

COCONUT BASED MIXED FARMING SYSTEM

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Coconut is essentially a crop of small growers in India. The distribution of coconut holdings in the four southern states i.e. given in Table 1, over 90% of the coconut holdings are less than one ha. in area and the average size of a coconut holding is only 0.22 ha. So it is essential to grow it mixed with annual and perennial crops so as to increase the productivity per unit area. This practice of growing other crops between or under coconuts is followed as a means of getting some additional returns. A system of integrating animal husbandry with coconut production has also been developed to suit the special conditions of diminishing farm size and surplus farm labour available at the coconut areas of India. The intensive system described here consists of a farmer with a small holding of about 0.5 ha. or more of coconut land, who maintains a few milch animals. The inter space of coconuts are planted with fodder grasses and legumes which are manured with the cowdung and burn wastes. A gas plant working with the cowdung will meet part of the fuel (energy) requirement of the farmers domestic purpose. There is vast scope to introduce other subsidiary enterprises like poultry, rabbit farming and piggery. Some of the crops like banana, tapioca, pineapple can be taken up as intercrops in staggered manner all through the year.

Fodders: Screening trials conducted at Kasaragod showed that the fodder grasses Guatemala (*Tripsacum laxum*) hybrid napier (Pusa giant and NB21) and guinea grass *Panicum maximum* gave an yield of around 50-60 t. of green fodder per ha. per year under coconut shade; and the legumes brazilian lucern (*Stylosanthes gracilis*) and cowpea (*Vigna unguiculata*) about 30 t./ha. The cutting interval is 30-40 days. At a feeding rate of 30-40 kg. of green fodder per animal per day with grasses and legumes in ration of 3:1 an area of one ha. could support four milch animals.

In one ha. there will be 175 palms with a spacing of 7.5 m x 7.5 m. Choose such a garden where the palms are above 30-35 years at age with satisfactory light interception. After deep ploughing apply 10 t. compost, 25 kg. nitrogen, 80 kg. P_2O_5 and 80 kg. K_2O per ha. Grass slips are planted at 50 cm row spacing with 30 cm. spacing within the row with about 66,000 slips per ha. of circular area of 2m radius around the palm was left free. After every cutting about 25 kg. N per ha is to be applied and irrigation is given at frequent intervals. Every year apply about 50 kg. P_2O_5 and 50 kg. K_2O per ha. in two splits i.e. first dose in June-July and second dose in September-October. The grass will be ready for cutting in 70-80 days after planting and afterwards at 30-40 days intervals. At a feeding rate of 30-40 kg. green fodder per animal per day the grass raised can support four to five milch animals. All these crops except cowpea will be in field for a period of three years after which they require replanting.

Intercrops: Pepper can be trailed to the coconut. Usually pepper is planted 30 cm away from the bole and will be maintained to a height of 4 meter. Crops like clove and nutmeg can be planted at regular intervals in between cocomut rows. Other crops like banana, tapioca and vegetables can be grown all along borders and field bunds.

Drying: Grass from one hactare garden can support 5 miloh animals. High yielding cow breeds suited to local environment should be chosen. Balance feed has to be given.

Feeding schedule

When grass is available plenty When paddy straw is the main source

	Concentrate	Green grass Kg	Concen- trate Kg.	Green grass Kg.	Straw Kg.
Dry cow	..	25-30	1.25	3.00	6.00
Milking animals	1 kg for every 2.5 to 3.00 kg. of milk	30	1.25+ 1 kg. for e every 2.5 to 3.00 kg. of milk.	5.00	6.00
Pregnant	Production allowance + 1 kg from 7th month of pre- gnancy.	30	Maintenance + Production allowance + 1 kg from 7th month of pre- gnancy.	6.00	6.00

Biogas plant: The production of biogas from cowdung is based on the principles of anaerobic decomposition of the dung, so that the carbon, which constitutes about 40% of the dry weight of dung is converted to methane. Manure from 4-5 cows can generate about 4 M³ gas which will be sufficient for a the domestic use of small family. This gas is safe and innocuous. The slurry from the gas plant can be used as manurè as it lose no manurial value by anaerobic decomposition.

Farm family model: Mixed farming experiment was started in 1972 at Central Plantation Crops Research Institute, Kasaregod. The project envisaged a study on benefits and support a small family could get by mixed farming practice. Grasses NB-21 and Guinea are interplanted in about 1.0 ha. coconut garden. The coconut palms 214 in number were approximately 60 years of age at the time of starting of the experiment. Five milch animals of Jersey cross/Brown Swiss/Holstein foreign were handed over to a family consisting of a man, his wife and children. All the operations connected with the mixed farming system were done by the family. Additional labour is provided for replanting of grass, fertilizer application, harvesting of coconuts and repairs of buildings and field bunds. The milk is sold to the consumers at prevailing market rate. The male calves are regularly disposed. The female calves were reared till the first lactation and if found good yielder they are replaced. The average milk yield per day is 6 to 8 kg. per cow during first lactation and 8 to 9 kg. in 2nd and 3rd lactation. The lactation period is about 300 days.

Economic analysis: This model is in progress for last 16 years. The system seems to be viable although the initial investment is high. Hence the system can be effectively employed if lead banks lend loan. The system at present yields about 16,000 coconuts, 7000 litres of milk, 500 kg. banana and other subsidiary crops and byproducts. Net return to the family including the wages earned is approximates Rs.48,000/- per annum. As against the 150 man days, annual labour requirement for pure coconut plantation mixed farming generates nearly 800-850 man days per year.

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Table 1: Distribution of coconut holdings in the southern states of India.

Size of holding (ha.)	Percentage of holdings			
	Kerala	Karnataka	Tamilnadu	Andhra Pradesh.
Less than 0.2	37.1	61.5	52.5	67.7
0.2 - 1.0	52.8	33.2	42.9	36.6
1.0 - 2.0	7.9	3.6	3.6	1.7
More than 2.0	2.2	1.7	1.0	..