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The Economic Causes of
Soil Erosion
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THE ECONOMIC CAUSES OF SOIL EROSION

Introduction

Most farmers in South Africa are Black. Most Black farmers in South Africa are relatively poor. It is an easily verified observation that agricultural land is most Black farming areas is poor, that the grazing areas are overgrazed, that the arable land produces yields considerably lower than in corresponding White farming areas and that soil is either depleted or rapidly depleting whether measured along a quality or quantity dimension.

This is a theoretical paper. It attempts to evaluate some of the popular explanations for poor agricultural output in Black farming areas with particular emphasis on the quality and quantity of the primary agricultural resource - soil. It offers no answers, but may serve to pose a few new questions or at least cast doubt on some existing preconceptions.

Basic insights

Soil erosion and the depletion of soil reserves is not a problem unique to Black agriculture. White agriculture experiences similar problems and the State has intervened. The Soil Conservation Act (Act No.76,1969) uses a combination of co-operation and compulsion to discourage White Commercial farmers from allowing their soil reserves to be destroyed. Whether such government assistance has been successful is debatable. It has recently been argued, for example:

"Because present drought aid in all its facets depends on the condition of the veld - disregarding farming practices that preceded the crisis - the farmer who paid the least attention to judicious veld utilization is the first to receive the most help". (Farmers Weekly, Editorial, 10/2/84)

Further doubt regarding the efficiency of soil conservation measures applied to White farming in South Africa is cast by the following quotation from the Second Report of the Commission of Enquiry into Agriculture (RP84/1970) comparing areas where soil conservation measures have and have not been implemented:
"In respect of (soil) quality a significant difference has been found in favour of unplanned farms". (p.79)

The purpose of these quotations is to illustrate that soil depletion is not a problem unique to Black agriculture, nor is it a problem easily solved. The provision of subsidisation schemes and other measures does not seem to have been particularly successful in the case of White agriculture. It may even have exacerbated the situation.

Is Black agriculture different?

The term "soil erosion" is an omnibus term and it may be that the activities of White farmers are strictly irrelevant in attempting to examine the decisions of Black farmers. Such has usually been the assumption. It has been argued that soil erosion (in particular overgrazing) in Black areas could be attributed to a Tragedy of the Commons phenomenon. The mechanism is roughly as follows: Suppose we assume common grazing land or commonage and a number of individual profit-maximising farmers. Each farmer (independently of others) makes a profit maximising calculation of his own optimal course of action. Should he keep another cow? The benefit from adding one more cow to his herd are clearcut. The cow yields milk. It may produce a calf. It can be slaughtered for meat and a hide. It can be used as security in a financial transaction. Against these benefits must be set the costs. In a common grazing land situation, however, the costs are virtually zero. The cow eats grass but the grass does not belong to the farmer himself but to the community (for what belongs to everybody belongs to no-body). Setting the substantial benefits against the minimal costs, the obvious course of action is to keep another cow .. and another ... and another. Overgrazing and agricultural depletion are the inevitable result of individual maximising behaviour coupled with a common property resource.

The farmer indeed is in a Catch-22 situation. He may altruistically choose not to keep another cow. In this case he benefits not at all but nor do the other farmers because as long as two of them are not selfless altruists overgrazing will result and everybody will be poor.
This parable is intuitively appealing and may in fact be the single most powerful explanation of the poverty of Black agriculture. There are some warning signs that more is needed. Firstly, as mentioned, it cannot apply to White agriculture where private tenure is the basis of farming but where soil erosion also occurs. Secondly, the simple assumption of common property rights does some violence to the complicated methods of land tenure amongst rural Black farmers which we understand very imperfectly. Thirdly it obviously copes for more easily with grazing land than with arable land where, one would imagine mutually satisfactory sharing arrangements can be more easily formulated. Finally, it assumes that property rights arrangements are fixed and given, exogenously determined for a particular group of people. This last point should perhaps be emphasised because it is directly contrary to the views of Hayek (amongst others) that institutional constraints (such as common law and property rights) change as the requirements of society alter to produce an efficient outcome. Such considerations have formed the basis for Harold Demsetz's explanation for the emergence of private property rights among the Canadian Indians.1) Buchanan has warned in this connection, however, that:

"... the rights of the several participants must have been mutually recognised by all participants before further contractual negotiations could be undertaken to change the structural characteristics ".2)

The question then is whether after several decades, during which the inefficiency of common property rights has been manifestly obvious, there are certain constraints, such as the power of the local chiefs, which prevent the realignment of rights to produce a more efficient allocation. It would be interesting to know more about this. It must be admitted that economics lacks a useful theory of institutional change for even if it can be shown that institutional arrangements change with direction of greater efficiency, the extent of this change and the rate of change remain a mystery. A final possibility must be borne in mind: that for Black farmers existing property rights arrangements are not in fact inefficient given their objectives. It is to a discussion of these objectives that we now turn.
Maximising what?

Until now it has been assumed that the objective of Black farmers is to maximise the yield from their land. More accurately, to maximise the yield from their land over time. It may be that this is simply wrong. It may be that given the increasing population pressure on the land rational farming procedures simply cannot be carried out and devastation results. This last possibility is mentioned in order to refute it. It would seem unreasonable that a large (or a rapidly expanding) population on its own would be sufficient to cause the destruction of the soil. Indeed the reverse would seem to be the case. A large population would make land more valuable, would cause farmers more carefully to husband their resources and would probably speed up the changes in property rights necessary to achieve increased output. Population pressure on its own does not carry us very far.

The question of the time horizon is a more serious question, however. In a situation where land is not readily transferable (either because it is common grazing land or because it is allocated according to a complex traditional formula) a farmer with a starving family has no alternative use for the land and a very short time horizon. An anti-smoking campaign would be unenthusiastically received in death row because everybody there has a short time horizon. For a farmer with a starving family the relevant time horizon is likely to be very short indeed. Rational farming implies farming techniques which result in rapid soil depletion.

Less dramatic situations of poverty may also lead to soil erosion (though always with the proviso that land cannot be bought and sold). It is observed that Black parents exhibit great concern for the education available to their children. Given limited resources, investment in one's children rather than investment in one's soil may be very sensible indeed. After one generation the soil may be depleted, but one's child may have a white collar job or at least some urban employment. If one can supplement one's present farming income with migrant earnings from the mines, say, the depletion of rural land is still rational but occurs sooner. Indeed in the absence of a market in land, soil depletion is rational for all Black farmers except those who believe influx control will still be in place thirty or forty years from now. How would you place your bet?
An understanding of the choices made by Black farmers needs to include the possibility that these farmers are behaving rationally given a relatively short time horizon, a supplementary income from migrant earnings and the possibility of fairly dramatic institutional changes in the future.

This would be a useful start, but the discouraging possibility exists that none of these arguments apply because it may be that for the Black rural areas the comparative advantage lies in labour rather than in land. The existence of a subsidised White agricultural sector and the availability of maize and wheat products (often at subsidised prices) may reduce the viability of farming in Black areas. Just as it is economically rational (and desirable) to deplete our gold and coal reserves) so it may well be the sensible thing for Black farmers to deplete their soil resources quickly before turning their attention to areas where the rewards are greater. These activities include migrant labour or living illegally in White towns.

Conclusion: The next step

Something can be learnt from all this. The causes of soil erosion may be complex (they are certainly elusive) and they require further investigation. A good deal of clear thinking is needed because (and this can be learned from our experience in White agriculture) an ill-thought-out programme to improve soil quality may well back-fire. Diagnosis must preceed prescription.

As promised, no answers are on offer here. Finally (to fulfil a further promise) it may be as well to question a popular explanation for the lack of investment in land quality in Black agriculture — that of the alleged unavailability of suitable credit facilities. Considerable funds are in fact available in the form of migrant earnings. These funds, however, are spent either on immediate consumption or on other forms of investment of which education is perhaps the most obvious. The fact that people in the Black rural areas may be poor does not prove anything about the availability of funds for investment. There must be plenty of urban dwellers who would be happy to lend to their country cousins if the returns were attractive —
and attractive returns would seem to be a necessary condition if the "scarcity of credit" argument is to hold any water at all.

In attempting an explanation of soil poverty in Black rural areas, a final problem that needs to be confronted is the virtual universality of the phenomenon. There seem to be no Black farmers who drive a Mercedes-Benz — though significantly perhaps, the same cannot be said of Black politicians. What is the common factor which keeps them all so poor?

FOOTNOTES


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These papers constitute the preliminary findings of the Second Carnegie Inquiry into Poverty and Development in Southern Africa, and were prepared for presentation at a Conference at the University of Cape Town from 13-19 April, 1984.

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Quoting (in context) from these preliminary papers with due acknowledgement is of course allowed, but for permission to reprint any material, or for further information about the Inquiry, please write to:

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