

SOIL EROSION — A PROBLEM CONFRONTING THE SUGAR FARMER

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Soil erosion I feel is probably one of the most important problems facing the agriculturalist. How far reaching it is few if any of us appear to realise, and the general policy seems to be one of allowing the future to take care of itself. Such a policy, anyone will admit, is essentially suicidal and unfair to the future generation. The agricultural and pastoral lands are our heritage, held by us in trust, and they should be cared for scientifically and handed down to future generations in a healthy productive condition. Is this being done to-day? My observations lead me to the opinion that we to-day are guilty of much neglect.

I suggest that in order that we may cope with the problem better, erosion experiments should be laid down and information sought from experienced farmers. In fact I suggest that a general investigation should be made into the whole matter. To do this effectively would require the services of some technical officer, well experienced in soil erosion control, and who should be allowed to devote the whole of his time to the problem. I have no doubt that he would find farmers willing to cooperate. The Government spends much money on soil erosion work and experts are employed to devise means to remedy and guard against further loss. I do not know how far the Government would be prepared to assist us in the matter, but there is no doubt that a few years study of the problem, together with the application of approved methods of control, would be of great benefit to our lands.

Without going into the matter very fully I would give the following as five principal causes of erosion:—

- (1) Denuding land of bush and vegetation.
- (2) Breaking up the soil by ploughing.
- (3) Faulty drainage systems.
- (4) Faulty methods of planting.
- (5) Burning trash.

There are other causes, but these points will be sufficient to illustrate why erosion takes place. I claim that our methods of cultivation are chiefly the cause of erosion, and consequently the remedy lies in our own hands if we care to adopt them.

It is essential that whatever methods are agreed to should be general, otherwise the results will be unsatisfactory. Owing to the limited area under cultivation fifty years ago, I am of opinion that erosion then took place by no means so readily as it does today. In the first place, the burning of trash was not practised, and the preparation of land for planting by holing did away almost entirely with the facilities for erosion. Today, our principal source of loss takes place in ploughed lands, where the soil is left exposed to heavy rains. Erosion also takes place after planting, unless furrowing is carefully designed and suitable drainage provided for.

May I give you one example of the wastage of surface soil due to bad treatment? Most of you are well acquainted with the Verulam Hill. The land on the Durban side was leased by Indians as far back as 1870. The tenants planted mealies and for years reaped heavy crops, but gradually the land became unproductive. This I attribute to continued erosion of the surface soil owing to inadequate attention being paid to correct agricultural methods. I know of other cases where the land has suffered in like manner. Now if this is allowed to continue, of what worth will our soils be to the future generation.

We are told that agriculture is the backbone of any country. Perfectly true, and hence the urgent necessity for every effort being made to conserve and safeguard this wonderful heritage—the land.

In conclusion, I admit that the subject I deal with in this paper is a very difficult one, requiring much thought and study. I trust, however, that my paper, though brief in composition, may stimulate at least an interest in the subject and lead to the adoption of methods to control the evil of soil erosion in a practical way.

Mr. A. TOWNSEND read paper No. 13, "Soil Erosion—a Problem confronting the Sugar Farmer," and continued: I would just like to say that when I suggested the paper, I was particularly instructed to be brief in its composition, so I have been brief. But, Mr. Chairman, I do feel that this is a question that certainly should receive the whole-hearted attention of the South African Technologists' Association and the South African Sugar Association too, and that no delay should be made in taking up methods of correcting the loss that is taking place almost daily. I am speaking from a life experience. I was born on the farm, lived all my life on a farm, and I have passed through almost every stage of the Sugar Industry. I know very well if this state of affairs is allowed to continue, it is only a matter of time when all your chemical research, all your boilers and other matters, will be of no use at all. You have Mr. Dodds saying just now that in India certain lands have become unprofitable for the purpose of growing crops, due to the continual cropping. I think it is due to the fact that those lands have been unprotected. It is our duty to do this, to conserve and protect that heritage to the best of our ability, and I am convinced more than ever from the last few years of my own experience, that the waste that is going on to-day on our surface soils is enormous, and it is very little realised, and it will not be realised until it is too late. I feel the importance of this question, and I do hope that you will look to it from that serious aspect and do your utmost to bring about a better condition of affairs.

The PRESIDENT: We are all very pleased to have this paper from Mr. Townsend. As most of you know, Mr. Townsend is one of the pioneers in the Sugar Industry. We are very pleased to see Mr. Townsend looking so hale and hearty. The paper is open for discussion.

Mr. PALAIRET: I would like to say a few words here first of all in absolute support of everything that Mr. Townsend has said. I would like to express a little regret that he has not gone further, in that he has not indicated any practical methods. In this respect I would like just to sum up this subject, because there are two factors concerned. One is the hydraulic gradient, which is, of course, an engineering matter. It is referred to here with regard to your furrows and trenching systems and things of that sort, and generally matters connected with soil erosion. That is the aspect that is usually stressed. Now I want to point out that that is very, very far from being the real, bedrock factor. The real bedrock factor rests much more on the question of soil absorption. It brings me back to my own little pet subject. I wish I had with me, I think it is the 1935 report of the Rothampsted experiments. They carried out certain tank experiments on some soils, taking soil, mixing it thoroughly in two tanks, putting one on as it stood, mixing the other lot with a liberal

supply of compost and putting that in. Measured quantities of water were added, and the drainage also measured. The figures, of course, varied with different soils, but I believe some soils actually gave as low absorption as 5%. That means to say the top ten inches of soil could not absorb more than half an inch of rain, the rest has got to run off or soak through. Some soils containing the compost came up to somewhere near 40%. That is to say 4 inches of rain. No doubt those are very extraordinary examples, but I personally have no doubt whatever that if we go properly about the increasing of the organic matter in our soils, we will find two results—first, an enormous reduction in sheet erosion, which is the one that causes the trouble; and secondly, much more moisture available for the crop, and I do feel that this question of increasing the absorptive capacity of the soils is one that we have got to treat very seriously, and I think that there lies one of our openings for future progress.

Mr. TOWNSEND: I may point out that our soils are essentially non-absorbent, for this reason, that wherever you come on a sugar belt, you find the soils are of shallow depth, and when we have underlying shale, there can be no chance of penetration. Our danger does not lie in an ordinary half-inch rain, or three-quarter-inch, but when it comes to a five-inch rain in a limited time, then there is the danger. Last night we had rain at Umhlali. On my farm it was $1\frac{1}{2}$ inches. My neighbour had $2\frac{1}{2}$ inches, two miles from me: there was a cloud burst on his farm. How in the world is he to deal with that on a question of absorption? You can only deal with it, in my opinion, by ploughing properly constructed drains. If you get land which has rain falling on it until it has got as much as it can possibly hold, and you get more rain falling on it, something has got to go. The water has got to go away somewhere. If it should be allowed to go away as best it can, the water is going to make a big furrow and will take the soil along with it. If you make a judicious drain and carry that water off at intervals, you certainly do have some erosion, but that erosion takes place in your sub-soils. The water is carried in the shallow drains and taken away. The fields remain intact. You prevent your farm from being carried away. You are losing the sub-soil, which is of very little value to you. Mr. Palairret's suggestion of absorption is a very valuable one, and it means, of course, that you should go in for deeper cultivation. Up to a certain point you can do that, but beyond that, with these heavy rains, we have got to devise means which will prevent the water washing away our soils.

Mr. CUTLER: I associate myself with the remarks made by Mr. Townsend. I would like to point out that there does exist in the Department of Agriculture a special section, comprising engineers and soil scientists, studying the question

specifically, and the services of these men are available at any time to anybody who cares to write a letter, either to the Principal of the School of Agriculture, or to the Secretary for Agriculture up at Pretoria. Their services are always available at any time for any question in regard to the combating of erosion, and their advice is always available.

Mr. LINTNER: I should very much like to second what Mr. Cutler has just said. It is more than advisable that the planters should avail themselves more than they do at the moment of the Government services at their disposal.

Mr. DODDS: I quite agree with Mr. Townsend's remarks on the great importance of this question, perhaps ultimately the most important question with which the Industry will have to deal. There was a recent Government Commission dealing with this matter, one of whose remarks was that the logical conclusion of present methods of farming in South Africa was the Great South African Desert, uninhabitable by man. And one can see in various parts of this country how far that condition has already been arrived at. There are certain parts of the Interior of Natal, for example, in the Vryheid District—for miles around there the condition of

the soil is an eye-opener as showing to what lengths erosion has already gone. With crops such as sugar cane, our lands are less liable to erosion than where faulty methods of pasturing are concerned, but nevertheless erosion can and does occur to a very serious extent. I therefore heartily endorse Mr. Townsend's remarks. I would like particularly to welcome his presence here amongst us. We are always glad to see Mr. Townsend in view of his long experience and rich store of knowledge of the Industry in the past and present, and I think one of the best acts of this Association during the past year was to elect Mr. Townsend an honorary member.

Mr. LINTNER: There is one point I would like to ask Mr. Dodds in connection with this work whether he has envisaged the undertaking of lysimeter studies at the Experiment Station, which have a very important bearing on the subject?

Mr. DODDS: That is one of the many subjects we have in mind, but have not been able to undertake yet. But the importance of lysimeter work is realised from several points of view, and we intend to establish an installation as soon as we can possibly do it.