familiar with the inherent problems associated with sugar cane production on the Umfolozi Plain and estimations of flood damage along with possible and more accurately, to the greater satisfaction of the members of the insurance pool or stabilisation fund.

CONCLUSION

Because the average outcome with regard to flood damage for the Lower Umfolozi Plain is known and the risk is therefore statistically measurable, it is possible to insure against flood damage. Pool insurance has the greatest potential for application with a group of homogeneous producers, a high degree of participation and a low risk producers in that one only specific risk, namely flood damage, would be insured against.

The average annual net cash flow in respect of each farm size is not only higher where flood damage is insured against, but also more stable. As against this there is a considerable variation in the annual net income stream where flood damage is not insured against. Flood damage increases net cash flow in years in which flood damage occurs, while net cash flow in normal years is slightly lower. Apparently then, flood damage insurance has, at least potentially, considerable benefits for the sugar cane producers on the Lower Umfolozi Plain.

BIBLIOGRAPHY


ABSTRACT

In this article the focus is on the structural changes that have occurred recently in South Africa in respect of ownership and the right of use of land in commercial agricultural production units. Attention is devoted more specifically to changes in respect of the number of farmers and farms, farm sizes, types of enterprise, the lease of land and part-time farming. An effort was made to answer the following questions in respect of every structural component:

- What changes have recently occurred?
- What were the most important socio-economic forces behind these changes?
- What socio-economic forces should have an important influence on these changes in the near future?
- What are the effects of these changes on their structural components likely to be?
- Is the direction which the changes are expected to take desirable from the point of view of social welfare?
- Briefly, the finding was that important changes, caused by a variety of factors, are taking place in respect of every structural component and that the direction which these structural changes are taking is not very desirable from the point of view of social welfare. Possible courses of action to deal with this problem are discussed.

DISCUSSION OF CONCEPTS AND APPROACH

In this fast-changing world the structure of commercial agricultural production units is changing continuously, although relatively slowly (Groenewald, 1974, p.12). The structure of agricultural production units refers, according to Scholtz (1987, p.14) to the number of enterprises, the size of an enterprise and the ratio to which production factors such as natural resources, capital and labour are applied by the entrepreneur within the context of the farm and the industry. Structural changes in recent future will be the result of a variety of forces working together. Put in another way, the structure at any one point is the result of forces that have influenced the structure until that moment. This view of structural changes partially coincides with that of Dreyer and Brand (1986, p.131), who regard structural changes as on the one hand derivatives of changes occurring in the economy and on the other hand conditions for an increase in economic growth and social welfare.

When the structure of agricultural production units is studied over a period of time, it is found that meaningful changes in respect of almost all structural components take place in the course of time (compare, for example, the publication series of the Division of Agricultural Production Economics on structural changes in various farming areas of the RSA). The scope of this article is restricted to those structural components that relate to aspects of ownership and the right of use of land. Attention is focused specifically on changes that have occurred in the recent past (and should occur in the near future) in respect of the number of farmers and farms, farm sizes, types of enterprise, the leasing of land and part-time farming. The emphasis is placed on socio-economic forces as causative factors, i.e. those forces of social and economic origin that change the structure of agricultural production units by changes in their scope or nature. The possible influence of the structural changes on social welfare is also indicated.

The following questions in respect of each of the structural components mentioned will be addressed in detail:

- What changes have occurred in the recent past?
- What were the most important socio-economic forces that gave rise to these changes?
- What socio-economic forces should have an important influence on these changes in the near future?
- What are the effects of these changes on the structural components likely to be?
- Is the direction which the changes are expected to take desirable from the point of view of social welfare?

The approach followed is firstly to give a review of a social welfare model. The purpose of the model is to provide guide-lines on the basis of which the influence of structural change on social welfare can be determined and also to place the relevant

by M.F. Viljoen*
structural components in perspective in the context of welfare. After reviewing the welfare model, the first four questions will be answered in respect of each of the structural components. (A macro approach will have to be followed, owing to limited data, instead of the more desirable regional approach (Kotze, 1970, p.28)). The last question will then be answered by bringing expected changes in the structural components into relation with the model for social welfare.

THE SOCIAL WELFARE MODEL

The theory of economic welfare has a comprehensive and generally acceptable argument on the effective (optimum) application of resources (Spies and Bester, 1975, p.26) and also provides the fundamental logic for the model proposed here.

It is, however, assumed that the conditions necessary for the operation of a free-market economy must be fulfilled. In these conditions, the assumptions of marginal equalities and the producer curves of indifference, which promote the various policy objectives in an ideal balance with one another in order to maximise social welfare interoperatively, are possible. Before the model is applied, it is necessary to indicate changes in the relevant structural components.

THE NUMBER OF FARMERS AND FARMS

When considering the statistics concerned, it is possible to obtain an infinite number of Pareto optimum situations for an economic system. It is consequently necessary to assume the existence of the maximisation of prosperity, in order to select the best of the Pareto optimum situations. The sufficient condition is the maximisation of social welfare function.

Analysis I

Although it is realised that it is necessary to consider the effect of structural change on all the objectives of social welfare in the community, the point of general satisfaction can be achieved. This point will automatically be reached in an economy system, provided that the assumptions of the free-market system are complied with, and readjustments will also automatically take place as the relevant variables change.

Although a variety of valid arguments can be put forward for welfare-economic theory not working in practice as it stands (this argument revolves mainly around the assumptions of the theory, which do not hold water in practice), the model at least provides a framework and guide-lines for thought and analytical purposes.

FIG. 1 - Maximisation of welfare by interaction between the social curve of indifference and the general marginal utility (Spies and Bester, 1975)

Alternative II

Although it is realised that it is necessary to consider the effect of structural change on all the objectives of social welfare in the community.

Alternative I

Application of resources (Spies and Bester, 1975, p.26). The last question will then be answered by bringing expected changes in the structural components into relation with the model for social welfare.

THE SOCIAL WELFARE MODEL

The theory of economic welfare has a comprehensive and generally acceptable argument on the effective (optimum) application of resources (Spies and Bester, 1975, p.26) and also provides the fundamental logic for the model proposed here.

It is, however, assumed that the conditions necessary for the operation of a free-market economy must be fulfilled. In these conditions, the assumptions of marginal equalities and the producer curves of indifference, which promote the various policy objectives in an ideal balance with one another in order to maximise social welfare interoperatively, are possible. Before the model is applied, it is necessary to indicate changes in the relevant structural components.

THE NUMBER OF FARMERS AND FARMS

When considering the statistics concerned, it is possible to obtain an infinite number of Pareto optimum situations for an economic system. It is consequently necessary to assume the existence of the maximisation of prosperity, in order to select the best of the Pareto optimum situations. The sufficient condition is the maximisation of social welfare function.

Analysis I

Although it is realised that it is necessary to consider the effect of structural change on all the objectives of social welfare in the community, the point of general satisfaction can be achieved. This point will automatically be reached in an economy system, provided that the assumptions of the free-market system are complied with, and readjustments will also automatically take place as the relevant variables change.

Although a variety of valid arguments can be put forward for welfare-economic theory not working in practice as it stands (this argument revolves mainly around the assumptions of the theory, which do not hold water in practice), the model at least provides a framework and guide-lines for thought and analytical purposes.

FIG. 1 - Maximisation of welfare by interaction between the social curve of indifference and the general marginal utility (Spies and Bester, 1975)

Alternative II

Although it is realised that it is necessary to consider the effect of structural change on all the objectives of social welfare in the community, the point of general satisfaction can be achieved. This point will automatically be reached in an economy system, provided that the assumptions of the free-market system are complied with, and readjustments will also automatically take place as the relevant variables change.

Although a variety of valid arguments can be put forward for welfare-economic theory not working in practice as it stands (this argument revolves mainly around the assumptions of the theory, which do not hold water in practice), the model at least provides a framework and guide-lines for thought and analytical purposes.

FIG. 1 - Maximisation of welfare by interaction between the social curve of indifference and the general marginal utility (Spies and Bester, 1975)

Alternative II

Although it is realised that it is necessary to consider the effect of structural change on all the objectives of social welfare in the community, the point of general satisfaction can be achieved. This point will automatically be reached in an economy system, provided that the assumptions of the free-market system are complied with, and readjustments will also automatically take place as the relevant variables change.

Although a variety of valid arguments can be put forward for welfare-economic theory not working in practice as it stands (this argument revolves mainly around the assumptions of the theory, which do not hold water in practice), the model at least provides a framework and guide-lines for thought and analytical purposes.
structural components in perspective in the context of welfare. After reviewing the welfare model, the first four questions will be answered in respect of each of the structural components. (A macro approach will have to be followed, owing to limited data, instead of the more desirable regional approach (Kotze, 1968, p.28).) The last question will then be answered by bringing expected changes in the structural components into relation with the model for social welfare.

THE SOCIAL WELFARE MODEL

The theory of economic welfare has a comprehensive and generally acceptable argument on the effective (optimum) application of resources (Spies and Bester, 1975, p.26) and also provides the fundamental logic for the model proposed here.

Beginning with the assumptions that are necessary in a free-market economy for its successful operation, the conditions for optimum effect are set out first in the theory. These conditions consist of three sets of necessary and one set of sufficient conditions. The necessary conditions refer to certain marginal equations that have to be applied in order to obtain successful optimum in the production sphere and the consumer sphere and between the production and the consumer sphere. If these conditions are fulfilled, what is known as a Pareto optimum situation is obtained. Since, depending on the allocation of inputs and outputs to the production of particular goods and services and the allocation of goods and services to persons in the community, it is possible to obtain an infinite number of Pareto optimum situations for an economic system. It is consequently necessary to add the sufficient condition for the maximisation of prosperity, in order to select the best of the Pareto optimum situations. The sufficient condition is considered to be the idea of a social welfare function. This function is, according to Spies and Bester (1975, p.28), an order of preference in the authoritative decision-maker in a community, containing a complex series of moral-ethical arguments and in which the nature and type of function in a democratic community is determined by the aspirations and values of the community participating in the decision-making process.

By bringing the social welfare function (sufficient condition for maximising welfare, represented by the social curves of indifference in Figure 1) into relation with the Pareto optimum situations (necessary conditions for maximising welfare represented by the general marginal utility), the point of general satisfaction can be achieved. This point will automatically be reached in an economic system, provided that the assumptions of the free-market system are complied with, and readjustments will also automatically take place as the relevant variables change.

Although a variety of valid arguments can be put forward for welfare-economic theory not working in practice as it stands (this argument revolves mainly around the assumptions of the theory, which do not hold water in practice), the model at least provides a framework and guide-lines for thought and analytical purposes.

Applied to this particular problem, the social welfare function may be regarded as consisting of various welfare objectives pursued by the community (James and Lee, 1971). These welfare objectives, in which overall social welfare is manifested, are embodied, among other things, in the policy objectives of the Government as contained in White Papers and public statements by Government decision-makers. It could be argued that if certain structural changes in respect of the commercial agricultural production units tend to promote one or more of the policy objectives, they increase social welfare. On the other hand, if they conflict with certain policy objectives, they are prejudicing social welfare. Finally, on the extent to which structural changes influence social welfare, if certain policy objectives are promoted and other simultaneously prejudiced, is not possible without value judgements.

FIG. 2 - Model for social welfare

which promotes the various policy objectives in an ideal balance with one another in order to maximise social welfare intertemporarily. Before the model is applied, it is necessary to indicate changes in the relevant structural components.

THE NUMBER OF FARMERS AND FARMS

When considering the statistics concerned, the most significant fact is that the number of farmers and farms has decreased steadily since 1950 and that the rate of decrease is continuing to accelerate. (The farmer is described as the manager of the farm or any other person who runs the farm.) Table I indicates that the number of farms, which is in direct proportion to the number of farmers (Hattingh, 1986, p,3), decreased for the period indicated in the table, at an increasing rate from 0.9 per cent per annum during the fifties, 1.4 per cent per annum during the sixties and 2.4 per cent per annum during the seventies to 2.9 per cent for the first half of the eighties.

The total area devoted to farming did not decrease to the same extent (the area increased until 1960 before beginning to decrease), however, so that the average size of farms continued to increase. Table 2 indicates that the average size of farms increased from 744 ha in 1950 to 1 903 ha in 1978, with the greatest increase of 2.73 per cent per annum during the period 1970 to 1978. The relative share of farms larger than 1 000 ha in the total number of farms increased from 20.4 per cent in 1950 to 28.5 per cent in 1978.

The most important factors (socio-economic forces) determining the number and size of commercial farmers is economic development and wealth in national income: "Technology usually relates to size and creates economies of scale that tend to favour larger commercial farms. Growth in national income increases the opportunity costs of farm labour in terms of the real per capita income of non-farmers and farms need to enlarge in order to maintain an economic balance with earnings comparable to those of non-farmers."

Table 1 - Number of farms in white areas and the change in the course of time

In addition to the above forces, there is another important force in the RSA, namely the price-cost squeeze. This is reflected, for example, in the ratio between the prices of producer prices and agricultural production agents. The terms of trade that reflect the ratio of producer prices to prices of...
TABLE 2 - Average size of farms in White areas and the change in the course of time

<table>
<thead>
<tr>
<th>Year</th>
<th>Average size (ha)</th>
<th>Change per year</th>
</tr>
</thead>
<tbody>
<tr>
<td>1950</td>
<td>744</td>
<td>+1.65</td>
</tr>
<tr>
<td>1960</td>
<td>886</td>
<td>+1.29</td>
</tr>
<tr>
<td>1971</td>
<td>971</td>
<td>+1.73</td>
</tr>
<tr>
<td>1972</td>
<td>1 193</td>
<td></td>
</tr>
</tbody>
</table>

Abstract of Agricultural Statistics, 1987, p.6

agricultural means of production weakened from 1.0 in 1975 to 0.77 in 1986 (Scholtz, 1987, p.4). This phenomenon indicates that the prices of agricultural products to pay for means of production, which has been taking place for a long time and tends to get worse with time, has resulted in many farmers being forced to leave their farms since they can no longer make a living from them.

Before a forecast of the future number of farmers and farms can be made, it is necessary to form an opinion on the nature and scope of forces in favour of, or against, a further reduction. Forces which will favour this are predominantly economic ones. The expectation is that the terms of trade will not improve within the foreseeable future. Various factors contribute to the fact that prices of agricultural products should not rise fast, such as increasing issues of agricultural products, when the steadiness of the increase in the domestic demand for agricultural products, among other things as a result of a low growth rate in the population, on limited export opportunities for most products and low international prices. Input prices, on the other hand, are of a relatively high rate as a result of the expected high domestic inflation. With the cost-price pressure increasing in this way, many farmers will be required to give up farming or to enlarge farming units.

Opposing the economic forces, there are also certain factors which may be classified as short-term, medium-term and long-term, and which are aimed at reducing the number of farmers leaving farming. Among their objectives is the prevention of ever greater pressure on the already reduced number of farmers to increase with time. This average figure conceals two diverse trends, however, which occur simultaneously, and both of which are considered by the community as undesirable, namely the trend towards the formation of uneconomic, small farming units and that towards excessively large units. The extent of this phenomenon is illustrated by the skewed distribution of income. Hattingh (1986, p.7) for example indicates that approximately 30 per cent of the farming units were estimated to contribute 75 per cent to the total gross farming income in the RSA in 1985, with an average gross farming income of R409 500 per farming unit. The 70 per cent that contributed only 25 per cent to the gross farming income, had an average gross farming income of R58 000 per farm. 30 per cent of the farmers contributed only 3.5 per cent to the gross farming income, while the income per farm of R19 110.

This phenomenon of an ever greater concentration of wealth in the hands of ever fewer people and the increasingly skewed distribution of income is a feature not only of the agricultural sector, but also that occurs in other sectors and in other countries. It occurs in almost all capitalist countries in the world (Hattingh, 1986, p.9). When the forces that have given rise to this situation are considered, it is found that they are inherent in such a situation from the point of view of food production, farming units that are economically becoming uneconomic.

In contrast with this, little has been done to reduce the pressure of excessive large areas of land, in spite of the recommendations of various commissions (Hattingh, 1986, p.20). If the information on the establishment of public companies (these at the recommend the following causes, among other things: division of the land into small farming units into viable units. Considerable success has been achieved with these measures. The drought, an increased debt burdens and high interest rates have recently contributed, however, towards many units that would otherwise still have been economically becoming uneconomic.

With regard to the diminution of units, there are, in addition to the economic factors opposing this, certain (social) community factors which have been in operation for a long time. One may refer in this respect to the Subdivision of Agricultural Land Act, 1970 (Act 70 of 1970) and the Agricultural Credit Act 1966, (Act 28 of 1966), which will reduce the investment value of land. Research results that are consistent with this are the findings of the Commission on land sales in South Africa (ibid., 1984).

TABLE 3 - Types of farms in White areas, 1971 to 1981

<table>
<thead>
<tr>
<th>Type</th>
<th>Number</th>
<th>Source: Central Statistical Service, Pretoria, telephonic communication, 1987</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total</td>
<td>14 860</td>
<td>99 819 35</td>
</tr>
<tr>
<td>Government enterprises</td>
<td>11 199 210</td>
<td>62 200 1</td>
</tr>
<tr>
<td>Private companies</td>
<td>6 293 256 8 186 227 75</td>
<td>5 434 24</td>
</tr>
<tr>
<td>Public companies</td>
<td>4 4 293 256 8 186 227 75</td>
<td>5 434 24</td>
</tr>
<tr>
<td>Government enterprises</td>
<td>10 46 89 67 82 46 57 242 152</td>
<td>6 464 250</td>
</tr>
<tr>
<td>Other</td>
<td>13 123 94 137 188 130 260 270 152</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>14 860 99 819 35</td>
<td></td>
</tr>
</tbody>
</table>

The phenomenon of foreigners buying farms in the RSA using the financial rand is a recent development, and should be regarded as undesirable for the above reasons and others. Financial problems may prevent such measures from being implemented in the near future. Two economic forces will place a dampener on growth: the increased debt burden incurred by many large enterprises over the past three to four years which will make it difficult, if not impossible, at least for a while, to expand further, and the trend towards more market-related interest rates for agriculture which will reduce the investment value of land.

TYPES OF ENTERPRISE

We will now consider the relative share of the various types of enterprise found in farming, and Table 3 provides more information on these. The following are apparent from the table:

- The number of enterprises has decreased from 83 438 in 1971/72 to 58 395 in 1981, a reduction of 21 669.
- The only reduction, and the largest overall change, occurred in respect of one-man businesses and partnerships, namely from 83 438 in 1971/72 to 58 395 in 1981, a decrease of 25 043.
- The type of enterprise which had the greatest increase over the same period was the number of companies, which increased by 9 988 in 1971/72 to 5 590 in 1981, an increase of 3 297.
- The number of companies in one-man businesses and partnerships is relatively few, when expressed as a percentage of the total number of enterprises) is to serve as an indication of the extent to which these enterprises are being formed, this number increased approximately by 32 per cent between 1976 and 1981. Owing to the disadvantages inherent in such a situation on the point of view of the security of the country and from the point of view of agricultural and regional development and the general welfare which is contributed by the community on these factors, ever greater pressure may be exerted for direct measures such as compulsory occupation and/or the implementation of a progressive land tax.

The relevant question here is: What forces led to the change in composition of types of enterprise and in particular to the increased share of companies when compared with one-man businesses? The most
TABLE 2 - Average size of farms in White areas and the change in the course of time

<table>
<thead>
<tr>
<th>Year</th>
<th>Average size (ha)</th>
<th>Change per year</th>
</tr>
</thead>
<tbody>
<tr>
<td>1950</td>
<td>744</td>
<td>+1.65</td>
</tr>
<tr>
<td>1960</td>
<td>687</td>
<td>+1.29</td>
</tr>
<tr>
<td>1971</td>
<td>687</td>
<td>+0.50</td>
</tr>
<tr>
<td>1979</td>
<td>694</td>
<td>-0.73</td>
</tr>
<tr>
<td>1981</td>
<td>694</td>
<td>-0.73</td>
</tr>
</tbody>
</table>

TABLE 3 - Types of farms in White areas, 1971 to 1981

<table>
<thead>
<tr>
<th>Type</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>One-man businesses</td>
<td>7152</td>
</tr>
<tr>
<td>Partnerships</td>
<td>7373</td>
</tr>
<tr>
<td>1-3</td>
<td>38348</td>
</tr>
<tr>
<td>4-6</td>
<td>2293</td>
</tr>
<tr>
<td>7-9</td>
<td>2964</td>
</tr>
<tr>
<td>Public companies</td>
<td>3118</td>
</tr>
<tr>
<td>10-12</td>
<td>148</td>
</tr>
<tr>
<td>Private companies</td>
<td>118</td>
</tr>
<tr>
<td>Co-operatives</td>
<td>148</td>
</tr>
<tr>
<td>9-12</td>
<td>2967</td>
</tr>
<tr>
<td>Municipalities</td>
<td>2599</td>
</tr>
<tr>
<td>Government enterprises</td>
<td>4956</td>
</tr>
<tr>
<td>Public corporations</td>
<td>4532</td>
</tr>
<tr>
<td>Municipalities</td>
<td>4159</td>
</tr>
<tr>
<td>Other</td>
<td>58395</td>
</tr>
<tr>
<td>Total</td>
<td>148609</td>
</tr>
</tbody>
</table>

The phenomenon of a greater concentration of wealth in the hands of ever fewer people and the increasingly skewed distribution of income is a feature not only of the agricultural sector, but also of industry in the RSA, but that also occurs in other sectors and in other countries. It occurs in almost all capitalist countries in the world (Hattingh, 1986, p.9).

The type of enterprise which had the greatest increase over the same period was one-man businesses, the number of which increased from 2.293 in 1971/72 to 5.906 in 1981, an increase of 3 297.

The type of enterprise which had the greatest increase over the same period was one-man businesses, the number of which increased from 2.293 in 1971/72 to 5.906 in 1981, an increase of 3 297.

The type of enterprise which had the greatest increase over the same period was one-man businesses, the number of which increased from 2.293 in 1971/72 to 5.906 in 1981, an increase of 3 297.

Before a forecast of the future number of farmers and farms can be made, it is necessary to form an opinion on the nature and scope of forces in favour of, or in opposition to, a further reduction. Forces which will favour this are predominantly socioeconomic ones. The expectation is that the trend of land will not improve within the foreseeable future. Various factors contribute to the fact that prices of agricultural products should not rise fast, such as large surpluses of agricultural products, the steadiness of the increase in the domestic demand for agricultural products, and the increasing surpluses of agricultural products. In this way ever more farmers will be required to give up farming. Short- and medium-term forces refer to the measures launched by the Government to consolidate non-viable farms. Long-term forces are included in the studies of the department of agriculture to regional development, and the establishment of such industries in rural areas is a matter of high priority.” In an information document on the White Paper the promotion of industrial development as an element of a coherent regional development strategy for Southern Africa, it is emphasised that regional-economic development incorporates much more than merely industrial development and that the development of many of the less developed regions will only be able to be addressed effectively if the mining sector, the service sector, and the industrial sector, the latter in particular, are focused on as priorities” (Fourie, 1984) (translation).

In the policy for the promotion of industrial development, one of the main objectives is: “The third important aim of regional industrial development is to try to counteract the depopulation of the rural areas, which has already taken on alarming proportions” (ibid., 1984).

Where the above policies on short-term forces oppose the depopulation of rural areas and therefore also the withdrawal of Whites from farms, the question is how strong an influence this will have on the rate of depopulation within the foreseeable future (if supported by suitable measures). The provisional estimate is that the number of farmers will continue, at first at a fast rate, but later at a lower rate than that during the seventies and early eighties.

SIZE OF ENTERPRISES AND SKEWED DISTRIBUTION OF INCOME

In the preceding paragraph it was noted that the average size of farms continues to increase with time. This average figure conceals two diverse trends, however, which occur simultaneously, and both of which have inherent in such a situation from the point of view of the Subdivision of Agricultural Land Act, 1970 (Act 70 of 1970) and the Agricultural Credit Act 1966 (Act 28 of 1966), which information on the establishment of public companies (these at least as part of total number of enterprises) is to be available to an indication of the extent to which excessive size of the enterprises are being formed, this number increased by approximately 32 per cent over the period 1976 and 1981. Owing to the disadvantages inherent in such a situation from the point of view of the security of the country and from the point of agricultural and regional development and the greatest danger to the economy by the community on this factors, ever greater pressure may be exerted for direct measures such as compulsory occupation and/or the implementation of a progressive land tax.

The type of enterprise which had the greatest increase over the same period was one-man businesses, the number of which increased from 2.293 in 1971/72 to 5.906 in 1981, an increase of 3 297.

The type of enterprise which had the greatest increase over the same period was one-man businesses, the number of which increased from 2.293 in 1971/72 to 5.906 in 1981, an increase of 3 297.

The type of enterprise which had the greatest increase over the same period was one-man businesses, the number of which increased from 2.293 in 1971/72 to 5.906 in 1981, an increase of 3 297.

The type of enterprise which had the greatest increase over the same period was one-man businesses, the number of which increased from 2.293 in 1971/72 to 5.906 in 1981, an increase of 3 297.

The type of enterprise which had the greatest increase over the same period was one-man businesses, the number of which increased from 2.293 in 1971/72 to 5.906 in 1981, an increase of 3 297.

The type of enterprise which had the greatest increase over the same period was one-man businesses, the number of which increased from 2.293 in 1971/72 to 5.906 in 1981, an increase of 3 297.
Important reason for a change from one-man businesses and private companies was, according to Jordaann (1987), the income tax benefit. (Other reasons such as continuity, avoidance of estate duty, and the need for security were of lesser importance.) The income tax benefit, which was originally large, decreased with time and even in 1979, where there was particularly large increase (the number of private companies increased from 2,599 to 5,180 between 1978 and 1979), the income tax benefit dropped to 13 per cent the following year, as against the marginal tax rate of one-man businesses. This benefit has in the meantime disappeared completely, so that the income tax rate of private companies is at present 5 per cent higher than the marginal rate of individuals. The rate of increase should, however, be fairly slow, on the one hand because the tax on dividends of 33 1/3 per cent if it were to remain a type of enterprise and in accordance with the trend of increased taxation, making the leasing of land without some prior ownership unattractive to many farmers. For economic reasons, people who wish to farm full-time on leased land only are usually not successful. The profitability, compared with the risk of leasing, did not produce more than 20 per cent of the gross value of the agricultural production in the area. These data indicate, according to them, “that part-time farmers in certain areas of the Eastern Cape play a significant role in the agricultural sector and even produce more effectively than the average farmer. There is no reason why the same trend should not prevail in many other farming areas of South Africa particularly in areas that offer more job opportunities outside agriculture.”

The appreciation in land value makes it increasingly difficult to become a landowner, and the need to attract new, young farmers may lead to a greater measure of acceptance of lease farming, in contrast with ownership farming. The White Paper on the Agricultural Policy (1984, p.6) policy is on this and it reads as follows: “The pursuit of a maximum number of financially sound owner-occupier farmers is an important aim of agricultural policy, and although this could make an important contribution to the retention and establishment of a stable, happy and prosperous rural population, the importance of new entrants and a revival of enterprise does not share in certain types of farming in certain areas, making it difficult to farm part-time, and the fact that this type of enterprise does not share in certain types of Government aid.

It is expected that this type of enterprise will grow in importance in the course of time. Certain types of part-time farming may also get the official sanction of the Government. It is expected that this type of enterprise will grow in importance in the course of time. Certain types of part-time farming may also get the official sanction of the Government.

STRUCTURAL CHANGES AND SOCIAL WELFARE

Significant changes are occurring in respect of all the structural components discussed so far. The average size of farming enterprises is expected to continue to increase and the number of farmers to continue to decrease initially at an accelerated rate, but then at a lower rate than in the seventies and of time remains an open question. Smith and Ondelai's expectation was that, in spite of the fact that this type of entrepreneurship has been discouraged in South Africa, it will continue to increase here over time, in accordance with trends in overseas countries. If Harrison's (1987, p.132) contention is correct - be that it that many of the approximately 55,000 farming enterprises belonging to Whites 20,000 are predominantly part-time farms - the enterprises of part-time farmers seem to be at least that part-time farming has increased significantly. Various forces operate in favour of the establishment of part-time farms, such as the growing inability of an increasing number of farms to provide a viable income for the farmer and his family, the desire that many people feel to own land, the attraction that land holds, for example, as an investment for professional people who work outside agriculture and the income tax benefits that farming holds for such people. On the other hand, there are certain opposing forces such as the rapid increase in the number of private companies, making it almost impossible to work elsewhere too, the nature of farming in certain areas, making it difficult to farm part-time, and the fact that this type of enterprise does not share in certain types of Government aid.

The appreciation in land value makes it increasingly difficult to become a landowner, and the need to attract new, young farmers may lead to a greater measure of acceptance of lease farming, in contrast with ownership farming. The White Paper on the Agricultural Policy (1984, p.6) policy is on this and it reads as follows: “The pursuit of a maximum number of financially sound owner-occupier farmers is an important aim of agricultural policy, and although this could make an important contribution to the retention and establishment of a stable, happy and prosperous rural population, the importance of new entrants and a revival of enterprise does not share in certain types of farming in certain areas, making it difficult to farm part-time, and the fact that this type of enterprise does not share in certain types of Government aid.

It is expected that this type of enterprise will grow in importance in the course of time. Certain types of part-time farming may also get the official sanction of the Government.
important reason for a change from one-man businesses to private companies was, according to Jordaans (1987), the income tax benefit. (Other reasons such as continuity, avoidance of estate duties and higher security are of lesser importance.) The income tax benefit, which was originally large, decreased with time and even in 1979, where there was a particularly large increase (the number of private companies increased from 2,959 to 5,180 between 1978 and 1979), the income tax benefit reduced to 13 per cent the following year, as against the marginal tax rate of one-man businesses. This benefit has in the meantime apparently completely, so that the income tax rate of private companies is at present 5 per cent higher than the marginal rate of individuals. This is the most obvious reason for the large number of private companies in favour of close corporations is expected for the future. The advantages of the latter are of such a nature that this type of enterprise should become very popular. In addition to distributed ownership, limited liability and estate duties relief, the tax solution for the hanging tax burden on accumulated income reserves in companies (a fixed rate of 10 per cent on conversion, in contrast with a maximum rate on dividends of 33 1/3 per cent) is also expected to be of significance.

LEASING AS OPPOSED TO OWNING

Leasing as a method of using land remains relatively unimportant in the RSA, in contrast with certain countries overseas. Analysis of the data shows that land leased as a percentage of the total area owned by Whites in the Republic stabilised at approximately 18 per cent for the decade up to 1978. Both the commission of enquiry into agriculture and the establishment of a stable, happy and prosperous rural population, the importance of new entrants and a revival of entrepreneurial skills in agriculture 1s increasingly difficult to become a landowner, particularly in areas that offer more job opportunities outside agriculture. The efficiency based on net agricultural income per unit cost. Although the income and yields showed increasing or decreased in the Republic in the course of time remains an open question. Smith and Odendaal's expectation was that, in spite of the fact that this type of entrepreneurship has been discouraged in South Africa, it will continue to increase here over time, in accordance with trends in overseas countries. If Harrison's (1979, p.132) contention is correct - he states that of the approximately 55 000 farming enterprises belonging to Whites 20 000 are predominantly part-time farms and the enterprises of this size that they should expect that part-time farming has increased significantly.

Various forces operate in favour of the establishment of part-time farms, such as the growing inability of an increasing number of farms to provide a viable income for the farmer and his family, the desire that many people feel for their own land, the attraction that land holds, for example, as an investment for professional people who work outside agriculture and the income tax benefits that farming holds for such people.

On the other hand, there are certain opposing forces such as the high cost, making it almost impossible to work elsewhere too, the nature of farming in certain areas, making it difficult to farm part-time, and the fact that this type of enterprise does not share in certain types of Government aid. Finally, it is expected that this type of enterprise will grow in importance in the course of time. Certain types of part-time farming may also get the official sanction of the Government.

STRUCTURAL CHANGES AND SOCIAL WELFARE

Significant changes are occurring in respect of all the structural components discussed so far. The average size of farming enterprises is expected to continue to increase and the number of farmers to continue to decrease initially at an accelerated rate, but then at a lower rate than during the seventies and eighties.
eighties. The diverse trends accompanying this, namely the appearance of farms which are either too small or too large, should also continue. The inviably small farms may appear relatively faster than the exceedingly large farms in the short term, but the pattern is expected to change later.

- The number of full-time and owner farmers is expected to decrease in favour of more part-time and lease farmers respectively. Part-time farming may increase at a faster rate than leasing.

- As regards types of enterprise, the number of one-man businesses, companies and private corporations, commercial trusts and public companies may increase. Figure 5, which comprehensively demonstrates the above change, also indicates that the projected course of the structural changes (the reduction in the number of farms and farmers, and the accompanying substitution of land use rights and types of enterprise) is the result of economic and social forces. Whereas it may be expected that the economic forces will be relatively stronger than the social over the short and medium term, the latter should become ever stronger over the long term.

A first approach to determine the influence of the expected course of structural changes on social welfare is to examine the changes of every structural component to each of the three relevant social welfare objectives. This may be done with the help of a social welfare impact matrix (Figure 4). A plus (+) in the matrix indicates progress, a minus (-) indicates regression and an asterisk (*) indicates indifference in respect of a certain objective. The indicators in the matrix provide the following views.

- The effect of the changes in respect of the size of enterprises and the number of farmers should be to promote the conservation of natural resources, since farmers who have larger pieces of land are in a better position to conserve these resources, since farmers who have larger pieces of land are in a better position to conserve these resources. On the other hand, a reduction in the number of farmers will oppose this objective of establishing a maximum number of owner-occupant farmers and promoting regional development.

- Significant changes are occurring in all the structural components discussed as a result of the joint operation of socio-economic forces. The following changes are expected to occur.

### POSSIBLE COURSES OF ACTION

The following possible courses of action arise in view of the above findings. In the first place, it could be decided to allow the expected changes to continue without doing anything effective about them. A motivation for this decision would be that such structural changes are unavoidable in the process of economic growth and development and should therefore be accepted.

Secondly, the changes could be regarded as too undesirable and it could be argued that the farmers should be encouraged to take co-operative action, work out a system by which full-time owner-occupant farmers are retained in agriculture. There is not much prospect of success for this possibility, particularly over the short and medium term, owing, for example, to the domination of individual interest above group interest in this matter, as well as to the lack of funds for the purpose within the co-operative system. The method could have some merit over the long term, since it would acquire a significant share in the marketing chain of their products through co-operative action, and if the productivity within the agricultural sector could be considerably raised.

Thirdly, certain measures could be launched by the Government to check the move of full-time owner-occupant farmers from agriculture. This alternative is not possible over the short and medium term, owing to the funds that would be necessary (given the poor financial condition of most farmers and the variety of other claims on Government funds), and the relatively low measure of the success that can be expected by Government measures in this respect. By accompanying the structural changes taking place by purposeful new measures, there is the potential that the changes have to be applied in the welfare context. A primary example is the support of certain types of part-time and lease farming by maintaining the benefits in which farmers, known as bona fide farmers, share, applicable to these groups too, for example. A further example is the establishment of a system of non-violable leases, in which the Government takes possession of the land that becomes available from farmers who have gone out of farming, and makes it available to deserving farmers at an agricultural potential-based lease value. As long as the leasehold farmer then looks after the land and pays the applicable rent, he remains in effect the "owner" of the land, which his children may then also inherit.

The above objective measures, however, adaptations in welfare norms and therefore also in the welfare model which has served as the basis for the analyses and in the present agricultural policy.

### CONCLUSION

Significant changes are occurring in all the structural components discussed as a result of the joint operation of socio-economic forces. The following changes are expected to occur.

The average size of farms is expected to continue to increase and the number of farmers to decrease - initially at an accelerated rate, but then at a slower rate than during the seventies and eighties. The economic growth and development accompanying this, namely the appearance of non-viably small and excessively large farms, should continue. Now the ex-urban small farms may appear relatively faster over the short term than the exceedingly large farms, but the pattern is expected to change later.

- Full-time and ownership farming is expected to decrease relatively in favour of part-time and lease farming. Part-time farming may increase at a faster rate then lease farming.

- As regards types of enterprise, the number of one-man businesses and private companies should decrease, while close corporations, commercial trusts and public companies may increase.

In estimating the influence of the structural changes on social welfare, it has been found that some changes should promote certain welfare objectives, others will detract from them and others still will leave them unchanged. Viewed as a whole, it seems that the changes on one hand are likely to benefit social welfare while on the other hand may be detrimental than beneficial. Various possible courses of action to deal with the disadvantages on social welfare have been analysed. It does not seem possible to guide structural changes meaningfully in a "favourable" way sooner or to the short or medium terms. A certain measure of success can indeed be achieved with purposeful action over the long term.
The average size of farms is expected to continue to change without doing anything effective about them. A main reason for this decision would be that such structural changes are unavoidable in the process of economic growth and development and should therefore be accepted.

Secondly, the changes could be regarded as too desirable and could be argued that the farmers should be encouraged to take co-operative action, work out a system by which full-time owner-occupant farmers are retained in agriculture. There is no much prospect of success for this possibility, particularly over the short and medium term, owing, for example, to the domination of individual interest above group interest in this matter, as well as to the lack of funds for the purpose within the co-operative system. The method could have some merit over the long term if it could acquire a significant share in the marketing chain of their products through co-operative action, and if the productivity within the agricultural sector could be considerably raised.

Thirdly, certain measures could be launched by the Government to check the move of full-time owner-occupant farmers from agriculture. This alternative is not possible over the short and medium term, owing to the funds that would be necessary (given the current financial condition of most farmers and the variety of other claims on Government funds), and the relatively low measure of structural changes that can be expected by Government measures in this respect. By accompanying the structural changes taking place by purposeful new measures, the potential that the changes have can be applied in the welfare context. A primary example is the support of certain types of part-time and lease farming by the establishment of a system of tenure, in which the Government takes possession of the land, which becomes available from farmers who have gone out of farming, and makes it available to deserving farmers at an agricultural potential-based leaseage value. As long as the leaseholder farmer then pays the applicable rent, he remains in effect the "owner" of the land, which his children may then also inherit.

The above objectives imply, however, adaptations in welfare norms and therefore also in the welfare model which served as the basis for the analyses and in the present agricultural policy.

**CONCLUSION**

Significant changes are occurring in all the structural components discussed as a result of the joint operation of socio-economic forces. The following changes are expected to occur.

The average size of farms is expected to continue to increase and the number of farmers to decrease - initially at an accelerated rate, but then at a slower rate during the seventies and eighties. The reasons for this are the same factors accompanying this, namely the appearance of non-visibility small and excessively large farms, should continue. Non-viability of small farms may appear relatively faster over the short term than the exceedingly large farms but the pattern is expected to change.

Full-time and ownership farming is expected to decrease relatively in favour of part-time and lease farming. Part-time farming may increase at a faster rate than lease farming.

As regards types of enterprise, the number of one-man businesses and private companies should decrease, while close corporations, commercial trusts and public companies should increase.

In estimating the influence of the structural changes on social welfare, it has been found that some changes may promote certain welfare objectives, others will detract from them and others still will leave them unchanged. Viewed as a whole, it seems that the in favour of changes on social welfare will be more detrimental than beneficial. Various possible courses of action to deal with the disadvantages on social welfare have been analysed. It does not seem possible to guide structural changes meaningfully in a "favourable" context over the short to medium terms. A certain measure of success can indeed be achieved with purposeful action over the long term.
ON TESTING FOR STOCHASTIC DOMINANCE

INTRODUCTION

Van Zyl and Groenewald (1986) studied maize cultivar selection under uncertainty using a variety of decision rules. One of these rules was stochastic dominance (SD) testing. This will be re-examined here to illustrate the pitfalls of using unwarranted approximations of the cumulative density functions (CDFs) required in SD tests.

The SD computer program used by Van Zyl and Groenewald is to be found in Anderson et al. (1977). Its key feature is the representation of the CDF by straight-line segments representing equal intervals in probability (see also Anderson 1974). In fact, Van Zyl and Groenewald write: "An element of judgement and approximation is required to compare the derived functions irrespective of whether the method of integration is numerical or analytical in nature." This statement ignores the fact that one is dealing with statistical data sets; arbitrary approximations are not allowed if the data are to be acceptable representations of the underlying populations.

In what follows, the accepted estimation of the population CDF will be given. Van Zyl and Groenewald's calculation is then repeated using these CDFs and discrepancies pointed out. Some graphical illustrations of the errors incurred by using the Anderson et al. (1977) computer program are also presented.

The appendix contains an alternative computer program which tests for first, second and third degree stochastic dominance (FSD, SSD and TSD) with CDFs calculated in the statistically acceptable fashion. The program is in BASIC, intended for execution on microcomputers.

THE CDF

This is

\[
F(x) = \frac{N(x)}{n}
\]

(1)

where \(N(x)\) is the number of observations \(x_i\) with \(x_i \leq x\); \(n\) is the sample size (e.g., Conover 1980).

According to Yamoto (1972), \(F\) is the unbiased estimator for the population CDF with the smallest variance.

ANNOUNCEMENTS, COMMENTS AND NOTES

ANNOUNCEMENT

S.J.J. DE SWARDT AGREKON PRIZE

The S.J.J. de Swardt Agrekon Prize for 1987 has been awarded jointly to Prof W.L. Nieuwoudt for his article "Taxing agricultural land" which appeared in the June 1987 edition of Agrekon and Prof J.J. van Zyl, Mr A. van der Vyver and Prof J.A. Groenewald for their article "The influence of drought and general economic effects on agriculture: A macro-analysis" which appeared in the February 1987 edition.

Mr S.J.J. de Swardt, former Secretary of Agricultural Economics and Marketing was responsible for the foundation of the S.J.J. de Swardt Agrekon Prize in 1962. He made a bequest to the Department for the award of prizes for meritorious contributions in the field of agricultural economics published in Agrekon.

The Editorial Committee of Agrekon, in 1984, in consultation with Mr De Swardt also instituted the S.J.J. de Swardt Agrekon Debutant Prize for the best debutant article with a view to encouraging younger and less experienced agricultural economists in particular, to write for the journal. During 1987 no articles qualified for the Debutant Prize.

RESEARCH NOTE

The S.J.J. de Swardt Agrekon Prize for 1987 has been awarded jointly to Prof W.L. Nieuwoudt for his article "Taxing agricultural land" which appeared in the June 1987 edition of Agrekon and Prof J.J. van Zyl, Mr A. van der Vyver and Prof J.A. Groenewald for their article "The influence of drought and general economic effects on agriculture: A macro-analysis" which appeared in the February 1987 edition.

Mr S.J.J. de Swardt, former Secretary of Agricultural Economics and Marketing was responsible for the foundation of the S.J.J. de Swardt Agrekon Prize in 1962. He made a bequest to the Department for the award of prizes for meritorious contributions in the field of agricultural economics published in Agrekon.

The Editorial Committee of Agrekon, in 1984, in consultation with Mr De Swardt also instituted the S.J.J. de Swardt Agrekon Debutant Prize for the best debutant article with a view to encouraging younger and less experienced agricultural economists in particular, to write for the journal. During 1987 no articles qualified for the Debutant Prize.