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human factor, will thus open up new vistas for our farm population and will make unprecedented gains in incomes possible. Raising the quality of the human element or the educational problem, as it may be called, is the fundamental problem and should be tackled if a long-run solution of the problem of under-developed agriculture is desired.

FARM PLANNING—A TECHNIQUE OF BETTER FARM MANAGEMENT

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How can an individual farmer so organize the factors of production—land, labour, capital and managerial ability—on his farm, so adopt farm practices to his particular environment and so dispose of his products, as to yield him the largest continuing net returns? With the myth of self-sufficiency and production for consumption receding to past, every farmer, big or small, is posed with this question more sharply than he had been ever before. And rightly, therefore, in India, the need of the use of farm management as a tool of practical help to the farmer has now been realized. The present study (the results of which will be presented in this paper) was undertaken to test the role of better farm planning in increasing the farm and family welfare.

Basic Facts

An ordinary farmer with a small holding of 6 acres was selected for the study. An extensive soil survey of the holding showed that, broadly speaking, 4 acres of land possessed heavy soil with bad drainage system remaining under water for about 4 months in the rainy season. The remaining 2 acres had a sandy, well drained soil and was situated relatively at a higher level. The village from where the farm was chosen was situated in District Bijnor in U. P. and thus had the general climatic conditions of the region. The average annual rainfall of the region being 40", the land was suitable for growing both types of crops requiring high as well as low humid conditions.

Besides rainfall, the village has a perennial system of canal irrigation, although never had the requirements of the cultivators been met in full.

The village was connected by *kachcha* road with a railway station at a distance of half a mile and the nearest *tehsil* town was 3½ miles away from the village although well connected by a *pucca* road.

* The views contained in this paper are the author's own and have nothing to do with his official capacity.

PRESENT FARM PLAN
(Agricultural Year 1958-59)

As a necessary pre-requisite of suggesting a better plan (though not necessarily the most scientific one), diagnosis of defects in the existing farm plan was necessary. An intensive survey of the existing farm plan was undertaken for the purpose. A consolidated picture of this farm plan is reproduced here so that the process of preparing alternative farm plan can be appreciated.

Cropping Pattern and Crop Rotations

The following three crop rotations were being followed:

- (i) *Chari* (*Jowar*)—Gram (one year)
- (ii) Fallow—Wheat (one year)
- (iii) Cotton—Fallow—Gram—Sugarcane (3 years).

The details of area under crop, intensity of cropping, etc., are given in Table I.

TABLE I — CROPPING PATTERN

Name of Crops	Area Occupied (in acres)	Proportion in the Total Area
<i>Chari</i>	1	14.3
Gram	2	28.6
Wheat	2	28.5
Cotton	1	14.3
Sugarcane	1	14.3
Total	7	100.00

$$\text{Intensity of cropping} = \frac{\text{Total cropped area} \times 100}{\text{Total cultivated area}}$$

or $7/6 \times 100$ or 116.6 per cent

Table I shows that in spite of the availability of irrigation and nearness to the market, the intensity of cropping is not as high as it should have been. It very closely approximates to the all-India average of intensity of cropping, which is an average of both irrigated as well as unirrigated land.

TABLE II — UTILIZATION OF FAMILY LABOUR

S. No.	Months	Number of labour days available	Number of labour days utilized	Percentage utilization
1.	July	58	56	96.5
2.	August	60	42	70.0
3.	September	61	23	37.7
4.	October	62	50	80.6
5.	November	60	25	41.7
6.	December	60	30	50.0
7.	January	62	20	32.3
8.	February	54	50	92.6
9.	March	62	40	64.5
10.	April	60	30	50.0
11.	May	58	46	79.3
12.	June	60	52	86.6
	Total	717	464	64.6

Table II shows that the then existed plan of farm production including crop and livestock, left 35.4 per cent of the available family labour unutilized. The under-utilization of available family labour was particularly marked in the months of September, January and November.

TABLE III — UTILIZATION OF BULLOCK LABOUR

Sl. No.	Months	Available Bullock Labour units	Bullock Labour units utilized	Percentage utilization
1.	July	31	11	35.5
2.	August	31	13	41.9
3.	September	30	15	50.0
4.	October	31	19	61.3
5.	November	30	10	33.3
6.	December	31	—	—
7.	January	31	—	—
8.	February	28	15	53.6
9.	March	28	12	38.7
10.	April	30	18	60.0
11.	May	31	17	54.8
12.	June	30	10	33.4
Total		362	140	38.6

Table III clearly shows that the plan utilized only 38.6 per cent of the bullock power available on the farm. Thus about 60 per cent of the bullock power remained unutilized. And rightly this increases the incidence of fixed expenses on the production and thereby reduces the margin of profit by increasing the cost per unit of production.

Table IV shows that family labour cost accounts for about 50 per cent of the total cost of cultivation. There can be no doubt that farming in the then existed plan was highly labour intensive. And it is surprising that even then, as much as 35.4 per cent of the available family labour remained unutilized. Net returns per acre amounted to Rs. 53.47 (Rs. 374.25 ÷ 7) and net returns (family earnings) to Rs. 721.25, *i.e.*, Rs. 103 per acre of land cultivated. In this farm plan, return on account of the investment of family labour was Rs. 347. And on the basis that 464 units (days) of labour was provided by the family, the returns per unit of family labour came to Re. 00.75 which is less by about Re. 0.25 than the prevailing wage rates.

It was, therefore, felt that the present farm plan furnished a good scope for experimenting with an alternative farm plan which can increase the net earnings as well as the labour earnings, on the farm as a whole. So long as the labour on farm is surplus and its opportunity cost is nil (because of no alternative avenues of earnings) there cannot be any objection to the investment of family labour till its marginal contribution in the output comes to zero. Conceded that after a certain stage, the additional output brought through the additional investment of family labour will decrease, but for the reasons explained above, absolute family income will increase. Thus in the suggested farm-plan, the attempt was to use all the available family labour and bullock labour available on the farm and thus get higher returns. Simultaneously the operation of the law of diminishing returns was delayed by altering the cropping pattern and increasing the effective size of the plan.

TABLE IV — COST AND RETURNS OF DIFFERENT CROPS*

(In Rupees)

Sl. No.	Names of Crops	Direct Charges		Indirect Charges†	Total Cost of Cultivation including Impured Cost of Family Labour	Total Cost of Cultivation excluding Cost of Family Labour	Total Value of Output**	Net Returns (Col. 8—Col.6)	Net Returns including Return on Family Labour
		All	Excluding Impured Cost of Family Labour						
1	2	3	4	5	6	7	8	9	10
1.	Chari	42.00	17.00	34.68	76.68	51.68	106.00	29.32	54.32
2.	Cotton	110.00	57.00	34.68	144.68	91.68	166.00	21.32	74.32
3.	Sugarcane	273.00	87.00	34.68	307.68	121.68	560.00	252.32	438.32
4.	Wheat	149.00	97.00	69.36	218.36	166.36	251.00	32.64	84.64
5.	Gram	116.00	85.00	69.35	185.35	154.35	224.00	38.65	69.65
	Total	690.00	343.00	242.75	932.75	585.75	1,307.00	374.25	721.25

* The methods employed in calculating and apportioning costs and returns were very much similar to those described in Problems of Farm Costs in Indian Agriculture, A Study in Research Methodology, published by the Indian Society of Agricultural Economics, Bombay.

† Indirect cost includes common costs including rents, *panchayat* tax, expenses of cattle shed and farm equipment.

** Total output includes output of grain, *bhansa*, fodder and wood stock as the case may be.

ALTERNATIVE PLAN
(Agricultural Year 1959-60)

Lack of data on input-output coefficients forced us to concentrate on fewer items of farm planning. The first field of concentration was the optimum use of land which was an important scarce resource upon which to base the whole production apparatus of the farm. Aspects of balanced utilization of land and maintenance of its fertility were also adequately cared for.

The details of the alternative farm plan with its results on family and bullock labour utilization and the consequent results on family labour earning and net returns are summarized below:

<i>Crop Rotations</i>	(B) Heavy Loam Soil (4 Acres)
(A) Sandy Soil (2 acres)	(ii) Tobacco—Potato (one year)
(i) Groundnut-Mustard (one year)	(iii) Cotton—Pea (one year)
	(iv) Paddy— <i>Berseem</i> —Sugarcane (2 years)

TABLE V — CROPPING PATTERN

Name of the Crops	Area (in acres)	Proportion in the Total Area
Groundnut	2	15.3
Mustard	2	15.4
Tobacco	2	15.4
Potato	2	15.4
Cotton	1	7.7
Pea	1	7.7
Paddy (Transplanted)	1	7.7
<i>Berseem</i>	1	7.7
Sugarcane	1	7.7
Total	13	100.00

$$\text{Intensity of cropping} = \frac{13 \times 100}{6} = 216.6 \text{ per cent.}$$

Table VI shows that in the alternative crop plan, family labour was utilized to the extent of 93.7 per cent and bullock labour to the extent of 85.9 per cent. If we consider that a little of rest is necessary on grounds of health and general comforts to both family and bullock labour, we find that the utilization of two resources was almost full.

TABLE VI — EXTENT OF FAMILY LABOUR AND BULLOCK LABOUR UTILIZATION

Sl. No.	Months	Utilization of Family Labour		Utilization of Bullock Units	
		Units Available	Units Utilized	Units Available	Units Utilized
1.	July	58	53	31	25
2.	August	60	48	31	19
3.	September	61	60	30	30
4.	October	62	65*	31	31
5.	November	60	48	30	22
6.	December	60	52	31	15
7.	January	61	54	31	27
8.	February	58	60	28	28
9.	March	62	61	31	30
10.	April	56	52	21**	20
11.	May	60	59	31	31
12.	June	60	51	30	28
Total		718	663	356	306

* Family labour over-worked during this month due to the preparation of *rabi* sowing, harvesting of *kharif* and picking of cotton and other work.

** The availability of bullock power was reduced much in the month due to the bullocks being caught in 'Foot and Mouth' disease.

The revised and alternative farm plan, the results of which are shown in Table VII had the following advantages over the previous one.

- (i) The cropping pattern, although intensive, strikes a fair balance between the leguminous crops like groundnut, pea, and *berseem* and exhaustive crops like sugarcane, tobacco and potato. The crop rotation in the revised plan provides suitable checks against a rapid process of depletion of the soil nutrients.
- (ii) The alternative farm plan which is of a more diversified nature, reduces the element of risk in farming business. A good variety of crops grown in the plan above reduces the risk arising out of physical and climatic factors as well as those arising out of uncertain marked conditions.
- (iii) The net returns to the farmer in the alternative plan increases by about four times over the previous one. And the net returns to the farm family increased by about 400 per cent. Thus the farm family stood to gain by every criterion. (Table VII).
- (iv) Net returns per acre of crop land increased from Rs. 53.47 in the previous plan to Rs. 168.00 in the alternative plan.
- (v) Returns per unit of family labour investment increased from Re. 00.75 to Rs. 00.83 in the revised programme of production. The return on the investment of bullock labour also increased considerably. The incidence of indirect cost per acre was much reduced in the alternative plan as compared to the old one.
- (vi) And lastly the alternative plan made available fodder resources better in quality and more in quantity.

There is no attempt here to claim that the plan devised and implemented, was the scientific one from the point of view of profit maximization. Also it is neither feasible nor very desirable to do so under Indian conditions, where the requirements of food and clothes of family are to be met largely from the farm

TABLE VII — COST AND RETURNS

(In Rupees calculated at constant prices)

Sl. No.	Names of Crops	Direct Charges		Indirect Charges	Total Cost of Cultivation including Cost of Family Labour	Total Cost of Cultivation excluding Cost of Family Labour	Total Value of Output	Net Returns Col. 8— Col. 6	Net Returns including Return on Family Labour Used
		All	Excluding Family Labour Charges						
1	2	3	4	5	6	7	8	9	10
1.	Groundnut	617.00	511.00	40.00	657.00	551.00	1,152.00	995.00	601.00
2.	Mustard	377.00	337.00	40.00	417.00	377.00	758.00	341.00	381.00
3.	Tobacco	466.00	489.00	40.00	506.00	429.00	797.00	291.00	368.00
4.	Potato	685.00	514.00	40.00	725.00	554.00	1,255.00	530.00	701.00
5.	Cotton	138.00	98.00	20.00	158.00	118.00	187.00	29.00	69.00
6.	Pea	48.00	36.00	20.00	68.00	56.00	108.00	40.00	52.00
7.	Paddy	177.00	147.00	20.00	197.00	167.00	257.30	60.00	90.00
8.	<i>Berseem</i>	60.00	48.00	20.00	80.00	68.00	168.00	88.00	100.00
9.	Sugarcane	280.00	210.00	20.00	300.00	230.00	610.00	310.00	380.00
Total		2,848.00	2,390.00	260.00	3,108.00	2,550.00	5,292.00	2,684.00	2,742.00

itself. And this was the reason why cotton, though the least profitable crop in the plan was retained at the insistence of the farmer.

The importance of farm management approach in agricultural extension programmes needs to be emphasized and re-stated. For long, the agricultural extension agency has been groping in the dark, following a blanket approach to the problem of increasing farm production. It is now being growingly realised that our advice to the individual cultivator should take into consideration the particular physical and economic environment, in which a cultivator is working. Note has to be taken of the fact that with the advent of planning, new social and economic over-heads are being created and thus the physical and economic environments are also undergoing change and necessitating a constant revision of the farm plans. This is particularly so in the ever-changing technological content of agricultural practices. Thus, leaving for the moment the approach of farm management purists, it will be enough if a system of simple and workable farm budgeting is evolved and recommended to be followed by the extension workers in the field. Needless it is to emphasize that even in the absence of data on input-output co-efficients, farm budgeting can be an effective and rather the basic tool of our approach to the problem of increased production in agriculture. The impact of farm management approach on increase in agricultural production needs to be closely watched and carefully studied in the Package Programme areas. After getting a fair experience with this approach the experiments needs to be extended to other areas without much time lag.

PROGRAMMING AND BUDGETING IN FARM MANAGEMENT *

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Farm programming and budgeting are important management functions in determining the most profitable combination of enterprises and practices for the farm as a whole. Farm programming is a process of developing and allocating the scarce resources of the individual farmers amongst the diverse lines on the farms in such a way that together they yield the maximum net income on the farm as a unit. It calls for balancing of farm operations and making decisions on such points as: what is to be done and how? What crops and in what combinations to grow and under what acreage? What labour programme to use particularly at the peak periods? What combination of crops and livestock to keep and in what proportion? What quantity and types of fertilizers and

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