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Technological interventions for sustainable cashew production and income enhancement

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Abstract: Cashew is an importance foreign exchange earning commercial horticultural crop of India. The cashew industry is facing certain problems, major being non availability of enough quantity of good quality raw nuts for processing. Need of the hour is expansion of area under cultivation and quality nut production; more farmers are to be brought under cashew cultivation, which in turn necessitates sustainable production/productivity and high returns from the plantations. This necessitates technological interventions and exploration of diversification possibilities in cashew plantations. Increased returns from unit area of cashew plantation is possible through assuring quality planting materials, high density /ultra high density planting systems, by following scientific cultivation practices or recommended package of practices which should be region specific, using high yielding and improved varieties, intercropping, bee keeping etc. Cashew apple utilization is another field to be looked into for large scale exploitation. The potential of cashew apple utilization has been proved by Kerala Agricultural University by standardizing technologies for tannin removal, long term storage of cashew apple and juice, and production of around 16 value added products from cashew apple.

INTRODUCTION

Cashew, (*Anacardium occidentale*), a native of Brazil was brought to India by the Portugese in the 16th century. The crop took to the soils of Peninsular India in a big way and flourished well. Over a period of four centuries from its introduction to India a

systemized economic exploitation did not take place. Only after later part of 19th century the versatile properties of this crop was realized and many small and large scale industries based on this crop started to flourish. Now cashew is grown in our country as a commodity of commerce and plays quite a

substantial role in the agricultural sector. It has a unique role in industrial and economic performance, livelihood support to farming communities, export earnings, agricultural and rural development and sustainable agriculture. Apart from protection of the environment and income generation that enhances food security, cashew has also a direct input into the nutrition of people in both rural and urban areas (Masawe and Kapinga, 2010).

Now it is an importance foreign exchange earning commercial horticultural crop of India. However, at present, the cashew industry is facing problems and a large number of factories are on the verge of shut down, mainly due to availability of good quality raw nuts for processing; a situation has arisen due to the fall in the domestic production of raw nuts as well as due to increased competition consequent to other nations entering into processing and value addition. Our domestic requirement of raw nuts for processing at present is about 15-20 lakh tones but the annual production is only 7-8 lakh tones. The demand is growing every year and we are bound to fulfill the huge requirement in a short period as import of raw nuts is dwindling and may stop after a few years.

The solution is, more farmers are to be brought under cashew cultivation, which in turn necessitates sustainable production/productivity and high returns from the plantations for which technological intervention is required. Increased returns from unit area of cashew plantation is possible through high density /ultra high density planting systems, by following scientific cultivation practices or recommended package of practices, using high yielding and improved varieties, intercropping, bee keeping etc. Cashew apple utilization is another field to be looked into for exploitation.

MAJOR CONSTRAINTS IN CASHEW PRODUCTION

- Scattered nature of plantations

- Senile plantations of seedling origin and of non-descript types, with poor yield and quality.
- Cashew is generally a neglected crop, planted in degraded lands, soils with poor fertility wasteland unsuitable for any other crop and receive little care and management. Pest and disease incidences when left unattended, damages the trees.
- Non adoption of recommended package of practices and scientific production technologies.
- Replanting and rejuvenation /top working not being done as per requirement.
- Lack of high yielding varieties and scarcity of quality planting material of improved varieties.
- Labour shortage, specific to regions
- Farmers shifting to other crops due to less returns in some of the cashew growing areas
- Dwindling size of operational holdings and other uses for land.
- Minimum domestic use for the raw nuts and cashew apple, which are by nature cumbersome to handle.
- Lack of cashew farmers'/producers' groups or registered companies.
- No compensation for yield loss due to climatic vagaries or pest attack.

STRATEGIES FOR BOOSTING CASHEW PRODUCTION

Realization of yield potential and maximization of returns from unit area of cashew plantation through the adoption of scientific production technologies, intercropping, cashew apple utilization etc can lead to sustainable cashew production in our country as well.

Some of the ideas are discussed briefly hereunder.

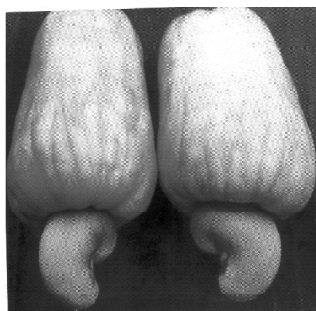
1. Use of improved /HY/hybrid varieties

Cultivation of high yielding varieties is the most important step in improving the productivity in cashew. Use of improved varieties with bold nuts, good kernel size of first grade quality, high shelling percentage and with very high yield can lead to high returns from cashew plantations. Examples are high

yielding varieties like Priyanka, Dharasree, Dhana, Sulabha, Sree, Amrutha, Vengurla-9, Vridhachalam-3, BPP- released from various research stations. Their potential yield can be exploited under good management conditions and adopting scientific production techniques, which can increase yield up to two to three fold times compared to local varieties.



Dhana



Priyanka



Sulabha

2. Use of grafts as planting material

Soft wood grafts have been identified as the best planting material for realizing maximum and consistent yield in cashew. Scions of high yielding varieties can be used for the production of grafts. For raising rootstocks, quality fresh seed nuts of medium size (7.0-9.0 g) have to be selected to get vigorously growing seedlings and sown in polythene bags of size 25 cm x 15 cm, (300 gauge thickness). Select 50-60 days old healthy seedlings having single

main stem grown in the centre of the polythene bag, as rootstock. Identify a high yielding preferred variety as mother plant to collect the scion material. Select 3-5 month old non-flowering lateral shoots of current season's growth with a length of 10-12 cm, straight, uniformly round and pencil thick with brown colour having dormant plumpy terminal bud as scion stick. Wedge grafting is done in the rootstock using the selected scion. The grafts will be ready for planting at 5-6 months after grafting.

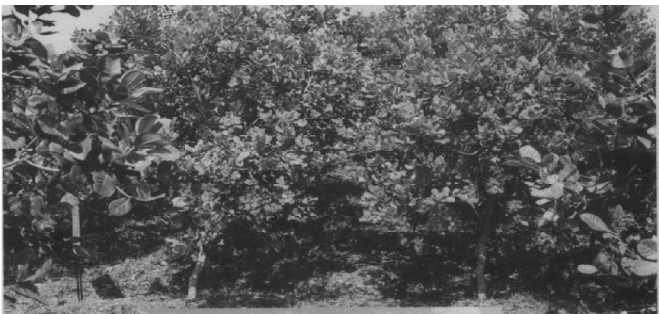


Cashew nursery

3. Adoption of High Density Planting

High density planting (HDP) is a technique useful for enhancing production and productivity of cashew plantations. This technique involves planting more number of grafts per unit area. High density planting would be more useful in poor soils where the rate of canopy expansion is slow. Adoption of high density planting with 625 trees/ha at a spacing of 4m x 4m proved to be better than normal density of planting with 170-180 trees/ha, at spacing of 7.5m x 7.5m, for realizing maximum production in the

initial years of cashew plantation. This can be brought to the normal density by selective felling or can be managed by regular pruning and fertilizer application. Ultra high density planting with 3m x 3m spacing is found to be successful in cashew as reported by Directorate of Cashew Research, Puttur, Karnataka, which can accommodate more than 1000 plants per hectare of land and hence more yield from unit area during the initial years. However, management of such plantation will be labour intensive. Moreover, varieties which give good response to such system have to be identified.



High density planting



Pruned plants in HDP

4. Intercropping

The inter space available in the plantation can be utilized for raising other crops which will provide additional income to the growers. During the first year, about 90% of the area is available for intercropping which reduces to 80 and 70 % during the second and third years. Intercropping can be successfully adopted for making cashew cultivation highly profitable and remunerative. The choice of the intercrop depends on the soil and climate as well

as age of the plantation. Leguminous crops, tuber crops, pineapple, turmeric, ginger, pepper, papaya, certain medicinal plants and vegetables have been found to be profitable which increases total revenue from cashew plantations. The intercrops can be grown till the full development of canopy in cashew, after which only the shade loving crops can be cultivated. Some varieties of pepper which prefer shade were found to be successfully grown in cashew plantations.



Intercropping with colocasia, turmeric, pineapple and yam

5. Adoption of scientific production technologies

Pruning and training

The sprouts coming from the rootstock portion of the graft should be removed during the first year of planting. Initial training and pruning of young cashew plants during the first 3-4 years is essential for providing proper shape to the tree. This allows proper growth of the canopy and receipt of adequate sunlight on all the branches. Thereafter, little or no pruning is necessary. Proper staking of the plants is required to avoid lodging. The flower panicles emerging from the grafts during the first and second year of planting should also be removed. Removal of dried and criss cross branches is necessary at all stages of growth for better performance of the crop.

Nutrient management

Since cashew is grown mainly without applying fertilizers, the potentialities of bio fertilizers as well as other management practices including efficient recycling of litter can be utilized best for improving the productivity. Integrated nutrient management can lead to higher returns from cashew plantations. Nutrients are to be applied based on the soil test data. The organic materials available in the plantation can be subjected to vermicomposting and applied to the trees as needed. The requirement of nutrients varies from place to place according to the soil type, climatic factors, age and also other crop management practices. Timely application of correct dose of manures and fertilizers is important for getting maximum yield.

Irrigation

Water requirement and irrigation depends on many factors such as climatic conditions, soil type, age and stage of the crop, etc. Research reports show that drip irrigation @ 80 litres/tree once in 4 days from 2nd fortnight of December to end of March

coinciding with the flowering season resulted in significantly higher yield compared to lower levels of irrigation or without irrigation. In high density planting systems fertigation is found to give very good yields.

Weed management

Timely weeding is needed for better performance of the crop. Depending upon the weed growth, weeding operation may be done during August-September. Mulch the plant base with dry leaves to reduce sun-scorch to tender plants. Sickle weeding is the most common practice of weeding.

Pest management

Pest infestation is a serious constraint in cashew production. Key insect pests are tea mosquito bug (TMB) and cashew stem and root borer (CSRB), even though multitudes of insect-pests inclusive of other arthropod pests are recorded. Timely pest management is very essential in cashew for getting sustainable yield. Tea mosquito bug is a serious pest affecting cashew, usually appears with the emergence of new flushes and panicle. Drying of inflorescence and dieback of shoots are the symptoms of attack. Cashews stem and root borer is another serious pest, which is capable of destroying the whole cashew tree. Main symptoms of attack are yellowing of leaves, drying of twigs, presence of holes at the base of stem with exuding sap and frass. Regular checking for the symptoms of these pests' attack and monitoring will lead to timely control measures and in turn better yield. Disease infestation is also to be taken care though not much severe compared to pest attack.

6. Cashew apple utilization

Cashew apple utilization has been identified as a highly remunerative enterprise to get additional income from cashew plantations. Kerala Agricultural University has standardized the value addition

technologies in cashew apple for the first time in India. According to Mini *et al* (2006), a net profit of Rs 10368/- can be obtained by processing one tone of Cashew apple. By effective utilization of cashew apple on a commercial scale, the farmers can be assured of increased income. KAU has standardized the technologies for removal of tannin and preservation of apple and juice and also developed many value added products like syrup, jam, RTS

drink, pickle, carbonated drink, vinegar, candy, chocolate, halva, etc from cashew apple (Sobhana, 2018). Cashew apple or its *pomace* can be used to make vermicompost, biogas, animal feed etc. Cashew apple processing can promote considerable economic activity in cashew growing areas, leading to substantial employment generation and added income to farmers, thereby making cashew cultivation more attractive.



Cashew apple and products from Cashew Research Station, Madakkathara, KAU, Thrissur

Future Line

Replacing the plantations of seedling origin with grafts of high yielders is to be done. Rejuvenation of senile cashew orchards is another better option. In case, if there is a little scope for expansion of area under cashew because of less per capita land availability high density planting is a good option for land utilization, the high rate of labour to be utilized for pruning measures, a constraint has to be looked into. The research programme on varietal improvement has to be intensified with emphasis on selection from existing variations in different regions. The ideal type would be dwarf bushy plant with intensive branching, regular bearing and short flowering phase, high sex ratio and good setting percentage and with production of medium sized nuts giving high shelling percentage. Potential combinations for above traits may be the target for hybridization. The compact dwarf types are best suited for high density planting. Awareness

programme on scientific crop management techniques and cashew apple utilization is to be intensified. Identified cashew producers' groups should be formed at state level as well as national level. They should have good linkage and interaction with all agencies/organizations related to cashew like Cashew Export Promotion Council of India, National Horticulture Board, Cashew Development Corporations, Directorate of Cashew nut and Cocoa Development, National Horticulture Mission etc. There should be crop insurance and support price for cashew so as to get steady income to the farmers.

Potential areas for increasing the production of cashew

More area has to be brought under cashew cultivation. It can be thought of to plant cashew in the fallow and waste lands, marginal land and roadside/canal side lands as well as in the barren lands of the public sector undertakings, government

institutions, university campuses, cashew factories etc. With the maximum exploitation of the existing area and rejuvenation of senile plantations as well as adoption of scientific management technologies, it is very much possible to boost cashew production in our country.

CONCLUSION

There is no doubt that domestic consumption of cashew is increasing day by day and production has to be enhanced. Poor genetic make-up of the existing cashew plantation is one of the reasons for the extremely poor and fluctuating yields. The new hybrid varieties have a very high yield potential. Hence new plantation and replacement of senile plantation with the clones of these varieties should be undertaken to enhance production. Cashew industry which is a major employment provider to women is facing severe challenges due to this declining domestic production. Area expansion with high yielding varieties, replanting and rejuvenation of old plants, value addition and scientific care and management of the crop can go a long way in

enhancing productivity and production of the sustainable crop and make it popular among the farmers. The practices to retain the quality of cashew nut and kernel like organic farming, good agriculture practice, good manufacturing practice; etc has to be adopted by farmers and processors.

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