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

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Farm Management - a Prerequisite for Sound Agricultural Development

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THE DIFFERENCE BETWEEN FARMING AND OTHER PRODUCE-PRODUCING NON-FARM INDUSTRIES

Farming in a wealthy, growing economy will generally face a costprice squeeze and a less favourable income situation than other major economic sectors of the community. It is worth while tabulating the different characteristics of farming and other productive industries to determine which are sufficiently significant to affect the welfare of both industry (farm or non-farm) and society as a whole.

1. Number of firms in an industry

The most significant difference between farming and other industries is the extent to which the rate of growth, as well as relationship between levels of output and market demand, are under control of the industries' managers.

In most industries, especially product-producing ones, certain firms, because of their size and managerial capacity, are industry leaders. They tend to set die pace for the entire industry. Farming, with its tens of thousands of individual units, does not and cannot have industry leaders.

2. How is the productive capacity of the industry determined?

Managers of key product-producing non-farm industries make estimates of the potential future market, the effect of variation in scale upon costs, and so on, and then decide whether it would be wise to expand or not. Rank and file firms tend to follow the lead of the key firms. Capacity is thus under managerial control.

The productive capacity of the farming industry is mostly determined by competitive striving to use new technology. The first farmers to adopt new techniques of production, and to make corresponding capital investments, usually realise an immediate gain in profits. These innovators simply reduce the cost per unit of output. Since they do not account for a very large portion of total output, product prices are not depressed. These farmers are temporarily in a more profitable position than those who have not adopted the new practice, but a profitable innovation is gradually adopted by more farmers, and the resulting increased output depresses product prices. The profit benefits of lower per unit production costs are offset by decreased per unit product prices. Whether or not any gain remains after most farmers have incorporated the new innovation into their operations, depends on several factors. But it is clear that non-adopters of the innovation are worse off than before, because they have not reduced their per unit costs or increased their output to offset the fall or relative fall in prices.

Innovators are thus using new ideas; their costs are reduced but prices are not affected; their profits improve. The next group of adopters (imitators) sees the advantages of this; they follow suit. By this time total output increases and prices are affected and profit margins are narrowed. Later adopters find margins narrowing, but are forced to adopt improved methods if they are to remain viable. But while one source of innovational profits is disappearing, some new innovation is being put into practice. And so the process goes on, "die proses van skeppende vernietiging". The competitive pressure thus tends to increase production at all times.

3. Is capacity kept in full use?

The capacity of a typical product-producing non-farm industry is not at all times in full use. Firm managers watch demand, orders and output-inventory for the industry as a whole. If inventories become burdensome, selling prices are seldom cut much, if at all. Instead, the work-week is shortened, or the work-force reduced, purchase of materials is slowed down, and output is cut back. If this does not bring about the required balance in output and sales, the firm's higher cost plants may be shut down and production workers discharged. By slowing down output, money costs of the total operation can be cut substantially, and the firm is better off to slow down rather than to cut prices sharply. If, on the other hand, orders grow rapidly, plants are put back into operation and a longer work-week restored - perhaps even with overtime-work.

The farming industry, on the other hand, tends to keep capacity in full use all the time. Farmers find it best in most cases to carry on with full production but try to shift, if possible, from one enterprise to another in order to improve the balance. An important portion of

the costs in farming is fixed and continues at the same level regardless of the amount produced. This means that a planned reduction in farm output usually results in a greater reduction in gross income than in costs. For this reason the short-term tendency is to maintain farm production under conditions of unfavourable prices. Even in the depths of past recessions, total farm production has not declined as has the production of other industries. Farmers generally try to increase output in order to cut fixed costs per unit.

4. What happens if the industry has more plants than it needs - has too much capacity?

Some firms in product-producing non-farm industries may go broke; these are the inefficient ones. Others may have high cost plants. In either case, such plants are offered for sale to some other industry or for other kinds of uses, and the units are removed from the industry involved. The total size of the industry is automatically reduced in plant capacity.

Some farmers may also go broke or may decide that farming is no longer worth while, but since most farmland has no alternate commercial uses, some other farmer - frequently a larger and more efficient operator - takes over the land and puts it back into production. Frequently his methods are better; he gets a higher output per morgen than before, and the size of the industry is not reduced but actually increased.

5. Magnitudes of income elasticity of demand

Income elasticity indicates for a particular commodity, or for a particular group of commodities, how much more food consumers will buy as their incomes increase, expressed as a percentage. Industries which produce commodities with high income elasticities are thus in the most advantageous position to use more resources, and increase production as national and per capita incomes grow. Those industries with low income elasticities are much less favoured, largely because they represent commodities with which the consumer is well supplied and has little capacity for further expansion.

It is a fact that the income elasticity of demand for food at the farm gate is very low. As consumers' incomes increase, food no longer becomes their major concern. They demand relatively more home appliances, better housing, recreation, travel and education.

The consumers' willingness to pay higher prices for non-farm goods and services keeps up the cost of steel, labour, petrol, oil and other materials which produce the more luxurious goods. Consequently, the cost of tractors, lumber, fuel, fertilizer and other cost items of the farm are kept up because of the nature of consumers' demand and the organisation of industries which produce and fabricate these materials.

THE FARM PROBLEM

Farmers thus find themselves faced with a dilemma. Individually, it is initially profitable for them to adopt new technology and to increase capital expenditures and farm production accordingly. But farming is highly competitive; it has a high fixed-cost burden while farmland has little alternative commercial uses. The demand elasticity for farm products at the farm gate is, furthermore, as a rule, extremely low. Therefore, income is depressed as the majority of farmers improve their operations and aggregate production is increased.

It is not profitable for an individual farmer to retrench, discarding recent technology and the capital investment it represents. If he does so, he finds the diminution in his own production too small to show up in the total supply, or to have any effect in increasing market prices. He would end up producing less at a lower price and with a greatly reduced income.

The competitive nature of farming provides a strong force leading to continued technological and economic progress. But at the same time this progress, which benefits consumers in variety and favourable prices for food, causes short-run income burdens on farmers.

Although the farm problem is thus mainly the relatively low income of farmers, underlying this or related to it are:

(1) The difficulties of balancing overall production and demand;

(2) the difficulties of enlarging the individual farm business and obtaining greater efficiency; and

(3) the rural community and public affairs problems confronted in a rapidly growing and changing economy.

BALANCING OVERALL PRODUCTION AND DEMAND

It is not in the scope of this paper to discuss in detail the various methods already in use or possible measures to balance production and demand. I feel, however, that it is necessary to mention the excellent work done by various marketing boards to stabilise farm prices. Table 1 illustrates this point.

TABLE 1 - Effect of production variations on prices under conditions of marketing control

Crop	Production		Percentage increase in production	Price per Unit		Percentage decrease in prices
	1965/66	1966/67		1965/66	1966/67	
			%	R	R	%
Maize (fixed price) Bags	56 ml.	106 ml	89	3.45	3.23	6.4
Groundnuts (pool price) Short tons	151,837	300,000	98	110	104	5.5
Kaffircorn (floor price) Bags	3.7 ml.	9.3 ml.	151	3.48	3.00	13.8

One wonders what the position would have been without controlled marketing.

Prospects are not particularly bright for demand to increase sufficiently in the near future to bring about a balance between farm production and demand. Some marketing boards can, however, smooth out price variations caused by production variations which result from weather variations. This smoothing-out of prices is a valuable prerequisite for the sound application of farm management principles.

DIFFICULTIES OF ENLARGING THE INDIVIDUAL FARM BUSINESS AND OBTAINING GREATER EFFICIENCY

(a) Why greater efficiency?

The gross income of the farming industry can be increased by reducing total farm output. Total farm output can be reduced by cutting down the resources going into production. Is there then any justification for spending money on agricultural extension and research, and to create credit facilities with the purpose of increasing production? Does this not merely "boomerang" back to farmers in the form of depressed prices for their products?

(1) Seen from the national point of view

Rising incomes of farmers depend on the growth and structural change of the total economy. This, in turn, implies that the real leverage for economic gains by farmers lies first and last in the creation and maintenance of conditions favourable for general economic growth. Farming can contribute greatly to total economic growth. Two major contributions are (1) the release of labour for off-farm work as productivity per person on farms increases, and (2) the lower cost of food and other farm products resulting from improved efficiency in farming.

An expanding national economy makes farm problems more manageable because there will be opportunity for dynamic adjustments in agriculture. If, on the other hand, the economy contracts - if instead of expanding it stagnates or even begins to shrink - farm problems become increasingly difficult. In the event of prolonged depression, the flow of labour from the farm to non-farm employment may be reversed and farm labour may build up in rural areas.

Innovations, research and the general advancement of technology, and their practical application, are some of the main forces that generate growth. The resulting reduction in costs and improvement in returns, anywhere in the trade chain from producer to consumer, encourage investment and stimulate growth.

(2) Seen from the individual farmer's point of view

(i) The innovator farmers. - The innovator is the man with vision, originality and daring. He may not be the scientist who invents the new process, but he is the one who successfully introduces it. Maxwell developed the scientific theory of radio waves, Hertz discovered them experimentally, but Marconi and Sarnhoff made them commercially profitable. The income earned by the successful innovators is defined by some economists - like Schumpeter - as profit. Usually these profit earnings are temporary and finally are driven out of existence by rivals and imitators. But while one source of innovational profits is disappearing, some new clever innovation is being put into practice. So, altogether, these profits do not ever have to disappear completely, provided research is continuous in order to discover new knowledge.

No single farmer has the knowledge and resources at his disposal to conduct his own research in all its numerous facets. The farmer is very seldom the scientist who discovers new truths, but he is the one who successfully introduces them into practical farming. If agricultural research, extension and the provision of credit had to be stopped, this would constitute a severe blow to the leading farmers.

(ii) The imitator farmers. - The difference between the net farm income per R100 capital investment of the best third of the farmers and that of the poorest third is considerable in all areas, in good as well as bad years, as is clearly indicated in Table 2.

In Table 3 an analysis is given of factors which have an effect on the production per morgen of maize in the Bethlehem-Reitz area. The results are affected by external factors such as weather soil type, etc., but nevertheless show a general trend as far as the factors that affect unit-yields are concerned.

This difference between the results obtained by the best third and the poorest third of the farmers may be accounted for partly by the lack of capital to invest in new technology, or to unwillingness or inability to assume the risk incident to the larger investment. It will frequently be accounted for partly by ignorance concerning technological advances. In some cases, the use of better practices is the only means by which individual operators can lower their cost of production and survive the cost price squeeze.

(b) Farm management and technical skills for increasing efficiency

The first step towards success in any type of farming is to know, and to be able to do well, all the practical jobs connected with the enterprises involved in the immediate area in which the farm is located. There is no substitute for this practical knowledge and experience.

The second important rule of success in farming is to know the scientific principles of crop and livestock production.

The third important rule leading towards success in farming is to know and to use the basic business principles in accordance with which the common farm practices and the scientific principles should be applied. They are the so-called farm management principles.

TABLE 2 - A comparison of the net farm incomes per R100 of capital investment of farmers who showed the best financial results, with that of the farmers who showed the poorest financial results

Area	Group	Net income per R100 of capital investment				
		1961/62	1962/63	1963/64	1964/65	Average
		R	R	R	R	R
Bethal-Standerton	Best 1/3	13.62	11.49	17.07	16.55	14.68
	Poorest 1/3	2.14	1.47	3.66	5.04	3.08
Frankfort-Villiers	Best 1/3	12.45	22.24	20.56	22.15	19.38
	Poorest 1/3	3.52	6.77	8.48	9.07	6.96
Bethlehem-Reitz	Best 1/3	16.43	17.94	16.99	26.20	19.39
	Poorest 1/3	4.51	3.41	4.99	8.31	5.31
N.W. - O.F.S.	Best 1/3	21.82	15.56	13.68	18.95	17.50
	Poorest 1/3	6.99	4.19	4.39	3.11	4.66
Western Transvaal	Best 1/3	18.83	20.43	11.34	5.12	13.93
	Poorest 1/3	7.08	6.68	0.82	-1.27	3.33

TABLE 3 - Efficiency of maize production for the best third and the poorest third and for the average of all sample farms, Bethlehem-Reitz area, 1962/63

		Best third of maize producers	Poorest third of maize producers	Average of all maize producers in sample
Gross income per morgen	R	86.40	34.56	52.95
Yield per morgen	bags	30.0	12.0	18.4
Seed costs per morgen	R	1.14	0.78	1.08
Fuel costs per morgen	R	4.22	2.95	3.70
Fertilizer costs per morgen	R	11.34	3.63	6.33
Fertilizer elements per morgen				
(a) Nitrogen	lb N	55	11	24
(b) Phosphate	lb P_2O_5	85	40	56
(c) Potash	lb K_2O	18	5	10

A complete knowledge of the theory and application of the basic principles of farm management is useless to a farmer without the knowledge of the other two major factors determining success in farming:

1) familiarity with the farm practices and operations in the area; and
2) knowledge of the scientific principles of crop and livestock production involved in the farming programme.

The new technology of production makes vastly greater demands on both management and technical skills than the simpler practices which prevailed a generation ago. The successful farm operator today has a much more complex job in determining the highest income potentialities. He must also have sufficient engineering ability to operate expensive equipment and to perform repairs in case of breakdowns. He must be informed about the most suitable crop varieties, the most economical application of fertilizer, the best tillage practices for his soil conditions, etc.

The successful use of new technology, however, involves much more than adoption of new techniques. Capable management is required to combine the new methods into profitable systems of farming. More capital is needed for improved equipment and for higher operating expenses. Successful adoption of the new technology involves substitution of brain for brawn, of machines for labour and of capital for both land and labour. It requires a delicately balanced combination of capable management, capital investment and technical skills. Today's - and tomorrow's - farmer must possess more management ability, more capital, and more technical skills than ever before to combine new technology - thus to achieve the highest possible net income.

(c) Farm size and efficiency

Recent technologies also include those which require a larger farming unit and a greater production per farm, if they are to be used profitably. Cost advantages for farms with larger acreages or animal numbers arise mainly from mechanical innovations relating to machines, equipment and buildings. Increased capacity of machines has greatly increased the number of morgen which can be handled by one man. Since the fixed costs of these high capacity machines are great, it is imperative that as many morgen as possible are handled by one machine, so that the per unit cost can be kept as low as possible.

Table 4 indicates the effect of changes in farm size on some cost items in the Drakensberg grazing region.

No systematic economies of scale studies have yet been made in South Africa. My hypothesis is, however, that most potential economics of larger farms are realized within the size limit of existing commercial farms and that only minor economies of scale (if any) are achievable beyond the upper size limit of existing commercial farms.

The impact of mechanical innovations and the accompanying scale advantages are more notable in crop farming than in livestock farming. This indicates that larger farms are more necessary in crop areas than in livestock areas. Biological innovations, on the other hand, that is to say, innovations which have a physiological effect in increasing the amount and/or quality of output for a given physical unit of input, have made it possible to substitute capital for land. The impact of biological innovations and the accompanying substitution of capital for land is also more prominent in crop farming than in livestock farming. The greater demand for cropland created by the introduction of mechanical innovations is thus partially offset by the integration of biological innovations, whereby capital could be substituted for land.

The increase in productivity in livestock production has not nearly been so great as in crop

TABLE 4 - The effect of changes in farm size on some cost items in the Drakensberg grazing region

Average farm size	Percentage of area under cultivation	Cost per morgen of farmland					Total
		Fixed improvements	Tractors	Implements	Vehicles	Regular labour	
Morgen	%	R	R	R	R	R	R
468	26.8	0.93	1.40	0.85	0.87	1.31	5.36
558	26.8	0.82	1.28	0.84	0.90	1.27	5.11
650	26.7	0.71	1.22	0.82	0.80	1.23	4.78
770	26.7	0.71	1.18	0.83	0.74	1.12	4.58
976	26.7	0.69	1.14	0.76	0.66	1.06	4.31

production. This has led to relative lower profit margins in the case of certain livestock enterprises. Farmers who are mainly engaged in the production of these commodities are therefore compelled either to increase the area of their farms or to lower their standard of living relative to workers in other sectors of the economy.

This has led to the paradox in some areas that, although the returns on land have been declining, land values have risen substantially; with the result that the return on land in some of these areas is currently below the mortgage rate of interest. If the returns on land continue to fall in these areas, some major adjustments in the land market may be anticipated. Although the mortgage debt load of farmers is light, a downward adjustment of land values could eliminate a proportion of their anticipated savings and retirement income. Buyers with heavy mortgages would be faced with even more serious problems.

Arguments that land prices are too high and that the return on land is in some areas below the mortgage rate of interest are, however, usually based on averages. But average farmers buy very little land, at least in the areas where land prices are highest. Most land purchases are made by superior farmers, with an above-average management ability.

Although the increase in productivity in livestock production has, in general, not been so great as in crop production, there also exists a considerable gap between the best farmers and the poorest farmers, as is clearly indicated in Table 5.

The creation of larger farms is, in some areas, the only solution to the low-income problems of farmers. At present land values, farmers with average management ability cannot afford to increase the size of their farms. Only those with above average management ability can increase the size of their farms at present land prices. The average and below-average manager will have to make way for the superior manager. Whilst there will most probably be fewer farmers in future, we shall nevertheless need more well-trained farmers.

SUMMARY

When new technology is adopted rapidly, farm production is increased rapidly - and excess production results. The nature of demand for farm products is such that the small excess in the market greatly depresses farm prices - and farmers' incomes are depressed drastically. Several marketing boards have, however, done a remarkable job in smoothing out price fluctuations.

It is to the advantage of the individual farmer to raise his own production as high as possible. The only ways by which he can improve his income is by increasing the number of units sold or by reducing his costs per unit, or both.

Farmers who have not made adaptations in recent years are becoming further and further out of adjustment as additional new technology is developed. The extent of farm maladjustments is represented by the present deficiency in average size of farms in many areas. While there will be fewer farmers in future, we shall need more well-trained farmers.

BIBLIOGRAPHY

SAMUALSON, PAUL A., Economics, an introductory analysis.

ADJUSTMENTS IN AGRICULTURE. A National Basebook.

HATTINGH, H.S., Farm management within certain homogeneous soil groups.

DIVISION OF AGRICULTURAL PRODUCTION ECONOMICS. Unpublished data.

HOW AGRICULTURE OPERATES. Iowa State University, Ames, Iowa.

TABLE 5 - Efficiency of the sheep enterprise of the best third and poorest third of sample farms in Elliot-Maclear area, 1966/67

Item		Elliot-Maclear area, 1966/67	
		Best Third	Poorest Third
Gross income per L.S.U.	R	43.03	23.63
Wool per sheep	lb	9.91	6.70
Price per lb of wool	C	36.88	36.26
Ewes in flock	%	56.86	51.78
Lambing percentage	%	84.50	69.63
Feed cost per L.S.U.	R	13.74	8.57
Gross income less feed cost per L.S.U.	R	29.29	15.06
Mortality and otherwise lost	%	3.06	3.71
Veterinary surgeon and medicine cost per L.S.U.	R	1.39	0.85