

Discussion.

cane was there, and it was quite possible that many planters had such stools in isolated portions of their farms.

Mr. Jas. Hulett stated that the Indians grew this cane for sale to the Natives. There was a tremendous amount of it done at Kearsney.

Mr. Storey stated that he had not the figures with him but he knew they had quite a number of names on their list from Kearsney and Glendale. He believed it was a common thing for Indians and Natives to plant a bit of soft chewing cane in amongst the Uba on the farms. That of course was what they were up against and that was where he relied absolutely upon the planters checking that. Eventually it would all be checked.

Mr. Alf. Warner referred to the growing of cane from seed and asked if they were to import seed from other parts of the world would it be pregnant with disease. Some years ago he was in Mauritius and he had seen Uba raised from seed from cane obtained from Natal. It was very seldom that the Uba cane did flower. He wished to know if it would be possible to bring in the seed from other countries and raise the cane here. It was only about thirty years ago that the seedling cane business was started. Previous to that in the West Indies there was only one variety, just like the Uba here. Some had had it in their fields for forty to fifty years, no one knew when it had been planted. Now of course it had all been wiped out. Perhaps Mr. Storey could tell them why the Uba did not seed here.

Mr. Storey replied that the danger of introducing the actual seed for cane would be very much less than the danger of introducing setts; in fact from the disease point of view the introduction of seed would be far and away the best thing to do, but there were great difficulties. When fertile seed was formed on the sugar cane, which was a very rare thing, its life

was very short. It was possible that one might manage to get fertile seed from Mauritius and be able to induce it to grow.

He doubted whether one could get it from any other country as the time would be too long to allow the seed to arrive here in living condition. The difficulties of raising seed were very much greater than one would imagine, for other reasons. Of the seedlings raised in other countries perhaps one in every thousand finally came into cultivation on any scale at all. Of that thousand it meant they would have to carry out at least a third to the point of crushing and testing the juice. The amount of work involved therefore was enormous in comparison with the return. It was a fine piece of work to undertake, but it was no good half doing it.

With regard to the Uba not seeding he could not definitely explain it. Presumably the climatic conditions were unsuitable, but it was quite a definite thing that all Uba arrows that had been examined had always contained infertile pollen and unopened anthers. The same with the sweet cane arrows that had been examined. It might be found that under certain conditions it might be possible to get fertile arrows.

The Chairman thanked Mr. Storey for the three papers read by him, which had been of very great interest; also for the enthusiasm which he had shown in his work in the last twelve months. (Applause). Also for the excellent results he had achieved. (Hear hear). The questions which were outstanding as between the Association and Mr. Storey's Department would have the very early attention of the Executive, and he felt sure these questions, including the question of the greenhouse, would be dealt with at the first meeting of the Executive. He hoped the result would be satisfactory both to Mr. Storey and to the Association.

PAPER ON STATISTICAL ASPECTS OF AGRICULTURE

(By W. A. KITCHENER, Census and Statistics Office.)

The agricultural industry is of paramount importance, not only to the farming community but to the whole of the South African nation. Upon the prosperity of the agricultural industry depends the whole of the future prosperity of South Africa. More depends upon it than even upon the mining industry, and, although this may appear to some a hard saying it will be found, on examination of the facts and figures, to be the bare truth. If there is any aspect of the material affairs of the country which demands careful observation and measurement, it is the pro-

gress of the agricultural industry. In this industry sugar growing plays a most important part, and, while this paper will deal with statistics as relating to agriculture in general, it will be seen to have a very direct bearing upon the special branch of the industry with which those present are most directly concerned.

The only means of getting a clear and precise measurement of the development of a country is by means of statistics. In the business world to-day there are few factors of greater importance than

Statistical Aspects of Agriculture.

reliable statistical data, and sound statistics have been the foundation on which the prosperity of all the large business concerns of the world have been built up. Witness also the great part played by statistics in the Great War. There was not a single branch of the immense organizations brought into being for war purposes which was not absolutely dependent upon a statistical service. The great necessity of a life and death struggle forced men to abandon haphazard methods of guess-work and to be absolutely sure of their facts. But a sure foundation of facts is necessary also for peace times if efficient production is to be aimed at. The sugar industry lends itself in a special way to a statistical service because it is more compact and in some ways more capable of scientific treatment than general agriculture. I feel sure, therefore, that I shall not have to press at great length the necessity for a statistical service for this one branch of agriculture.

It was only at your last Conference that the Director of Census discussed with representatives of various branches of the Sugar Industry the question of collecting more complete and specific statistics in regard to the Sugar Industry than then obtained and as a result of this discussion a special census of Sugar Cane Plantations was undertaken in July last. The results of this Census are contained in the March issue of the Monthly Bulletin, copies of which are before you now.

Briefly summarized, full and accurate agricultural statistics may be expected to render the following services amongst others:—

(1)—To encourage capital, as without statistics showing the actual production of the country, it cannot be expected that investments will readily be attracted.

(2)—To stimulate agricultural production.

(3) To provide the only means of measuring with any certainty a country's growth.

(4)—To prove a great importance to Departments of State in studying the progress of the various crops, etc., in different parts of the country, and in arranging and organizing transportation and export.

(5) To lead commerce into right channels, and to make possible a proper organization of production.

It is only by individual stock-taking that we can arrive at national stock-taking, and it is only by so doing that we can adequately gauge the resources, progress and possibilities of our country. Thus national statistics of agricultural production can only be built up from individual returns from the actual producers.

In every successful mercantile business it is customary to take stock, at certain set periods, of all goods, in order to ascertain what headway, if any, has been made since the last stock-taking. Equally necessary it is for the farmer to know exactly what he produces and how far he has progressed and even more important for a Government to know what are the resources of the country over the destiny of

which it has control, and whether the country is progressing, stagnating or retrogressing.

The collection of Agricultural Statistics also serves an advertising purpose which is as important for the Nation engaged in trade with other countries as for the individual merchant.

Every new country, no matter how great its natural resources may be, requires for its development capital and immigrants from older countries. Competition for both capital and immigrants is keen and without the fullest information regarding a country's past successes and failures, present position, and future possibilities the oversea capitalist and even the humbler immigrant cannot be expected seriously to consider any proposals for investment or settlement which may be laid before him. Unfortunately the necessity for such information in the form of statistics has only lately been realized in South Africa with the result that this country has not recorded the progress that its potentialities justify.

Prior to the establishment of the Census and Statistics Office in 1917, the only industry in South Africa regarding which reliable and detailed statistics were regularly made available was the mining industry. Without these statistics, which were referred to and quoted by possible investors in all countries, it is extremely doubtful whether sufficient capital would have been obtained to enable the mining industry to attain the predominant position in this country which it now occupies.

Before the date of Union the Governments of the Cape and Natal collected certain statistics of agriculture which were embodied in the statistical Registers of these colonies, but after 1910 even these limited statistical activities came to an end.

It is difficult to understand why the necessity for the regular collection of complete statistics of agricultural and pastoral production was not earlier recognized by the Union Government. The fact remains that until recently no regular collection of such statistics was undertaken in respect of the whole of the area now comprised in the Union. Vague and inconclusive statements of the progress or otherwise of the Union in these matters were made. Such statements were based on incomplete or out-of-date information or on personal opinion and, in the absence of full knowledge of the facts, were in many instances invested with an importance which they did not merit.

The passing of the Statistics Act and the establishment of the Census and Statistics Office on a permanent basis rendered it possible to undertake a statistical survey of South Africa at regular intervals. Endeavours have been made to fill in as far as possible the incomplete pages of the statistical record of the past and every preparation has been taken to ensure the completeness and accuracy of statistical operations undertaken at present or to be carried out in the future.

Statistical Aspects of Agriculture.

In setting up the machinery for a statistical service the Government has done its duty by the country. It remains for the inhabitants, or at least that section of the community which stands to gain by the Government's action, to realize their responsibilities in this connection. All agriculturists, industrialists and others who have the interests of South Africa at heart should appreciate the necessity for rendering the most complete and accurate returns possible when called upon by the Government to do so and for seeing that the resulting statistics are given the widest possible publicity. In these days of competition success in national as well as private business largely depends on advertisement and there can be no doubt in the mind of any unbiassed person that only good can result from broadcasting the achievements and possibilities of South Africa. The completion of statistical returns may present some difficulty in individual cases, but when it is realized that the filling in of even the simplest form is part of a national undertaking, the object of which is to assist the progress and promote the prosperity of the country, the necessity for and value of a little personal effort should become apparent.

At the last Congress of the South African Agricultural Union, the President bore testimony to the immense value of the Statistical Service of the Union and stated to what a great extent these statistics had assisted in guiding discussion throughout the proceedings of Congress.

Farmers have been urged again and again by the Government to increase their production, but the statistics which are available in South Africa go to show, in a most unmistakable manner, that equally important is it to find adequate markets for the country's production. The attitude of the average farmer is that his farm is capable of almost indefinite multiplication of production if he can be assured of a market at remunerative prices. If markets are not provided it is idle and mischievous to exhort producers to produce beyond the capacity of available markets. Two things are absolutely essential if, in South Africa, production is to be greatly increased. The first and most important is the extension of our own home markets by increasing in every possible way the civilized population of our country. Here is the best and most profitable market. The second object is to discover and organize our foreign markets. Because our population is limited, the great cry at present is for export, and it is for this reason, in a special measure, that statistics of production are essential. Otherwise how can we advertise our agricultural produce and claim for ourselves a share in the markets oversea. Certainly no Government can do its duty by the business interests of its country without information such as that which can be obtained only by a properly conducted annual census of agriculture.

Then again it must be borne in mind that the publication of reliable statistics is totally opposed to the

interests of the speculative element that has been the curse of the country for years.

Of course statistics must cover a number of years to be of any real value, in order that comparisons may be made and the measure of progress or falling off be determined. Statistics for a single year would be almost meaningless. They must be collected methodically and systematically year after year so that measurement may be made possible.

In the Union, agricultural censuses have been taken for the past six years. A comparison of the results of each of these censuses goes to prove that the statistics collected are accurate enough for all general purposes. They are based on information secured directly from all the individual farmers and should not be considered in any sense as estimates, and must be carefully distinguished from the Crop Estimates of the Agricultural Department which serve a different purpose. On the other hand it cannot be claimed that they are meticulously accurate. Perfect accuracy is very seldom obtained in statistics and in this respect they differ from accounting. But perfect accuracy is not necessary for a purpose of this kind although it would be desirable were it at all practicable, for some purposes, to have absolute accuracy. The astronomer photographs a region of the sky and obtains an exact chart of the stars covered by the photographic plate.

But for any other purposes a less exacting measure of accuracy is all that is necessary. The motorist is content that the road in front of him is reasonably level. He does not insist upon microscopic examination of the dust in the roadway nor ask that the road shall be as level as a piece of plate glass. The geographer is content to draw his contour maps in bold outline without attempting to fill in every nook and cranny of the hills and valleys. Thus the national statistician must be content to draw his picture in broad outlines; and of the agricultural statistics of South Africa it may be said that, in broad outline, they are as truthful a picture of the production of the country as can be shown by any country in the world similarly situated as to population and extent of territory.

The first Union Agricultural Census was undertaken in 1911, the next being taken in 1918 (under the Statistics Act, 1914, and it has been taken annually since that date.

Thus we are able to study what progress or otherwise has been made in the several branches of farming for a period of ten years; that is comparing the 1911 with the 1921 Census, which were both complete censuses of Agriculture. The 1919, 1920, 1922 and 1923 censuses were taken on a modified scale as compared with the complete censuses taken in 1918 and 1921, that is to say, they excluded production in Native areas owing to the expense involved in the census enumeration of Native production. For similar reason they also excluded the Live Stock in towns. The importance of the Native section of production has, however, become adequately recognized,

Statistical Aspects of Agriculture.

and the censuses from 1923 onwards include the total agricultural production of the country, exclusive, however, of the Live Stock in towns, which is obviously too costly an operation altogether to repeat annually.

In this study it is brought to light that with the exception of maize, ground nuts, sugar cane (the production of which has increased 49 per cent) tobacco, cotton and cultivated grasses, little progress has been made so far as the area under cultivation of agricultural crops is concerned. No more striking proof can be adduced of the great and crying need for closer settlement and for the more intense cultivation of the soil. Unless every effort is strained to this end a similar picture will again present itself in ten years' time.

On the other hand improved methods of cultivation are undoubtedly being followed. There has been an increased yield per morgen in nearly all the crops.

The morganage under cultivated grasses has made a big jump, which indicates that stock farmers are at last becoming alive to the fact that in order to protect their stock in times of drought, provision must be made for fodder other than veld grasses.

Cotton growing has now got beyond the experimental stage in many districts of the Union and promises to be one of the staple crops in certain areas. Considerable advance has been made in the production of this article.

The production of monkey nuts has been considerably increased. During the Great War there was a good demand for monkey nuts. This demand has been maintained and farmers are gradually realizing the value of this crop.

A considerable advance has also been made in the production of tobacco, encouraged by the requirements of local factories, which have been established in recent years. Any further increases must depend upon overseas markets.

The cultivation of tea until recently had been a languishing industry and several estates had to close down. This was brought about by the low prices received from leaf, competition of cheap imported Ceylon tea and the high price of labour. Many former tea estates are now planted with Sugar Cane. There is, however, a world shortage of tea just now, prices have consequently increased and it is hoped that this will result in the re-establishment of the Tea Industry of Natal. According to our statistics of wholesale prices the price of South African Tea in January last was the highest recorded.

A marked advance is noted in cattle breeding and this is due to the dipping of stock. It is estimated that fully 85 per cent of calves are now reared against 30 to 40 per cent previously. The prevention and control of stock diseases in the last few years has reduced the risks previously involved and farmers and others are now disposed to invest money on cattle breeding operations. Better breeds are

now being imported and stock farmers are also realizing the value of providing better fodder for their animals.

Considerable advance is also shown in the production of wool per sheep. This has been due to careful selection of rams and breeding of pure merinos. Sheep farming has, however, from a numerical point of view not made much progress. Farms generally, especially in the Cape Province have been overstocked and the veld eaten out, with the result that periods of severe drought have diminished the flocks considerably from time to time.

A considerable decrease in the number of ostriches is reflected. This was to be expected in view of the low prices of ostrich feathers during the past few years.

Great strides have also been made in the production of butter and cheese, but it is considered that even greater progress could have been shown had more attention been given to the organization and economics of this industry. Many of the principal lucerne districts of the Union admirably suited to dairy farming operations are still waiting development in that direction. Few seem to realise the great potentialities of the Dairy Industry of this country if properly organized.

Horticulture has also made considerable strides and the dried fruit industry is now well established owing to improved methods in drying.

Considerable progress is also reflected in afforestation.

The above facts are reflected by statistics which serve as your agricultural statistical barometer which, if rightly used, may be read as foretelling fair weather or foul, as giving encouragement or uttering warnings. An instrument of this kind, if neglected by those in authority, will lead to quagmires of confusion and into all the dangers of guesswork. The history of the past in South Africa gives tragic examples of this kind, but now that a service of information is available, those who sin at all will sin against the light.

Seeing, however, that the interests of the farming industry can hardly be disassociated from the interests of the country in general, (such as, say, the interests of the Minery Industry, which provides a considerable market for the farmer's produce, or from the interests of the Manufacturing Industry, which consumes a large amount of raw material produced), it will be as well to note what the rate of progression has been both in the Agricultural Industry and in certain other directions as well since 1911.

For this purpose the Union has been divided up into four regional areas. I am able to ask you to observe these regions on the map which has been provided for the purpose. It will be seen at once that these regions are really definitely homogeneous areas based in three cases upon a port or ports and a system of railways, and, in the case of the fourth, centred round the great industrial area of the Witwatersrand round which are grouped some of the most important agricultural districts of the Union.

Statistical Aspects of Agriculture.

The summary prepared gives a bird's eye view of the progress of the country generally and reflects the results of thousands of operations in the Census and Statistics Office.

Region I, Cape:—

Capetown with Western Province of the Cape and contiguous Northern Districts.

Region II, Midland:—

Port Elizabeth and East London with the Cape Midlands and Eastern Province, Kimberley and the Northern Cape, Bloemfontein and South-West Free State.

Region III, Natal:—

Durban and Natal.

Region IV Witwatersrand:—

The Witwatersrand and Transvaal with Northern and Eastern Free State.

Summary of Rate of Progression of each Region 1911 to 1921.

(Base, 1911, equals 100).

Description	Region	Region	Region	Region
	1	2	3	4
	Cape	Midland	Natal	Witwatersrand Union
Population—				
European	119	103	140	126 119
Non- "	117	106	118	123 115
Production—				
Agriculture				
(Volume)	136	106	122	168 134
Mining				
(Value)	6	26	319	121 109
Manufactures				
(Value)	206	222	275	233 226
Total	155	94	174	144 136
Tonnage of Oversea Trade handled (1920)	111	64	177	— 126

By subtracting 100 from each of the above numbers, or by subtracting from 100 each number, if less than 100, it is possible to obtain the percentage in increase or decrease of production or advance in each region, and, read in this way, the figures are, in some ways, encouraging. For example it will be seen that the white population of the Union in ten years increased by 19 per cent, but that agriculture increased by 34 per cent and manufactures by no less than 126 per cent. The tonnage of our oversea trade increased by 26 per cent. In this progression Natal took comparatively little share as far as agriculture is concerned, that is, only 22 per cent in ten years. On the other hand Natal mining increased 219 per cent. Natal manufactures by 175 per cent and Natal oversea trade by no less than 77 per cent.

The one figure in the summary which gives cause for serious thought is that the white population of the Union, during the decennium, increased only by 19 per cent as compared with over 40 per cent in each of the three previous decades. This means that the Union has actually made no advance at all in the

way of immigration during the course of 10 years. In the case of a young country this fact is one of momentous significance and should be faced by every man who has the interest of the country at heart. It is worth while noting that while the Union increase of White population has only been 19 per cent, Natal at any rate did its duty by recording an increase of 40 per cent. Had other areas of the Union progressed similarly, the Union of South Africa today would have been in a far better state than is the actual case.

Perhaps a few remarks on the valuation of the Agricultural Production of the Union might also find a proper place in this Paper.

There are many great difficulties which stand in the way of securing a figure which would represent even approximately the net value of all farm products, that is, the actual amount added to the wealth of the country through the operations of farmers.

It is possible, however, to make up directly from the Census Reports a total which may be termed the "Gross Value of Farm Production" and this is the method which has been adopted by the Census Office. Even in giving effect to this method many difficulties had to be faced and overcome.

The gross value of farm products may be taken to correspond approximately to the gross value of products from a manufacturing industry, while the net value of farm products, if it could be obtained, would correspond to the "Value Added by Manufacture," which is shown in the Industrial Census Reports, and which is generally regarded as a better measure of manufacturing production than the figures of gross output. In the case of Agriculture, however, the gross value forms a very satisfactory index of progress or of the relative importance of the Agricultural Industry in different areas.

The gross valuation of the Agricultural Production of the Union at average price (wholesale or open market) for each of the years 1917-18 to 1921-22 has been calculated to be:—

1917 - 18	£m. 71
1918 - 19	£m. 76
1919 - 20	£m. 111
1920 - 21	£m. 74
1921 - 22	£m. 66

The 1920-21 Production has also been calculated on the basis of the price received by the farmer, less transport charges, agency and commission fees and totals a figure of £m. 56 a difference of £m. 18 between the market value and the valuation on the basis of the price received by the farmer. This is certainly an extravagant price to pay for the primary service of distribution. Incidentally the figures provide yet another instance of the important issues that may be elucidated by the Agricultural Statistics, for they convey a clear suggestion in regard to the fundamental question of our inefficient system of distribution. We may urge that we are in no worse case than some other countries, but certainly this is no argument against remedying a gross element of in-

Statistical Aspects of Agriculture.

efficiency in our economic machinery. This is not the place, nor have I the time, to deal with this matter more fully, but a little reflection will show that both producers and consumers stand to gain very greatly by improving our system of distribution and by reducing the enormous difference between the farmers' price and the prices which are paid by the individual consumers.

This paper has taken the form of a general survey and, as such, I trust that it has not been without interest. Many of the problems dealt with do not directly concern the sugar producers, but many here are interested also in general farming, and the interests of all here are closely bound up with those of the rest of the agricultural community of South Africa. The prosperity of one part should interest all, and the Statistical Office, with which I am connected, is only anxious to serve in the best way possible the interests of each section of production and of the nation as a whole.

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There being no discussion, the Chairman stated he could only presume that the paper was so excellent that it did not require any discussion. He would like to be able to assure Mr. Kitchener that no Planters would object to the additional census being taken this year, because the value of this additional census was difficult to overestimate. He was looking at it purely from the point of view of one who was personally concerned in the selling of the planters' pro-

ducts, and it would be of immense assistance to all concerned in their sale to have this data. Their difficulty always was to know exactly what their production was likely to be. The census would help them immensely in that respect. They had something fairly definite to go on instead of groping in the dark as they had to do in the past. He would also like to say that in the Census Department of Pretoria they had one of the most enthusiastic staffs in the whole of the Government service. There was nothing that they were asked to do in any shape or form that they did not undertake, and whatever methods might be suggested to them he had found they were always able to improve on those methods themselves. He thanked Mr. Kitchener on behalf of the members for his very excellent paper. (Applause).

Mr. Kitchener said he wished to thank them for the very appreciative manner in which his paper had been received, and also for the very eulogistic remarks passed by the Chairman in respect of his Department. The whole success of his Department was the real live business head they had in Mr. Cousins; he was a regular grafter and grinder; he got every ounce out of his staff but his staff were pleased to serve him loyally. At any time they could be of assistance to the farmers they would be pleased to do so. They knew that in serving the interests of the farming community they were serving the interests of the country as a whole. (Applause).

GENERAL OUTLINE OF CHEMICAL CONTROL OF SUGAR FACTORIES.

(Paper by L. F. De FROBERVILLE, Darnall.)

(1) What is meant by Chemical Control?

There is a certain similarity between the Chemical Control of sugar factories and commercial bookkeeping.

In this latter, a regular system of accounts is kept, tracing the raw material from the time it is purchased right to the end, when the manufactured product is delivered and sold.

The difference between the sale price and the purchase price being the gross profit, all the expenses incurred in the manufacture are deducted, leaving a balance which constitutes the net profit.

In the sugar industry, accounts are being kept so as to trace from beginning to end the different stages of the manufacture.

The difference between the sucrose bought in the cane and the sucrose sold as bagged sugar constitutes what is commonly called the "Loss Account."

The loss account traces from the beginning, when the sucrose enters the mill as cane, (1) the loss in the crushing plant; (2) the loss in the clarification or defecation, where some of the sucrose is lost in the residues of filtration and some destroyed by inversion; (3) the loss in the evaporating plant, where the difference between the sucrose in the clear juice and in the syrup delivered by the multiple effects represents the loss by entrainment; (4) the loss in the massecuite, where the decrease in the sucrose content indicates the loss by caramelisation or burnt sugar and mechanical losses between the evaporating and boiling plants; (5) the loss in the curing of sugar, where the difference in sucrose is attributed to mechanical losses mainly and to the melting of sugar in the curing process and (6) the loss in the final molasses.