

# Coconut based cropping systems developed for different agro- climatic regions

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About 80 per cent of coconut in the world is cultivated by small farmers, and these small holdings are mainly committed to coconut monocrop, which normally occupy the land for about a century. Under such monocropping system, majority of the coconut holdings do not generate adequate income and employment for the dependent families. Considering the availability of coconut areas, rainfall and climatic conditions there is huge scope for intensification and diversification of coconut based farming systems by modification/realignment of interspaces. Multispecies cropping under coconut particularly during the early growth stage (> 5 yr) and after the age of twenty five years of plantation ensures maximum resource utilization and higher additional income per unit area of soil, water and light. Intercropping results improvement in the soil properties and biological activities in the root region. Overall the soil environment is modified for

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<b>Evolving location-specific coconut based farming systems with major emphasis on farm-waste utilization.</b>	
<b>a. Coconut based cropping system comprising of following crops was recommended for different regions:</b>	
Aliyarnagar (TN)	Coconut+banana+turmeric+EFY+pineapple+Tapioca+Bhendi
Veppankulam (TN)	Coconut + black pepper + banana + elephant foot yam + coriander
Mondouri (West Bengal)	Coconut+black pepper+pineapple+banana
Bhubaneshwar (Odisha)	Coconut + banana + tube rose (in young coconut garden)
Jagadapur (Chhattisgarrah)	Coconut + black pepper + carnation + chrysanthemum
Kahikuchi (Assam)	Coconut + black pepper + turmeric+banana
Konkan region of Maharashtra	Coconut + Turmeric + banana + pineapple + tapioca
Arsikere (Karnataka) -	Intercropping of lemon, drumstick, french bean-ladies finger with adult coconut palms is productive and remunerative.
<b>b. Intercropping with region specific medicinal and aromatic crops in coconut garden was also found to increase income of coconut farmer with the following crops.</b>	
Ambajipeta (A.P.)	Palmarosa, mango ginger, patchouli, Citronella
Aliyarnagar (TN)	Alpinia galanga, Lemon grass, Patchouli
Arsikere (Karnataka)	Lemon grass, garden rue, tulsi, kalmegh, arrow root and makoi
Kahikuchi (Assam)	Pipali, Patchouli, Citronella, Sarpagandha
Mondouri (WB)	Sarpagandha, Aswagandha, Arrowroot
Ratnagiri (MS)	Sathavari, Adulsa, Arrow root, Lemon grass, Citronella
Veppankulam (TN)	Alpinia galanga, Ocimum sanctum
Jagadapur (Chhattisgarh)	Alpinia galanga, Amahaldi, Sarpagandha, Tikhur, Patchouli

the better crop growth and development. Diversified cropping system could be one of the solutions to realize sustainable productivity and maximum income per unit area of land besides maintaining soil fertility by the recycling of by products of crops.

All India Coordinated Research Project on Palms (AICRPP), has been an important contributor to the region’s specific coconut research and development effort. Evaluation of coconut based cropping system for their performance in different agro-climatic regions is one of the priority areas of research under AICRP on Palms. At present, in eight coconut centre. CBCS model has been evaluated and suitable inter crops are listed below.

### Coconut based cropping system research highlights from AICRP centers

The Coconut based cropping system model Coconut + Cocoa + Banana + Moringa + Pineapple with integrated nutrient management at AICRP Aliyarnagar revealed that the cropping system with 75% NPK + organic recycling with vermicompost recorded highest nut yield of 182 per palm and highest net income (Rs. 3.80 lakhs per ha) and B:C ratio (2.71) compared to monocrop coconut with recommended NPK + FYM which recorded 150



Coconut based cropping system at Ambajipeta



Alpinia galanga

Patchouli as inter crop in coconut



nuts /palm, Rs. 1.31 lakhs / ha and B:C ratio of 2.00 respectively. In this cropping system, the maximum earth worm population in coconut basin (12 no./m<sup>2</sup>), cocoa basin (12 no./m<sup>2</sup>), banana basin (9 no./m<sup>2</sup>) improved with vermicompost, vermi wash, green manuring, coir-pith compost and mulching with coconut leaves, similar pattern was observed with Bacteria (65.4 10<sup>4</sup> CFU/g), Fungi (103 CFU/g), Actinomycetes (16.3 x 10<sup>5</sup> CFU/g) and least in mono crop with RD NPK + FYM (46.6;10.1;14.2/g soil respectively) .

Studies at AICRP Ambajipeta in CBCS model cocoa + banana + pineapple + tomato + heliconia revealed that the system provided with 75 % recommended NPK + organic recycling with vermicompost recorded maximum nut yield per palm (124.8) compared to mono-crop with recommended NPK + FYM (108 nuts per palm) . The cropping system comprising of coconut + black pepper + nutmeg + cinnamon + banana + pineapple provided with 50% recommended NPK + organic recycling with vermicompost + bio fertilizer and green manuring reported significantly higher yield of nuts per palm (126), Rs. 6.29 lakhs/ha compared to mono-crop of coconut (102 nuts/palm) and Rs. 1.57 lakhs net returns/ha.

A field experiment conducted at Horticultural Research Station, Kahikuchi of Assam Agricultural University revealed the performance of medicinal

and aromatic plants grown as intercrops in 32 year old Assam Green Tall coconut garden. There were three medicinal plants viz., sarpagandha (*Rauvolfia serpentina*), pipali (*Piper longum*) and vedailota (*Paederia foetida*) and two aromatic plants viz., citronella (*Cymbopogon winterianus*) and patchouli (*Pogostemon cablin*) in the experiment. The yield of all the medicinal and aromatic plants grown as intercrop in coconut garden were found to be reduced compared to their sole crop yields. Intercropping system of growing with patchouli under coconut recorded the highest net income (178,089 ha<sup>-1</sup>) and B:C ratio (3.26) followed by sarpagandha (157,484 ha<sup>-1</sup> and 3.09), pipali (113,118 ha<sup>-1</sup> and 2.62), citronella (107,432 ha<sup>-1</sup> and 2.40) and vedailota (100,382 ha<sup>-1</sup> and 2.36). Hence, intercropping of patchouli, sarpagandha and pipali with coconut was recommended for Assam condition.

Coconut based intercropping and mixed cropping systems have to be promoted for best owing multiple benefits on the farming community. This will enhance the productivity of natural resources, economic viability of coconut farming as well as the food and nutrition security of the nation. Soil health management practices which play a greater role in increasing the soil carbon sequestration needs to be studied in different locations with different cropping systems. ■