

A SIMPLE BUT ADEQUATE OPERATIONS PLAN

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Abstract

A simplified approach to operational planning is recommended. It is suggested that less emphasis be placed on the relatively complicated annual plan and that the monthly plan should assume greater importance. The monthly plan should be a quantitative estimate of resource requirements based on a field by field inspection done by the farmer. The success of the plan should not be measured by comparison with what actually happened, but against the results achieved in the field.

Introduction

It is unlikely that any significant improvements can be made to the methods of programme planning described by Thompson and Moberly,³ and Paxton, Lamusse and Johnston.² However, programme planning of this kind is not used as generally as it could and should be. The reasons for this appear to be that the detail of annual budgets and operations plans appear excessive particularly when the crop growth can vary so much because of variable rainfall and, although the plan is in fact very simple the first impressions gained are that the calculations required are difficult, the tables numerous and the exercise very time consuming.

This paper suggests ways in which the time required for some aspects of programme planning can be reduced and how the methods proposed by others can be modified to suit different requirements.

Methods

Budgeting and cash flow

Budgeting and calculating cash flow may be done for each field, but this is very time consuming. In Table 1 some methods of reducing the time required are illustrated. Similar methods can be used to reduce the work required for the annual operations plan.

The calculation of wages can be done simply as shown in Table 2. The labour budget can be simplified by grouping together all tasks which are done throughout the year and categorising these staff requirements as "permanents". In this category would be included staff in the range from senior supervisor to herdsmen.

It is essential, however, that the planting operation be budgeted on a field by field basis as considerable detailed planning is required eg harvest date, drainage requirements, availability of tractors for land preparation, availability of clean seed and planting method. The number of staff required to apply herbicides and fertilizer can be assumed to be the same as it was in the preceding year provided there is little difference in area to be treated. It is clear from the above that some records from the previous year's operations are essential. A simple method of keeping labour records is presented in Appendix 1.

The ration budget is best calculated by multiplying the number of staff per day by the average daily ration cost. If it is difficult to estimate the number of staff then the wages:rations ratio will give a reasonable approximation.

The fertilizer budget can be calculated by inflating the previous year's costs per hectare and adjusting for the new area. However, there is an advantage in determining the requirement for each field, as then the quantities of each different fertilizer mixture required will be known and advantage of the "early delivery rebates" may be taken. The annual programme plan can be simplified for herbicide requirement by calculating the amount of chemical used per hectare of plant plus ratoon cane in the previous year and adjusting this for the new area. Provision would have to be made in the new budget if substantial changes to farming methods are to be made, eg if the grower is going to burn rather than trash a greater area of cane at harvest.

In the case of tractor running costs the method suggested is to use the records of the previous year (Appendix 2) and to sub-divide the budget into haulage, land preparation and other operations. The litres of fuel used per ton hauled in the preceding year can be adjusted with the new estimate of tons cane to be harvested, and multiplied by the running cost/litre for the new year. Land preparation costs can be calculated in the same way and for other operations it is usually adequate to use the preceding year's litres again for the current budget year.

The statistics, eg litres/ton, can be calculated at the end of the season. The total litres used for haulage, for example, can be divided by the tons delivered to get litres/ton. Similarly the litres per hectare of plant cane can be calculated by dividing the litres used for land preparation by the area planted.

TABLE 1
An example of simple methods of budgeting and calculating cash flows

Farm Expenses	Method of Estimating	Monthly Cash Flow Calculations	Records Required
(1) Salaries:	Calculate	$\div 12 + \text{Bonus}$	
(2) Labour:	See Table 2		Appendix 1
Wages			
Rations	$\text{Last year's ration cost} \div \text{wages} \times \text{new wage}$	$\text{Ratio} \times \text{wage}$	Last yr
(3) Fertilizer:	$\text{Field by field or last year's cost/ha} \times \text{ha}$	$\div 12$	Last yr
(4) Chemicals:			
Weedicides	$\text{Litres product last year} \div \text{area in ha (plant + ratoon)} \times \text{new area in ha}$		Last yr
Other	$\text{Last year's figures} + \text{inflation}$	$\text{As for last year} \div 12$	
(5) Seed:	Calculate	From planting plan	
(6) Fuels:			
Haulage	$\text{Litres fuel/ton last year} \times \text{new tons} \times \text{running costs/litre}$	As for last year	Appendix 2
Land prep	$\text{Litres fuel/ha plant} \times \text{new ha plant} \times \text{running costs/litre}$		
Other	$\text{Litres used last year} \times \text{cost/litre}$		

TABLE 2
An example of a simple alternative to zero budgeting for labour

Task	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Remarks
Permanents*	15	15	15	15	15	15	15	15	15	15	15	15	Same every month
Cutters	4	4	4	4	4	4	4	4	4	4	4	4	Daily allocation ÷ productivity
Other harv.	2	2	2	2	2	2	2	2	2	2	2	2	Same every month in cutting season
Drainage		2	2	2	2								Calculate
Planting					18	18	12						Field by field
Weeders	6	6	8	10	12	16	20	20	20	20	16	12	Last year's figures modified
Herbicide				1	2	3	3	3	2	1			Last year's figures modified
Topdressing					3	3	3	3	2	1			Last year's figures modified
Other	1	1	1	1	2	3	3	3	3	3	2	1	Last year's figures modified
Total	28	30	32	35	50	64	62	50	48	46	33	28	

* Permanents are people who do a task every day of the year.

The cost per litre of fuel used can be calculated for each tractor or for the whole fleet by dividing total annual running costs by the total annual litres used. Clearly if abnormally large or unusually few repairs are going to be needed, this cost will have to be adjusted accordingly.

Monthly operations plan

The operations plan is established by visiting each field and listing all the operations required to be done, eg drainage, weeding, topdressing and herbicide spraying. Tractor and labour plans should be done monthly for the month ahead but the herbicide plan should be done weekly. For the plan to be successful in reducing expenditure to a minimum it is essential that when the weeding and herbicide plans are done the grower walks through the field thoroughly, and quantifies accurately labour and other requirements. The weeding requirements are compiled by estimating the labour requirement for each field as indicated in Table 3.

TABLE 3
An example of the monthly weeding plan

Field Number	Task Mandays/ha	Area Ha	Mandays Required
1	10	5.0	50
2	8	5.0	40
3	7	2.0	14
Total	25	12.0	104

So that grasses in particular are weeded at the correct stage of development, the field should be included into the plan a week or so after it has been sprayed with herbicide, or as soon as the grower can see which weeds will survive the herbicide treatment. Similarly if cane which is to be harvested during the month requires weeding after harvest it should be included in the plan prior to harvest.

When planning herbicide applications the number of staff required for the week ahead should be calculated, bearing in mind that herbicide cannot be sprayed every day and tasks are often not completed because of excessive wind speeds. Having inspected all the fields the monthly plan is used to calculate the labour requirement for the month. (Table 4).

A similar plan can be done for tractors although in this case, because the number of units available is fixed, the exercise would involve changing the order of operations or working overtime rather than calculating how many units are required.

Results

Experience has shown that because of the difficulty in predicting crop yields under rainfed conditions the simpler method of budgeting has proved to be accurate enough for management

TABLE 4

An example of calculating labour requirements for the month ahead

Task	Total Mandays	Men/Day*	Recommended Calculation
Permanents*	390	15	Same every month
Cutters	104	4	D.R.D. ÷ product
Other harvest	52	2	
Drainage	52	2	624 ÷ 12 m/man
Planting	312	12	Months planned req.
Weeding	260	10	See Table 3
Herbicide	78	3	Assessed weekly
Topdressing	78	3	Fields for month
Other	78	3	
Daily strength required		54	

* Permanents are people who do a task every day of the year.
* Men/day = Total mandays ÷ days/month, in this case 26.
DRD = daily rateable delivery.

requirements and that planning can improve with experience. The method also permits more flexibility eg planting programmes are reviewed with the harvest estimates, which is not always possible with some programme plans. Perhaps the biggest advantage is the substantial saving in time for managers and clerks.

However there are numerous hazards associated with this system and it is very important that the effect of a change in the work programme on final expenditure and on the cash flow should be investigated and that all parts of the budget which are affected by the change, should be altered. Perhaps the greatest hazard with this type of budgeting is that if over-expenditure occurs, it will tend to be perpetuated by the system because the next budget will include the over-expenditure.

The use of the operations plan has been very beneficial with one of the direct effects being the virtual elimination of the grass weed *Rottboellia exaltata* and a remarkable reduction in broadleaf weeds because they are being controlled at a much younger age. This has led to a lower herbicide and labour requirement on farms where the plan has been applied properly. Undoubtedly this result could have been obtained with more detailed programme planning but it would have required more managerial resources. Indirectly benefits from using the operations plan include the involvement of field supervisors who understand the basics of the plan and who have contributed to the solving of infield problems, eg surface water drainage problems which may never have been detected if such regular and thorough field inspections had not been carried out.

Discussion

The simple and quicker budgeting methods that have been described appear to be adequate. The resulting budget requires less time and effort and is subject to fewer changes than the number that have to be made when annual programme plan-

ning is practised. In common with more detailed methods, it can be considered as an estimate of expenditure and not a plan which should be adhered to rigidly. Planting programmes can be changed one month ahead of time, and herbicide programmes a week ahead. This flexibility has a disadvantage in that greater care has to be taken to ensure that budgets are not exceeded.

Care also has to be taken not to perpetuate over-expenditure. It is consequently recommended that the grower reassess periodically his cost centres such as those for rations and haulage. Some examples of aspects which should be re-evaluated regularly to see if the system being used is still the most economical include the following:

Rations	Source of labour	Irrigation
Size of farm Haulage system Harvest system Varieties	Mechanization Training requirements Employees' requirements Tractors required	Fertilizer mixtures Herbicides Minimum tillage Alternate crops

A study of cane planting systems as described by Landrey¹ is an example of what should be undertaken periodically to determine that productivity levels are adequate and to provide standards against which to measure future performance.

Another useful exercise would be an evaluation of the cane haulage system. Firstly determine what alternative systems are available, select what appear to be the best 3 or 4, ascertain from growers who use them, the advantages and disadvantages and, finally, decide whether the haulage system should be changed. Growers should be alert to changes which necessitate re-evaluation, eg a rise in the fuel price.

Because simpler planning systems may not be as accurate as those proposed by Thompson and Moberly³ they should not be adhered to as closely as is recommended with some plans but the monthly operations plan as described here should be closely followed.

Conclusions

It is suggested that in the rainfed areas of the sugar industry sugarcane growers should reduce the time taken to do annual operations plans and budgets by using simple methods and that they should concentrate on doing a detailed monthly operations plan which will allow accurate calculation of the resource requirements for the month ahead. This should eliminate unnecessary operations being carried out and tasks should be completed at the correct time. Costs should be reduced during the year being planned and in subsequent years.

In order to ensure that the farming systems being used are the most economic a grower should re-evaluate one or two farming operations each year. The success of plans should not be measured by comparison with what actually happened but rather against the results achieved in the field.

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APPENDIX 1

A simple method for compiling labour records

Month

	Day												Average
	1	2	3	4	5	6	7	27	28	29	30	31	
Permanents													
Cutters													
Other harvest													
Land Prep.													
Planting													
Weeding													
Herbicide													
Topdressing													
Others													
Total													

APPENDIX 2

A simple method for compiling fuel utilization records

Month

Day	Daily Fuel Use		
	Haulage	Land Preparation	Other
1			
2			
3			
28			
29			
30			
31			
This month			
Last month			

REFERENCES

1. Landrey, O. P. (1984). Productivity improvement in planting using activity sampling and analysis. *Proc S Afr Sug Technol Ass* 58: 180-182.
2. Paxton, R. H., Lamusse, A. and Johnston, N. A. (1976). The adaptation of programme planning to sugar farms and Estates in the SA Sugar Industry. *Proc S Afr Sug Technol Ass* 50: 50-55.
3. Thompson, G. D. and Moberly, P. K. (1976). Programme planning — a step towards improved sugar cane production. *Proc S Afr Sug Technol Ass* 50: 40-49.