Elephant Foot Yam - a profitable intercrop for coconut gardens of Andaman and Nicobar Islands

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Coconut is the most widely grown crop in the Andaman and Nicobar Islands, either as monocrop or in combination with multiple crops and animal components. It is grown in over 20,000 ha area in Andaman and Nicobar Islands, out of which over 15,000 ha are in Nicobar district and remaining in Andaman Islands. The coconut area is fragmented in several islands making it impossible to follow any single type of cropping or farming systems. Growing various annuals and perennials in the interspaces of coconut plantations with a recommended spacing of 7.5 mx7.5 m have been proven to be successful as coconut based farming systems. However, depending upon the availability of inputs and management conditions, proper selection of crop species or combination of crops with adaption of appropriate management practices are lacking in many gardens of South Andaman which results in lesser income generation and under-utilization of natural resources.

Intercropping models with higher utility of horizontal and vertical space in the plantations are suggested as the best alternative to boost the income of the coconut growers as well to increase the productivity.

Elephant Foot Yam (EFY) *(Amorphophallus paeoniifolius)*, commonly known as Suranor Jimmikandis a tuber crop which produces underground stem tuber. The crop is gaining popularity due to of its yield potential under marginal management conditions of the Island cropping systems and its culinary properties.

The crop is largely cultivated in the Philippines, Java, Indonesia, Sumatra, Malaysia, Bangladesh, India and China. In India, it is cultivated widely in the states of Andhra Pradesh, West Bengal, Gujarat, Kerala, Tamil Nadu, Maharashtra, Uttar Pradesh, Bihar and Jharkhand. The tubers (called corms) are used as a vegetable after boiling or baking or frying. It is reported to be a rich sources of carbohydrates, calcium, (50 mg/g), phosphorus(34 mg/g) and vitamin A (260 IU/g). The leaves are also used as a vegetable by some local tribes in India which are reported to be rich in vitamin A.

It is a preferred tuber by different island communities in Andaman and Nicobar Islands for variety of culinary preparations such as fry, chips, curries either alone or in combination with other vegetables, tubers and coconut. Wild relatives under *Amorphophallus genus* and many introduced local types of EFY are used in the Islands which vary in the size, taste, and yield potential. Due to introduction of high yielding, non-acrid varieties, the crop is being adopted for commercial cultivation at many places in the country. In Andaman and Nicobar Islands, ICAR-CIARI has introduced and demonstrated the cultivation of improved varieties such as Gajendra, Sree Padma varieties of EFY. Demonstration of organic production of elephant foot yam under coconut based cropping system by ICAR-CIARI have shown to enhance productivity and profitability under Island cropping systems of marginal management conditions.This crop also offers excellent export potential from India,since it is not generally cultivated commercially in other countries.Cultivation practices of EFY under coconut plantations of Andaman is detailed here.

Soil and climate

Generally, Amorphophallus species grows well under tropical and subtropical humid climatic conditions with a mean annual temperature of 30-35^{o}C and a well distributed rain fall of 1000-1500 mm spread over a period of 6-8 months. It can come up on variety soils but a well-drained sandy loam soil (or) sandy clay loam soil with a pH of 5.5-7.0 is ideal for the growth of this crop. The climate and soil of Andaman and Nicobar Islands is ideally suited for cultivation of this crop.

Seed tubers of Elephant foot yam and preparation of cuttings

Treating the cut tubers in cow dung slurry and planting in interspaces of coconut plantation

Propagation

EFY is propagated by the use of offsets (or) corms. The off sets are nothing but miniature tubers arising from the mother corm. In some varieties/ types, the daughter corms are not produced in which the mother corm is cut vertically into pieces in such a way that each piece has portion of the central bud from where the plant grow after planting. Depending on the size of mother corm, it is cut into 4 or 6 or more pieces making them to about 300 to 500g weighing pieces. Dipping of planting material in cow dung slurry followed by drying in a shaded place is effective in accelerating the sprouting.

Field preparation and planting

Most coconut gardens in South Andaman are undulated. Hence use of tractors and mechanical devises is difficult. In such places, only manual field preparation is done with pickaxe. Wherever possible, the interspaces could be subjected to ploughing two to three times. Pits of 45 x 45 x 45 cm are dug at a spacing of 90 x 90 cm and the filled with 4-5 kg of FYM and topsoil. About 25 to 40 EFY plants could be accommodated per interspace of coconut depending on the presence of other intercrops such as cinnamon, nutmeg etc. The pretreated planting material is placed vertically in the pits and then covered with soil and compacted lightly. The ideal planting time is March-April under Island conditions. Delayed planting after commencement of monsoon rains may cause rotting of tubers. Hence, planting should be done at the right time.

Intercultural operations

Mulching: Immediately after planting, the pits are to be mulched with dried leaves which will induce better sprouting by conservation of moisture and helps controlling weed growth. Coconut leaves and arecanut leaves, both dried and fresh are used as mulch in the interspaces of coconut plantations. Application of Gliricidia leaves is also beneficial as it adds more nutrient to the soil.

Weeding: One (or) two manual weeding is necessary depending upon the amount of weed growth, first at 45 days after planting and the second, about one month after the first. Proper mulching decreases the need for second weeding which helps in manpower efficiency.

Plant protection

Not any major pests and diseases are noticed under Island conditions. Collar rot is an important disease, which occurs mainly due to poor drainage, water logging and mechanical injury at collar regions. Brownish lesions first occur on collar regions which spread to the entire pseudo stem and cause complete yellowing of the plant. Using disease free planting materials, maintaining good field sanitation, providing proper drainage and application of neem

Luxuriant growth of EFY under coconut

Harvested tubers, ready for sale

cake with Trichoderma will help in managing the collar rot.

Sucking pests like aphids and mealy bugs are also noticed occasionally which could be managed well with spraying neem oil @ 2ml per litre of water.

Harvesting

The crop can be harvested in about 8-9 months after planting. The tubers are harvested in November-December. The harvestable maturity is indicated by yellowing and drooping of the leaves. A light irrigation may be required before harvest of tubers to loosen the soil and to avoid damage of tubers during digging. The corms are dug out, cleaned and stored in well under ventilated places for several months without damage. The corm yield ranges from 40 to 50 t/ha depending on the soil conditions and management. This provides a reasonable additional income to the farmers as the price of EFY is about Rs. 30 to 40 per kg at farm gate. About 20 per cent of the harvest need to be kept as seed tubers for the next planting season after 3 or 4 months and the rest can be marketed.

Conclusion

Under the demonstrations by ICAR-CIARI, the selected farmers from South Andaman were provided with the planting material of Elephant foot yam (100 kg) each and imparted training on scientific cultivation practices. The scientific practices that were adopted by the farmers include basal application of organic manure; seed treatment with cow dung slurry and Trichoderma viride before sowing; Glyricidia green leaf mulching after sowing and once again after 45 days; Weeding after 45 days followed by earthing up. The farmers have realized average yield of 800 to 1000 kg elephant foot yam from 0.02 ha area plot after about nine months. Considering the market rate of Rs 30- 40 per kg of elephant foot yam tubers, they earned about Rs 24000- 30000 from 0.02 ha as additional income from the coconut system.Hence, Elephant Foot Yam is an ideally suitable intercrop in coconut plantation with high yield and high returns in Andaman and Nicobar Islands under rainfed and organic production. Use of improved varieties such as Gajendra, Sree Padma and adoption of scientific cultivation along with other suitable intercrops such as Cinnamon, Clove, Nutmeg and Black Pepper under coconut plantations will make the coconut based cropping systems profitable and productive in Andaman and Nicobar Islands. ■