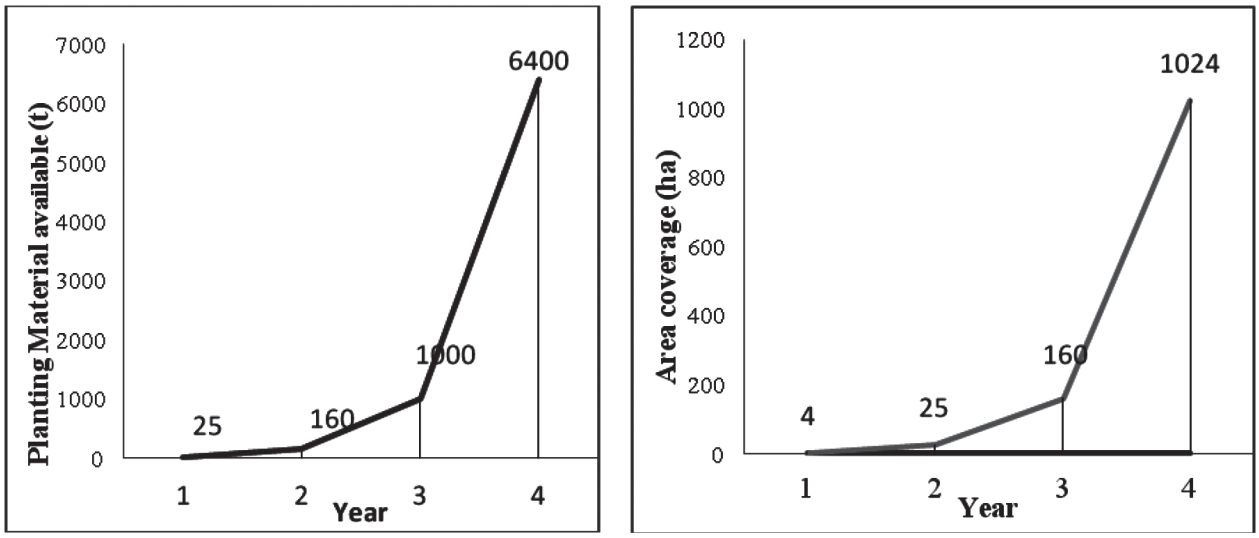

Fig.1. Projected estimate of planting material production and area coverage

Table 2. Economics of elephant foot yam cultivation in farmers fields (10 cents)

Item	Agali (₹)	Amabalavayal (₹)
Cultivation expenses including cost of planting materials	15,000/-	15,000/-
Corm yield	1725 kg	2435 kg
Gross returns (@ 30 per kg for tuber)	Rs. 51,750/-	73,050/-
Net returns	Rs. 36,750/-	58,050/-
B:C ratio	2.45:1	3.87:1

also possible to link the needy farmers of neighboring districts with the seed producing farmers through the project, thus creating an avenue for gaining additional revenue to tribal farmers.

Taking into consideration of the cost of elephant yam corms, transportation, field preparation, planting and other related expenses, the total cost of cultivation was estimated to be Rs.15000/- for an area of 10 cents. However, planting materials and cultivations expenses were distributed to beneficiary farmers from ICAR-CTCRI under the scheme. On an average, farmers got a corm yield of 3.45 at Agali and 4.87 kg at Ambalavayal. At the time of harvest, tuber price in the local markets was ₹ 30 to 40 per kg. Average B:C ratio was worked out to be 2.45: 1 at Agali and 3.87:1 at Ambalavayal (Table 2).

Conclusion

Highly fertile soil, hard working tribal population in tune along with their indigenous knowledge, comparatively pest and disease free environment, compatibility of elephant foot yam with the present homestead farming systems were the strengths identified for enhancing the socio economic situation of tribal farmers through the present intervention. Inadequate availability of rainfall, wild boar attack in farmers fields, collar rot incidence etc are some of the constraints identified in these areas, which may reduce the production by more than 50%,in some cases. However, it is felt that, the requirement of quality planting materials of improved elephant foot yam variety could be achieved to some extent through this tribal farmers participatory approach.

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