The Pharma Innovation Journal 2023; 12(4): 1226-1228

www.ThePharmaJournal.com

The Pharma Innovation

ISSN (E): 2277-7695
ISSN (P): 2349-8242
NAAS Rating: 5.23
TPI 2023; 12(4): 1226-1228

www.thepharmajournal.com
Received: 05-02-2023
Accepted: 10-03-2023

Jagadeesha SK
Department of PSM & AC, UHS, Bagalkot, Karnataka, India

Kiran Kumar KC
Department of Plant Pathology, UHS, Bagalkot, Karnataka, India

Chandasheker GS
Department of Entomology, UHS, Bagalkot, Karnataka, India

Swetha
Technical Assistant, UHS, Bagalkot, Karnataka, India

Corresponding Author:
Jagadeesha SK
Department of PSM & AC, UHS, Bagalkot, Karnataka, India

Integration of sheep in coconut based cropping system

Jagadeesha SK, Kiran Kumar KC, Chandasheker GS and Swetha

Abstract
The experiment was laid out in old coconut garden (Arsikere Tall) spaced at 10 m × 10 m. Two treatments *viz*., T_1: Coconut + Pasture crops +Sheep (IFS), T2: Mono crop of coconut are compared with each other in non-replicated trials in an area of 0.40 ha each. 40 old palms were in each treatment. The pasture crops: Anjan grass (*Cenchrus ciliaris*) and stylo (*Stylosanthes hamata*) were sown in the inter space of coconut at the ratio of 3:1. The experiment results revealed that the T1 has produced the highest average value with respect to yield of nuts per palm per year (88.93), Gross return (Rs. 1,44,005/ unit) and net return (Rs. 1,08,488/ unit) and also B: C ratio (4.00). The experiment results revealed that the integration of sheep in coconut based cropping system is the best way to.

Keywords: Coconut, integrated farming system (IFS), benefit: cost ratio, sheep

Introduction
Indian agriculture faces serious challenge in attaining sustainability and profitability of farming due to decline in land holding. The average size of land holding has declined to 1.16 ha during 2010-11 from 20.28 ha in 1970-71. If this trend continues, the average size of holding in India would be mere 0.68ha in 2020 and would be further reduced to 0.32 ha in 2030 (Anon., 2011) [1].The 70 per cent of the farmers of India have annual per capita income less than Rs, 15,000. Only 10 per cent of them earn more than Rs. 30,000 (Kumar and Chahal, 2018) [5]. Only 7 per cent of the marginal farmers fall in the high-income class (>Rs. 30,000) might be due to a more diversified income portfolio in terms of the number of income sources accessed and the intensity of engagement. National Round Table conference given a total of 40 recommendations for increasing incomes of farmers, among these IFS approaches will play a most important role (Khan, 2016) [3]. Present scenario leads to 85 per cent of marginal and small farmers to adopt alternative farming system which integrates agriculture and subsidiary enterprises to make farming more profitable and sustainable (Ramrao *et., al* 2005; Radha *et., al* 2000) [8, 7]. The farmers gradually started focusing on a few enterprises due to several imposing factors including shrinking farm sizes, fluctuating commodity prices, livelihood diversification and shortage of labour during peak agriculture season (ponnusamy and Devi, 2017) [6]. Integrated Farming System (IFS) Approaches is holistic, multidisciplinary, dynamic, problem solving, location specific and farmer needs oriented, which make a vital contribution to sustainable development by adding consideration of economic, ecological and social objectives to the essential business of agricultural food production. The well-being of farmers can be improved by bringing together the experiences and efforts of farmers, scientists, researchers, and students at different locations with similar eco-sociological system. In addition to this, proactive government policies and institutional support are the needs of the hour to make IFS approach successful for small and marginal farmers of developing countries like India (Kumar, 2013) [4]. Hence, the present investigation was undertaken with broad objective to develop location specific Coconut - Livestock (Sheep) integrated farming system model, compare the performance of IFS model with coconut mono cropping system, study the effect of integration on the productivity of coconut, soil fertility and nutrient status of soil, work out the economics of the models and to define optimum number of Sheep can be maintained per unit.

Materials and Methods
The experiment was laid out during May 2014in old coconut garden (Arsikere Tall) spaced at 10 m × 10 m. Two treatments *viz*., T_1: Coconut + Pasture crops +Sheep (IFS), T2: Mono crop of coconut are compared with each other in non-replicated trials in an area of 0.40 ha each. 40 old palms were present in each treatment.

The pasture crops: Anjan grass (*Cenchrus ciliaris*) and stylo (*Stylosanthes hamata*) were sown in the inter space of coconut at the ratio of 3:1. The observation on the number of leaves on the crown and number of bunches and buttons produced during the year were recorded. Nuts of coconut were harvested at maturity and yield data recorded. The observations on copra content and oil content were recorded and copra yield and oil yield per palm were computed. The 20 sheep were allowed to graze the pasture. The productions of pasture, sheep and sheep manure have been quantified.The cost of labour, fertilizer, crop and sheep maintenance, plant protection measures and other miscellaneous overhead charges were treated as input cost of respective year. The returns (output) were computed in terms of rupees by combining the weighted average yield of different years under consideration with weighed average market prices prevailed during respective years. Coconut lots auction happens four times a year and individual nut price will be calculated by dividing the auctioned lot price by number of nuts per lot.

Results and Discussions

Influence of treatments on growth and yield of the IFS (Sheep) and mono crop system cultivation of coconut presented in Table 1. Mean of eight years data indicates that number of leaves on the crown is marginally more in T2 (30.77) compared with T1 (30.44), with respect to number of bunches per palm T1 (12.53) recorded slightly more than the T2 (21.11), number of buttons per palm recorded more in T1 (216.08) compared with T2 (213.40), with respect to nut yield per palm T1 (88.93) recorded highest nut yield per palm than T2 (84.00), Copra content was more in T2 (146.36) than T1 (130.93), with respect to Copra yield per palm, oil content and oil yield per palm T1(13.09, 67.46, 9.06) recorded highest than T2 (12.30, 67.16, 8.64) respectively. Marginal increase in coconut yield was observed it may be due to application sheep manure.

Economics

The economics of the Livestock (Sheep) based farming system (T1) and coconut based mono cropping system (T2) was analyzed in the terms of average gross return, net return and benefit cost ratio. The average of eight years data presented in Table 2. The maximum average gross return obtained in T1 is Rs. 1,44,005/ Unit. Whereas minimum average gross return of Rs. 43,500/ Unit were obtained in T2. With respect to average net return T1 recorded highest of Rs. 1,08,488/ Unit in comparison with T2 which has recorded lowest average net return of Rs. 27,225/ Unit. Benefit cost ratio was also calculated for both the models where T1 recorded highest of 4.00 whereas T2 recorded the lowest of 2.73. Inclusion of sheep in the IFS model is the major contributing factor for increased returns.These results are in consonance with the findings of Chand, 2017 [2].

Soil Nutrient STATUS

The observations respect to soil nutrient status of the IFS and mono crop system cultivation of coconut presented in Table 3. After eight years of treatment initiation the soil organic carbon content differed among the treatments. In T1 soil organic carbon content found maximum of 0.98 per cent whereas the minimum of 0.79 per cent was recorded in T2. Among major soil nutrient content Nitrogen (N), Phosphorus (P_2O_5), potash (K_2O) was found highest in T1 (251.40 kg/ha, 20.50 kg/ha, 148.80 kg/ha respectively), whereas lowest was found in T2 (196.50 kg/ha, 16.50 kg/ha, 142.18 kg/ha respectively). Among two treatments T1 (IFS) showed increased soil nutrient content of N, P_2O_5 and K2O. This may be attributed to proper utilization of sheep manure to enrich the soil.

Table 1: Influence of treatments on growth and yield of the IFS (Sheep) and Mono crop system cultivation of coconut.

parameters	T1: Integrated Farming System (IFS) Sheep								
	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21	2021-22	Average
No. leaves on the crown	29.70	29.90	30.00	29.90	30.50	31.00	31.00	31.50	30.44
No. bunches / palm/ year	12.20	12.20	12.30	12.20	12.50	12.90	12.90	13.00	12.53
No. buttons / palm / year	207.50	210.50	205.80	208.60	214.80	225.30	225.30	230.80	216.08
Nut yield/palm/ year	85.70	86.30	88.50	88.60	88.20	89.40	89.40	95.30	88.93
Copra content (g/nut)	146.20	147.20	145.50	14.80	144.20	149.60	149.60	150.30	130.93
Copra yield/ palm (kg)	12.53	12.70	12.87	12.82	12.70	13.37	13.37	14.32	13.09
Oil content (%)	66.90	67.00	67.90	67.60	67.50	67.60	67.60	67.60	67.46
Oil yield/ palm (kg)	8.40	8.50	9.61	9.64	8.57	9.03	9.03	9.68	9.06
parameters	**T2: Mono crop of coconut**								
No. leaves on the crown	30.10	30.20	31.00	30.70	31.10	31.00	31.02	31.00	30.77
No .bunches / palm/ year	12.20	12.40	12.80	12.80	12.00	11.60	11.60	11.50	12.11
No. buttons / palm/ year	202.80	203.50	215.50	212.40	211.20	220.60	220.60	220.60	213.40
Nut yield/ palm/ year	81.60	82.20	83.30	84.20	84.60	85.10	85.10	85.90	84.00
Copra content (g/nut)	141.80	142.30	148.30	148.20	147.50	147.90	147.90	147.00	146.36
Copra yield/ palm (kg)	11.57	11.70	12.35	12.52	12.47	12.58	12.58	12.62	12.30
Oil content (%)	67.20	67.60	67.00	67.20	67.30	67.00	67.00	67.00	67.16
Oil yield/ palm (kg)	7.78	7.90	9.69	9.68	8.39	8.42	8.78	8.45	8.64

Table 2: Economics of the IFS (Sheep) and Mono crop system cultivation of coconut

		T1: Integrated Farming System (IFS) Sheep								
		2014-15	**2015-16**	**2016-17**	**2017-18**	**2018-19**	**2019-20**	**2020-21**	**2021-22**	**Average**
Input cost	Crop maintenance (Rs)	10600	11200	11700	10440	11800	12000	15000	20000	12843
	Fodder production (Rs)	3600	3800	4000	3000	3200	3300	4000	4000	3613
	Sheep Maintenance (Rs)	20500	15500	20500	17000	22000	19000	18000	20000	19063
Cost of production (Rs)		34700	30500	36200	30440	37000	34300	37000	44000	35518
Output cost	Coconut (Rs)	41136	41424	46020	46930	52920	67944	67944	72428	54593
	Sheep sold (Rs)	45750	56200	90500	100780	106500	31500	84890	155975	84012
	Sheep manure (Rs)						18000	10200	15000	5400
Gross Returns (Rs)		86886	97624	136520	147710	159420	117444	163034	243403	144005
Net returns (Rs)		52186	67124	100320	117270	122420	83144	126034	199403	108488
B.C Ratio		2.50	3.20	3.77	4.85	4.31	3.42	4.41	5.53	4.00
		T2: Mono crop of coconut								
Cost of production (Rs)		13600	14600	14700	15500	14800	15000	15000	27000	16257
Gross Returns (Rs)		39168	39456	43316	41600	40608	40848	44252	58752	43500
Net returns (Rs)		25568	24856	28616	26100	25808	25848	29252	31752	27225
B.C Ratio		2.88	2.70	2.95	2.68	2.74	2.72	2.95	2.18	2.73

Table 3: Soil nutrient status of the IFS (Sheep) and mono crop system cultivation of coconut

Soil Nutrient status		
	T_1 (IFS) Sheep	**T_2 (Mono crop)**
OC (%)	0.98	0.79
N (kg/ha)	251.40	196.50
P (kg/ha)	20.50	16.50
K (kg/ha)	148.80	142.18

Conclusion

The experiment results revealed that the Treatment T1: Coconut + Pasture crops + Sheep (IFS) has produced the highest average value with respect to yield of nuts per palm per year (88.93), Gross return (Rs. 1,44,005/ unit), net return (Rs. 1, 08,488/ unit) and B: C ratio (4.00) also. Besides, the model also generated more manure and added more nutrients to soil compare to treatment T2: Mono crop of coconut. The income of conventional farming system was lower than the IFS. Integration of Twenty sheep per unit is quite optimum with cultivation of fodder crops. Hence, it can be concluded that the Integration of sheep in coconut based cropping system was more economical and would sustain the production and profit of coconut growers.

Acknowledgment

The authors are grateful to University of Horticultural Sciences, Bagalkot, Karnataka and Central plantation Crops Research Institute, Kasaragod, Kerala, for the financial assistance and support.

Reference

1. Anonymous. Agriculture Census, India; c2011.
2. Chand R. NITI Aayog. GOI. Doubling of Farmers' Income. Rational, Strategy, Prospects and Action Plan. National Institute of Transforming India. Kurukshetra, A journal of rural development. 2017;65(4&8):1-60.
3. Khan MJ. Indian Council of Food and Agriculture. India International Centre, 30 April, New Delhi; c2016.
4. Kumar S. Integrated Farming System models for food and nutritional security. Lecture Delivered during Model Training Course on Gender Perspective in Integrated Farming system w.e.f January. ICAR Research Complex for Eastern Region, Patna, Bihar; c2013 p. 17-24.
5. Kumar Shiv, Chahal VP. Doubling farmers' income: possible way out. Indian Farming. 2018;68(01):95-96.
6. Ponnusamy K, Devi M, Kousalya. Impact of Integrated Farming System Approach on Doubling Farmers' Income. Agricultural Economics Research Review. 2017;(30):233-240.
7. Radha Y, Eshwaraprasad Y, Vijayabhinanana B. Study on income and employment generation on agricultural based livestock farming system. Paper presented at VII Annual Conference of AERA at TNUASU, Chennai, 28-2 Dec; c2000.
8. Ramrao WY, Tiwari SP, Singh P. Crop-livestock integrated farming system for augment socio-economic status of small holder tribal of Chhattisgarh in central India. Livestock research for Rural Development; c2005 p. 17.