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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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manures to use and how to procure them? What kind of soil conservation practices to follow?

A farm programme may be of a short or long duration depending primarily upon the capital resources available with the farmer. But generally, a farm programme should be framed for a full rotational period.

As farm programming would bring different outputs per acre with the application of different levels of input, it becomes necessary to frame alternative plans. The plan which would prove most profitable can be tested through the adoption of budgeting technique which evaluates farming practices and production levels per acre or animal and gives an estimate of net income from the farm business as a whole.

A farm budget may be total or partial. Total farm budgeting refers to estimating the costs, returns and net income from the whole farm, while partial budgeting refers to an estimate of a single enterprise like sugarcane or cow keeping or to single resource-use such as the application of irrigation water or ammonium sulphate to wheat crops.

Both farm programming and budgeting are so interlinked and inter-related that when we speak of farm budgeting, we mean an inseparable process of programming and budgeting. In the following study attempts were made to apply farm management principles in planning and budgeting the holdings of the cultivators.

Case Study of Farms

The results of the present study are based on the data of 8 cultivators' holdings in the Extension Block, Kalyanpur, Kanpur. The purpose of the inquiry was:

(1) to determine the extent to which the output potential of the available resources of the farm families could be pushed up through farm programming and budgeting procedures, and

(2) to assess the effects of change in technology introduced through planning on the levels of farm production.

Selection of Farm Families

A preliminary contact was made with a large number of farmers to ascertain their reaction to our attempts at seeking their co-operation in the establishment of farm management and planning demonstration projects. The response was somewhat confusing. Some of them vehemently resisted to any sort of programming on their fields, while a few gave a welcoming response to the adoption of some types of changes on their farming practices and resources use under our programme. Ultimately 8 such cultivators were chosen as indicated a high degree of association with the programme.

Hypothesis Developed

The hypothesis of this paper is that the adoption of programming and budgeting device in farm management brings about increased output from a given land base and that the aggregate level of income and employment of farm

families is enhanced by the optimum level of application of even one variable input to the land factor.

Steps Followed in Programming and Budgeting

The following steps were taken in our line of action:

(1) An inventory of physical resources for each cultivator was prepared. Thereafter, a rough map of the farm was drawn to know the location of different fields, soil type, water supply position, drainage facilities and to ascertain handicaps that may affect the operation of the farm under the new programme.

(2) The next step was to set up alternative programmes in consultation with the farmers. The requirement of improved seeds, fertilizers, position of labour supply and other items of working capital along with credit needs were ascertained. The position of fodder supply in relation to the number of cattle was also taken into account.

(3) The acreage and probable production were estimated on the basis of the past experience and the production levels of the locality.

(4) The marketing programme was also discussed.

(5) In working out the probable net profit on the farm as a whole, the average of five years' prices was taken into consideration as a basis of budgeting process. The relationship of one price to another was also considered in determining as to which of the crop enterprises was most paying.

It may be pointed out that at the time of executing the programmes on the fields, the cultivators followed only certain items of the alternative plan. The plan was thus of short duration and evaluated by partial budgeting. The decision of the cultivator on such matters was treated as of their own.

Methods of Data Collection

Detailed cost accounting method was adopted in the present study. A Junior Research Assistant of the Agricultural Economics Section was exclusively deputed to record various operations daily and note the use of capital on various jobs. The yield data were obtained by crop-cutting experiments with the help of the post-graduate students in the subject.

Table I shows the results of the investigations.

The physical description of the holdings of the co-operating cultivators shows that all of them except one, *viz.*, holding No. 2, have irrigation facilities of varying degree and naturally the level of agricultural production was expected to be higher on all the holdings than on holding No. 2. The changes adopted by the cultivators under the new programmes included use of *sanai* and *dhaincha* for green manuring, line sowing of *jowar* and *arhar*, application of ammonium sulphate and superphosphate, adoption of Moong T_1 and wheat rotation instead of fallow and wheat, and timely weeding and hoeing of the crops.

Manurial trials of the nature of result demonstration were also laid on the plots of some of the cultivators within the framework of farm planning to

TABLE I—PHYSICAL DESCRIPTION OF THE HOLDINGS IN EXTENSION BLOCK, KALYANPUR, KANPUR

Sl. No. of the Farm	Village	Area of the Holding (acres)	Type of Soil	Source of Irrigation
1.	Bithoor Kalan	18.40	Sandy Loam	Canal
2.	Ludhauri	8.25	Clay	No Irrigation
3.	Sachendi	7.25	Loam	Well
4.	Dube Ka Har	7.60	Clay	Canal
5.	Gujaini	19.21	Loam	Canal
6.	Bhaunti	7.75	Loam	Well
7.	Bhelamau	11.05	Loam	Well and Tank
8.	Kursauli	14.43	Loam	Well and Canal
9.	Surar	40.36	Sandy Loam	-do-
10.	Chkratanpur	21.45	Loam	Canal

demonstrate the effectiveness of the programme both in terms of physical output and monetary advantages obtained from the additional input factors.

TABLE II – HOLDING-WISE COSTS AND RECEIPTS, NET INCOME, FAMILY LABOUR INCOME AND FARM BUSINESS INCOME

(*in Rupees*)

Sl. No. of the Farm	Value of Gross Profit	Total Expenses	Net Income	Net Income per Acre	Family Labour Income per Acre	Farm Business Income per Acre	Estimated Net Income through Budgeting Process	Percentage Variation of Col. 7 over Col. 4
	1	2	3	4	5	6	7	8
1.	4,001.26	2,317.18	1,684.08	91.53	91.53	104.82	108.0	+17.40
2.	2,797.20	1,351.14	1,446.06	175.27	204.56	222.33	148.0	—15.40
3.	2,367.25	1,563.95	803.30	110.80	110.80	137.81	100.0	— 9.90
4.	3,642.00	2,193.27	1,448.73	190.62	190.62	202.12	152.0	—20.40
5.	4,968.10	3,045.85	1,922.25	100.07	111.26	119.35	81.0	—19.00
6.	2,823.75	1,474.47	1,349.28	174.10	185.89	196.30	141.0	—24.20
7.	2,270.50	1,294.83	975.67	88.29	114.43	126.57	98.0	+11.40
8.	6,126.25	3,238.99	2,887.26	200.08	200.08	221.04	152.0	—24.00

The size of farm business increased on all the holdings whether measured in total inputs, net farm income, family income or farm business income. Within the farm groups, the net income per acre was highest on Farm No. 8 followed by Nos. 4 and 2 because of growing such cash crops as sugarcane, potato and vegetables. Farm No. 2, in spite of being rainfed, gave very good returns as the soil was productive and *Rabi* crop was very fine on account of good winter rainfall. The equalities between net income and family labour income per acre on Farm Nos. 1, 3, 4, 8 and to a large extent on Farm No. 5 can be explained by the employment of hired labour, as the family labour was not available for farm work. Where family labour was engaged, the intensity and expansion of farm work yielded more income to the family labour.

Estimating future financial returns through budgeting on the farms is not an easy task, because they are influenced by monsoon, weather conditions, incidence of pests and diseases, price fluctuations and other factors. Nevertheless,

past experience in the line came close to predicting the possible profits under the budgeting technique. The percentage variation of the budget estimates over those actually obtained ranged between −24.2 and 17.4.

The limitations imposed by the basic concept of farm programming and budgeting amongst the farmers necessitated the introduction of result demonstrations as a part of the programme to create initial interest in them and make them conscious of the utility of farm programming as a tool of increased production. Such demonstrations particularly on farms No. 2 and 6 were such a success that the farmers' fairs were held in which the research workers, Extension personnel and the farmers of the locality showed keen interest. The response to fertilizers was marvellous, because the soil was highly deficient in nitrogen and phosphate. For an additional input of one rupee, the cultivators got an extra output worth twelve rupees. In general, the additional service and capital input gave proportionately a higher return on all the farms as will be evident from Table III.

Hypothesis Substantiated

The foregoing study of the farms clearly supports the hypothesis with actual evidence that farm programming and budgeting are important tools in management to increase the net income of a farm and to provide greater opportunities for employment to the family labour through intensity of culture and greater volume of farm business.

Conclusion

The Indian farmers have extremely limited capital resources. Therefore, the main task in organizing the enterprises of the farm is one of allocating their resources amongst different crop and livestock enterprises in such a way as to get the maximum profit from the farm as a unit. This can be greatly facilitated through farm programming and budgeting procedures. The present study has conclusively proved that some of the recommended farm practices which were substituted for the old, added more to the value of production than they added to the costs. Similarly, the added resources in the form of fertilizers, green manuring or *Moong* T_1 followed by wheat instead of wheat alone in the rotation, gave higher returns than their costs.

Since most of our farmers are illiterate, it is the job of farm management extension workers to start farm management and planning demonstration projects on a wider scale for increasing the production potential of our farmers' limited resources and making them conscious of the utility of the technique in farm management.

TABLE III—FINANCIAL ASPECT OF THE RESULT DEMONSTRATIONS

Sl. No. of Farm	Area under Demonstration (in Acres)	Composition of the Inputs and Nature of the Farming Technology	Value of the Additional Input over Control per Acre		Value of Additional Returns from Additional Input per Acre	Extra Benefits derived from each additional rupee spent. Ratio between input and output
2.	(a) 0.30	Manurial demonstration on wheat application of N_2 @20 lbs.	N_2	16.71	202.38	12.11
		$N_2+P_2O_5$ @ 20 lbs. each per acre (without basal dressing of farmyard manure.	$N_2+P_2O_5$	31.79	220.88	6.94
	(b) 0.30	-do- with Green manure	N_2	20.75	264.80	12.76
			$N_2+P_2O_5$	37.75	97.09	2·59
4.	0.99	Manurial demonstration on paddy application of P_2O_5 @ 20 lbs. per acre.	P_2O_5	15·08	24.15	1.60
		20 lbs. of P_2O_5+ 20 lbs. of nitrogen with a basal dressing of 100 mds. of farmyard manure per acre.	$P_2O_5+N_2$	30.09	133.05	4.42
5.	0·60	" " " "	P_2O_5	15.08	28.12	1.86
			$P_2O_5+N_2$	30.09	120.75	4.01
6.	0.60	Manurial demonstration on wheat @ 20 lbs. P_2O_5 (100 mds. of farmyard manure per acre as basal dressing).	P_2O_5	16.71	140.79	8.41
8.	0.75	Manurial demonstration on paddy application of P_2O_5 @ 20 lbs. per acre.	P_2O_5	15.08	34.95	2.09
		20 lbs. of P_2O_5+ 20 lbs. nitrogen with a basal dressing of 100 mds. of farmyard manure per acre.	$P_2O_5+N_2$	30.09	147.09	4.89