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South Africa—
Agriculture

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SERIES I: AGRICULTURE No. 45.

THE STABILISATION OF SOUTH AFRICAN FARMING

A POLICY FOR SAFETY

by

HUBERT D. LEPPAN.

(Professor of Agricultural Economics)

PRETORIA.

1938.

BY THE SAME AUTHOR.

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South Western O.F.S., December 2nd. 1937.

Even in the near distance the heated, shimmering air gave fantastic shapes to the emaciated animals on the arid landscape. The red soil covered everything with a coating of dust and seemed determined to suffocate the remaining life from the parched vegetation next the road. The starkness of it all. In the veld the prominence of stone over soil added to the hardness. Underfoot the crackle of dried tufts of exposed grass roots. A heavy, smothering, hot silence gave a message of the inevitability of Nature's decrees—a silence, pregnant with struggle, even with peaceless death, for the vultures circled overhead in their quest for carcasses. Every now and then a dusty whirlwind passed across the scene. Numbed, apathetic natives, with eyelids half closed to keep out the glare, walked slowly from the scant shade of one hut to that of another. The miserable dwellings of the poor whites, with flattened roofs—often made from paraffin tins—aroused pity. Dead trees in the plantations showed the frustration of the hope which had fostered their planting. In all, an impression of Nature in harsh, relentless mood scoffing at Man's futilities. Drought.....the enemy of South African farming against which the farmer will always have to be prepared.

The purpose of this bulletin is to assist those who fight.

—H.D.L.

I. PLANNING: PRINCIPLES, AIMS AND THE GENERAL SITUATION.

In every direction a rapidly changing world presents itself. State regimes, looked upon a generation ago as belonging to the realm of abstraction, are to-day realities. Naturally the transition has, and is, causing severe upheavals which have their repercussions in every walk of life, whether political, religious, economic or social. Adjustment to the changed, and changing, circumstances is consciously and subconsciously being striven for by everybody. Happily, a certain boldness is discernable—thinking people now no longer regard themselves as the puppets of inevitable forces, but are actively contriving to direct forces to their own advantage. It is not surprising, then, to find plans being submitted for the organisation of the various activities.

In the economic field, for the first time in recorded history, the human race is master of its food supplies. In fact, with the ruling haphazard production and present maldistribution, surpluses have shown a tendency to become unmanageable—a novel situation, in itself calling for changed economic structures. In general, an increased supply (due largely to an improved technique in agricultural and industrial production) is now encountering a decrease in effective demand (due mainly to retarded population increases and to the consequences of the almost universal passion for national economic self-sufficiency). Maladjustments are in consequence everywhere to be seen, to rectify which, resort to conscious economic planning is taken.

PRINCIPLES AND AIMS.

The aims of economic planning, which must be distinguished from mere economic interventionism, are well defined by Martin, who writes[1]: "Economic planning differs from economic interventionism in three main characteristics. In the first place, to be considered as 'planning' State action in the economic field must be economic. For Governments to intervene only when part of the economic structure is in imminent danger, and then only to such extent as may be necessary to save it from collapse, is essentially negative. With planning there must be a certain readiness to assure the initiative, not merely to reserve, but to reconstruct. In the second place, planning requires that the situation be seen as a whole, and action taken with regard to the total position. Continuous co-ordination of the different parts of a programme is the essence of planning. This, moreover, is true not only in the national sphere, but, even more, internationally. No matter how expert planning may be in the various countries, so long as they remain separate systems, are not integrated one with another, the world situation remains chaotic. Finally planning must be directed towards some end. A plan without an aim is a contradiction in terms. Nor is it sufficient to have partial and short-run objectives only. There must be some broad

1) P. W. Martin. "The Present Status of Economic Planning." Annals of Collective Economy. Vol. XIII, No. 1, 1937 pp. 83—84.

guiding principle or principles giving direction to the movement as a whole." Except in broad outlines policies must necessarily change, and consequently a certain elasticity must be allowed for in the formulation of any successful plan.

In the organisation of farming, as of other economic activities non-economic values must be taken into acount. Throughout, the free play of economic forces is being modified to meet social requirements. A detailed account of this aspect of planning need not detain us; for the purpose of the present discussion, however, it must be borne in mind that the chief product from land is the citizen produced and not meat or maize; and, in turn, that the calibre of the farmer is largely determined by the production per man and not necessarily per acre. The highest yields per acre are often obtained by peasants whose standard of living is little above that of the Chinese coolie!

In their book, *Agricultural Planning,* Astor and Murray wisely emphasise that: "Agricultural policies can be divided roughly into two types, those which the State can put into force directly without the cooperation of farmers, and those which depend on their goodwill and voluntary action. For example, a policy which places a tariff on imported agricultural products does not need the cooperation of farmers to become effective—the State is the active agent and the farmer is passive. On the other hand, a policy for the promotion of cooperative marketing leaves the State in a more or less passive dependent position. The initiative rests with the farmer. and the activities of the State are limited to the suggestion and supervision of schemes, financial assistance, and insistence on certain minima (grades, standards, etc.) These distinctions should be borne in mind. To outward appearances, a State may have certain very definite policies, but the part it can play in putting them into operation is limited. Should the State's aims not prove acceptable to those in the industry they (the policies) may be rendered ineffective." To this we might add that where possible persuasion is always to be preferred to compulsion.

The above writers also write that: „The principle of State assistance, and the regulation which such assistance must necessarily entail, has been accepted in varied forms in most progressive countries. In regard to agriculture, there is usually some Central State Organisation, such as the Department of Agriculture, which provides the machinery for the administration of the different measures (whether compulsory of otherwise) embodied in the national policy. Common to most countries is the collection of statistical and other information, the provision for research and education, safeguards for the control of animal and plant diseases and supervision of the industry from the point of view of public health; similarly special credit facilities are available to agriculture in most countries."

The collection of industries which we call agriculture, have, of course, a number of characteristics in common. In varying degree all are subject to weather conditions; and ultimately all are subject to the quick operation of the law of diminishing returns. But to regard farming as a single industry when outlining policy is merely to court confusion, for agriculture is composed of a num-

ber of industries many of which may be directly competitive. The feeder wants cheap concentrates for his animals; on the other hand the grain producer wants high prices for his grain.

When framing policy, it is equally fallacious to regard farming as an isolated collection of industries divorced from other economic activity. The fortunes of farming are inextricably bound up with the prospects ruling in mining, manufacturing, commerce and other enterprise. For example: high protection for farm products, entails high prices for foodstuffs, and since food is one of the largest items in the family budget of the workman in other industries, high wages must be paid by industrialists—which means that the cost of manufactured goods will be high. So that often what the farmer gains in the high prices for his protected products is lost because of the increased prices he must pay for his manufactured requisites.

The agriculturist who fails to recognise the legitimate claims of each of the factors in his production—capital, land and labour—is equally short-sighter. A glaring example of this form of myopia is to be found with regard to labour in the Union where the rapid development of mining and manufacturing has withdrawn so much labour from rural areas that a shortage, to be accentuated in the near future, is now making itself felt. Despite the warnings of the medical profession of the fact that, mainly through under-nutrition in many areas, the mortality among native infants is excessive, the farming policy of this country persists in raising the price of grain beyond the purchasing power of the native. Cheap grain, in preventing this high mortality, would not only increase the labour force of the country, but, by allowing for an improved nutrition, would make for more efficient labour.

Another feature often overlooked by those concerned with the organisation of agriculture is the time required to effect change in farming. Apart from the fact that the nature of the profession calls for a conservative type, and is thus slow to adjust itself to change, the productive process in most farming enterprises is a lengthy one. Nature cannot be hurried. The pregnancy of the domestic animal covers the same period now as in the days of Solomon; orange trees start bearing only after four years; it takes years to build up 'good heart' into a soil; payable returns accrue to cattle ranching only after seven or more years; and so forth. Obviously then changes must and can only be brought about gradually. If the proposals contained in this discussion find acceptance, it is for these reasons that their full fruition is not anticipated in the near future but rather a couple or more decades hence. In the interim we must content ourselves with the truth of the statement that "foundations are seldom graceful things!"

THE GENERAL SITUATION.

Any plan for agriculture must take into account the local situation as well as the more general position abroad. In both, glaring maladjustments require to be remedied and in each, certain trends, to which adjustment is necessary, are discernable.

What is the general disorder and what trends can be detected?[1])

1. The almost universal urge for national economic self-sufficiency has obstructed trade channels. Behind tariff walls most countries seem determined to be self-contained in case of war. Natural deficiency countries have become surplus-producing; international loans have dried up, and exchange between nations has shrunk. Closed economics appear to be the order of the day—a trend which seemingly will continue well into the future. If so, there would seem to be no other course than to make fullest use of international exchange, i.e. promote, where natural endowments warrant so doing, a wide diversity in economic activity, at the same time remembering to make allowance for a gearing in with other national economics when the wheels of exchange again move freely. Naturally, many products, the surplus of which are being exchanged at the moment, will continue to be exported.

2. Retarded increases in populations have already accentuated the adverse demand situation and marketing will continue to be embarrassed by the ever improving technique of production. The supply of ordinary qualities has outrun the effective demand of today, and, as a concomitant, large numbers of unemployed are found in all countries. The conclusion to be drawn here would seem to be that, given a freer exchange, smaller numbers will eventually have a higher purchasing power per capita i.e. it will be a buyers' market and in the keen competition to sell in the main only the highest qualities will be acceptable. Insofar, then, as future external excange is concerned organisation should concentrate on the production of the highest qualities of products.

3. Previously, rapidly increasing populations readily absorbed the increases taking place in cereal production—so that hitherto emphasis was laid on the production of grain for human consumption. But the situation has changed. Mechanisation is able not only to accelerate production at lower costs but has liberated millions of acres—formerly employed to produce feedstuffs for draft animals —for the cultivation of grain. Added to this, diets have changed comparatively suddenly away from farinaceous foods to animal and horticultural products. In all a sudden shift, to which agriculture has not had sufficient time to adapt itself. In the future, the present unemployed and their dependents who can now afford only meals having a large proportion of starchy foodstuffs, will (when employed) imitate the diets of today's higher income groups and so add to the relatively higher effective demand for animal and horticultural products.

Policy, then, should aim at fostering these enterprises—having in mind, of course, the important roles of the ordinary field crop in supplying foodstuffs and feedstuffs and in protecting the soil. An increased use of cereals as concentrates for animal feeding will no

1) These have been more fully dealt with in the writer's **"The Organisation of Agriculture,** With Applications to South Africa." Cetnral News Agency, Ltd., Johannesburg.

doubt be one of the ways in which embarassing surpluses from soil cultivation will be absorbed.

4. Land values, owing to commitments made during the inflationary period, are almost universally too high, and adjustment to align these with the prices of farm commodities has not taken place. In farming largely because of the length of its productive processes and slow turnover this adjustment must always be slow.

Eventually, as much direct State aid to agriculture falls away, the fall in land values can only be met by a lowering of the costs of production. The situation, too, will be eased by preparing urban activity to absorb those redundant to farming.

So far, then, a local planning for agriculture is concerned with the general situation abroad, it should support all justifiable attempts at diversity in general economic activity, in and outside its own sphere; it should aim at producing the highest qualities of animal and horticultural products; and it should foster research into the lowering of the costs of products which investigation shews to be in demand abroad.

II. PLANNING FOR SOUTH AFRICAN AGRICULTURE.

The purpose in giving the preceeding discussion is to emphasise the fact that in the organisation of the Union's Agriculture the trends of markets abroad cannot be ignored, and that farming, because of its close dependence on mining, manufacturing and commerce, cannot be viewed in isolation.

So far as exports of agricultural products are concerned we have attempted to show that more than ever stress will have to be laid on producing the best qualities of animal and horticultural products. If this conclusion be correct, then we in South Africa are in many respects in a fortunate position. In the utilisation of the Union's land, because of the physical controls ruling, the policy of the authorities is to concentrate on the above products[1]) Another

1) Vide the Annual Report (1936) of the Secretary for Agriculture.

favourable circumstance is that the native's standard of living is gradually rising—which means that an increased internal demand is being established for those qualities which have not reached the required standard for export.

Two of the main disabilities against which South African agriculture will always have to contend are to be found in the instability of production and in the loss of the soil by erosion.

Fluctuations in Output: The wide fluctuations in output are mainly due to climatic causes, but their violence can be modified in no small degree by foresight in adapting farming to the situation.

The magnitude of these fluctuations is to be measured in many directions. The Union's maize yields vary from 11 million to 26 million bags per annum, and, it is not rare to find that the individual farmer has lost half or more of his sheep during a severe drought. It is almost unnecessary to point out that a stable production is to be preferred to an erratic one even if the averages of the yields over a number of years may be the same. This is true of national production as well as of that of the individual. All the functions of marketing—assembling, transportation, storage, financing and so forth—can be performed more cheaply the more constant the supply. Throughout, a stabilised production simplifies organisation. The unfortunate results of an uncertainty in crop yield are often overlooked. The following simple example[1]) is illustrative of some of these. Suppose that in eight consecutive years two farmers, one in district A (badly subject to drought) and the other in district B (assured rainfall) obtain the following yields of maize:

1) Taken from the writer's "Agricultural Policy in South Africa" 1931, p. 73.

Year.	A.—Bags per acre.	B.—Bags per acre
1	15	11
2	8	8
3	0	5
4	12	9
5	15	11
6	0	5
7	3	6
8	11	9
Total	64	64

Each obtains the same average of 8 bags per annum, but B farms at a distinct advantage. His relative loss in the good season is small because prices are low, but his returns in the bad seasons are relatively high because prices of maize or the products like milk and eggs for which his maize is utilised—in those years are usually high. Moreover, his farming operations are unhampered by having to purchase feeds during times when prices are high. Obviously he can undertake constructive enterprises, requiring continuity of effort, with greater confidence than can A. In the absence of compensating factors, it is wrong then to suppose that the average yield is all important and to assume that what A loses in the swings he gains in the roundabouts—certainly over the whole period he does not gain to the extent that B does. (These examples are not far-fetched. If B farmed in an area of assured rainfall but of poor soils his yields might well be those given; and, if A farmed in a district of good soils but erratic rainfall, the yields given could easily be representative). The position of two farmers in the same area, the one farming to secure his returns during adverse periods, the other regardless of any such provision, is much the same.

In a country such as ours, subject to recurrent droughts the necessity for the farmer to conduct his operations so as to give himself security in the bad years cannot be over-emphasised. Stability is to be attained not only by the farmers acting individually, but by any organised steps taken to adjust the country's agriculture as a whole to the circumstances ruling.

Fortunately the present policy of the Union Department of Agriculture is quietly directing agriculture along many avenues leading to stability. The pace, but for political and non-economic causes, would no doubt be more rapid. Fostering, as it does, animal and horticultural production must tend to lessen the wide fluctuations in national and individual production from the Union's land. This is mainly so because a properly organised animal husbandry is less susceptible to drought than is grain production and because the expense incurred in establishing successful orchards is now-a-days seldom incurred unless returns are assured.

Unfortunately, owing no doubt to political pressure, grain production is assisted to the disadvantage of the Union's rural welfare. Expensive grain hits the animal industry by making supplementary feedstuffs expensive; it undermines the country's labour

force by making the proper nutrition of the native difficult and is partly responsible for the high infant mortality among natives—already the complaint is common among natives that the farmer in a drought-stricken area can get grain more cheaply for his animals than they, the natives, can procure it for their families; finally, state aid resulting in high prices for grain has induced many farmers in areas of precarious production to gamble on grain crops — to the detriment of their soils and their animal farming. The effect of the last mentioned is hard to exaggerate. On a recent tour of the drought-stricken districts the writer visited numerous farms in areas like Burghersdorp, Jamestown, and Aliwal North on which half the sheep and cattle and perished through lack of feed. And yet, on these same farms the wheat crop which proved a failure, if grazed in the young state, would have saved these animals. Often valuable vlei land—the best pasture reserve during drought—has been ploughed up in the gamble for a grain crop. If high grain prices were not fostered the farmer would devote his cultivation more to the production of feedstuffs for animals, and, consequently would stabilise the output from his farm.

Instability in production has often resulted from farmers undertaking enterprises unsuitable to the areas in which they farm. Fortunately, here again, alive to the situation, the Union Department of Agriculture is now undertaking an agro-economic classification of land. When published, this classification, if properly appreciated by extension officers and farmers, should assist enormously in avoiding loss through maladjusted farming. In the course of time this classification will assume clearer definition in detail. It will then indicate the minimum unit of land required in the various districts to maintain a reasonable standard of living; the maximum carrying capacity if erosion is to be obviated; the types and systems of farming to be followed; and, will be a fair guide as to the value of land—and so, will assist in checking wild speculation in land.

In the final analysis it is obvious that a more stable output from South African land can be attained mainly through the individual farmer imbued with the necessity for conducting his farming so as to obtain security during adverse years. Indeed this should be the slogan for every South African farmer.

Since the vegetation on eroded land is the first to suffer during droughts, obviously any steps taken to check erosion must also tend to check wide fluctuations in production, which brings us to a discussion of the subject of erosion.

Erosion.—The threat to South African land through erosion requires no reiteration. In many areas it must always remain an ugly menace and because its harmful effects are insidious it is all the more dangerous as an enemy. Since often overlooked when considering the organisation of our agriculture, a brief discussion on the measures required to check erosion is called for.[1])

In directing attention to the gravity of the situation and in the

1) A fuller treatment of this subject is to be found in the University of Pretoria Publ. Ser. I, No. 37 "The Interdependence of Animals Crops and Pasture" by the writer.

financial assistance given to assist farmers for fighting erosion, the Union Department of Agriculture has rendered an invaluable service to the country. But the position cannot be successfully remedied unless the farmers fully appreciate what is required to be done and that the control of erosion can be achieved only with their co-operation.

In thinking of a farm as a unit, size, while important, is not the only determinant to be taken into account. To be a self-contained unit, a certain balance between grazing and arable land is necessary if adverse years are to be successfully weathered. A farm, in areas subject to drought and erosion, having insufficient arable land to supply the reserves of feedstuffs necessary to supplement the poor grazing during droughts, is almost invariably overgrazed during a period of shortage, and, of course erosion follows. The frequency with which small farms lacking suitable arable land change ownership in these areas is evidence of the difficulty of maintaining a reasonable standard of living on them. In time, no doubt, the tendency will be for those farms having suitable arable land to incorporate the adjoining farms without this provision. In other words, in order for the Unit to be balanced—for the farmer to be secure during droughts—the size of farm in the areas mentioned is likely to increase. And any policy framed to combat erosion should not lose sight of the desirability of favouring this tendency. Financial necessity drives the man on an unbalanced farm to stock at a rate which is beyond the carrying capacity of his veld during droughts.

Attention has been drawn to the necessity for producing products of high quality. Overgrazing is far too common. The average farmer is impressed more by the numbers of his animals than by the quality of their products. If fewer animals, giving an improved quality in the particular area, were kept, the increase in price for the improved quality would more than compensate for the decrease in numbers of animals—and, of chief importance, the vegetation would not be punished beyond the requirements of the vegetal cover needed for soil protection.

The use of arable land mainly in the production of supplementary feedstuffs needs no stressing. These feedstuffs if used when the vegetation is weakest, would not only assist in maintaining the condition of the animals only, but would save the vegetal cover of the soil.

How the farmer is to manage his veld without soil-washing is still little understood. Many problems, including those connected with veld-burning, still await solution. Recently, research along these lines has fortunately been enthusiastically undertaken by technical workers and the information already gained is full of promise. In the better-watered districts it would appear that artificially established pastures may play a valuable role in the cropping systems. If this proves to be correct a decided check to erosion on cultivated land will be brought about because the soil erosion taking place on pastures of Woolly Finger, Rhodes, Paspalum or Kikuyu grass is practically negligible.

Erosion will be checked, too, if less land in those parts of low rainfall liable to erode were ploughed up. The total soil lost through

the injudicious ploughing of land in these areas is already considerable. It is almost needless to add that high prices for grain tend to stimulate the cultivation of this land.

The average farmer in the Union is not tree-minded. In general a few bedraggled eucalyptus ornament the homestead. Well planted windbreaks or woodlots are seldom seen. Both have their bearing on erosion. Properly situated, windbreaks not only give shade and protection to animals, but are useful in preventing the blowing away of powdered soils. Woodlots would obviate the use of manure for fuel—a common practice among natives and some Europeans. The cumulative effect over generations of burning manure must eventually upset the soil-plant-animal cycle and so cause soil deterioration.

Traversing land held in parts by natives and in others by Europeans, the traveller is struck by the extent to which the soil has been abused through over-stocking, the felling of trees, and so forth. However improvident the European may have been in this regard, the destruction caused by him is incomparably less than that caused by the native. Indeed, the education of the native to the necessity for preserving his soil is unquestionably the major problem confronting those concerned with native agriculture.

A final comment on erosion might not be out of place. The formal economist is apt to under-estimate the agricultural economist's concern about the restrictions to farm earnings imposed by the quick operation of the law of diminishing returns on land in the younger countries. In so doing, they overlook the real costs, which should include the cost of lost soil and which should be debited to fixed charges for land.

In attempting to arrive at the costs of production for a particular locality during a specific period, the loss of soil through erosion is not taken into account. While difficult to assess, it is none the less very real and important. In many cases the inability of the farmer to furnish commodities at competitive prices is due to the deterioration of the soil through erosion.

So far, this brief survey has attempted to show the importance in the framing of agricultural policy of not neglecting the necessity for stabilising production and for combating erosion. But South African farming, to be successfully planned, requires adjustment to a number of other features.

The Dry Season—The regular seasonal drought during the winter in the summer-rainfall region and in the summer of the winter rainfall region—has now impressed itself an dso the majority of farmers, many inadequately, make some provision for the shortcomings of the pasturage which occurs during this period. More could be done by the grazing of arable crops, by the use of silage and, in suitable areas, by cutting the superabundant grass for hay. Veld hay does not play the role in our farming which it should. To be of real value, grass for this purpose should be cut at an early stage of growth when the nutritional value is still high. Too many farmers commonly cut the grass when nearly mature, the hay from which is harsh, unpalatable and low in nutrients.

As a result of their experience they consequently underestimate the value of the veld grasses as hay.

In the Southern Free State the droughts of 1926 and 1937 were preceeded by a summer of heavy rainfall which ceased suddenly and comparatively early. A remarkably rapid growth of grass had taken place which the animals would not touch during the droughts following. The strange sight of animals starving in camps containing an abundance of tall, long dry grass puzzles many. Under these conditions the grass is evidently abnormally low in feeding value, accentuated no doubt by extreme unpalatabity. On the other hand, when the rainy season extends into late autumn, the palatability and nutritive value of the resultant growth are generally found to be much improved.

It appears that these seasonal differences in the quality of the grass produced are explicable primarily in terms of the climatic variations from season to season.[1]) Other things being equal the composition and nutritive value of pasture herbage depend upon the balance between the rate of carbon assimilation on the one hand and the rate of absorption of nitrogen and minerals from the soil on the other. In our areas of summer rainfall the coincidence of high temperature and rain favours a high rate of carbon assimilation, leading to extremely rapid growth during late spring and summer. The rate of absorption of nitrogen and minerals is far outpassed by the growth rate, so that a rapid falling off in nutritive value of the grass with increasing maturity is inevitable. The more intense the period of flush summer growth is, the more marked will this falling off in quality be. Should drought set in, relatively early in the season, immediately following a period of good rains which have sufficed to bring a luxuriant growth of grass quickly to maturity, little or no further growth can take place and the feed available is restricted to mature grass of poor quality which soon dries out and becomes increasingly unpalatable to stock. With a less intense flush of summer growth and a prolongation of the rainy season well into autumn, the falling off in quality of the summer flush will not only be less sharp, but will be largely compensated for by the new and slower growth which takes place after the first flush.

The Intermittent Drought: But the greatest losses are caused by droughts irregular in their occurrence. It is rare to find a farmer who has built up sufficient reserves to enable him to pass through one of these with safety. This neglect is unquestionably one of the gravest shortcomings in the practice of South African farming. In the bountiful years reserves are not built up by farmers to safeguard their livestock during the lean years. If the arable land on any particular farm is inadequate for this purpose, then the farmer should buy up feedstuffs—to be stored for use during the adverse years—at the low prices ruling in good years. Too often the farmer delays purchasing until a drought is in full force, at which time prices are so high as to be prohibitive. A year

1) The writer is indebted to Professor J. C. Ross of the Dept. of Agric. Chemistry, University of Pretoria, for the explanation offered here.

ago lucerne hay could be bought at 1/9 per 100 lbs.; during the drought which has just broken lucerne hay cost 4/- and more per 100 lbs. and in many instances was unprocurable!

The value placed by farmers on good arable land, as a means for building up reserves, is often shown in the prices at which farms are sold. Examples, of which the following is typical, are easily found. Two Karroo farms each of 2,000 morgen and similar in all respects—except for the fact that the one has 20 morgen down to lucerne, are sold. The one without the lucerne might sell at £2 per morgen, i.e. £4,000 The one having the 20 morgen of lucerne would probably fetch £3 per morgen, i.e. £6,000. The value of the 20 morgen of lucerne is assessed then at £6,000—£4,000, i.e. £100 per morgen. The cautious farmer places this high value on this irrigated land knowing its worth in producing reserve stocks for droughts and in supplementing the pasturage of his lambing ewes when badly needed.

Overstocking: Intermittent droughts cause the most severe losses among the stock of those farmers who habitually overstock to such an extent as to deplete the reserves of the natural pastures. Camps in which the vegetation has been sufficiently rested are all too uncommon and few farmers manage their ranges with a view to meeting the requirements of their animals during intermittent droughts. The indictment against the Union's farmers is brought home by the Census returns which show that in the Union on the average more than half a million cattle and about four million sheep and goats die annually from starvation.

The folly of over-grazing was well illustrated on two farms, known to the writer, in the North-Eastern Cape. Both, approximately equal in area, have to all intents and purposes the same veld. They are owned by two sheep farmers, A and B, who keep the same strain of merino. In 1935, B, who was rather hard pressed financially, gambled on the prospect of a good year and knowingly overstocked beyond the capacity of his farm during a poor season. A employed the number of sheep which his farm could support during a bad year—far fewer than those kept by B on his farm. The season proved unfavourable.

It may surprise the layman to know that the wool clips were of the same total weight. A's sheep, being in better condition, averaged 10 pounds against B's average of 8½ pounds per sheep The wool of A's sheep, from animals well maintained, was much superior in quality to that shorn from B's under-nourished animals. A received 1½d. per pound more than B did for his. A's cheque for his wool clip was several hundred pounds more than B received. The comparative loss entailed by B did not end there for his succeeding lamb crop was poor and his veld, because of the overgrazing, took longer to recover than in the case of that on A's farm on which a crop of robust lambs was reared.

Classes and types of farm animals differ in their drought hardiness, the full significance of which is often not appreciated. Pregnant ewes, for example being far more liable to suffer during drought than hamels, should not be kept in preference to the latter

—or the proportion of breeding ewes should be small—on those farms where provision for drought is rendered difficult.

All credit is due to the State for what has been done in extending the rural telephone service and for the cheap facilities given by the South African Railways for moving drought-stricken stock. The value of these two services, in assisting the farmer to overcome droughts, is inestimable. In a few hours, by the use of the telephone, the farmer can now ascertain where grazing can be obtained, thus obviating the time taken up in long, wearisome journeys or fruitless correspondence. The farmer having ascertained where grazing can be had, the State transportation services take his animals—often emaciated and so unable to travel long distances on the hoof,—to their destinations within a few hours.

The "Red Terror" Drought: The severity of droughts varies, and fortunately all districts are seldom subject to drought simultaneously. The worst drought of which records exist occurred, according to Mr. A. W. Septon, about the period 1715 — 1725. Mr. Septon, a keen student of the history of the Ba Phuthi, has been given an account of this drought as handed down by the elders of this tribe. Apparently the whole interior of the sub-continent dried up. The coastal fringe of the country was the only part capable of supporting wild animals, on which the Ba Phuthi lived. In the interior, those that remained in the neighbourhood of drying up watering places were eventually driven to cannibalism—hence the name „Red Terror" among the Ba Phuthi for this drought. Although of alarming severity, the drought of 1862 was mild as compared with the one which happened between the years 1715—1725.

With a great deal of the country's soil now lost through erosion, with the protective vegetation destroyed to the extent which it has been in many districts, and with the overstocked condition of most areas, one shudders to think what would happen were such a drought as the „Red Terror" to recur. And yet in national policy such an eventually, however remote, should not be overlooked.

The Main Rôle of Arable Land: A feature of South African land is the small proportion that can be ploughed — in the far future possibly 12 per cent. will be cultivated. Again, of this only a small part is irrigable — about one million morgen. The soils of the Union are usually poor, in many cases shewing signs of exhaustion, often patchy in occurrence, commonly deficient in phosphates, and in some cases threatened by alkali. These disabilities with regard to the Union's arable land offer no small handicap to farming, for the proper use of the cultivated crop is of the greatest assistance in maintaining reserves for animals during droughts, consequently in obviating overgrazing and so preventing erosion. While small in area, the country's arable land is all important as a means to balance farming and to combat drought. At the moment the utilisation of much of this land is far from satisfactory. In many areas of uncertain rainfall farmers will persist in using their ploughed land to produce grain crops for sale, instead of employing it primarily for the production of feedstuffs. In these parts the crop, as a grain crop, fails

more often than not, and the animals are deprived of the necessary supplementary feeds. A good deal of this land would be better utilised were it put down to crops for hay or silage, to dry-land lucerne, and—in suitable areas—to pastures.

Mention has been made of the utility of trees as windbreaks and in woodlots. Certain trees, such as the Weeping Willow, which grow with comparative ease on the accumulated silt of erosion dams, may often prove of very material assistance during droughts. The practice of topping off the branches in dry periods not only saves the tree by cutting down the amount of water transpired, but the branches give an appreciable amount of valuable green feed.

Biological Interplay and Pests: As in all countries subject to dry periods of long duration, plant poisons exact a heavy toll on animals. Some poisonous plants, being very resistant to drought, furnish a certain amount of green growth when activity among the edible plants has ceased. Under these circumstances they offer too tempting a bite for the animal.

The biotic complex in South Africa is easily disturbed to the disadvantage of the farmer. The destruction of the jackal has favoured an immense increase in the dassie population, which in certain areas, e.g. Molteno, now competes with the sheep for pasturage; overgrazing is quickly followed by erosion; the shooting of certain birds and anteaters has caused the ant to become a pest in areas where it was relatively harmless before; it is thought by many that the locust menace is mainly the result of Man's upsetting Nature's balance; certain imported exotics, e.g. the Prickly Pear and Jointed Cactus, quickly prove to be pests of the worst kind; and so forth. For various reasons the results of the farmers' operations on the biological interplay of fauna and flora may have far-reaching ill effects.

The Union's Rural Labour: The rural labour force of South Africa—not by tradition cultivators, but pastoralists—receives low wages and, in its present state, is on the whole inefficient. The effects of these characteristics on the white, both economically and socially, are far from salutary. The low standard in farm operations set by the native is too readily accepted as inevitable by the white. In the inspection of some ploughing or fencing the expression of the farmer: „Not bad considering it was done by natives" is all too common. The acceptance of this inefficiency reacts badly on the character of the farmer since efficiency is largely the basis of self-respect. The fact that the wages—both nominal and real—are low, gives the country a low purchasing power and so renders the sale of manufactured and farm products difficult. But often the undeveloped labour of the native does not warrant higher pay. Obviously the solution lies in the judicious development of the native—a measure which would assist in increasing the internal market, the chief obstacle to material advances in South Africa. Abundant evidence exists to show that many of the natives can be trained to a high degree of efficiency not only in farm operations but as mechanics and in many other callings. The relatively rapid changes in Native Agriculture being brought

about under the direction of the Department of Native Affairs are indicative of what can be done to remedy the situation.

The country's small internal demand and the probable emphasis on the future demand for products of high quality have been previously stressed. The native, properly developed, will add very materially to the local demand, and, moreover, with his comparatively slowly rising standard of living will be able to absorb the poorer qualities of products during the transition period required for the production of higher qualities.

Aspects of differing climatic regions: Another feature with which the organisation of the Union's agriculture must contend is basically associated with the widely differing climatic controls to be found in South Africa. The country is divided economically into wheat, maize, sugar, wool producing and other regions and naturally to further the particular interests of each the political machine is resorted to. Under these circumstances it needs little imagination to account for the undue deflection of economic forces into "unnatural" channels. Conflict and clash must follow. The grain farmer, as a voter, is placated by legislation which gives him a high price for his grain; on the other hand the stock feeder requiring low-priced feedstuffs is naturally disgruntled, and so on. More than anything else it is this feature which calls for bold planning of the country's agriculture. Patchwork legislation merely adds to the instability of the Union's outlook. Full advantage of the country's resources can only be taken when the country as a whole is looked upon as a unit. As in all countries the rural population of the Union is conservative and so is slow to be convinced of the necessity for change. It is imperative, then, that a well-thought-out general policy should be formulated as early as possible and should be explained to the farmers on every suitable occasion.

The Balanced Farm: The necessity for balance between pasture and arable land, in order to provide for reserves, has already been stressed. In South Africa this balance is too often upset by the manner in which land is inherited. The sub-division of the farm among all the children must eventually not only give units too small in area to provide a decent livelihood, but it often leaves some of the smaller farms without the facilities for building up reserves. Recent legislation provides means for preventing the excessive fragmentation of land, but often long before it is considered necessary to invoke the law, the sub-divided portions may be uneconomic merely because the essential balance is absent. The situation can be remedied only by educating the farmer up to the requirements of what a balanced farm should embrace. Any farm which cannot provide for the building up of reserves of feedstuffs must eventually spell disaster to the owner. Without this provision, farming, under the erractic climatic conditions ruling in South Africa, takes on the worst form of gambling.

III. GENERAL OBSERVATIONS.

The preceeding discussion has attempted to indicate some of the main directions along which South African agricultural policy should be guided. Some prerequisites for the acceptance of such a policy require to be discussed as well as some suggestions to assist in the organisation necessary for its implementation.

The chosen end must be as clearly defined as possible. Although trite this goal might be broadly stated to be the greatest good for the greatest numer and so far as our rural population is concerned: the maximum stable output per farmer. Briefly stated, South African agriculture will achieve this by concentrating on the production of animal and horticultural products. If this policy is properly carried out it will stabilise production, conserve and improve soils, make fullest use of our arable production and will be in conformity with the trends of demand both locally and abroad.

Education as an Agent: But full support for such a policy will not beobtained until education has played its rôle. Education is required to show the necessity for a balanced national economic structure and for the proper development of the native. If brought about, both of these would result in increasing the internal market for farm products. Education, too, is required to show where our comparative advantage in farming the Union's land lies, as well as the shortcomings of the country's natural endowment and for the desirability of organisation (planning) and the remedies required to effect a better adjustment to resources. It is required in order to bring home the necessity for cooperation in the widest sense. And, finally, it is necessary to bring home the rôle of research in solving agricultural problems. In a democratic country reforms can be brought about by legislation only when the desire for these reforms is common to the majority and the desire to be common to the majority is only possible when the majority of the electorate have been educated up to the advantages of these reforms. The politician cannot go beyond that which his voters can appreciate. It is here that a coordinating economic advisory council would be useful. The function of such a council, briefly stated, would be to advise, to warn and to guide. This would be accomplished by a thorough study of the situation on which a general policy would be formulated and be made known. It would be important that the policy should be published—a procedure that would force politicians to give full reasons when rejecting any part of the policy or when deviating from the general outline. The council, too, would warn the public of any proposed legislation not conforming with their plan. It would guide by the publication of its findings from time to time. and by directing investigational work.

Land Classification: No plan for South African farming would be based on secure foundations were it not founded on a thorough agro-economic classification of land. Fortunately, as previously stated, such a classification is now being made. Stated

briefly, when completed, this classification will give direction to a more 'natural' development, since the most suitable enterprises in the various areas will be indicated; it should be of enormous assistance in the conservation of the country's resources in that it will give data regarding the carrying capacity and susceptibility to erosion of the different districts; and it would show what land is submarginal to ordinary farming.

Land Tenure: As the Americans have recently done, submarginal land should be boldly withdrawn from farming. Far better to use this land for State afforestation in some cases or as national game reserves in other cases, than to allow farmers to perpetuate poor whitism by farming this land. In areas of this nature, as well as in others, the question of the nationalisation of the land of desperate farmers[1]) presents itself. As State tenants, on long leases of say 99 years, where the rentals could be met at the ordinary prices for farm commodities, an improved utilisation of much land could be brought about through proper direction and safeguarding clauses in the contracts.

Further Suggestions: A number of other suggestions, which, if accepted would give guidance to policy, might be made. Some farm costing surveys have been made, but a greater concentration on this work is wanted. Research of this nature is invaluable in showing the profitability in the various areas of specific enterprises and the best combination of enterprises. An immense amount of investigation is still required into local consumer demand and of that abroad—of the effect on this demand of the levelling, effected principally by taxation, of incomes; the effects brought about by changes in age groups now taking place; the changes and differences in the wants of the various income groups; and, into the best means of educating consumers to differences in qualities of products. But a fuller discussion of these suggestions and others would take us beyond the present limits required for our plea—i.e. the necessity for an improvement in the organisation of South African farming.

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1) For a fuller discussion see the writer's "The Organisation of Agriculture" pp. 74—77. Central News Agency.

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