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Farmer Innovation to Integrate Inter Cropping and Soil and Water Conservation Measures in Coconut Garden - A Case Study

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Introduction

In Kerala, the coconut palm is predominantly grown in small and marginal holdings. Under such situations coconut cultivation as a monocrop provides less scope for gainful employment opportunities for the family labour throughout the year and to generate sufficient income to meet the family requirements. To overcome this difficulty, it is recommended to adopt coconut based multiple cropping systems, which could enhance income and employment opportunities of the cultivator. The unique growth habit of coconut palm provides ample opportunities for growing subsidiary crops in the interspaces in coconut garden. Studies have shown that the rooting pattern in coconut is such that only 25 per cent of land area is effectively utilized when it is planted at the recommended spacing of 7.5m. The remaining area could be effectively utilized for raising subsidiary crops. Similarly plenty of sunlight infiltrates down in the coconut garden which can be effectively tapped by growing intercrops. A variety of crop combinations involving annuals, biennials and perennials are suggested as suitable inter/mixed crops in coconut garden depending on the factors like growth stage of coconut palm and other agro-ecological situations in the coconut garden, availability of resources like finance, farmer's needs, market demands, etc.

Pit ready for filling with coconut husk

Mr. Sebastian, P. Augustine in his coconut garden where his innovative farming ideas are practiced

Proper soil and moisture conservation practices are vital for ensuring sustainable coconut production, especially in sloppy and undulating terrains. Non-adoption of proper soil and water conservation measures is often identified as one of the factors for the low productivity of coconut, in such areas. A number of soil and moisture conservation practices such as regular ploughing or digging of the interspaces of coconut palms, mulching, application of sufficient quantity of organic manure, husk burial, etc are recommended for soil and water conservation in coconut garden. Along with such measures, practices like contour bunding, terracing etc. can also be taken up. Many farmers adopt various practices for multiple cropping and soil and water conservation for sustainable production in coconut.

Coconut Cultivation by 'Kera Kesari', Mr. Sebastian P. Augustine - A success story

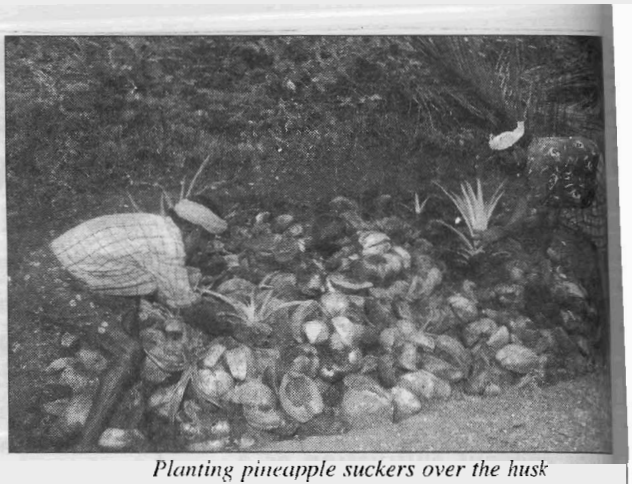
Shri. Sebastian P. Augustine is a retired Government employee who is

actively engaged in farming. He owns 6.0 ha of land at Bheemandadi in West Eleri grama panchayat of Kasaragod district, in which coconut is the main crop. The farm is located in sloppy terrain near the Chaithravahini river. About 300 WCT palms are accommodated in 2.0 ha with an average spacing of more than 7.5 m spacing. Pepper is trailed on to coconut palms as mixed crop. He follows the recommended technologies for integrated nutrient management, water management and crop protection in his coconut garden and harvests about 100 nuts per palm per year. As a recognition for the achievement made by Shri. Augustine in coconut cultivation, he was honoured with the "Kera Kesari" award instituted by the Department of Agriculture, Government of Kerala, for the best coconut cultivator, in the year 1999.

Apart from following the recommended crop management technologies, Shri. Augustine also adopts a unique method for integrating crop intensification and soil and moisture conservation practices in his coconut garden, which is described below.

Integration of inter cropping and soil and water conservation measures in coconut garden

As stated earlier, the coconut garden of Shri. Augustine is in the sloppy terrain and soil and water conservation measures assume much significance for sustainable productivity of the garden. He realised the same and implemented a unique approach to integrate crop intensification and soil and water conservation measures in coconut garden. The steps involved were :



Planting pineapple suckers over the husk

a) Taking pits in the inter space of coconut palms

At the commencement of south west monsoon, pits of 3 m width, 3 m length and 2.4 m depth were taken in the inter space across the slope of the land.

b) Putting the excavated soil across the slope to serve as contour bunds

The soil excavated while taking pits was put in the inter space at regular intervals so as to form contour bunds.

c) Arranging coconut husks in layers in the pits

Coconut husks were stacked in layers in the pits with their concave side facing upwards. At least one layer of husk was above the ground surface.

Pit filled with coconut husk

d) Planting pineapple suckers in the top layer of coconut husk in the pit.

After husks were arranged in the pit, pineapple suckers of Mauritius variety were planted in the top layer husk at a spacing of 30 cm.

e) Planting arrowroot in the four cor of the pit

3-4 arrowroot plants were plant the four corners of the pits after plar the pineapple suckers. This was do ward off the termite attack whi usually observed on husks spre ground surface.

f) Harvesting the pineapple after th crop and replanting with fresh suc

g) Refilling husks in the pit

After 3-4 years, the husk layers r down in the pit consequent to decomposition. At that time, he re the pit with fresh husk and plant pineapple suckers again.

Perceived advantages and scien rationale

Shri. Augustine perceived var advantages from the unique practic followed. The contour bunds he m using the soil excavated while taking could reduce the run off from the water. The benefits of husk burial in taken in the inter space of coconut pa such as conservation of moist addition of organic matter and sup of small quantity of plant nutrients well documented. Shri. Augus resorted to the indigenous practic growing arrowroots to prevent ter

attack, which was usually observed when coconut husks are spread on soil surface. On an average, he could harvest one kg pineapple per plant. He does not apply manures or fertilizers for the pineapple and as such there is no expense for crop maintenance except for removal of weeds in the husk bed. The team of scientists from CPCRI, Kasaragod on their visit to Shri. Augustine's garden agreed with Shri. Augustine that there are advantages and scientific rationale in the unique method he followed to integrate crop intensification and soil and water conservation measures in coconut garden.

The unique method of cultivating pineapple in the (soil less) husk medium has become feasible due to the slow degradation of husk and the resultant release of nutrients for crop growth. The degradation process could be brought about by the natural microbial flora in the husk as well as the microbial load deposited by the run off water in addition to the enzymes released by the pineapple roots. Another factor favouring the degradation of the husk is the continuous availability of moisture as the husks imbibe 6-8 times its weight of water during the monsoon season and it has very high moisture holding capacity. The interaction between plant roots, microbes and organic biomass results degradation of coconut husk releasing nutrients for pine apple growth and organic fruit production. The decomposed husk and the vegetative plant biomass of pine apple on recycling becomes a valuable nutrient source for the main crop coconut and the intercrops in the system. Though the growth and yield of pineapple plants grown over the coconut husk is not on par with the potential yield in an intercropped garden, there is scope for improving the same. Currently the pineapple suckers are just spread over the husk, which makes the anchorage difficult. However, by the application of a thin layer of soil over the top layer of husk and then planting pineapple suckers on that layer, better establishment of pineapple plants can be obtained which will be reflected in the subsequent growth and yield.

Pineapple established over husk

Conclusion

Adoption of coconut based cropping system enhances the income and employment generation in coconut cultivation which is very relevant for small and marginal holdings in Kerala. Similarly proper soil and moisture conservation practices are very important for ensuring sustainable productivity of coconut palms in sloppy and undulating terrains. Though there are a number of recommended technologies for the above, many farmers do innovate in implementing the technologies in their farms. The experience of Shri. Sebastian P. Augustine discussed above clearly indicates the viability as well as scope for refining, such practices in the light of the need for sustaining coconut productivity.

Egg Coconuts

Egg coconut is not a new coconut variety but refers to a form of product from tender coconuts where the whole round soft kernel is pull out from its shell with the tender water intact in it. This is possible by the use of a thin and flexible knife made from the horn of buffalo. The product is similar to the egg of turtle, which is soft. Uusally, a straw is used to drink the water inside, and the flesh (kernel) is eaten afterwards.

For the commercial production of egg coconuts, the age of the bunch to be collected is critical. The albumen (kernel) should not be too hard or too soft. Generally, the slightly older bunch of tender nuts are used to make egg coconuts, and this generally correspond to 8 or 9 months old fruits. From experience from a commercial processor of egg coconuts in Malaysia, the Malayan Yellow Dwarf is preferred than Malayan Red Dwarf, because the husk and shell of MYD is softer and easier to manage. Furthermore, the nut size of MYD is smaller than the MRD.

- The Cocomunity