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ECONOMICS OF NUTRIENT MANAGEMENT IN ARECANUT BASED FARMING SYSTEMS

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ABSTRACT

Arecanut is a small holder's crop in India cultivated in 0.27 million ha with an anr production of 0.33 million tons of nuts and the average productivity is 1243 kg/ha. Areca being a perennial crop, has a gestation period of 4-6 years and a long economic life spa about 45 years. Hence the flow of costs and returns spread over a number of years v varying degree of magnitude. Under this situation, in order to minimize the degre production and price risks and stabilize the gross farm income, arecanut A field sur conducted among 400 arecanut growers in North Kerala during 1997-98 indicated tha addition to dairy enterprise, arecanut farmers undertake various combinations of bana pepper and coconut as inter/mixed crops. In the case of nutrient management in these gard the farmers adopt appropriate integration of organic and inorganic manure for the main c and the level of fertilizer application increases with the size of holdings. About 50 to 75 ' the total organic manure requirement is recycled through the byproducts of the main cro well as the intercrops. The application of chemical fertilizers is mostly restricted to areca and coconut. However the intercrops are given sub optimal dose of organic manures c The share of manures and fertilizers accounted for 15 to 37 % of the Total Variable Cos different arecanut based farming system models. Farmers are advised to adopt vari cropping/farming system models.

INTRODUCTION

India is the largest producer of arecanut in the world. The crop is cultivated in the coastal and westren ghat regions of Kerala and Karnataka and alluvial deltas of Assam and West Bengal in 2,68,700 ha with an annual production of 3,33,900 t of nuts and the average productivity is 1243 kg/ha. Arecanut, being a perennial crop, has a gestation period of 4-6 years and a long economic life span of about 45 years. Hence the flow of costs and returns spread over a number of years with varying degree of magnitude. Under this situation, in order to minimize the degree of production and price risks and to stabilize the gross farm income, arecanut farmers are advised to adopt various cropping/farming system models. In addition, adoption of different Arecanut Based Farming System (ABFS) models would enable the farmers to optimize their resource use efficiency of land, labour, irrigation, and other farm resources. Further, farm intensification with other perennial/annual crops would help to ach higher allocative efficiency as well as econ efficiency of nutrient management. This ar highlights the economics of nutrient manager in arecanut based farming systems.

MATERIALS AND METHODS

The study is based on the primary collected from 400 arecanut gardens locat 16 Panchayats of four blocks in Kasaragod di of Northern Kerala. Random cum cluster sam technique was adopted. The field study carried out during 1997-98 based on 199 market prices of input-output. Tabular analy used for comparing the amount of organic inorganic manure used across the differen of holdings.

RESULTS AND DISCUSSIONS

Land holding structure: Arecanut E Farming Systems is predominated with sma marginal farms. From Table 1, it could be int

that in the study area, barring Manjeswar block, in all the other three blocks, the share of small and marginal farms ranged between 78-99 per cent of the total sample size. In case of Manjeswar, the respective share of small and marginal holdings were 55 and 9 percent of the total sample. The district average figures indicated that the respective share of marginal, small, medium and large holdings were 32, 53, 12 and 3 percent respectively.

Small and marginal farmers, who are more risk-averse than large farmers, are expected to adopt higher degree of farm diversification or intensification for protection against natural and economic risks. This means that these farmers can make use of the production complementarities to reap the benefits of synergism through appropriate choice of crop combinations or other economic activities. This would help them to achieve maximum resource use efficiency through i) intensive use of land, ii) optimum use of time, iii) benefits from additional enterprises, iv) reuse of farm wastes and byproducts, v) rational use of farm family labour and vi) integration of farm and non farm activities. However, in the case of ABFS, majority of the farms has the bottlenecks of scarcity of land and hired skilled labour, capital, lack of inter-spaces between arecanut palms etc. Hence adoption of ABFS models are mostly unscientific without systematic planting of the inter/mixed crops.

Nutrient management in ABFS

Organic manures: One among the advantages of adopting different ABFS models, as claimed by the researchers is the recycling of farm wastes and resources. From the survey it was inferred that farm diversification with other annuals like rice as well as animal enterprises like dairy played a crucial role in the recycling of farm wastes. Dairy enterprise plays a major role in the recycling of organic resources under ABFS. The data of the frequency distribution of the sample crops undertaking dairy is given in Table2.

It could be inferred from Table 2. that dairy was being widely practiced in the study area. The rate of adoption of this enterprise ranged between 70 percent in Nileswar to 98 percent in Manjeswar block. The district average figure indicated that 89 % of the sample farms were maintaining dairy animals, which confirmed the significance of this enterprise in ABFS.

Cow dung mixed with leaves and other farm wastes applied @ 15-25 kg /palm/year is the main source of organic manures used in the arecanut gardens both for the main as well as for the component crops. In addition to this, fresh green leaves were also applied @ 5-10 kg per palm per year. In most of the sample farms, the remaining farm wastes were burnt and converted to ash, which was applied @ 2-5 kg per arecanut palm. In certain medium and large farms, Steramil, a commercial organic manure was used @ 2-3 kg per palm. In general the amount of expenditure towards organic manures increased with the size of land holding as well as with the degree of farm intensification. Since the planting density of inter/ mixed crops was below the optimum level, major amount of the expenditure is spent for the main crop. The district average expenditure towards organic manures (inclusive of female labour charges for collection of green leaf manure) ranged from Rs.5680 in the case of arecanut monocrop to Rs.27800/ha in the case of arecanut + coconut + dairy system (Table 3).

Under the present situation, the availability of organic manures is becoming scarce. It was observed from the field survey that some of the medium and large farmers were importing cow dung from neighbouring states at a higher price. But it inferred that inclusion of dairy as a component in ABFS could meet about 50-75 per cent of the total organic manure requirements for the system and would considerably reduce the total cost of cultivation.

Chemical fertilizers: The common fertilizers used by the sample farmers in various ABFS were mixed form of straight fertilizers containing Nitrogen, Phosphorus and Potassium, complex fertilizers such as arecanut mixture, coconut mixture, Factomphos etc. applied @ 1-3 kg per palm for arecanut and coconut. The district average expenditure towards chemical fertilizers ranged from Rs.1420 in the case of arecanut monocrop to Rs.2840/ha in the case of arecanut + banana + dairy system. (Table 4).

The total expenditure of manures and

fertilizers for different ABFS models is furnished in Table 5. It could be observed from the above table that the average value of manures and fertilizers applied to different ABFS models ranged from about Rs.7090/ha in the case of arecanut monocrop to Rs.30,200/ha in the case of arecanut + coconut + dairy system. The percentage increase over arecanut monocrop ranged from 211.8 in the case of arecanut + dairy system to 426.6 in the case of arecanut + coconut + dairy system. The share of expenditure on manures and fertilizers in the average Total Variable Cost ranged from 21.3 percent in the arecanut + banana + pepper + dairy system to 47.6 percent in the case of arecanut + coconut system.

From the field survey, it was observed that in the case of organic manures, barring arecanut none of the other component crops like banana, pepper and coconut were not given adequate amounts. It was further interesting to note that the amount of organic manure applied in those ABFS models with dairy as a component was more as compared to those models without dairy. This indicates the importance of dairy enterprise in ABFS, as this is the prime component having a positive relation with the quantity of organi manures applied in different ABFS models. was also observed that the sample farmers wer utilizing the byproducts and farm waste from bot the main as well as component crops within th system and hence about 50-75 per cent of th organic manure requirements was being me within the system. This process of resourc recycling saves considerable expenses toward the annual maintenance cost of arecanut.

The linkage between crop and/or anim composition and its economic importanc justify the rationale for farm intensification as strategy for improving the economic prospect of small and marginal farmers. However thes farmers are strongly influenced by econom and non-economic factors like farm-specif resource endowment and consumption need Hence farm intensification schemes have necessarily face serious economic, resourc related and institutional obstacles. To overcom these obstacles, the planning process shou consider the possibility of linking dairying wi livestock credit, cattle insurance, and fodd development including promotion of fee industries.

Table 1. Distribution of land holding structures under arecanut based farming systems

S.No	Particulars	Manjeswar	Kasargod	Kanhangad	Niliswar	District Average
1	Marginal	09	28	46	44	32
2	Small	55	50	53	54	53
3	Medium	27	18	01	01	12
4	Large	09	04	-	01	03
	Total	100	100	100	100	100

Table 2. Adoption of Dairy Enterprise in Sample Farms

S.No	Particulars	Manjeswar		Kasargod		Kanhangad		Niliswar		District	
		I	II	I	II	I	II	I	II	I	II
1	Marginal	-	09	07	21	15	31	11	42	06	26
2	Small	01	55	03	47	11	42	19	25	09	49
3	Medium	01	26	01	17	-	01	-	01	01	11
4	Large	-	09	-	04	-	-	-	01	-	03
	Total	02	98	11	89	26	74	30	70	11	89

I - Not under taking dairy, II - Under taking dairy

Table 3. Organic manures applied to different arecanut based farming system models (Rs./ha)

ABFS Model	Farm category				District Average
	Marginal	Small	Medium	Large	
Arecanut Monocrop	4260 (51.2)	7070 (49.8)	NA	NA	5680 (50.5)
Arecanut + Coconut	14750 (58.3)	26950 (51.8)	NA	NA	20850 (55.1)
Arecanut + Dairy	11560 (63.5)	14500 (62.7)	15950 (58.1)	NA	14000 (61.4)
Arecanut + Coconut + Dairy	19800 (57.4)	28500 (58.3)	35100 (51.2)	NA	27800 (55.6)
Arecanut + Banana + Dairy	11620 (65.4)	14170 (69.5)	24470 (66.7)	NA	16750 (67.2)
Arecanut + Coconut + Banana + Dairy	23300 (56.2)	17200 (69.8)	20000 (75.3)	38000 (62.0)	24630 (65.8)
Arecanut + Coconut + Banana + Pepper + Dairy	19830 (62.0)	20430 (69.8)	27430 (67.8)	32630 (67.9)	25080 (64.4)
Arecanut + Banana + Pepper + Dairy	12540 (58.6)	15370 (59.8)	17800 (66.8)	NA	15240 (61.7)

Note : Figures in parentheses indicate percentage of own farm organic manures.

Table 4. Expenditure on chemical fertilizers applied to different arecanut based farming system models (Rs./ha)

ABFS Model	Farm category				District Average
	Marginal	Small	Medium	Large	
Arecanut Monocrop	Nill	1420	NA	NA	1420
Arecanut + Coconut	Nill	2310	NA	NA	2310
Arecanut + Dairy	Nill	150	1840	NA	1000
Arecanut + Coconut + Dairy	1600	2140	3500	NA	2410
Arecanut + Banana + Dairy	1850	2770	39100	NA	2840
Arecanut + Coconut + Banana + Dairy	1940	2470	3180	3340	2730
Arecanut + Coconut + Banana + Pepper + Dairy	1420	3530	1830	1200	2020
Arecanut + Banana + Pepper + Dairy	1200	2170	2470	NA	1950