

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

Details	Crop	Dairy	Biogas	Sylviculture	Spawn	Total
Receipt Rs.ha <sup>-1</sup> yr <sup>-1</sup>	19488	33728	5247	5996	10493	74952
Expenditure Rs.ha <sup>-1</sup> yr <sup>-1</sup>	8380	14503	2256	2578	4512	32229
Net income Rs.ha <sup>-1</sup> yr <sup>-1</sup>	11108	19225	2991	3418	5981	42723
Percentage to the total	26%	45%	7%	8%	14%	100%
Labour consumed mandays ha <sup>-1</sup> ya <sup>-1</sup>	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 conformity 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

**Table 1. Effect of irrigations and varieties on total phytomass and yield of wheat at harvest**

Treatments	Total phytomass (g/m <sup>2</sup> )	Grain yield (q/ha)	Straw yield (q/ha)	Harvest index (%)
<b>Irrigations</b>				
I <sub>1</sub>	64.80	20.02	30.03	39.90
I <sub>2</sub>	74.50	28.62	42.21	39.90
I <sub>3</sub>	86.08	34.23	51.30	39.80
S.Ed. ±	0.296	0.559	0.83	NS
CD (0.05)	0.8	1.55	2.31	NS
<b>Varieties</b>				
V <sub>1</sub>	74.67	31.60	44.73	41.00
V <sub>2</sub>	74.77	24.56	38.92	38.90
V <sub>3</sub>	79.97	24.28	36.93	39.17
V <sub>4</sub>	71.16	30.06	45.07	40.00
S.Ed. ±	0.459	0.946	2.972	
CD (0.05)	0.96	1.98	6.245	NS

laid out in split plot design with three replications. The soil was sandy loam in texture and fertility status of the soil was N 285 kg/ha, 18 kg/ha P<sub>2</sub>O<sub>5</sub> and 556 kg/ha of K<sub>2</sub>O.

The experiment was laid out with three irrigation levels at different physiological stages in main plots and four varieties in sub-plots.

#### Irrigation Treatments

I<sub>1</sub> - Four irrigations at CRI, tillering, late jointing, flowering.

I<sub>2</sub> - Six irrigations (CRI, tillering, late jointing, flowering, milking and dough stages).

I<sub>3</sub> - Eight irrigations (10 DAS, CRI, tillering, late jointing, flowering, milking and dough stages)

#### Varieties

V<sub>1</sub> - HD 2189; V<sub>2</sub> - HD 2380, V<sub>3</sub> - HD 4502, V<sub>4</sub> - NI 5439

The seeds were sown in furrows of 20 cm apart and 150:60:60 kg/ha N, P<sub>2</sub>O<sub>5</sub>, K<sub>2</sub>O were applied in the form of urea, single super phosphate and muriate of potash and half of the nitrogen was applied as basal dose and remaining half of nitrogen at 20 days after sowing (DAS). Standard procedures were followed for analysing plant samples.

## RESULTS AND DISCUSSION

#### Total phytomass

A critical study of the data reveals that total dry weight of plant was influenced by irrigation

**Table 2. Nutrient harvest (kg/ha) by grain and straw of wheat**

Treatments	Nitrogen		Phosphorus		Potassium	
	Grain	Straw	Grain	Straw	Grain	Straw
<b>Irrigations</b>						
I <sub>1</sub>	31.98	11.70	6.81	3.43	53.56	21.73
I <sub>2</sub>	54.52	24.05	9.65	4.23	64.87	26.07
I <sub>3</sub>	60.38	31.90	10.83	5.59	76.92	31.63
S.Ed. ±	0.24	0.30	0.039	0.02	0.141	0.158
CD (0.05)	0.67	0.85	0.107	0.05	0.392	0.44
<b>Varieties</b>						
V <sub>1</sub>	58.50	21.48	10.26	4.34	68.08	27.57
V <sub>2</sub>	46.08	20.56	8.84	4.36	68.82	27.51
V <sub>3</sub>	46.94	19.56	8.17	3.91	54.56	22.29
V <sub>4</sub>	44.32	25.60	9.10	5.04	68.60	28.54
S.Ed. ±	0.34	0.23	0.023	0.03	0.431	0.214
CD (0.05)	0.72	0.489	0.048	0.063	0.906	0.449

levels (Table 1). It was highest with eight irrigations. The extent of increase was 32.8 and 15.5 per cent over I<sub>1</sub> and I<sub>2</sub> irrigation levels respectively. Similar results were reported earlier by Rao and Bharadwaj (1982). Significantly higher total dry weight was recorded by HD 4502.

### Yield

Eight irrigations given at different physiological stages (I<sub>3</sub>) recorded 71.0 and 19.0 per cent over four (I<sub>1</sub>) and six irrigations (I<sub>2</sub>) respectively. The response obtained was 11 kg, 10.6 kg and 14 kg per mm of applied water with 4, 6 and 8 irrigations given at different physiological stages. The increase in grain yields due to increasing levels of irrigation in the present study is in complete agreement with the findings of Tomar *et al.* (1993). Among the varieties HD 2189, NI 5439 were on par with each other and were superior to other two varieties. The increase in grain yield may be due to favourable increase in all growth characters (Girothia *et al.* 1987).

### Nutrient uptake

The nutrient harvest both in grain and straw increased with increase in number of irrigations. The increase in uptake of these nutrients might be

due to availability of moisture at active root zone which might have enhanced the uptake and translocation of nutrients. This increased uptake and translocation of nutrients might have also increased the metabolic activities. The protein content of grain increased upto six irrigations and decreased at eight irrigations. These are in agreement with the findings of Soni *et al.* (1986). Among the varieties, HD 2189 recorded higher nutrient uptake over other varieties. This may be attributed to higher root dry weight.

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## PHOSPHORUS USE EFFICIENCY AND ITS RECOVERY IN LEGUME - PADDY CROPPING SEQUENCE

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### ABSTRACT

Field experiments conducted to study the Phosphorus (P) use efficiency and its recovery in a legume - paddy cropping sequence in red soils of Thambirabarani river basin indicated a marked influence of P application in increasing the yield and yield attributes of irrigated pulse as well as *Pisanim* rice crop. Split application of P was not found advantageous over full basal application on rice crop. The P use efficiency and apparent P recovery in rice were found to be higher under soil-test based fertilization over that of the blanket recommendation. The P recovery in rice was higher (13.24%) when both the crops in the legume-paddy sequence were fertilized with P than the P application to rice alone (7.63%).

**KEY WORDS :** Phosphorus, Recovery, Cropping Sequence

Phosphorus, (P) one of the major nutrient elements of crop plants, is being used only around 3

Kg P<sub>2</sub>O<sub>5</sub>/ha of cultivated lands in India. The crop recovery of added P seldom exceeds 20 per cent