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INTEGRATED FARMING SYSTEM FOR GARDENLANDS

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ABSTRACT

A model on integrated farming system to suit the small and marginal farmers under gardenland conditions was studied during 1988 to 1993 at Gardenlands of Tamil Nadu Agricultural University, Coimbatore with the aim, to achieve better utilisation of available resources for obtaining maximum returns by integrating cropping, dairy, spawn production, bio-gas and sylviculture, to recycle farm and livestock wastes effectively, to provide gainful employment throughout the year, to assure stability in production and return. The model integrating the components cropping, dairy, spawn production, bio-gas and syluriculture were contemplated in this study. The receipt, expenditures and net income for the integrated model for the farm as a whole was studied over a period of five years (1988-1993). Mean net income of 1988 to 1993 in integrated farming system (IFS) and conventional cropping system (CCS) was Rs.34584 and Rs.13496 ha-1 respectively. Integrated farming system thus provides an additional mean net income of Rs.20638 ha^{-1} over a period of five years by way of effective recycling. The employment opportunity in the new IFS with proposed components was enhanced to the tune 770 man days per year over CCS. The results of five years study revealed that by way of integrating agricultural allied enterprises with crop activity, the standard of living of the farmer, income per unit area per unit time and employment opportunity for the family were enhanced over the CCS.

KEY WORDS : Integrated Farming System, Garden Lands, Economics.

In an agricultural country like India, the average land holding is very small and in Tamil Nadu it is 1.26 ha. The population is steadily increasing without any possibility of increase in land area. The income from cropping for an average farmer is hardly sufficient to sustain his family. The farmer has to be assured of a regular income for a reasonable standard of living by including other enterprises and efficient management of inputs available in the farm to increase the average income (Throve and Galgolikar, 1985).

Farming includes cropping, dairy, spawn production, mushroom production, bio-gas and sylviculture. A judicious mix of any one or more of the components complements the cropping enterprise through the effective recycling of by products from other enterprises. A combination when carefully chosen, planned and implemented taking soil and environmental conditions into account, can get more dividends. Farm as a unit is to be considered and planned for effective integrated use of inputs.

MATERIALS AND METHODS

A model on integrated farming system approach to suit the small and marginal farmers under gardenland conditions was studied at the gardenlands, Department of Agronomy, Tamil Nadu Agricultural University, Coimbatore during 1988-93 with multiple objectives *viz.*, to achieve better utilisation of available resources for obtaining maximum returns by integrating cropping, dairy, spawn production, bio-gas and sylviculture, to recycle farm and livestock wastes effectively, to provide gainful employment throughout the year and to assure stability in production and return.

An area of one ha was selected for this integrated farming systems (IFS) study. The details of the treatment are furnished in Table.1. For comparison, conventional cropping system (CCS) as practiced by the farmers was taken up in an area of 0.2 ha. But the economics and other details of the CCS were computed to one ha.

The soil was clay loam (Typic Haplustaff), low N (264 kg ha^{-1}), high P (45.6 kg ha^{-1}) and K (457 kg ha^{-1}) in the soil respectively. The pH, EC, CEC and organic carbon were 7.9, 0.7 dSM^{-1}, 17 meg/100 gm soil and 0.3 per cent respectively. Crops were raised as per the treatment schedule and recommended cultural practices were followed.

Three cross bred Jercy cows and two calves were purchased for Rs.15,000 and maintained

Table 1. Treatment details of Integrated Farming System and conventional cropping system

Treatment details	Area (ha)
Integrated Farming System (IFS)	
Cropping	
Cotton + greengram - Maize + fodder cowpea - Bellary onion (Aug - Feb) (Feb - May) (May - Aug)	0.56
Wheat + Sunflower/ - Maize + Fooder cowpea - Summer cotton + green gram Beet root/Bengal gram/Radish	0.19
- Grass cumbu Napier (Co 1)	0.15
- Lucerne	0.05
150 trees of *Lucerne Leuceana lecucocephla* planted bunds	0.05
Farm stead	
Dairy unit	
3 Jercy cows + 2 claves	
Bio-gas unit capacity 2 m^3	
Spawn and mushroom production capacity 1.5 to 2.0 kg/day	
Conventional Cropping System (CCS)	
Cotton - Sorghum - Ragi (Aug - Feb) (Feb - May) (May - Aug)	0.20

throughout the period of study. The excess animals were disposed in the concerned years. To accomodate the dairy animals, a cattle shed was constructed with locally available materials at a cost of Rs.1000/-. The milk obtained from the cows was sold at the market rate prevailing in the concerned years.

A bio-gas plant with $2m^3$ capacity was constructed at a cost of Rs.4000/-. The dung collected from the dairy animals was fed to the bio-gas plant. The bio-gas obtained was used for the preparation of gruel to the dairy unit, lighting two lamps in the farmstead and mushroom spawn production. Production of mushroom spawn started from the year 1991-92.

Dairy concentrate feed include maize flour (20%), sorghum flour (20%), wheat bran (7%), groundnut cake (20%), cotton seed (20%), *ragi* flour (10%), mineral mixture (2%) and common salt (1%). Maize flour, cotton seed and wheat bran obtained from crop components were recycled for preparation of dairy feed from second year. In the first year, cost of all the materials were worked out at market prices. The green fodder was obtained from the cumbu Napier, lucerne fodder, cowpea and *Leuceana leucocephala*. Dry fodder was obtained from maize and *ragi* straw. Nearly 45.5 t of grass fodder, 2.5 t of legume fodder and 1.0 t of dry fodder were given to the animals in an year.

RESULTS AND DISCUSSION

The results of the IFS was compared with the CCS. The average gross income, expenditure and net income from 1988-89 to 1992-93 under IFS were Rs.74952, Rs.40370 and Rs.34584 (Table 2). The corresponding figures under CCS were Rs.32,230, Rs.18343 and Rs.13,946. An average

Table 2. Receipt, expenditure and net income for five years (1988-89 to 1992-93) in IFS and CCS.

Year	Receipt Rs.ha^{-1} yr^{-1}		Expenditure Rs.ha^{-1} Yr^{-1}		Net income Rs. ha^{-1} Yr^{-1}	
	IFS	CCS	IFS	CCS	IFS	CCS
1988-89	79862	34547	37161	10660	42701	23887
1989-90	70252	26400	36275	12490	33977	13910
1990-91	77832	26740	35855	12420	41987	14620
1991-92	45707	37845	17117	27507	28589	10338
1992-93	101105	35615	75440	28640	25665	6975
Mean	74952	32250	40370	18343	34584	13946
			Net income Rs. ha^{-1} day^{-1}		94.75	38.21

Mean additional income in IFS Rs. ha^{-1} yr^{-1} - 20638; Additional net income in IFS Rs. ha^{-1} day^{-1} - 50.54.

Table 3. Statement showing the contribution from different components in IFS (Gardenland)

Details	Crop	Dairy	Biogas	Sylviculture	Spawn	Total
Receipt Rs.ha^{-1} yr^{-1}	19488	33728	5247	5996	10493	74952
Expenditure Rs.ha^{-1} yr^{-1}	8380	14503	2256	2578	4512	32229
Net income Rs.ha^{-1} yr^{-1}	11108	19225	2991	3418	5981	42723
Percentage to the total	26%	45%	7%	8%	14%	100%
Labour consumed mandays ha^{-1} ya^{-1}	688	274	91	15	182	1250

additional income of Rs.20,638 under IFS over CCS was obtained. The net profit worked out per ha per day under IFS and CCS was Rs.94.75 and Rs.38.21 respectively. Out of the total income obtained from Integrated Input Management system 26% was from cropping, 45% from Dairy, 7% from bio-gas, 8% from sylviculture and 14% from the spawn production (Table 3). The additional employment generated through the IFS was 770 mandays/ha/year over CCS. The results are in confirmity with that of Rajakumar (1988).

Thus for the regular flow of income, generation of employment opportunities and for effective recycling of wastes, besides cropping, dairying and mushroom production promoting biogas utilization and protein supplementing tree culture (*L. leucocephala*) would be more ideal for gardenland farmers of Coimbatore tract of North Western Zone of Tamil Nadu.

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EFFECT OF IRRIGATION LEVELS AND WHEAT VARIETIES ON GROWTH YIELD AND NUTRIENT HARVEST

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ABSTRACT

The effect of irrigation levels and wheat varieties on growth, yield and nutrient uptake on sandy loam soils was studied at the College of Agriculture, Hyderabad. Eight irrigations at different physiological stages improved the nutrient uptake and yield over four and six irrigations. HD 2189 recorded higher grain yield and nutrient uptake over HD 2380, HD 4502 and NI 5439.

KEY WORDS : Wheat, Irrigation Levels, Varieties, Growth, Yield, Nutrient Harvest.

wheat has been and will continue to be sheet anchor of the national food security system of India, as it being a winter crop, is less prone to vagaries of monsoons and yields can be stabilised with efficient energy management (Swaminatha, 1986). Eighty five per cent of the total wheat is in the northern states and after release of photo insensitive varieties, its cultivation is extended to south. The duration of wheat variety is reduced under south Indian conditions, hence the yields are reduced. The water requirement of the crop varies at different growth stages. Hence, an experiment was conducted to study the effect of irrigation levels at different stages and wheat varieties on nutrient uptake.

MATERIALS AND METHODS

Field experiment was conducted during *rabi* season of 1987-88 at the Agricultural College, Rajendranagar, Hyderabad. The experiment was