

The Influence of Agricultural Development on the Nutritional Status of Homeland Populations

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SUMMARY

The nutritional status of a community is largely the result of three factors, viz. the availability of food, the purchasing power of the community and its level of education. The effect of agricultural development in the homelands on each of the factors is briefly examined. Agricultural development and improved nutrition are seen as parallel developments governed by the level of education of the population.

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There appears to be strong support for the theory that under- and malnutrition adversely affect the intellectual development of the infant and hence of the adult. Workers suffering from under- and malnutrition cannot achieve maximum productivity due to physical weakness, absenteeism as a result of minor or major illnesses, and undesirable attitudes as a result of the social and psychological effects of inadequate nutrition. Einstein's remarks that 'an empty stomach is not a good political adviser', should also be borne in mind.

The political and economic development of the homelands are of vital importance. Since the time when the Transkei obtained self-government 10 years ago, the political development of the homelands has progressed rapidly. Political development, without the concomitant economic development to support and stabilise it, must lead to economic stagnation or retrogression and, consequently, instability.

The basic function of agriculture is to feed the nation. However, because agriculture is also an industry in its own right, it can, and should, contribute materially towards the wealth of the country and the raising of the living standards of the population. It is, therefore, generally accepted that agricultural development must act as a springboard for further economic progress in underdeveloped or economically backward countries.

Economic development is the result of human development, and the latter must therefore precede, or at least accompany, the former. Development, as an evolutionary process, has become too slow in economically backward countries. The population explosion absorbs more energy than the economy can generate. Poverty thus breeds poverty and misery. To stop this downward trend a

tremendous combined upward thrust will be required in order to launch the developing countries on their way to economic development. Part of this combined upward thrust must come from within the nation or the people themselves. An adequate level of nutrition could play an important role in removing part of the inertia slowing down the rate of development.

The rate of agricultural development may vary proportionally with the change or development potential, and inversely with the resistance to change due to social, economic, political and other hindrances. The effect of these hindrances must be borne in mind when reference is made later to the potential for agricultural development and the resultant economic growth in the homelands.

Reference will be made to conditions pertaining to the Transkei and Ciskei. Although these conditions may differ in some ways from those existing in other homelands, the trends should be the same, and the general conclusions drawn from these conditions should, therefore, also be applicable to other homelands.

NUTRITIONAL STATUS OF HOMELANDS POPULATIONS

A number of studies have been undertaken to investigate the diet of rural Black households in the Transkei.¹⁻³ These studies make interesting reading because they also deal with the traditional and customary methods of food production, storage and utilisation, and the effects of these on the diets of the Xhosa.

The dietary pattern of a household or a community is also reflected by the pattern of cash expenditure on foods. This is given in Table I. Although there are differences in the spending patterns among the districts, it is evident that the diets consist largely of cereals, mainly maize and maize products. Another interesting feature is the relatively high expenditure on sugar and sugar products and non-alcoholic (cool) drinks, especially in the Transkei. The expenditure on meat, dairy products and eggs and vegetables is relatively low.

The trend illustrated in Table I has been confirmed by study of the diets, and can be summarised by saying that the diet is high in carbohydrate, due to the fact that it consists mainly of maize and, to an increasing extent, of refined maize products as well as a lot of sugar; low in protein, especially animal protein; and also very monotonous. The monotony of the diet is probably due more to custom and ignorance than to environmental poverty.⁴

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TABLE I. PROPORTIONATE AND TOTAL CASH EXPENDITURE BY HOUSEHOLDS ON FOOD COMMODITIES IN TWO DISTRICTS OF THE TRANSKEI (WILLOWVALE AND TABANKULU)⁷ AND ONE DISTRICT OF THE CISKEI (HERSCHEL)¹¹

Commodity	District		
	Willowvale %	Tabankulu %	Herschel %
Cereals and related products	49,36	40,22	60,7
Meat and meat products	8,01	4,61	6,5
Fish	0,27	0,68	0,8
Fats and oils	2,68	3,09	3,7
Milk products and eggs	3,35	4,67	4,6
Vegetables	1,86	7,43	4,1
Fruit and nuts	1,18	1,95	4,1
Sugar and sugar products	22,38	23,03	10,7
Non-alcoholic drinks	5,82	5,30	—
Other foods	2,01	6,01	8,9
Baby foods	3,01	2,95	—
Total expenditure	R83,36	R73,55	R140,40

The diet is qualitatively inadequate rather than quantitatively insufficient, and the high incidence of malnutrition is mainly due to a lack of understanding of the nutritional requirements of humans, especially of children, and a number of traditional customs and beliefs connected with food and nutrition. Investigations in 26 European countries showed that failure to make proper use of available food rather than a lack of food supplies was the root cause of malnutrition.⁵ The same applies to a large extent in rural Black households.

The amount of money spent on food depends upon a number of factors, such as the size of the household, the amount of food which is home-grown or received as *in natura* payment and, since income elasticity of demand for food is low, only to some extent on the *per capita* or total household income. According to the 1970 census figures 97,4% of the Transkei population was resident in rural areas. Furthermore, the social structure of the rural communities is such that food is shared among the members of the community, especially within family groups. In addition to what each household grows in its home garden, members of households with no agricultural rights supply labour to assist those households enjoying agricultural rights. Wages are not paid in cash but in kind. Furthermore, although it is strictly speaking contrary to agricultural policy, it is customary for everybody to have the right to keep livestock. Thus farmers as well as non-farmers obtain at least part of their food requirements from the system of peasant or subsistence agriculture practised. The very inefficient production techniques are followed by equally inefficient storage facilities, with the result that the amount of food consumed is often a small percentage of the food harvested and always an infinitesimal percentage of the production potential.

The increase in the number of shops in the rural areas, the development of transport facilities, and the increased

wages and salaries also affect the expenditure pattern and the dietary pattern. Continuous exposure to Western civilisation also leads to the gradual breakdown of taboos and beliefs. The more extensive use of milk (especially powdered milk), eggs and fish is an example of this.

From the foregoing it is evident that the nutritional status of a household or community is largely the result of three factors, viz. the availability of food, the purchasing power of the household, and the level of education. Agricultural development can affect each of these factors and, therefore, the nutritional status of the population. The effect of agricultural development on each will therefore be briefly examined.

EFFECT OF AGRICULTURAL DEVELOPMENT ON THE AVAILABILITY OF FOOD

Despite the population explosion during the last decade or so, the South African agricultural industry was able to feed the growing population and, in addition to that, to earn valuable foreign exchange through agricultural exports. The food required by the present population of 23,6 million is mostly produced by the approximately 90 000 White farmers in the Republic.

The homelands can as yet still not feed their people. The almost 290 000 Black farmers in the Transkei could not feed the Transkeian *de facto* population of 1,75 million (1970 census). In fact, during a fairly favourable season (1971/72) the Transkei produced an estimated 189 000 metric tons (2,1 million bags) of maize (at an average yield of 3,6 bags/ha), while an estimated 117 000 metric tons (1,3 million bags) had to be imported. Although statistics are incomplete and do not give a true picture of the situation, only 0,65% of the cattle population of 1,2 million in the Transkei was sold by public auction, mainly for export and for consumption in the towns where Whites are the main consumers. On the other hand, an estimated 12,5% of the cattle population died. One is therefore tempted to say that the production and availability of the very important animal protein must also have been pitifully low. However, it is not uncommon among Blacks to consume the meat of animals that have died, and the picture is not as gloomy from a dietetic point of view, although it is rather grim from the hygienic standpoint.

Around 1950, production in the homelands agricultural sector represented only some 5% of agricultural production in the country as a whole, and it was estimated that while total agricultural production in South Africa as a whole increased at an average annual rate of about 4% between 1950 and 1960, the part of it originating in the homelands remained virtually stagnant.⁶

Table II illustrates the degree of dependence of the homelands on food imports from the White sector.

Table III gives an idea of the population composition of the Transkei.

TABLE II. EXPENDITURE PATTERN ON, AND AVERAGE LOCAL PRODUCTION OF FOOD PER BLACK HOUSEHOLD IN THE DISTRICT OF HERSCHEL DURING 1969¹¹

Commodity	Local production		Imports
	Expenditure R	R	
Cereals and related products	85,20	7,90	77,30
Meat and meat products	9,00	23,65*	—
Fish	1,20	—	1,20
Fats, oils and margarine	5,10	—	5,10
Milk and milk products	5,90	2,64	3,26
Vegetables and fruit	5,70	0,24	5,46
Eggs	0,50	0,22	0,28
Sugar and sugar products	15,10	—	15,10
Other foods	12,70	—	12,70
Total food expenditure	140,40	34,65	105,75

* Since a considerable amount of beef was exported on the hoof, it was assumed that the exports would more than compensate for the imports of canned meat, etc.

TABLE III. ESTIMATED POPULATION COMPOSITION OF THE TRANSKEI ACCORDING TO AGE DISTRIBUTION

Age group (years)	Percentage of total population ⁷	No.
0 - 4	13	225 410
5 - 9	18	312 108
10 - 15	18	312 108
16 - 20	10,5	182 063
>20 (adults)	40,5	{ 287 920* 414 322* ⁷
Total		1 733 931†

* Ratio of male : female = ± 41:59.

† 1970 census.

Table IV gives a theoretical calculation of the amount of the various food commodities required annually to feed the population of the Transkei. The calculation is based on the *de facto* Black population of the Transkei according to the 1970 census figures, the age distribution of households according to recent surveys,⁷ and the food requirements for the various age groups given by Maree.⁸

It is of interest to note that an amount of 170 523 tons of maize and maize products is theoretically required in a balanced mixed diet, while the 1971/72 consumption was estimated at 306 000 tons. This illustrates the relative over-consumption of maize and maize products in the Transkei and, probably, in the other homelands. At the same time, although reliable statistics are not available, it becomes quite clear that the Transkei falls far short in the production of meat, dried beans (1971/72 production about 1 350 tons) and vegetables.

The question now arises as to whether the Transkei and the other homelands possess sufficient agricultural potential to feed the people—not only the *de facto* but also the *de jure* population.

TABLE IV. APPROXIMATE ANNUAL REQUIREMENTS OF DIFFERENT FOOD COMMODITIES FOR TRANSKEIAN DE FACTO POPULATION, 1970

Commodity	Requirement (metric tons)
Skim milk powder	31 662
Meat/fish	35 466
Dried beans/peas	28 121
Potatoes	35 466
Fresh vegetables	119 423
Margarine	15 176
Oil	7 130
Brown bread	123 956
Maize meal	121 505
Samp/maize rice	49 018
Sugar	39 050
Coffee/tea	3 717
Salt	6 413

AGRICULTURAL POTENTIAL OF THE HOMELANDS

The Bantu homelands will, after the addition of the land set aside by the Native Trust and Land Act (Act No. 18 of 1936), amount to about 17.7 million ha. Although this would comprise only 13.7% of the total area of the Republic, these areas have a relatively high carrying capacity because of favourable rainfall, climatic and soil conditions. About 75% of the homelands enjoy an annual rainfall of 600 mm compared with only 35% of the Republic having that amount of rain. Of the 10.4 million ha in South Africa with a temperate humid climate, about half, or 5.1 million ha, are in the homelands areas. Furthermore, in the process of consolidation of the homelands, considerable areas of highly-developed and well-preserved White-owned farms will be added to the homelands in exchange for rather depleted and eroded areas.

It was previously calculated that the present Black areas in the Transvaal and Natal could produce sufficient food to provide a diet similar to that of the urban Blacks for 25 million people, or 1.5 times the present total Black population of the Republic. The development of considerable irrigation potential was not taken into account in this estimate.

As far as the Transkei is concerned it was estimated that the annual crop production could be increased to 5.8 million bags of maize, 215 000 bags of grain sorghum and 144 000 bags of legumes.⁹ A study of the agricultural potential of a portion of the Transkei called Fingoland,¹⁰ and comprising about 8% of the total area, showed that with correct land use, the area can yield an annual production of 225 000 tons (2.5 million bags) of maize, 5 040 tons (56 000 bags) of grain sorghum, 7 470 tons (83 000 bags) of beans, 17 500 tons (1 million pockets) of potatoes and 42 300 tons of hay. In addition the area would be capable of carrying 53 000 large stock units (LSU) (1 LSU = 1 beast = 6 sheep) in terms of dairy cattle, 11 000 LSU in terms of beef cattle and 33 000 LSU in terms of sheep and goats.

Considering that the abovementioned production could come from about 8% of the Transkei area, and that the Transkei has considerable irrigation potential ($\pm 10\ 000$ ha have been, or are being, developed), it is clear that agricultural production can be increased considerably.

It is, however, difficult to say how long it is going to take the homelands to develop agriculture to this high standard. Until now the progress has been disappointingly slow. The population growth has been comparatively rapid and indications are that the rate of growth will accelerate. This means that even if increases in production could be achieved, they will have to be higher than the rate of population growth in order to increase the availability of food *per capita*. For the Herschel District it was calculated that, on the grounds of a population growth rate of 3,27%, an elasticity coefficient of demand for food equal to 1,07 and an expected annual increase of the income per household of 2,9%, the demand for food will increase annually by at least 6,37%.¹¹ A sustained rate of increase in agricultural production in the homelands of that order is impossible unless two things happen quickly and on a wide front. Firstly, development will have to be given a very strong push—an explosion, in fact, is necessary—and secondly, population growth will have to be drastically curtailed. Rural development, based on cash cropping, is likely to reduce infant mortality to such a high degree that a net gain *per capita* can only be sustained provided the push is a very powerful one. The danger of stagnation on a higher level or a fall back to a low level equilibrium, is very high indeed. Agricultural development must, therefore, be accompanied by rapid urbanisation and by family planning.¹²

EFFECT OF AGRICULTURAL DEVELOPMENT ON THE PURCHASING POWER OF HOUSEHOLDS

With the homelands far advanced on the road to political independence, it is essential that they develop economically. Economic growth, evidenced by an increase in the gross domestic product (GDP) is necessary for two reasons, viz. to provide for the increase in population so as to maintain the standard of living, and to raise the standard of living.

The contribution of the agricultural sector towards the GDP of the homelands is high percentage-wise, but very low in real terms. Agriculture's contribution towards the GDP of the Transkei has been of the same order as in other developing or economically backward countries, viz. 37% on the average over the 11-year period 1959/60 - 1969/70. If one very poor agricultural year (1968/69) is excluded, the average is 40%. A disturbing aspect is that the subsistence share of the total agricultural contribution has been increasing over the same 11-year period, and amounted to an average of just under 80% while, if the poor year is excluded, it amounts to almost 82%.

Until now there was, as far as the inhabitants of the homelands are concerned, no reason why agriculture in

the homelands should develop, because the advanced White agricultural sector could produce sufficient to supplement the subsistence production in the homelands. The backward economies of the homelands are completely integrated with the advanced economy of the Republic as a whole. The stagnation of agricultural development in the homelands is largely due to this. Horwood¹³ states: 'Had the advanced sector of the economy been dependent on the Reserves (homelands) for food, for example, they would not present the intractable development problem which they have done for so long.'

Owing to the fact that the vast majority of the people reside in the rural areas, their requirements for cash are apparently very low. The opinion expressed by Samuel Butler, that 'all progress is based upon a universal innate desire on the part of every organism to live beyond its income', does not apply to the rural Blacks. The *per capita* income is low and between 40% and 50% of the annual cash expenditure is made on food. The largest single source of income of Transkeian households is from contributions from non-members of the households. Agriculture contributes about 20% to the income. It is estimated that migrant workers send home about 20% of their wages. The recent wage increases should, therefore, result in a greater cash inflow into the Transkei and enhance the purchasing power. However, due to the high adult male dependency burden in the Transkei (i.e. the number of dependents per economically active male between 15 and 64 years of age; for the Transkei the figure based on the *de facto* population is 2,9, i.e. 1 male must support 2,9 other minor dependents), very little saving can be effected and the greater cash inflow will contribute very little to capital formation which is essential for economic growth. It also necessitates the allocation of a large share of the scarce resources to unproductive programmes, e.g. health and social welfare.

As far as the potential contribution of agriculture to the GDP is concerned, the study on the potential of Fingoland¹⁴ showed that the total gross value of agricultural production calculated at prices ruling at the time, and under a system of optimum utilisation of resources, amounted to approximately R17 million. In 1960 the gross value of agricultural production in the whole of the Transkei amounted to R18,7 million. Further, if one considers the additional contributions to the economic activities flowing from the secondary and tertiary sectors following in the wake of such intensive agricultural production, it is evident that agricultural development could increase directly and indirectly the *per capita* income and, therefore, the purchasing power of the population.

It is true that the income elasticity of demand for food is low, and that, as a result, increased levels of income would probably not result in much higher food consumption. The population is, however, not on a full food level and there could thus be a quantitative increase in food consumption. There will, however, be a marked increase in the quality of the diet, which will, from a nutritional point of view, be of great significance.

EFFECT OF AGRICULTURAL DEVELOPMENT ON THE EDUCATIONAL LEVEL OF THE POPULATION

Malnutrition is said to be basically due to poverty, ignorance and environment. Agricultural development strives to do away with poverty and to improve the environment, but the state of both of these is really the result of ignorance. Ignorance, therefore, is the arch-enemy and also the common enemy of all those active in the development of backward communities.

TABLE V. LEVEL OF EDUCATION OF THE POPULATION OF TWO DISTRICTS IN THE TRANSKEI AND ONE DISTRICT IN THE CISKEI

Level of education	Districts		
	Willowvale ⁷ %	Tabankulu ⁷ %	Herschel ¹¹ %
Up to Std 4	39,4	46,8	41,0
Std 5 - 6	11,7	11,4	16,3
Std 7 - 8	2,9	1,5	2,7
Std 9 - 10	0,4	1,0	0,4
Post-school education	0,6	0,8	1,1
No education	45,0	38,5	38,5

Table V indicates the average educational level of the rural Blacks according to surveys.⁷ It is evident that the level of education is generally low. This, together with the fact that Black people are extremely tradition-bound, makes it extremely difficult to bring about rapid and major improvements in attitudes and practices.

Development of human potential is a prerequisite for all development. During the 1972/73 financial year the Transkei spent 35,3% of its total budget on this aim and only 21,9% on income and employment creation. The development of human potential covers a wide field and starts with primary school education, to which was allocated 21,7% of the total budget. The increase in the number of pupils in primary schools showed a growth rate of 4,1% over the period 1964 - 1971.

The importance of school education for human development is obvious. It is, however, of interest to find that school education also promotes agricultural development. A survey in Rhodesia²⁵ revealed that there was a highly significant difference in crop yields, attitudes to irrigation, fertilisation and other agricultural extension issues, when the head woman in a household has had 4 or more years of schooling. Her attitude and opinion carries weight within the household. If she is against something, everybody is against it. If she favours something, she will convince her husband and he will do it. On the other hand, women with less than 1 year's schooling have particularly negative attitudes towards improved agricultural techniques and extension (extension officers and their work). This finding, and the fact that men are frequently away at work, have led to the conviction that modern extension in the Black areas

should primarily be directed to the better-educated women.

For men, education is a less discriminating variable with respect to land use, and it was found that they should have at least 6 years of schooling. Even then the educational level is best considered in combination with that of the wife. With up to 6 years of combined education there was a steady increase in crop yields. From 6 - 8 years the crop yields actually dropped when the male head was at home; it was found that with that degree of education he was maladjusted if he was not away working in the urban area. From 8 years of combined education onwards almost all male heads were away at work, but the head woman was so effective at this stage that crop yields rose and less food was purchased. With a mean combined education of 13,8 years it was found that significantly more couples accepted family planning. The results also showed that to take family planning to the uneducated was having just the opposite effect. Boserup²⁶ said: 'Reports of extension officers . . . give numerous examples of cultivators who refuse to introduce ploughing or other changes suggested by the advisers, with the explicit motivation that this would add too much to the labour of the crop.' The finding of the Rhodesian surveys suggests that this attitude can be dispelled by, of all things, formal education.

The contribution of other instances towards human development cannot be disregarded, however. The object of an agricultural extension service is to help, guide, teach and create awareness among the people. Its ultimate objectives are to help the people to help themselves. To achieve this objective a variety of methods are used. Extension officers are trained before appointment and in-service training is undertaken regularly. Mass media methods, such as radio, press, posters, leaflets and film shows, are employed. Extension officers have demonstration plots. Credit facilities are made available and the co-operative movement is strongly propagated and supported. Marketing facilities are created. Farmers' Associations are formed and the Zenzele Club, a women's organisation, is assisted and guided. Above all, the Government undertakes the physical development of the agricultural land. Despite all these efforts the expected increase in production has not materialised. One reason, no doubt, for this slow progress, is the fact that all these efforts are directed towards uneducated or poorly educated people.

Mention should also be made of the extremely important work of the Health Educators attached to the Department of Health. These officers do a tremendous job at hospitals and clinics and during private visits. In some instances they give their full co-operation to officers of the Department of Agriculture. In the Ciskei,²⁷ for instance, a woman health educator did a magnificent job by popularising the soya bean as part of the diet in preparation for a campaign to popularise the production of the crop.

The relatively slow progress made with increasing agricultural production and improving the nutritional status of the homelands population can, therefore, *not* be ascribed to a shortage of food due to insufficient agricultural potential. It is mainly due to the ignorance of the

rural population, and their customary way of life, as put by Boserup¹⁶: 'Only when very high population densities have been reached will cultivators using the plough have to give up their periods of seasonal freedom; and it is undeniable that many people hesitate to change accustomed methods unless economic incentives are very strong.'

Agricultural development can only be accelerated if progress in education and the creation of economic incentives can be achieved, and the rate of acceleration will depend on the rate of progress in educating people and the rate at which economic incentives will take effect. Agricultural development and improved nutrition are parallel developments—they are both cause and effect.

REFERENCES

1. Van Wyk, J. H. (1967): 'Die fisiese struktuur en landboupotensiaal van die Transkei', D.Sc. (Agric.) thesis, University of Pretoria.
2. Rose, E. F. (1972): *S. Afr. Med. J.*, **46**, 1353.
3. Lubbe, A. M. and Maree, C. M. (1973): *Ibid.*, **47**, 304.
4. Rose, E. F. (1972): *Ibid.*, **46**, 1357.
5. Copping, A. M. (1967): *J. Amer. Dietet. Assoc.*, **53**, 127.
6. Brand, S. S. (1972): 'Agriculture and economic development in Southern Africa', Paper read at Conference on Accelerated Development in Southern Africa, Jan Smuts House, Johannesburg, March 1972.
7. Bureau of Market Research on behalf of the Bureau for Economic Research re Bantu Development, Pretoria (1972): Reports on the socio-economic structure of rural Bantu households in the districts of Tabankulu and Willowvale in the Transkei.
8. Maree, J. G. B. (1973): 'Problems of definition and measurement of the under-utilisation of labour in the traditional rural sector of an economy with migrant labour with particular reference to the Ciskei and Transkei, RSA', M.A. thesis in Development Economics, University of Sussex.
9. Van Wyk, J. H. (1967): *Op. cit.*,¹ p. 234.
10. Geyer, H. J. (1971): 'Fingoland—'n studie in landboupotensiaal', D.Sc. (Agric.) thesis, University of Pretoria.
11. Kempen, P. D. (1972): *Instituut vir Sosiale en Ekonomiese Navorsing, Verslag No. 1.*, bl. 282. Bloemfontein: Universiteit van die Oranje-Vrystaat.
12. Ruthenberg, H. (1972): 'A decade of agricultural development in Tanzania and Kenya—comments of an observer'. Paper read at Conference on Accelerated Development in Southern Africa, Jan Smuts House, Johannesburg, March 1972.
13. Horwood, O. P. F. (1970): *Agrekon*, **9**, 1.
14. Geyer, H. J. (1971): *Op. cit.*,¹⁰ p. 346.
15. Reader, D. H. (1972): *S. Afr. J. Agr. Extension*, **1**, 21.
16. Boserup, quoted by Reader, D. H. (1972): *Ibid.*, **1**, 24, 26.
17. Allan, J. E. A. Senior Professional Officer, Ciskeian Dept of Agriculture and Forestry (1973): Personal communication.