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Articles in the field of agricultural economics, suitable for publication in the journal, will be welcomed.

Articles should have a maximum length of 10 folio pages (including tables, graphs, etc.), typed in double spacing. Contributions, in the language preferred by the writer, should be submitted in triplicate to the Editor, c/o Department of Agricultural Economics and Marketing, Pretoria, and should reach him at least one month prior to date of publication.

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Contents

	<u>Page</u>
I. EDITORIAL	1
II. ECONOMIC TRENDS IN THE SOUTH AFRICAN AGRICULTURE	3
III. ARTICLES	
1. The measurement of managerial inputs in agriculture- IV: Application with business results	5
- A. A. Jansen, G. H. Swanepoel & J. A. Groenewald	
2. The monthly income and cost pattern of farmers in four crop farming areas in the summer rainfall area of South Africa	15
- F. G. Steyn, Maize Board - J. A. Groenewald, University of Pretoria	
3. Risk and uncertainty in agriculture	20
- W. L. Nieuwoudt, University of Natal	
4. A few thoughts on agricultural policy in the light of changed conditions	26
- C. S. Blignaut, University of the Orange Free State, Bloemfontein	
IV. STATISTICS	32

The monthly income and cost pattern of farmers in four crop farming areas in the summer rainfall area of South Africa*

by

F.G. STEYN, Maize Board

and

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I. INTRODUCTION

One of the features of the farming industry is its close dependence on the seasons, and this naturally makes the planning of activities and finances and the implementation of such planning more difficult. Knowledge of the seasonal nature of farming activities is therefore often a prerequisite for efficient management.

A number of studies have been carried out in South Africa on the seasonal distribution of the utilisation of labour and tractive power in the various farming regions. However, the seasonal patterns in farming finances have hitherto received very little attention. This aspect is of the utmost importance for the effective planning and regulation of the year's activities, especially where refined methods of organisation, such as management accounting,¹⁾ are being considered. Another important consideration is that credit institutions such as commercial banks often want to see complete financial statements of their debtors.²⁾ The fuller the statements, the more willing a bank may be to grant a loan.

Such an analysis might show the extent of the funds and/or credit available and needed for short-term expenses such as labour, feed, repairs, stock remedies, etc.

This study contains an example of this type of analysis, carried out in 1964 in respect of a test sample of farmers in four crop areas - the Western Transvaal and the North-Western Free State, which may be considered largely specialised maize areas, the Bethlehem-Reitz area, a maize-wheat-stock farming area, and the Frankfort-Villiers area, which is a maize-stock farming area.³⁾

* This article is based on an M.Sc.(Agric.) thesis submitted to the University of Pretoria by F.G. Steyn.

- 1) See: Seldon, W.M. and Groenewald, J.A. (1966). Management accounting in agriculture. *Agrekon* 5(4): 19-29.
- 2) Steyn, F.G. (1968). *Die finansieringspatroon in die Suid-Afrikaanse landbou, met spesiale verwysing na sekere streke.* M.Sc.(Agric.) thesis, University of Pretoria, pp. 59-63.
- 3) For a more comprehensive discussion see: Steyn, F.G. and Groenewald, J.A. (1971). A review of the financing pattern of farmers in the four maize-producing areas of the Republic of South Africa. *Agrekon* 10(4).

II. ANALYSIS OF THE SEASONAL PATTERN OF FARMERS' SHORT-TERM EXPENDITURE

In this section five categories of expenditure will be dealt with, viz:

1. Tractor costs, i.e. repair costs, fuel, oil and grease, third party insurance and tax
2. The cost of seasonal labour, bags, twine, combining and threshing
3. Purchases of seed
4. Fertiliser costs
5. Bought feed, stock remedies and veterinary expenses
6. Total operating expenses

Factors that remain constant throughout the year such as regular labourers' wages, and capital expenditure are therefore not considered separately, but all non-capital expenses are included in the total. Since the patterns in the two specialised crop farming areas (the Western Transvaal and the North-Western Free State) show a strong resemblance, these two regions will be dealt with together. Tables 1, 2 and 3 show the monthly analysis of these costs.⁴⁾

In the Western Transvaal and the North-Western Free State the pattern of expenditure shows a slow increase from January onwards until a peak is reached in June (harvest). Expenditure then drops until December but there are peaks in August and October, owing chiefly to planting expenses. Tractor costs are uniform from January to September, with a sharp rise in October which continues in November and December. By far most of the money spent on seasonal labour, bags, twine, threshing and combining (over 90 per cent) is paid out during the period April to July.

Most seed is bought in May, July, September and October. Expenditure on fertiliser rises slowly from January to June, and from July to October there is a sharp rise, after which expenditure drops until December. About 60 per cent of all fertiliser purchases take place from August to November.

There is considerably less variation in the expenditure pattern at Bethlehem-Reitz than in the other two areas. This may be ascribed largely to the more diversified farming pattern in this area.

4) For a more comprehensive discussion see Steyn, F.G., *op. cit.*, pp. 78-98.

TABLE 1 - Average monthly expenditure pattern of farmers in the Western Transvaal and the North-Western Free State, 1964/65

Month	Tractor costs	Seasonal labour, bags, twine, threshing and combining	Seed	Fertiliser	Feed, stock remedies, veterinary costs	Total variable costs	
						Amount	Percentage of total
January	R 117	R 5	R 38	R 29	R 17	R 387	4,6
February	R 86	R 10	R 8	R 11	R 20	R 312	3,7
March	R 97	R 59	R 18	R 86	R 25	R 457	5,4
April	R 132	R 253	R 18	R 159	R 27	R 791	9,3
May	R 139	R 306	R 80	R 137	R 30	R 1 019	12,0
June	R 118	R 420	R 4	R 186	R 38	R 1 079	13,0
July	R 99	R 88	R 82	R 44	R 52	R 729	8,6
August	R 133	R 13	R 45	R 142	R 38	R 901	10,6
September	R 81	R 3	R 56	R 301	R 31	R 637	7,5
October	R 211	R 2	R 97	R 386	R 31	R 918	10,8
November	R 219	R 2	R 67	R 274	R 28	R 770	9,1
December	R 184	R 11	R 23	R 59	R 25	R 492	5,8
Total	R 1 616	R 1 172	R 536	R 1 814	R 362	R 8 492	100,0

TABLE 2 - Average monthly expenditure pattern of farmers at Bethlehem-Reitz, 1964/65

Month	Tractor costs	Seasonal labour, bags, twine, threshing and combining	Seed	Fertiliser	Feed, stock remedies, veterinary costs	Total variable costs	
						Amount	Percentage of total
January	R 123	R 318	R 51	R 92	R 60	R 862	10,3
February	R 94	R 180	R 39	R 189	R 104	R 896	10,7
March	R 93	R 54	R 12	R 121	R 50	R 600	7,1
April	R 122	R 22	R 17	R 75	R 78	R 504	6,0
May	R 71	R 75	R 24	R 51	R 138	R 514	6,1
June	R 72	R 128	R 25	R 128	R 103	R 631	7,5
July	R 89	R 135	R 33	R 145	R 59	R 696	8,3
August	R 98	R 51	R 37	R 188	R 98	R 871	10,4
September	R 104	R 16	R 74	R 136	R 71	R 588	7,0
October	R 120	R 19	R 32	R 494	R 59	R 908	10,8
November	R 97	R 75	R 16	R 38	R 79	R 485	5,8
December	R 113	R 330	R 50	R 58	R 56	R 842	10,0
Total	R 1 196	R 1 403	R 410	R 1 715	R 955	R 8 397	100,0

TABLE 3 - Average monthly expenditure pattern of farmers at Frankfort-Villiers, 1964/65

Month	Tractor costs	Seasonal labour, bags, twine, threshing and combining	Seed	Fertiliser	Feed, stock remedies, veterinary costs	Total variable costs	
						Amount	Percentage of total
January	R 72	R 20	R 11	R 44	R 85	R 422	3,1
February	R 71	R 117	R 6	R 12	R 45	R 502	3,7
March	R 92	R 2	R 40	R 18	R 105	R 479	3,5
April	R 61	R 322	R 1	R 0	R 155	R 726	5,2
May	R 92	R 864	R 102	R 0	R 143	R 1 386	10,2
June	R 119	R 637	R 0	R 0	R 119	R 1 206	8,8
July	R 235	R 361	R 44	R 948	R 146	R 2 273	16,7
August	R 147	R 160	R 196	R 1 387	R 91	R 3 308	24,2
September	R 164	R 388	R 199	R 169	R 160	R 1 281	9,4
October	R 57	R 73	R 15	R 190	R 105	R 687	5,0
November	R 205	R 26	R 9	R 323	R 50	R 841	6,2
December	R 132	R 33	R 1	R 42	R 84	R 534	3,9
Total	R 1 447	R 3 003	R 624	R 3 133	R 1 288	R 13 645	100,0

Total operating expenses reach a peak in January and February, remain fairly stable from March to June, and rise in July, reaching a new peak in August. In September and November expenditure remains relatively low, but it reaches peaks in October and December.

Total tractor costs in this area are fairly stable throughout the year, with peaks in January, April and October. About half the expenditure on seasonal labour, bags, twine, threshing and combining is incurred from December to February (chiefly for wheat), and about a quarter from May to July (chiefly for maize). Purchases of seed reach peaks in December, January, August and September, and are stable throughout the rest of the year. Most purchases of fertiliser take place from June to October (about 63 per cent of the total) - chiefly for maize - and again in February and March (about 18 per cent) for wheat and winter feed. Feed is purchased fairly regularly throughout the year, with a peak in May and relatively high expenditure in February, June and August as well.

In Frankfort-Villiers more than half the total variable costs are incurred during the period July, August and September. From October to April there is little variation, but in May costs rise considerably, dropping slightly in June before the big rise in July. About 65 per cent of the tractor costs are incurred during the six-month period July to December. These costs remain stable at a low level during the rest of the year. During the four-month period April to June, during which maize harvesting is one of the main activities, more than 70 per cent of the expenditure on seasonal labour, bags, twine, threshing and combining is incurred. Almost 80 per cent of the seed required is purchased during the three months May, August and September - when maize seed in particular is bought - and almost 75 per cent of all fertiliser purchases take place in July and August. Feed and stock remedy purchases and veterinary costs are fairly stable at a high level from March to October, and at a low level from November to February.

TABLE 4 - Monthly income pattern of farmers in the Western Transvaal and the North-Western Free State, 1964/65

Month	Income received					Percentage of annual total
	Crop sales	Animal products	Stock sales	Other*	Total	
January	R 0	R 79 ^e	R 336 ^g	R 39	R 454	3,4
February	7	123 ^f	70 ^g	50	250	1,8
March	208 ^a	133 ^f	262 ⁱ	31	634	4,7
April	303 ^a	119 ^f	33 ^g	35	490	3,6
May	1 312 ^b	67 ^e	41 ^g	72	1 492	11,0
June	3 618 ^b	74 ^e	61 ^g	83	3 836	28,3
July	1 375 ^a	66 ^e	489 ^g	47	1 977	14,6
August	1 929 ^a	70 ^e	186 ^g	35	2 220	16,4
September	0	94 ^f	314 ^g	116	524	3,9
October	0	247 ^f	445 ⁱ	31	723	5,3
November	82 ^d	117 ^f	170 ^g	45	414	3,1
December	15 ^e	85 ^f	342 ^g	85	527	3,9
Total	8 849	1 274	2 749	669	13 541	100,0

a Maize only

b Chiefly maize

c Wheat only

d Chiefly wheat

e Milk, cream and eggs

III. ANALYSIS OF THE SEASONAL PATTERN OF FARMERS' CASH RECEIPTS

In Tables 4 to 6 data for the farmers in the test sample in the Western Transvaal and the North-Western Free State, the Bethlehem-Reitz area and the Frankfort-Villiers area are analysed on a monthly basis.

In the Western Transvaal and the North-Western Free State, where maize is by far the most important source of income, the major portion of the income (70,3 per cent) is obtained during the period May to August, when the maize crop is harvested and sold.

Sales of stock and animal products provide a supplementary source of income throughout the year, and are the most important source of income for seven months. Stock sales reach their lowest point during autumn and early winter (April to June), and sales of animal products reach a peak in October, chiefly because wool production is seasonal.

In Bethlehem-Reitz, where the farming pattern is more diversified, income is more evenly distributed over the year. Wheat and wool sales result in 56,1 per cent of the income being received during the first three months of the year (January to March). Another peak (12 per cent of receipts) occurs in August, when most maize is sold. Income from animal products is fairly evenly distributed over the year, probably partly because wool sales take place over a fairly long period. During winter (May to July), however, income from this source is lower than at other times of the year. Most stock sales take place from August to November.

At Frankfort-Villiers, where maize is the most important source of income, 73 per cent of the farmers' income is received during the period June to August, i.e. from the sale of the maize harvest. Considerable numbers of livestock are

f Milk, cream, eggs, wool and skins

g Chiefly cattle

h Chiefly sheep

i Chiefly cattle and sheep

* Including non-farming income

also sold in August. During the rest of the year sales of stock and animal products yield the highest income. These sales are distributed fairly evenly throughout the year, except that most wool is sold in December and January. Indeed, income reaches a small peak in December (8,3 per cent of the total).

IV. A COMPARISON OF FARMERS' PATTERNS OF INCOME AND EXPENDITURE

The seasonal patterns of income and expenditure of farmers in the areas investigated can now be compared. Such a comparison can be useful in planning financing, since a profitable farming enterprise

may show a shortage of funds at certain times of the year and the funds then have to be supplied from other sources so that the activities on the farm can go forward smoothly. Financing of this kind costs money. If credit facilities are used, there are interest costs. If the farmer uses his own funds for such financing, this also costs money, according to the principle of opportunity costs, since he could have derived income from such capital sources if the money had been invested elsewhere.

An analysis of the monthly cash balance can also lead to more efficient financial management, since

TABLE 5 - Monthly income pattern of farmers at Bethlehem-Reitz, 1964/65

Month	Income received					Percentage of annual total
	Crop sales	Animal products	Stock sales	Other*	Total	
January	R 3 580 ^d	R 388 ^f	R 76 ^g	34	R 4 078	22,1
February	2 884 ^d	198 ^f	228 ⁱ	59	3 369	18,3
March	2 486 ^d	175 ^e	184 ^g	42	2 887	15,7
April	87	350 ^f	70 ^g	8	515	2,8
May	141	139 ^e	100 ⁱ	32	412	2,2
June	151	152 ^e	192 ^g	26	521	2,8
July	512 ^a	184 ^e	215 ^h	11	922	5,0
August	1 448 ^a	208 ^e	529 ^h	21	2 206	12,0
September	76 ^b	210 ^e	379 ⁱ	9	674	3,7
October	79	302 ^f	403 ^g	27	811	4,4
November	116 ^d	351 ^f	412 ^g	23	902	4,9
December	548 ^d	307 ^f	139 ^g	59	1 089	6,1
Total	12 144	2 964	2 927	351	18 386	100,0

a Maize only
b Chiefly maize
c Wheat only
d Chiefly wheat
e Milk, cream and eggs

f Milk, cream eggs, wool and skins
g Chiefly cattle
h Chiefly sheep
i Chiefly cattle and sheep
* Including non-farming income

TABLE 6 - Monthly income pattern of farmers at Frankfort-Villiers, 1964/65

Month	Income received					Percentage of annual total
	Crop sales	Animal products	Stock sales	Other*	Total	
January	R 0	R 900 ^f	R 61 ^g	R 0	R 961	4,0
February	19	284 ^e	228 ⁱ	12	543	2,3
March	96	241 ^e	46 ⁱ	0	383	1,6
April	67	208 ^e	225 ^g	30	530	2,2
May	119	233 ^e	97 ^g	0	449	1,9
June	2 835 ^b	206 ^e	37 ^g	10	3 088	13,0
July	5 060 ^a	247 ^e	85 ^h	18	5 410	22,7
August	7 927 ^a	264 ^e	694 ⁱ	0	8 885	37,3
September	0	296 ^e	50 ⁱ	0	346	1,5
October	0	314 ^e	278 ^g	0	592	2,5
November	0	428 ^f	208 ⁱ	0	636	2,7
December	0	1 699 ^f	246 ⁱ	24	1 969	8,3
Total	16 123	5 320	2 255	94	23 792	100,0

a Maize only
b Chiefly maize
c Wheat only
d Chiefly wheat
e Milk, cream and eggs

f Milk, cream, eggs, wool and skins
g Chiefly cattle
h Chiefly sheep
i Chiefly cattle and sheep
* Including non-farming income

the entrepreneur can deduce from it what sums he can invest elsewhere for various periods.

Tables 7 to 9 show the results for the areas concerned. The tables are based on the assumption that at the beginning of a financial year - 1 July to 30 June - the farmers had no accumulated funds or short-term debts.

It is apparent from Table 7 that in the Western Transvaal and the North-Western Free State incomes exceeded short-term expenditure during seven months of the year. The positive difference between income and expenditure was greatest in June, July and August. Differences (positive or negative) were relatively small during other months.

At Bethlehem-Reitz (see Table 8) short-term expenditure exceeds cash income only in October, May and June. These differences are small; the largest of these negative differences is R110 in June. As a result of the diversified system of farming, with maize and wheat as the main crops, the cumulative difference rises gradually from July to December, and there is a sharp increase in January, February and March, and then a gradual drop until June.

TABLE 7 - Difference between average short-term income and expenditure of farmers in a test sample in the Western Transvaal and the North-Western Free State, 1964/65

Month	Total income	Short-term expenditure	Difference, income, less expenditure	Cumulative difference
July	R 1 977	R 729	+1 248	+1 248
August	2 220	901	+1 319	+2 567
September	524	637	-113	+2 454
October	723	918	-195	+2 259
November	414	770	-356	+1 903
December	527	492	+35	+1 938
January	454	387	+67	+2 005
February	250	312	-62	+1 943
March	634	457	+177	+2 120
April	490	791	-301	+1 819
May	1 492	1 019	+473	+2 292
June	3 836	1 079	+2 757	+5 049

At Frankfort-Villiers income exceeds short-term expenditure during six months of the year (Table 9). In June, July and August income exceeds the variable costs by large amounts, and there is also a considerable positive difference between income and variable costs in December. May and September show considerable negative differences. During the other months of the year the differences (positive or negative) are less than R540.

V. CONCLUSION

This article contains an exposition of the seasonal pattern of income and short-term expenditure of farmers in a test sample in a few summer rainfall crop farming areas of South Africa. Analyses of this kind, together with data on

TABLE 8 - Difference between average short-term income and expenditure of farmers in a test sample in the Bethlehem - Reitz area, 1964/65

Month	Total income	Short-term expenditure	Difference, income less expenditure	Cumulative difference
July	R 922	R 696	+ 226	+ 226
August	2 206	871	+1 335	+ 1 561
September	674	588	+ 86	+ 1 647
October	811	908	- 97	+ 1 150
November	902	485	+417	+ 1 967
December	1 089	842	+247	+ 2 214
January	4 078	862	+3 216	+ 5 430
February	3 369	896	+2 473	+ 7 903
March	2 887	600	+2 287	+10 190
April	515	504	+ 11	+10 201
May	412	514	-102	+10 099
June	521	631	-110	+ 9 989

TABLE 9 - Difference between average short-term income and expenditure of farmers in a test sample in the Frankfort - Villiers area, 1964/65

Month	Total income	Short-term expenditure	Difference, income less expenditure	Cumulative difference
July	R 5 410	R 2 273	+3 137	+ 3 137
August	8 885	3 308	+5 577	+ 8 741
September	346	1 281	-935	+ 7 779
October	592	687	- 95	+ 7 684
November	636	841	-205	+ 7 479
December	1 969	534	+1 435	+ 8 914
January	961	422	+539	+ 9 453
February	543	502	+ 41	+ 9 494
March	383	479	- 96	+ 9 398
April	530	726	-196	+ 9 202
May	449	1 386	-937	+ 8 265
June	3 088	1 206	+1 882	+10 147

spending on private consumption and the seasonal pattern, may be useful to farmers in the financial organisation of their farming enterprises. Financial institutions whose activities include the provision of short-term credit for agriculture may also find such knowledge useful in arranging times when liquid sources for farming finances should be available in various parts of the country.

It would seem that analyses of the type contained in this article can be of great value. Naturally the analyses in this article should be regarded as a pioneer effort. More comprehensive analyses, including more farmers and a greater variety of cost items carried out in more areas, could lead to better and more efficient planning of credit, especially short-term credit, in South African agriculture.