Coconut based High Density Multi Species Cropping System

E. Padma, H.P. Maheswarappa and G. Ramanandam
AICRP on Palms, Ambajipeta (East Godavari, A.P.).

In India, Andhra Pradesh is one of the major coconut growing states after Kerala, Karnataka and Tamilnadu with 1.05 lakh hectares area and producing 1463 million nuts annually. Though, the state has the highest productivity of 13811 nuts per hectare (CDB statistics, 2014), the net returns per unit area is low and uncertain. In Andhra Pradesh, though coconut is being cultivated in almost all districts, majority area is confined to East and West Godavari districts. These two districts stand first in area, production and productivity in the state. However in the recent past, coconut farmers experienced considerable loss due to increased cost of cultivation and abiotic stresses like rising temperature and frequent cyclones. In coastal Andhra region, monocropping is predominant under irrigated conditions adopting spacing at 8.0 x 8.0 m, which does not fully utilize the natural resources like soil, space and solar radiation. Coconut being a widely spaced crop, provides sufficient scope for intercropping of different annual and perennial crops. Moreover, certain intercrops can successfully be grown because of its ability to tolerate coconut shade. Therefore, interspace could be profitably exploited for cultivation of intercrops suitable for the agro climatic condition and has good scope for increasing the net returns from existing coconut plantations.

Keeping in view the importance of High Density Multi Species Cropping System (HDMSCS) a trial was conducted at Horticultural Research Station, Ambajipeta during 2008-12 with cocoa, banana, pineapple, elephant foot yam and heliconia as intercrops in coconut. The mean data of four years revealed that nut yield recorded in coconut under cropping system was117.3 per palm whereas under monocropping it was 96.5 nuts per palm

.With respect to intercrops, cocoa recorded yield of 2.0 kg dry beans/tree, banana 22.7 kg/plant, pineapple 0.9 kg/plant, elephant foot yam yielded corm of weight 2.8 kg/plant and Heliconia 12 spikes/plant. With respect to biomass production, a total quantity of 34.5 t/ha/year on fresh weight basis was collected from the bio-system which was used for production of vermicompost. The economic analysis revealed that the highest net returns were obtained in coconut based cropping system (Rs.1,77,480/-compared to coconut monocrop (Rs.19255/-)

The coconut based high density multispecies cropping system was successfully demonstrated in farmer's fields to create awareness among farmers to adopt HDMSCS for sustained and higher economic returns.

Major Cropping systems being adopted by farmers of East and West Godavari districts of Andhra Pradesh

- Coconut+ Cocoa + Banana
- Coconut+ Cocoa

+Papaya + Fodder grasses ● Coconut + Papaya + Elephant Foot Yam + Dioscorea +Marigold ● Coconut + Arecanut + Cocoa+ Pepper +Banana ● Coconut + Arecanut + Cocoa+ Pepper +Banana+ Pineapple ● Coconut + Cocoa+ Guava ● Coconut +Papaya+Ginger ● Coconut + Turmeric

Success Story: Sri Khandavalli Nageswara Rao, Munganda, Ambajipeta, East Godavari District, Acerage:1.6 ha. Cropping system : Coconut + Arecanut + Cocoa+ Pepper +Banana

Mr. K. Nageswara Rao is a progressive farmer cultivating coconut with local cultivar *East Coast Tall* at a spacing of 8x8 m as monocrop since 1980. Due to wide interspace, there was luxuriant weed growth which lead to increased cost of cultivation with respect to weed management. The farmer applied higher dosage of nitrogen fertilizers with less usage of Phosphorus and Potassium fertilizers with no organic manures.

Cyclone impact and his new approach

During the year 1996, due to super cyclone in coastal region of Andhra Pradesh, the farmer's coconut garden was badly affected wherein more than 90 % trees were lodged and uprooted. Under this situation, the farmer approached the scientists of AICRP on Palms, Horticultural Research Station and replanted in 1997 with coconut hybrid Godavari Ganga in two acres and remaining two acres with East Coast Tall cultivar and Arecanut variety Mangala (600 nos) as intercrop duly adopting the scientific management practices as advised by the scientists. The hybrid started bearing within four years while the ECT cultivar started bearing from 6th year and Arecanut started bearing from 5th year onwards. He maintained the garden as such for 15 years. In 2011, the farmer was inspired by HDMSCS model grown in the research station and adopted HDMSCS in his garden by planting cocoa variety Forestero (600 nos), banana variety Tella Chakkerakeli (2000 nos), and pepper variety Panniyur-I (240 nos) as inter crops.

Increased returns and additional benefits

After adopting HDMSCS for four years, he obtained increased yields of 100 and 150 nuts/palm in ECT and Godavari Ganga respectively in HDMSCS compared to mono cropping. Further he reaped on an average of 1.5 kg dry beans /tree in cocoa, 0.8 kg chali /plant in arecanut and 1.25 kg/vine in pepper. By adopting high density multispecies cropping system in his four acres, he obtained an annual net income of Rs.2,44,600/- Coconut – Rs.63,600/-, Cocoa – Rs.54,000/-, Arecanut – Rs.50,000/-, Banana – Rs. 46,000/- and Pepper – Rs.38,000/-). Further he opined that HDMSCS improved soil fertility and nutritional status of his garden which helped in reduced inorganic fertilizer usage.

The farmer is satisfied with HDMSCS model in getting higher returns compared to coconut monocrop and also noticed low incidence of pest and diseases with sustained and assured net returns from different intercrops . He expressed his gratitude to AICRP on Palms, HRS, Ambajipeta for developing HDMSCS model. ■