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POVERTY IN THE MIDST OF PLENTY  
PROBLEMS OF CREATING INCOMES  
AND EMPLOYMENT IN BOTSWANA

I. LIVINGSTONE  
R.K. SRIVASTAVA

OCCASIONAL PAPER NO 8

JULY, 1980

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## FOREWORD

As the title of this paper states Botswana faces urgent needs to create employment opportunities for its citizens and to improve income opportunities while at the same time the Government's fiscal means are rapidly growing with revenues from mineral developments. The basic concerns of this paper follow closely the theme developed by Professor Steven Lewis in his 1977 IDM lecture where he discussed "Balanced Development in Resource Rich Countries".

The authors appraise the economic characteristics and potential of Botswana's major productive sectors - cattle, mining, and agriculture - and examine the basic constraints which operate in terms of generating employment opportunities. The paper concludes with an assessment of an arable lands program (ALDEP) and suggest various policy alternatives that could funnel resources towards arable development in order to create employment opportunities and raise the standard of living of the rural poor. The paper is particularly relevant at this time as the Government embarks on implementing NDP V which stresses employment creation and arable agriculture.

The authors assume responsibility for the contents of the paper. This paper will also be published as Occasional paper No. 4., School of Development Studies, University of East Anglia. By this publication the IDM is pleased to assist the distribution of these findings in the BLS region.

James G. Campbell  
Asst. Director.

POVERTY IN THE MIDST OF PLENTY : PROBLEMS OF CREATING INCOMES AND  
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I. Livingstone and R.K. Srivastava

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POVERTY IN THE MIDST OF PLENTY : PROBLEMS OF CREATING INCOMES AND  
EMPLOYMENT IN BOTSWANA.

I. Livingstone and R.K. Srivastava\*

The purpose of this article is diagnostic: to diagnose the main elements of the development problem in Botswana and to present these elements, perhaps with some risk of simplification, in a starker and more coherent form than may have been done hitherto. It is argued that, despite genuine and valuable efforts by the Botswana government at securing wider participation in the benefits of growth, there exist certain basic structural and social factors which make this difficult and which instead generate 'inequality with growth'.

Recent Economic Development

Until comparatively recently Botswana could have been described simply as a 'livestock economy', cattle-raising being the main source of cash income and, for the country, of exports and foreign exchange. At Independence in 1966 the share of agriculture in GDP was 40 per cent, largely due to cattle - keeping, and of mining just one per cent. In 1976-77 agriculture's share was 25 per cent (Table 1.), of which three-

Table 1. Structure of the GDP (Percentages)

	Estimated 1976-77	Forecast 1984-85
Agriculture, fishing, forestry and hunting	25	13
Mining, quarrying and prospecting	12	36
Manufacturing	5	5
Water and electricity	3	3
Construction	6	5
Trade, hotels and restaurants	22	13
Transport and communications	3	2
Finance, insurance, business services, real estate, community and personal services	13	10
General government	11	13
	100	100

Source: Ministry of Finance and Development Planning, Forecast for the National Development Plan (NDP V), September 1979 (mimeo).

\* University of East Anglia and International Labour Office respectively. The authors were members of an IFAD Special Programming Mission to Botswana in September 1979 but this paper has been written in their personal capacities only and does not draw on the work of the mission to any significant extent.

quarters was accounted for by cattle-raising, reflecting the low value and low productivity of arable farming as well as the importance of commercial ranching. Mining, based on diamonds, with some contribution from nickel-copper, had increased its share rapidly to 12 per cent. Botswana was thus described in a World Bank report of 1975 as "a mining-led, rapidly expanding urbanizing economy with a high rate of growth". Certainly Botswana had experienced extremely rapid economic growth after Independence. In the 10 years up to 1976-77 GDP grew at an annual rate of nearly 20 per cent in nominal terms, equivalent to some 15 per cent in real terms.<sup>1</sup>

The increase in mineral production should not, however, be allowed to obscure the tremendous expansion which also occurred in the pastoral economy. It is important to understand the basis of this expansion as the functioning of a pastoral economy (particularly the impact of investment therein) is frequently only partially understood, and trends and permanent changes are generally obscured by periodic droughts and catastrophes.

A pastoral economy, reduced to its essentials, depends upon two complementary inputs (apart from the basic infrastructural input of veterinary services to safeguard health), grass and water supplies. The former, which depends directly on the incidence of rainfall, is useless without the other: but judicious introduction of water supplies in previously unused areas can greatly increase the amount of effective grazing available. In Botswana this is precisely what has occurred: a massive programme of public and private borehole drilling has taken place, permitting expansion of the livestock economy, particularly to the west, as the number of boreholes increased to an estimated 6,800 in 1978. Between the mid-1960's and mid-1970's the area of accessible land approximately doubled and this, alongside the development of commercial ranching, permitted the size of the national herd to double or treble from a rough estimate of 1-1½ million in 1966 to some 3½ million in 1979.<sup>2</sup>

Limits to the geographical extension of livestock production are said to be being neared now, however, with overgrazing in many places, even if systematic investigation of these limits in terms of water availability

and potential grazing has not actually been carried out. However mineral resources have continued to bring more wealth to the country and promise a veritable bonanza in the future. A major new spurt will occur in 1982-83 when a new diamond mine at Jwaneng comes into operation. The mine has been described as being the sort of find that might be expected no more than once in 50 years. From Table 1 it can be seen that the share of mining in GDP could triple to 36 per cent (compared to 12 per cent in 1976-77), while the value of GDP itself may increase by as much as one third in two years.

This will mean a correspondingly great increase in foreign exchange earnings, in a situation which was already very healthy. Botswana's official exchange reserves have increased from P36 million in September, 1976, to P179 million at end - July 1979, and were expected to amount to over 9 months' expenditure on imports by the end of the year. Similarly government revenue can be expected to increase, by about 40 - 45 per cent over 5 years, as indicated in Table 2, due mainly to the increase in mineral revenue of some 130 per cent. In addition to this Botswana, for reasons not unrelated to its strategic importance associated with a location in the middle of South Africa, Zimbabwe, Angola, and Namibia,

Table 2. Estimated Government Revenue and Expenditure  
(Millions of Pula 1979-80 prices)

	1979-80	1984-85
Customs revenue	73.7	84.4
Mineral revenue	63.2	143.4
Other revenue	78.3	80.8
<u>Total</u>	<u>215.2</u>	<u>308.6</u>
Recurrent expenditure	118.5	192.6
Development expenditure	68.7	82.7
Net lending for development	17.2	28.1
<u>Total</u>	<u>204.4</u>	<u>303.4</u>
Budget surplus	+10.8	+5.2

Source: As Table 1.

may be described not just as liquid, but almost awash with offers of foreign assistance. This handy situation exists when Botswana already has virtually universal primary education for its small school-age population, reducing one obvious outlet for spare funds. In 1979, in fact, Botswana was near to financing its own very high rate of investment, equal to 30 per cent of GDP: foreign financial assistance appeared not to be increasing the country's investment effort so much as allowing Botswana to augment its already ample reserves.<sup>3</sup>

This increase in wealth and income is particularly significant when set against the small size of Botswana's population of only 800,000. It produced an average per capita income in 1979 approaching \$800 per annum. The dominance of mineral wealth and the comparative smallness of the population gives Botswana all the characteristics now of an 'oil economy' (see Seers, 1959), a high-value mineral-exploiting activity with few linkages with the rest of the economy and an attendant problem of how to distribute the benefits from such wealth more widely. We could almost go beyond this, referring to the high growth rates already cited, and discuss Botswana as a case of 'growth without development': 'almost' because this would be unfair in the light of genuine efforts at wider development by the Botswana government and outside agencies, particularly under the Accelerated Rural Development Programme (ARDP). However ARDP concentrated particularly on infrastructure (building and construction) in the rural centres and social services (rural clinics and primary schools)<sup>4</sup> rather than generating income opportunities and employment for the population as a whole (Chambers, 1977 see also Chambers and Feldman, 1973). Despite the benefits obtained in this direction, the distribution of income and wealth in Botswana remains highly skewed, and the economic status of certain strongly disadvantaged groups has actually been deteriorating and may continue to do so. It is useful to discuss this economic status first in terms of income and wealth and second in terms of employment opportunities.



Present Distribution of Income and Wealth

Approximately 85 per cent of Botswana's population can be classed as rural, so that the comparatively systematic Rural Income Distribution Survey (RIDS) of 1974-75 covers a large proportion of the population. The Survey reported the median rural household income in 1974 as P630:<sup>5</sup> but while the poorest decile had a mean annual income of only P130, the highest decile received as much as P3,400, 26 times as much. The top 10 per cent of households received almost 40 per cent of total rural income while the bottom 10 per cent received only an estimated 1.5 per cent of income, as shown in Table 3, similarly, the top 5 per cent of

Table 3. The Distribution of Total Rural Income

Percentile Income Group	% Total Income Received	Mean Annual Income (Pula)
Lowest 10%	1.5	129
10 - 20%	2.5	219
20 - 30%	3.4	298
30 - 40%	4.4	385
40 - 50%	5.5	483
50 - 60%	7.1	616
Sub-Total Lowest 60%	24.4	-
60 - 70%	8.9	777
70 - 80%	11.1	970
80 - 90%	16.8	1468
Highest 10%	38.8	3390
Highest 5%	26.2	4485
All Income Groups	100.0	

Notes:

1. Based on Table 2 in "Rural Poverty in Botswana" by C. Colclough and P. Fallon, WEP 10-6/WP26, ILO, Geneva, July 1979.
2. Ratio of mean annual income of highest 10% to lowest 10% - 26.29 times.
3. Highest 5% received 26.2% of total income, while the lowest 60% received 24.4%
4. All data in the RIDS were valued in Rands. In 1976 Botswana introduced its own currency - Pula, and Pula and Rand were at par until mid-September 1979.

Table 4. Distribution of Households by Per Capita Incomes, 1974-75.

Per capita income	No. of households	Percentage
P 0 - 48	6,980	10
48 - 96	28,360	31
96 -192	26,120	29
192 -384	16,740	18
384 -768	8,100	7
P768+	4,230	5
	90,630	100

Source: RIDS - Further Analysis, C.S.O., Statistical Bulletin, March, 1979

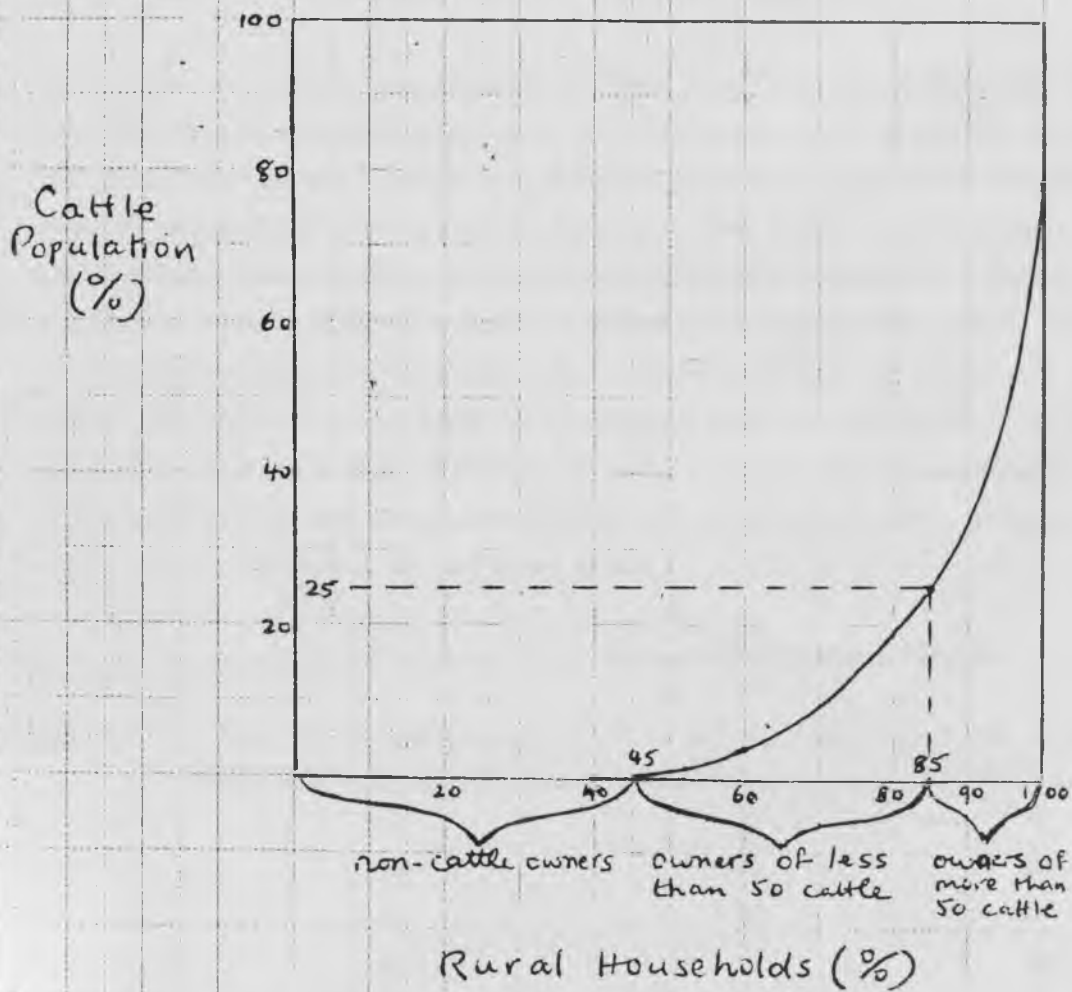
households received a higher share of total income than the bottom 60 per cent. Corresponding information is given in Table 4.

Despite the establishment of a good network of rural health facilities, low levels of health, together with malnutrition, are widespread. Initial results from nutrition surveys indicate that at the end of 1978 some 25 per cent of the pre-school population could be regarded as 'at risk' in nutritional terms, and in July, 1979, a figure of 30 per cent was quoted. Protein - energy malnutrition was estimated to be 19 per cent in some rural areas. Infant mortality is high, with a national average of 122, going up to nearly 200 in remoter areas such as Ngamiland.

Rural incomes and poverty are highly correlated with livestock ownership. Although the rural economy in Botswana may be said to be predominantly pastoral, in 1974, according to the RIDS, about 5 per cent of rural households owned about 50 per cent of the national herd, while about 45 per cent owned no cattle at all. More details are given in Table 5. This shows that 90 per cent of households owned 20 per cent of the cattle and the top one per cent of households 27 per cent of the cattle, the commercial sector included. Table 6, based on information obtained from agricultural surveys, offers supporting evidence while Figure 1 presents a summary of the RIDS data in graphical form.

One factor slightly moderating the skewed distribution of livestock is the prevalent system of mafisa, in which owners place some of their livestock in the care of others who lack or have lost their animals.

Fig. 1. Distribution of cattle ownership in Botswana, 1974/5



Source: derived from RIDS.

Table 5. Distribution of Cattle Holdings 1974-75.

% Households	Cumulative % Households	% Cattle Owned	Cumulative % Cattle Owned
45	45	0.0	0.0
5	50	0.5	0.5
25	75	14.5	15.0
15	90	20.0	35.0
5	95	15.0	50.0
4	99	23.0	73.0
0.6	99.6	10.0	83.0
0.4	100.0	17.0	100.0

Notes: Based on Rural Income Distribution Survey - Further Analysis  
Central Statistical Office, Gaborone, May 1979.

The holder is normally permitted to keep the first calf born and has the right to milk produced, meat from the carcasses and, commonly in Botswana, the right to use the cattle for draught purposes (for which ox teams may also be specifically borrowed or hired). The system would appear to be directed towards offering marginal households a subsistence level of existence rather than to correct inequalities in wealth, since such an arrangement would hardly permit recipients to build up their own cattle herds, whereas it would tend to safeguard that of the donor. It does mean that a distinction needs to be made between the distribution of cattle ownership and the distribution of cattle holdings. But, as Table 6 shows, the difference is not very great.

Table 6. Proportion of Agricultural Households without Cattle.

Year	No. of Agricultural Households ('000)	% Not Owning Cattle	% Not Holding Cattle
1968-69	48	30	29
1970-71	52	25	23
1971-72	64	32	30
1974-75	80	37	32
1975-76	80	39	36

Notes: The estimate of agricultural households is derived from the surveys of agriculture. The estimates of households not owning or holding cattle are approximate, and the difference between them represents the share of the "mafisa system".

Based on C. Colclough and S. McCarthy: The Political Economy of Botswana - A Study of Growth and Distribution, Oxford, forthcoming.

The data available also shows clearly that poorer households are more likely to own goats and sheep than cattle. Thus Table 7 shows (row 1) 45 per cent of households lack cattle and (column 1) only 21

Table 7. Number of Rural Households by Cattle Owned and Small Stock Owned, 1974-75 (no.\percent)

Holding of of cattle	Holding of small stock	0	1 - 10	11 - 80	81 +	Total
0		18.1 16,270	15.4 13,790	11.3 10,120	0.3 230	45.0 40,410
	1 - 10	1.2 1,100	8.5 7,610	10.3 9,260	0.1 90	20.2 18,160
	11 - 80	1.7 1,510	5.9 5,260	22.1 19,810	1.8 1,660	31.4 28,230
	81 +	0.1 120	0.4 370	1.4 1,300	1.4 1,240	3.4 3,020
	Total	21.4 19,190	30.1 27,040	45.1 40,480	3.6 3,220	100 89,820

Source: Adapted from RIDS - Further Analysis, C.S.O., Gaborone, May 1979.

per cent lack small stock. In addition (row 1) nearly 27 per cent of households own no cattle but have between 1 and 80 small stock, whereas only 3 per cent of households who have no small stock possess cattle (column 1).

#### Historical Background to Livestock Ownership

Three factors may be identified as responsible for generating inequalities in livestock ownership. First, entrepreneurs may enter the industry 'at the top' as large-scale commercial ranchers or use savings/credit obtained elsewhere to initiate relatively large herds. The growth of commercial livestock production in Botswana occurred particularly on a number of large modern ranches owned by freehold farmers. These owned only 3 per cent of the land and 14 per cent of the national herd in 1975 but supplied roughly half of the cattle slaughtered by the Botswana Meat Commission, though in part this reflects their role in finishing cattle from a very much larger number

of semi - traditional farmers. These farms, located in the Tuli Block in the northeast, the Mologo Farms near the southern border, and the Ghanzi Block in the far west, are owned principally by white farmers (some of whom are Botswana citizens) and some wealthy Batswana, including civil servants. This aspect of 'entry at the top' is not merely recent, since Roe (1980, p.27) points out (referring back to Parsons, 1977, p.120 and Schapera, 1943, pp. 218-9) that

"Cattle ownership was traditionally tied to representatives and close associates of the tribal chieftaincy along with, somewhat later, a minority of entrepreneurs, such as school teachers and government employees, who invested their wages into cattle holdings."

Apart from this element, secondly, it is likely that a pastoral society in which land is communal (with no institutional limit to an individual's access to grazing) shows a natural tendency to generate inequality of holding. This is because a large herd (especially if the owner can divide his herd geographically) has a better chance of surviving droughts and other hazards and because larger owners are in a better position to replenish their herds by natural process or by recourse to the market. Roe states (1980, p.20) that

"There is evidence that the drought of the 1960's increased the skewed distribution of livestock holdings among the Batswana, that is, those with small herds lost disproportionately more of their livestock than owners of larger herds (Campbell, 1979, p.108, Kooijman, 1978, p.78). It is highly probable that this dynamic was at work in the devastating drought of the 1930's and explains partly the dramatic increase in the number of migrant labourers during that time"

and again (p.27)

"Whatever gain in livestock numbers the small herder managed to acquire was probably wiped out for the father in the drought of the 1930's and for the son in the drought of the 1960's"

In other words periodic drought hits the small herder hardest and keeps him small, rather than periodically reducing the larger herds in cyclical fashion to maintain some sort of equilibrium, as often suggested in the literature on this subject. Livestock accumulation may be seen as a 'ladder', with small stock owners at the bottom and large cattle - keepers at the upper end, in which those successful in the 'game' against natural hazards move up and those unsuccessful down and perhaps off the ladder altogether. Small stock, which reproduce more rapidly and are

more resistant to drought, are particularly important in building up the minimum 'stakes' and can be progressively converted to acquire a small cattle herd. However in this game success is likely to breed success, and vice versa, for the reasons suggested, and thus generate inequality of holding. <sup>6</sup>

The third factor is that to an important extent the expansion of cattle - raising in Botswana has been associated with investment in water supplies, particularly boreholes, which because of its high capital requirement, has been the preserve of larger owners. Roe states (1980, p.7, see originally Ronald, 1972, p.4) that

" the number of private boreholes and cattle posts increased considerably over time, thereby creating a situation where relatively larger herds had access to fairly permanent water supplies, while the smaller herds of poor stockholders were left to communal water sources that were traditionally highly susceptible to drought stress and attendant overgrazing."

The cost of borehole drilling (exclusive of equipping) was estimated to be between £950 and £1,325 in 1960 (Morse, 1960, p.38), but it has always been high, the Pim Report (1933, p.186) estimating the average cost of a borehole in 1932 to be around £300. Hence from the very beginning

"... the cost of sinking a well, let alone a borehole, was so prohibitive that only the very wealthy could afford a well for private use; the provision for communal use had to be funded either through tribal treasuries or by syndicates of large livestock owners" (Roe, 1980, p.14).

and Chief Tshekedi argued before the Pim Commission that

"it was not possible for a man owning 40 head of cattle to sink a water-hole (well), the expenses would be too high for him."

and yet

"... enough wealth existed in the Ngwato area for there to have been at least 774 wells and boreholes there in 1932." (Roe, p.14).

Conflicting estimates exist of the cumulative number of boreholes drilled up to 1960, as shown in Table 8. However the table suggests a figure in the range 1,500 to 3,000 for the number of publicly and privately constructed boreholes up to 1960. After 1960 there was an acceleration in activity and in the short period 1964-66, for example, about 1,100

Table 8. Estimates of Boreholes Drilled : Bechuanaland Protectorate  
 (Figures in parentheses are for successful boreholes.)

Director, Geological Survey.

Morse Commission

Campbell

	Government	Private	Total
1929-59	1152 (662)	1146 (823)	2298 (1485)
1929-59			(1485)

	Government	Private	Total
1946-56	414 (220)	(395)	(615)
1956-60	437 (270)	(220)	(490)
1946-60	(490)	(615)	(1105)

	Government & Private	Total
Up to 1954		(1350)
1955-60		(1700)
Up to 1960		(3050)

Source: Roe, 1980



private boreholes were sunk, many of these in the sandveld areas (Campbell, 1979, pp.99-104). Roe states (p.16) that

"By 1965, a transformation had occurred in the role of water provision vis-a-vis livestock production in the Protectorate: livestock water development was largely being focussed in sandveld areas by private livestock holders, where their ability to open up these areas drew heavily from the government experience of over a quarter of a century of borehole drilling in the Kalahari as a means of opening up the desert to stock routes and ranches."

Taking the period up to Independence,

"The general trend through the colonial period appears to have been one of an increasingly unequal distribution of holdings." (p.7)...

"... by becoming part and parcel of the development of the Protectorate's livestock sector, borehole drilling and ownership became both a consequence and cause of an increasingly skewed distribution of livestock holdings. Drilling was feasible only if the livestock sector was viable and conversely, the growth of livestock numbers in the country was primarily a function of the increasing number of boreholes there." (p.17).

The process described above continued and perhaps even gained momentum after Independence, apart from a temporary freeze which had to be instituted in February, 1974 to permit closer assessment of the effects on the water table and of the implications for land use planning. By that time, as already mentioned, nearly 7,000 boreholes were in existence.

There is some uncertainty as to what ownership of a borehole implies regarding access to land where the range is communal. It is not easy for individuals or syndicates operating boreholes to prevent general access to the water source and the presence of traditional water sources in the vicinity open to all would bring competition for grazing. However, recent figures gave sources of water as 61 per cent boreholes, 11 per cent small dams, and only 28 per cent traditional sources (pans, wells etc.). And ownership of a borehole appears to produce de facto ownership of the surrounding range. Thus a 1975 World Bank document states that

"The Government's present practice of awarding water rights and approving the establishment of boreholes on a "first-come, first-served" basis contributes to the skewed distribution of resources and incomes in the ranching sector, since allocation of water confers a de facto right over the surrounding grazing lands. A more equitable situation could be achieved if, for instance, priority of water rights and government assistance were given to small cattle farmers combined in group ranches or syndicates".

Apart from traditional sources, smaller livestock - keepers may have access to District Council boreholes and have the option of forming syndicates. The latter were an important medium for tribal borehole drilling as long ago as the 1930's among the Bakgatla (Kooijman, 1978, pp. 73-4). However the syndicates themselves are likely to be of medium-to-large owners and District Council boreholes may be leased to such syndicates, on a subsidized basis, rather than open to the 'general public', because of high maintenance costs.

This section cannot be concluded without a reference to the Tribal Grazing Land Policy (TGLP) which was launched by the Government's Paper No.2 of 1975. This was an ambitious and well-intended attempt to reallocate grazing land and increase livestock production at the same time as improving range management practices. Under the policy the range was divided into three categories, communal land, commercial land and reserved land. Larger livestock owners are encouraged to leave the communal areas, increasing commercial production and at the same time easing overgrazing and leaving more space for smaller owners in the communal areas. Thus smaller as well as larger livestock - keepers would benefit.

It is doubtful whether the actual effects have been those anticipated. The main financial assistance granted, including subsidized water consumption, has been to those who moved to the commercial land, i.e. the larger owners. To some extent, also, TGLP has operated as an 'enclosure movement' in which sections of the communal range may be fenced off and transferred to large livestock - owners. More generally, it is not certain exactly how the land allocation process under TGLP is working out. It has become clear that the public is very far from

being fully aware of its rights and that there is as yet no general programme of land adjudication and regulation (Ministry of Agriculture, 1978). Moreover livestock-keepers transferring to the commercial areas were simultaneously maintaining a herd in the communal areas, in many cases, or even sending part of the increase in their cattle wealth deriving from access to commercial grazing land back to the communal land, thus denying the remaining smaller livestock-owners of much of the anticipated benefit arising out of transfers. Also, the TGLP does nothing to help those who do not possess cattle to obtain these and more generally has been criticised as representing a purely 'livestock' approach, not covering the full variety of economic activities which are carried on in the areas concerned.<sup>7</sup> Indeed, the approach has been narrower than this, since it largely excludes sheep and goats, which are relatively more important for smaller livestock-keepers. There may also have been a negative impact on the mafisa system. Finally, referring back to the 'livestock ladder' discussed earlier TGLP may operate to reduce the risks particularly of the larger owners and those who have been most successful in the game against nature, reinforcing and making more permanent the divisions identified.

#### Basic Factors Limiting the Spread of Incomes and Employment

As suggested above, the rapid real rates of growth experienced in Botswana over the last two decades or more could nevertheless be described as 'growth without development': this despite genuine and continuing efforts on the part of government to secure wider participation in the benefits of growth. The reason lies in certain basic factors which limit the spread of income and employment opportunities in Botswana. Briefly these are:

1. Neither of the two main economic activities, mining and cattle-raising, are labour-intensive. Mining is capital-intensive and livestock-keeping land-intensive, involving economies of scale in herding which reduce labour requirements. Thus neither of the two activities create very much employment. In fact livestock-keeping in some areas already has been competitive for land with arable farming, reducing the scope for the alternatives, much more labour-intensive agricultural occupation: to that extent it may actually become employment-destroying. As we shall see, this aspect is likely to become increasingly important.

2. Neither of the two leading activities have so far had important linkages or multiplier effects,<sup>8</sup> although they both earn foreign exchange and mining, in particular, generates government revenue which can be used for development. Moreover, in addition to the effect on arable agriculture just mentioned, the expansion of the livestock sector has made serious inroads into the traditional hunting and gathering economy, another backwash effect. The low multiplier effect is due to the inequality of wealth and income in the livestock sector together with a high marginal propensity to consume imported goods.

3. This is related to the natural tendency hypothesised above for a traditional pastoral livestock system to generate inequality of holdings. This tendency has been aggravated in Botswana by the dependence of the expansion of livestock activity upon expensive capital inputs for water supply, favouring larger stock holders and commercial ranchers, and perhaps inadvertently by the official Tribal Grazing Land Policy.

4. Development of secondary and tertiary sectors, particularly the 'informal sector' so important in its effect on the real economic welfare of citizens in most African countries, has been noticeably limited in Botswana (see Livingstone, 1980), for a number of reasons.

The most important of these is competition from cheap South African goods which, together with the small size of the domestic market (small population X low income per head), has restricted manufacturing possibilities historically<sup>9</sup> and in 1976-77 to 5 per cent of GDP. Apart from a marked dearth of rural (and urban) artisans, lack of local entrepreneurship and the absence of an immigrant trading class like the East African Asians has meant a less effective and more expensive trading network for produce-buying and the distribution of retail goods. A few expatriate-owned stores stocking a wide range of goods tend to dominate retail distribution in the small townships.

The Marketing Board (BAMB) has relatively few buying points for produce outside the main townships, and the cooperative movements lack any extensive or effective organisation, particularly in the less accessible parts of the country.

These factors worsen the rural-urban terms of trade, reduce real incomes, and make life harder for the mass of the population in the rural areas. At the same time, although a process of rural-urban

migration is under way, there is little or no industry in Botswana to provide a core or productive foundation for urban centres: hence the prospects for urban employment, even for informal sector employment (since this depends in part on a core of formal sector industries), are very poor, compared to other African countries.

5. Hence the majority of the population are left to obtain a livelihood in the circumscribed areas which have some potential for cultivation, engaged in low-productivity arable farming, mainly for subsistence.

While peasant farmers elsewhere in Africa have been able to obtain money income through the successful production of cash crops for export, the main cash 'crop' in Botswana has been cattle and their products, where larger stockholders have dominated.

Even if small-scale producers of maize and sorghum, the main food crops in Botswana, are able to obtain a marketable surplus, prices are again kept down by competition from cheap imported grain from South Africa (Table 9) with which only the freehold and other farmers operating on a larger scale are comfortable.

A consequence of the structure described above is that the economy is an extremely open one, with imports equal to 67 per cent of GDP in 1975 and exports 45 per cent. The latter figure will increase considerably over the next few years. While minerals and commercial livestock production are oriented to the export market, manufactured goods have largely to be imported, mainly, because of transport advantage, from South Africa. Beyond this, the very low productivity of most arable agriculture means that a substantial food deficit (excluding meat) exists which requires very large imports and use of foreign exchange.

The export - import position is one important element (investment is another) in the dependency situation, particularly vis-a-vis South Africa, in which Botswana finds itself, directly affecting opportunities for income and employment creation.

Table 9. Imports and Exports of Selected Agricultural Commodities 1974-77

	<u>Imports</u>							
	<u>(c.i.f. and duty inclusive)</u>							
	1974	1975	1976	1977	1974	1975	1976	1977
	<u>(units of account)</u>							
Total Cereals (grain)	540,604	640,686	1,113,221	2,396,047	133,166	904,229	340,534	129,548
Maize	--	--	662,102	1,147,806	--	--	253,404	67,761
Wheat	--	--	3,167	4,882	--	--	16,500	53,132
Sorghum	--	--	123,097	694,598	--	--	52,431	7,679
Milled Cereals	3,971,791	5,047,688	6,759,042	10,212,876	15,901	10,792	23,139	129,196
Wheat flour	--	--	2,320,100	3,479,543	--	--	7,167	0
Maize: flour & stamped	--	--	3,841,846	6,189,282	--	--	684	10,059
Dairy Produce			2,263,554	3,195,131			3,108	7,367
Vegetables	522,989	906,577	1,071,095	1,353,451	604,914	702,570	602,136	248,206
Fruit and nuts	311,885	425,288	579,548	745,932	9,069	66,643	15,291	1,664
Sugar and confections	3,034,901	3,666,884	4,671,345	6,064,432	1,094	138	1,073	11,069
Poultry and eggs	--	--	497,251	657,075	--	--	0	50

Source: External Trade Statistics, 1977, Gaborone

(Prior to the end of April 1977, the unit of account was equal to P1.00; subsequently it has been equal to P.096).

### Employment Prospects

Employment prospects need, moreover, to be seen against increasing population size. At the present rate of growth of 3 per cent, population in Botswana could double in 22 years. If this occurred the economy in 1991 would need to support 557,000 more people than in 1971, an increase of 89 per cent. This is shown in Table 10. Tables 11 and 12 give estimates of possible increases in employment in the formal sector

Table 10. Twenty-year Population Projection for Botswana.

	1971	1991	Increase 1971 - 1991 (per cent)
Total population ('000)	623	1180	89
Share of urban population (per cent)	10	26	

Source: Ministry of Finance and Development Planning.

and in agriculture and the rural and urban informal sectors over the period 1979 to 1984. The estimates are based on two alternative assumptions of policy. In the more conservative assumption, the continuation of current policies is implied with only modest changes in the structure of sectoral activities. These changes accordingly involve small changes in employment as indicated below. However, the more optimistic assumptions would require greater decentralisation, dynamisation of the rural population, allocation of funds outside the government-controlled system to rural industry, trade and housing, and the break-up of free-hold farms. These suggest nil increases in employment on freehold farms, in livestock farming (with overgrazing already in many areas) and in hunting and gathering (which sector might even be expected to shrink in size), and an increase of only 2,000 in manufacturing out of total increases of some 76,000. The government sector, having grown in size very rapidly already in the period 1974-79, would again make

Table 11. Estimates of Formal Sector Employment, 1974-84

	1974		1979		1984		Increase 1979-84		Proportion of increase 1979-84	
	No.	%	No.	(a)	%	(b)	(a)	(b)	(a)	(b)
Household farms	4,150	-	4,300	4,300		6,800	0	2,500	0	3.7
Mining and quarrying	4,100	-	5,100	7,900		8,500	2,800	3,400	9.2	8.1
Manufacturing	3,500	-	6,500	8,500		9,600	2,000	3,100	6.2	7.4
Electricity and water	525	-	1,200	1,700		2,000	500	800	1.2	2.1
Construction	6,075	-	9,800	13,700		15,000	3,200	5,200	13.4	13.0
Trade	9,400	-	13,400	18,000		20,000	5,600	7,600	12.4	12.0
Transport and communications	1,050	-	2,500	3,300		3,300	800	1,100	2.8	2.8
Other services	3,425	-	5,700	8,000		9,000	2,300	3,300	8.2	8.1
Total, excluding government	35,925	70	47,500	65,400	61	92,400	17,900	27,000	62	62.5
Government	15,675	30	31,000	42,000	39	44,000	11,000	13,000	38	30.5
Total	51,600	100	78,500	107,400	100	136,400	28,900	40,000	100	100

Note: Estimates for 1974 are from Statistical Bulletin, C.S.O. June 1979  
 Estimates for 1979 and 1984 have been made on the basis of alternative  
 assumptions (see text).

Table 12. Estimates of Employment in Agriculture and Informal Sector  
 1979 - 1984.

Sector	1979	1984	Increase 1979 - 1984
Informal urban	14,000	24,000	10,000
Informal rural	19,000	25,000	6,000
Livestock farming	60,000	60,000	0
Arable farming	35,000	60,000	25,000
Hunting/gathering	5,500	5,500	0
Domestic service	12,200	18,400	6,200
Total	145,700	193,000	47,200

Note: These estimates are based on the conservative assumptions (see text).  
 The division between formal and informal sector activities in Botswana  
 is difficult because of continuous interchange between them.



a substantial contribution, 11,000, to the increase. But the major increases would be in the informal sector, 16,000, and in the 'residual employer', arable farming, 25,000.

These estimates are extremely shaky, particularly the division between livestock farming and arable farming in Table 12, which division is bound to be arbitrary because of the interdependence of livestock - keeping and arable farming. The figures do make the important points that the main income earners, mining and cattle-raising, will provide very little additional employment; that little assistance can be expected from manufacturing; that a very large number of people will have to be absorbed into the informal sector, rural and urban, into trade, and into domestic service where income opportunities are uncertain; and that the main hope for the employment of the large additional workforce which will be 'coming on to the market' lies with the sector in which a very large segment of the population is already engaged, arable agriculture. The need to develop arable agriculture as the main source of new employment is already well recognised by the Botswana government. The difficulty is to provide adequate and reliable income opportunity in this sector in which productivity is at present extremely low. We need now to examine what the possibilities might be both for improving productivity in agriculture and absorbing an increasing number of farm households.

#### Origins of Poverty and Inequality in Arable Farming

The two most important factors affecting farm productivity for the large majority of Botswana farmers are (1) access to draught power, and (2) the physical separation between villages, lands and cattle posts, which affects the management of arable farming.

The most important if not generally recognised feature of arable farming in Botswana is that it is basically extensive in nature, rather than intensive, due to the low average productivity of the land, vulnerability to drought, and unresponsiveness to fertilizer application. Without mechanisation of any sort and using only the hoe, labour availability imposes a severe constraint on the number of hectares planted

and thus total farm output and household food supply. Ox ploughing with one team can comfortably increase this to 6 hectares or more and the availability of draught oxen becomes crucial. Here inequality in livestock ownership links across to inequality of opportunity in arable farming: since the RIDS reported that in 1974 about 45 per cent of rural households owned no cattle at all, it is likely that a much larger proportion did not have available their own ox teams. Table 7 suggests 65 per cent had 10 animals or less, whereas perhaps 25 would be needed to maintain an ox team of six. Oland and Alverson (1978) estimated that between 30 and 40 per cent of farmers lacked demand rights of any kind to cattle for draught power. The situation is eased somewhat by the possibility of borrowing or hiring oxen: thus 90 per cent of farmers covered by the last agricultural survey ploughed with oxen although only 38 per cent ploughed exclusively with their own team. The Study of Constraints (Ministry of Agriculture, 1974, p.25) revealed access to draught power to be one of three main factors (the others were lack of rain and lack of seed) affecting farmers' decisions not to plant larger areas. These areas are generally small: according to the Agricultural Survey of 1971-72 60 per cent of farming families planted less than 4 hectares, where average grain crops yields are as low as 200 to 300 kg per hectare, falling to very much lower levels in bad years.

This is shown in Table 13, which also reveals the considerable degree of rural stratification related in part at least to this factor. Thus the top 10 per cent of farm holders planted 34 per cent of the land area and the bottom 34 per cent just over 8 per cent of the land area, the latter each planting less than 2 hectares.

Even those with their own cattle are at the mercy of the elements: the usual practice is to start cultivating with the first rain, covering as large a patch as possible before the land dries out again, expanding the area progressively with further instalments of rain. Obviously those who, worse still, have to wait upon others for their opportunity to plough, obtaining only second or third chances of utilizing the rains, will achieve very much smaller hectarages and, due to poorer timing, lower yields. This will be worse, in bad years when 'at the end of the queue' there may be no more rains to utilize.

Table 13. Distribution of Agricultural Holders by Hectare Planted 1971-72.

Hectares planted	Holders (000)	Hectares (000)	Percentages	
			Holders	Hectares
0	3.5	0	5.5 )	0 )
-2	17.9	21.1	28.2 )	8.2 )
2-4	17.6	49.3	27.6 )	19.1 )
4-6	11.6	55.2	18.2 )	21.4 )
6-8	6.5	43.8	10.1 )	17.0 )
8-10	3.6	32.1	5.7 )	12.0 )
10-20	2.5	37.9	3.9 )	14.7 )
20-40	0.3	6.3	0.5 )	2.5 )
40+	0.2	12.3	0.3 )	4.7 )
Total	64.7	258.1	100.0	100.0

Source: Agricultural Survey 1971-72, p.30.

In response to this severe land preparation constraint an interesting system of what is rather inaccurately described as "sharecropping" has developed. This may involve either tractors or ox-plough teams with or without planters and cultivators as supplementary equipment and is a means of spreading overhead costs. The practice is fairly significant in certain parts of the Hardveld.

It is not, in fact, sharecropping in the traditional sense, under which a small tenant cultivates the land of the large owner and makes a proportionate payment in kind to him: rather the reverse. Here it is the tractor owner, say, who seeks additional land and rents a major piece of land allocated to a small owner, carrying out more advanced farm operations on this portion. The tractor owner may obtain as much as three-quarters of the product from this portion, paying the other quarter in kind to the small farmer.

The origin of the transaction may lie in an initial excess allocation of land to the smaller owner (i.e. it may be a means of getting around the restrictiveness of the Land Board allocations) or in the lack of means available to the small farmer to plant and cultivate his or her land. 'Sharecropping' is thus very much a second best solution.

In the former case the tractor owner is using land which may not be used at the moment but may be needed for more equitable distribution some time in the future. In the second case this alternative to providing the owner with the necessary means of utilizing his own land may mean his impoverishment.<sup>10</sup>

The unusual division in Botswana between major/minor villages, "lands" and cattle posts referred to earlier, with circular migration between the three, may have both general and specific effects on agricultural productivity. The general one is associated with loss of interest (including incentive to invest) and managerial effectiveness as a result of living away from the lands areas for substantial parts of the year. The specific effects are inability to take immediate advantage of the first rain (small farmers with oxen may be as much as two days walk from the lands, while those with tractors can drive over immediately); and, most important, inability to adopt winter or autumn ploughing rather than simple spring ploughing. Land ploughed ahead of the 'spring' rains are able to absorb the rain as it arrives, reducing run-off (and erosion) and thus making maximum use of the rains. This benefits both area and yield, for in bad years the vast majority of farmers who are only able to 'spring plough' may obtain no output at all. The most incisive aspect of poverty in Botswana may in fact not be the low level of subsistence income so much as its unreliability and low level or even absence in bad years. Unfortunately most farmers cannot be resident at the lands through the year and at these other critical times, because of the lack of water for either domestic use or for watering stock.<sup>11</sup> This factor is a major source of inequality as well as of poverty.

As stated above, average grain yields in Botswana are of the order of 200 to 300 kg, with lower yields in bad years. Farming households are frequently in a position where they need to supplement their own subsistence production with food obtained in other ways. Table 14 shows that the sale of livestock is the most important means of doing this, but families may depend on food or money obtained from relatives, or remittances from migrant members of the household; or may work for food (a government scheme) or for other farmers engaged in either arable or livestock activities. One significant point about this table

Table 14. Means of Obtaining Food in Case of Shortfall in Household Production.

Supplementary Food Source	Frequency of sufficient production				Total
	Every year	Most years	Infrequently	Never	
Sell stock	45.4	54.4	26.7	18.2	25.2
Live with relatives	4.6	4.8	11.5	13.9	12.0
Ask food from others	4.2	6.9	11.5	13.4	11.8
Money sent by family member	17.6	8.4	11.6	9.7	10.9
Borrow money from relatives	13.4	5.5	9.1	7.1	8.3
Food-for-work	4.6	9.8	11.0	13.1	11.5
Work on land or crops of others	-	5.1	5.0	8.1	6.0
Work with others' livestock	-	-	1.4	1.7	1.4
Work in mines	4.6	0.5	5.6	6.6	5.7
Other (misc.)	5.5	4.8	6.7	8.0	7.1
Total %	100.0	100.0	100.0	100.0	100.0
No. of responses	2,160	4,190	65,050	37,370	108,770

Source: Ministry of Agriculture, 1974, P.52.

is that it is the households who have 'sufficient' production of their own every year or most years who make the greatest use of livestock sales to pay for supplementary food purchases. The poorest households in terms of grain production are not able to do this to the same extent, and are forced to look for work much more.

#### Female - Headed Households

The movement of men into the South African mines and into the urban areas of Botswana has had profound social and economic effects on Botswana. Since about 40 per cent of rural households are temporarily or permanently without adult men, women are the effective head of household for a very large proportion of rural families:<sup>12</sup> so much so that the term 'female - headed household' is practically an every-day term among social scientists and statisticians in Botswana. Their numbers

may indeed be too large to be explained only in terms of migration to the mines. A related statistic is that in the working age groups women outnumber men by a ratio of 14 to 10.

As observed above, poverty in arable agriculture stems particularly from lack of access to draught power. A large majority of female-headed households fall into this category, since three-quarters of them own no cattle, as compared to only one-third of male-headed households. In other words the statistic quoted earlier of 45 per cent rural households without cattle at all is heavily weighted by the large proportion of female-headed households in that position. The same source (RIDS) shows that those that did have cattle apparently had only half as many as male-headed families.

This lack of livestock is partly the consequence of the traditionally distinct agricultural roles played by men and women (cattle-keeping being a male role), which tradition imposes other social and economic handicaps on these households. The effect is that the households are deprived of both draught power and male labour for clearing and ploughing. Women thus have to rely on male relatives to do their ploughing, leading to late ploughing, low acreages and low productivity, and failure to plough at all. Apparently about 40 per cent of female-headed families fail to plough in any one year compared to 20 per cent (still high!) for male-headed households. RIDS also showed that female-headed households on average ploughed only two-thirds of the area ploughed by households which had male heads but no male present during the ploughing season.

Another factor affecting the incomes of female-headed households is lack of the same access to employment either in the rural areas or in the urban sector. Although not a homogeneous group, the households headed by women received incomes which were on average less than half those received by male-headed households.

It might have been expected that female-headed households with husbands away in the mines or formal sector employment would have been comparatively well off, due to the receipt of remittances and to the possibility of investing accumulated savings in livestock in order to begin to climb up the scale of livestock, and wealth, ownership.

Certainly a good number of former mine employees have made this sort of transition. But this assumes much more stable household ties than probably exists; may exaggerate the size of average annual remittances per household; underestimate the very long period of time spent away, affecting the interest in farm investment; and exaggerate the extent of wise use of accumulated funds by returning workers.

Female-headed households are widely accepted as a target group of rural poor. Devising effective means of assistance is obviously a problem, however. The crucial thing would appear to be to find some means of providing draught power, either by credit for the acquisition of livestock or by providing cheap government ploughing services. Without draught power to overcome the basic labour constraint the provision of other inputs would not be worth considering. The use of donkey draught has been mentioned, donkeys being easier to control and manage.

#### Remote Area Dwellers in Botswana

The major disadvantaged group in Botswana consists of the so-called Remote Area Dwellers (RADS). These include the Basarwa or 'Bushmen' who have traditionally been hunters and gatherers but also a mixed group of Bakgalagadi, Bamangwato, Bakalanga and Bahero, occupying areas of low population density. Together they could account for some 50,000 out of a population of 800,000. Together with the Basarwa the latter have been regarded in the past as inferior and historically formed a 'malata' or servile class with restricted entitlement to cattle and have often been used as domestic servants, as herdsmen, particularly, and also as supplementary labour for cultivation. The Bakgalagadi tribal group remains under the supervision of Tswana chiefs.

Until a few centuries ago the Basarwa lived all over Southern Africa, especially in what is now the Republic of South Africa, but they retreated progressively in the face of the incoming agriculturalist with stronger and more aggressive social systems and of competition for communal land, traditionally used by the hunter/gatherers, from livestock keepers. About half of the surviving estimated 55,000 Bushmen of Southern Africa now live within Botswana, the remainder being nearby in Eastern Namibia and Southern Angola.

There is a tendency in Botswana to see the 'Basarwa problem' as a social and cultural one and therefore relatively intractable. Certainly according to a social anthropologist recently working in the area, the Bushmen, as a result of their past isolation from other groups and independent languages, have never developed a strong self-image of themselves or strong cultural identities, so that they have generally failed to defend themselves, their environment, their culture or way of life with any aggressiveness. (Wily, 1977). However, the origin of the 'Basarwa problem' clearly lies in the steady erosion of the hunting/gathering economy, which must clearly have been greatly accelerated in the last two decades with the extension of grazing areas westward. And the common suggestion that Basarwa are not 'economic men' and are incapable of effective management of resources is not entirely consistent with the evidence: a significant number have made good progress after settling in Ngamiland, where they are cultivating and keeping livestock; substantial numbers living as 'squatter farmers' in the Ghanzi freehold block do own significant numbers of large and small stock, but are hampered by lack of land for expansion; a third group work in different places, particularly at cattle posts, as wage labourers, and as long - distance cattle - drovers, indicating a desire as well as need to participate in the money economy. And if we include the RADS in the very substantial portion of rural households in Botswana who lack the draught power required for effective arable farming, it may be noted that many Basarwa and similar groups have experience of donkey draught. It should be noted, moreover, that hunting and gathering are not simply a 'way of life', impervious to economic considerations: resort to this mode appears to increase when the limited amount of arable crops fail, worsening the permanent shortage of food.

Efforts to assist have been made by the Ministry of Lands and Local Government through a number of projects, but these have been rather piecemeal. Current efforts at assistance are through the vehicle of the Remote Area Development Programme (RADP), which began as the much more limited 'Bushmen Development Project' before being incorporated into the National Development Plan early in 1975. Apart from some specific settlement schemes, the object of the programme is to take fuller account of these groups in land use planning exercises, as has been done in



Kgalagadi and Ghanzi. In some cases a 'communal service centre strategy' has been adopted whereby reserved areas are set aside for the use of defined groups of RADS and provided with basic services. In designated 'Wildlife Management Areas' (WMA's), RADS may be permitted to co-exist with the wildlife.

However from what has just been said above it is necessary to recognise (1) that several categories should be distinguished as regards present capacity to manage resources is concerned, some being more ready to participate in settled arable farming or to manage livestock than others, and (2) that for a large proportion the most fundamental problem is that of access to resources. Protection of Basarwa, along with wildlife in the WMA's, supported by Communal Service Centres, though highly desirable, clearly only goes a little way in this direction.

Weaknesses in the management of resources should not be considered a valid argument against a development effort in favour of economically weak groups. Since these constitute a significant proportion, some 50,000 out of 750-800,000, of the total population, rejection of one solution should depend upon a superior one being available: for a lack of positive proposals implies an increasing number of destitute rural families as the hunting/gathering economy continues to crumble and life in this economy appears decreasingly attractive alongside emerging wealth. The necessity is therefore to see this not as a 'Basarwa problem' but as a problem of creating employment and income opportunities, that is, as part of the general problem being considered here. Given the relative immobility of Basarwa a radical solution must depend on allocation of (good) land in the Western Sandveld i.e. in the Ghanzi Strip. Assistance towards settled arable farming could continue but since livestock - keeping has closer affinity with the traditional way of life some form of goat distribution scheme which would introduce more of the Basarwa to at least the bottom rung of the 'livestock ladder' recommends itself. Achievement of family holdings of some 20 or 30 goats would represent a very important raising of the standard of life for such households. And they could represent a transition in the most successful instances to cattle ownership within a mixed farming system. Small stock are, indeed, a traditional component of mixed farming in Botswana.

### Urban Unemployment and Poverty

Out of a population in Botswana of some 800,000 people the capital Gaborone has close to 50,000 and the three other main towns (Lobatse, Francistown and Selebi-Phikwe) 20-30,000. Beyond these a distinction is made locally between 'large' (major traditional) and 'small' villages, although some of the former approximate to small townships of 10-20,000 people. The reason for this unusual nomenclature is perhaps related to the division mentioned earlier between villages, lands and cattle posts: with people not fully resident in the lands area for cultivation purposes, even small townships can serve as bases for farming/livestock keeping communities and being more rural than would normally be the case merit the title of 'major villages'.

Keeping this in mind, we can examine anticipated population growth rates and their implications in Table 15. A high national population growth rate of 3.6 per cent per annum over the period 1971 - 79 has increased population towards the 800,000 mark; but rural - urban migration at over 10 per cent per annum over this period meant that while national population increased by one third, the population of urban centres and of urban centres together with large villages more than doubled. Consequently the combined share of the latter in the total population increased from 30 per cent in 1971 to 40 per cent in 1979, and is projected to increase to 57 per cent in 1984 and perhaps 63 per cent in 1989, when nearly two-thirds of the entire population of the country could be in the urban sector.

Formal sector employment in the towns has not been growing at anything like the rate necessary to absorb this influx, however, and since the migrants come largely from the low productivity arable sector the effect of rural - urban migration in Botswana inevitably means simply conversion of rural poverty into urban poverty: in the absence of formal sector employment and of a strong informal sector, this may also imply open unemployment. As already mentioned, the absence of a 'core' of manufacturing industry in Botswana towns must affect their absorptive capacity. According to a social and

Table 15. Rural and Urban Population Estimates 1971 - 1989 (Thousands)

	(annual rate 1971 of change )		1979	1984	1989
1. Population of Existing Urban Centres	68	(9.6)	142	239	280-290
2. Population of Existing Large Villages	80	(10.4)	177	296	350-370
3. New Towns	-	(-)	-	7	25-30
4. Total Population of Urban Centres and Large Villages (1+2+3)	148	(10.1)	320	542	655-690
5. Population of Small Villages etc.	447	(0.6)	470	403	408-443
6. Total National Population (de facto)	595	(3.6)	790	945	1098
7. 4 as % of 6	30		40	57	60-63

Notes:

- i. Urban centres include: Gaborone, Lobatse, Francistown, Selebi-Phikwe, Orapa; Tlokweng and Mogoditshane are included as they are being absorbed in the Gaborone urban complex.
- ii. Large Villages are semi-urban and include: Serowe, Palapye, Mahalapye, Mochudi, Molepolole, Kanye, Ramotswa, and Maun. The pressure for their recognition as urban centres is likely to increase.
- iii. Among new towns Jwaneng is shown for 1984. However, some new towns may come up if known mineral deposits are exploited.
- iv. The effects of (a) absorption of peri-urban areas into existing towns, and (b) returning migrants from South Africa to settle in urban centres, may be larger than assumed in the growth rates for 1979 to 1984.
- v. The changes depicted would be further modified if the Government adopts a "growth pole" strategy.

economic survey of three peri - urban areas (Ministry of Finance and Development Planning, 1974) unemployment rates for the peri - urban areas of Gaborone, Francistown and Selebi - Phikwe ranged from 15 - 18 per cent for males and 35 - 48 per cent for females. Large numbers of urban poor live in squatter housing in or near Gaborone (27 per cent

of the town's population), Lobatse (23 per cent), Francistown (60 per cent) and Selebi - Phikwe (40 per cent). All this amounts to a rising tide of unemployment and potential poverty which planners in Botswana will do well to keep down to a manageable level, irrespective of the financial resources with which they may be able to work.

The peculiar pattern of settlement and agricultural organisation has some implications, to which it is worth drawing attention. On the one hand the conventional pattern of rural - to - urban migration is disturbed: the fact that people are already in or around small townships/large villages may mean that there occurs a greatly accelerated process of migration and expansion of townships compared with other countries. On the other hand, a pattern has been established whereby it is possible to live in a 'township' while carrying on agriculture in the lands and grazing livestock in a third direction, at the cattle post. This implies a possibly useful blurring of the lines between urban and rural occupations, useful because it may permit the high proportion of the population who are in urban centres to obtain some means of subsistence.

Related to this is the fact that the distribution of population in Botswana is highly concentrated. Rainfall is such that only about 6 per cent of the total land area of the country (3 million hectares) is cultivable with dryland crops. This is located in what is known as the Eastern Hardveld, the Limpopo catchment areas along the eastern margin, just before the upper tributaries of the Limpopo disappear into South Africa. Examination of a population map shows that only a tiny fraction of Botswana's population lives outside this narrow strip. What is not so commonly appreciated is that in fact the population is concentrated even within this narrow strip into just three areas, (one centred on Gaborone, one between Serowe and Mahalapye, and the third in the North-east District)\*. This will further facilitate increasing concentration of the population in urban centres.

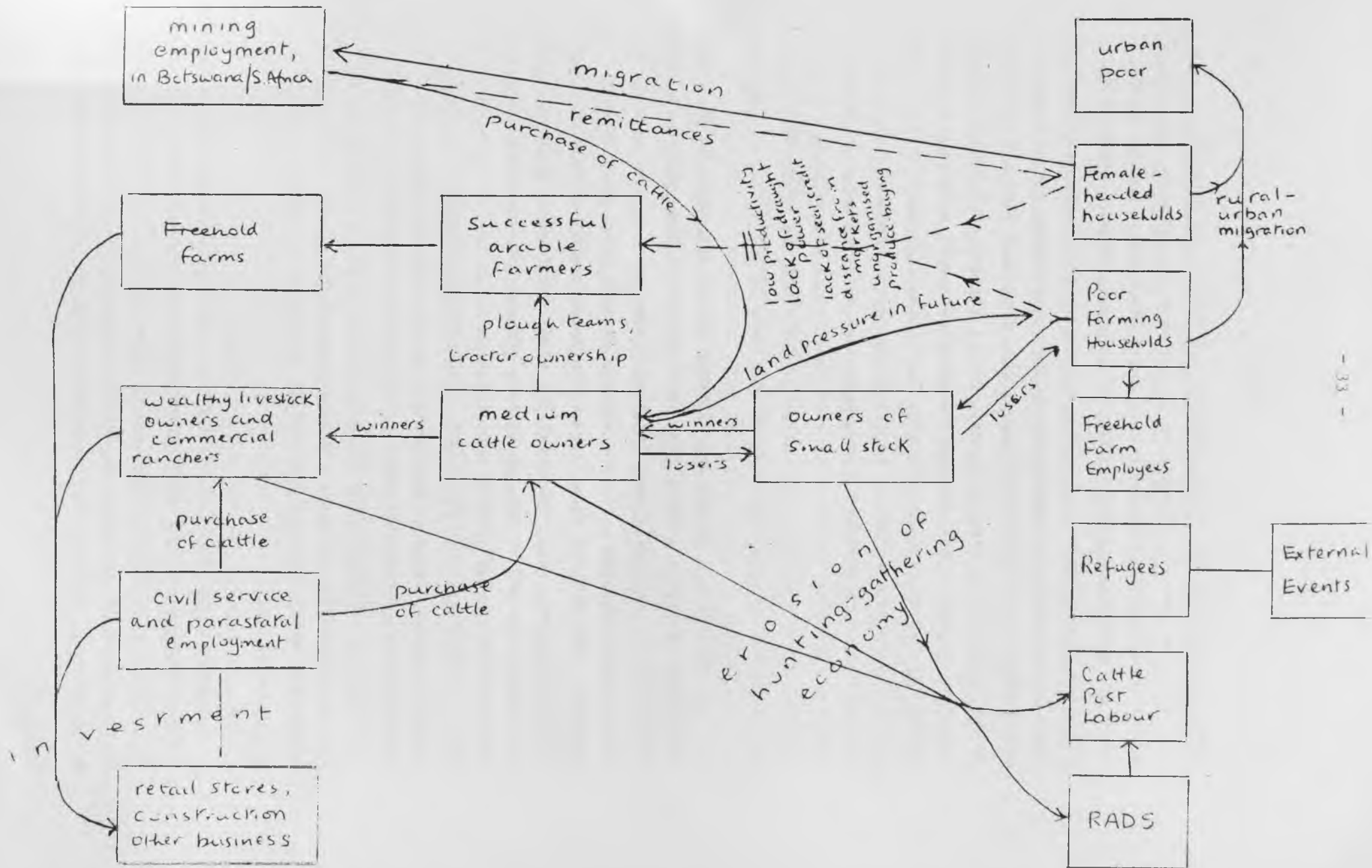
\* See map attached as annex.

Charting Wealth and Inequality in Botswana

In order to pull together and summarise the various elements in our discussion so far, Figure 2 is presented. On the left hand side are represented the main sources of wealth and income: from paid employment, mining and civil service/parastatal jobs, and from self-employment accumulation of cattle, commercial ranching and large-scale farming, and business enterprise. Civil servants and parastatal employees can use savings out of salaries to purchase cattle or to invest in business, which may also be entered through savings obtained in ranching/farming. The central element is livestock, in which there is a ladder starting with poor arable households who may succeed in building up, particularly through small stock, a small cattle herd which, if they are lucky in the 'game against nature,' they can expand, conceivably if not very likely, becoming wealthy: indeed it would be easier to enter the box of 'wealthy livestock owners' from the 'civil service and parastatal employment' box than to negotiate this risky ladder. The reverse process is that owners of small herds or small stock who 'lose' against nature may end up as 'poor farming households' with not much chance of escape or, if they lose male heads to mining employment (or simply lose their male heads), become even poorer female-headed households. Looking at the 'successful arable farmers' box this is easier to reach from the 'medium cattle owners' box, because of the importance of draught power, the absence of which operates among the other obstacles indicated to hinder the progress of poor farming households. Finally, it is indicated that the activities of the small, medium and large livestock owners have been responsible in the past for the progressive erosion of the hunting-gathering economy, producing poor RADS and cattle post labour, and in the future for land pressure (to be discussed presently) affecting poor farming households.

What emerges is the intrinsic difficulty, even if the most enlightened policies were devised, of widening access, particularly through employment opportunities, to the fruits on the left-hand side, and improving welfare among the mass of the population on the right hand side, even given generous revenue from the mining of diamonds. The prospects for broadening opportunities through the development of arable agriculture are considered next.

Fig.2. A Chart of Wealth and Inequality in Botswana



ALDEP: A Programme for the Development of Arable Agriculture.

The government's recognition of the need to emphasize the arable sector underlies the present Arable Lands Development Policy (ALDEP) which was announced in early 1978, to complement TGIP. Although the numerical concentration of arable farmers is in the Eastern Hardveld, ALDEP is not confined geographically and incorporates agricultural development in any part of Botswana, including more remote areas such as the north (where proposals exist for an Integrated Rural Development Programme in West Ngamiland and for the development of melapo farming around the Okavango Delta) and west (including especially policies and projects relating to RADS). In its range, also, ALDEP is viewed as a comprehensive but open-ended programme for the development of arable farming, focussing on the variety of constraints affecting the farmer's production, in which programmes and policies will be tested and evolved over a period of time. We comment here only on one or two salient aspects.

One of the foci at the present time is the upgrading of the basic technology of arable farmers through a particular technological package. Since 1975 investigative work financed by the ODA has been carried out into improved minimum - tillage systems through three associated projects. The Dryland Farming Research Scheme (DFRS), based at Sebele Research Station, was established "to study the factors limiting arable crop production and to develop tillage systems and machinery capable of increasing yields". This investigation could then be carried further under the Evaluation of Farming Systems and Agricultural Implements Project (EFSAIP), also at Sebele, but established for subsequent evaluation of research findings in cooperation with farmers on their own holdings. Finally, the Integrated Farming Pilot Project (IFPP) has been examining the impact of the recommended system in a combined arable and livestock community of 330 households at Pelotshetla in Southern District.

A great deal of effort was centred initially upon the makgonatsotlhe, a multi-purpose tool bar which represents an impressive attempt at local development of appropriate technology aimed at reducing the draught power requirement to two oxen. In the event this proved something of a red herring, since it still required 6 oxen for ploughing purposes,

experienced problems with its planter component, and was too expensive at P700 for the categories of farmer for which it was designed.

While this element of research and development diverted the IFPP from its primary objective of implementing improved approaches, a fairly definite technological package has now emerged from the experience of IFPP, even if some experimentation continues and improvements are still under way, a package comprising a mouldboard plough, Safim planter and cultivator (for weeding), together costing P250.<sup>13</sup> Planters and cultivators are in use among all of the 100 or so participating farmers at Pelotshetla, with sufficiently positive results, to concentrate now on widening access to this technology.

Just as important is a shift from spring ploughing at the time of the rains in October/November to autumn ploughing in March/April or winter ploughing in June/July. This implies a break with the traditional seasonal migration between the villages and lands, the 'circle of inefficiency' described earlier. The effects of this shift, together with the technological package, have been tested at Pelotshetla and under EFSAIP. Unfortunately sample sizes are far too small for any very strong conclusions to be drawn, small not only in terms of farmers but in terms of years, given that the impact of improved systems is likely to differ as between good and bad years.

Table 16 compares performance in kg/ha for the traditional (broadcasting) system with spring ploughing at the time of the rains, the "improved traditional system" with winter and spring ploughing, and use of a Safim planter, and finally the makgonasotlho, used in the same sequence. The evidence (on one year's result only) suggests that the 'improved traditional system' is at least as good as the makgonasotlho, although it is a considerably cheaper package. The important comparison now, however, is between the improved system and the traditional: here we can combine the results for 'improved traditional' and 'makgonasotlho' since they are both based on winter ploughing, row planting and better weeding and differ mainly in terms of the cost of the equipment. The improved methods appear to have a very clear advantage over the traditional.



Table 10. Average Yields (kg/ha) at the IFPP with Alternative Methods of Production (figures in brackets give number of farmers in sample)

	Traditional	Improved Traditional	Makgonatsotlhe
<u>Maize</u>			
1976-77	358 (53)	-	825 (25)
1977-78	204 (62)	762 (16)	599 (28)
<u>Sorghum</u>			
1976-77	142 (52)	-	522 (29)
1977-78	116 (55)	347 (11)	200 (18)
<u>Sunflower</u>			
1976-77	350 (7)	-	229 (1)
1977-78	185 (13)	362 (1)	560 (5)
<u>Output/ha/man-hour (kg)</u>			
Maize	3.52	6.86	2.89
Sorghum	1.77	2.41	1.00

Moreover this relates only to yield per hectare: we are not told whether farmers were enabled to plough greater hectarages by being able to take fuller advantage of the rains, as would be expected with the improved systems.

The last two rows show, on the basis of estimated labour requirements, what the average return to labour was, measured in output per hectare per man-hour, in the three cases. The makgonatsotlhe system required more labour, reducing its return, but the 'improved traditional' gave a higher return, due to significantly greater yields.

The data refers only to average yields, but in bad years results under the traditional system were much more widely spread between farmers, some obtaining satisfactory results but a long 'tail' of farmers obtaining no yield at all. The improved system thus appears to give an important degree of insurance against bad years.

Table 17. Average Yields of Sorghum (kg/ha) at EFSaip with Alternative Methods of Production (figures are for nil fertilizer application; figures in brackets give number of farmers in sample).

	1976-77	1977-78	1978-79
Control plots	305	243(25)	52(14)
SMP	122	186(10)	44(5)
AMP 1 (Safim planters)	378	259 (8)	467(1)
AMP 2 (Plough/planting)	-	1138 (2)	831(1)
AMP 3 (EFSaip planters)	-	-	272(3)

Table 17 gives data based on much smaller samples of farmers under the EFSaip for the traditional system of spring mouldboard ploughing (SMP). The figures are for mean yields/hectare of sorghum with nil fertilizer application. Autumn mouldboard ploughing with a Safim planter, with ordinary plough/planting (by hand over a third furrow) and with an EFSaip planter, labelled respectively AMP<sub>1</sub>, AMP<sub>2</sub> and AMP<sub>3</sub>, are compared with SMP and a given number of control plots of traditionally planted sorghum.

Once again, the improved packages showed considerably increased yields over the traditional system. More encouraging still, the difference was even more marked in the drought year of 1978-79 when yields under the traditional system were extremely poor on the average (and thus zero for a great many farmers), confirming the results from IFPP.

Unfortunately the experiments have not been carried out in such a way that we can distinguish between the effects of the planter/cultivator package itself and those of winter/autumn ploughing. It will be noticed that in Table 17 the yields for ordinary plough/planting in a third furrow, compared to both Safim and ESAIP planters, were much greater - although conclusions cannot be drawn from such a minuscule sample.

This is of the utmost importance. Should investment be directed towards the distribution of planters/cultivators (generally to those who are already equipped with oxen and are in a position to plough in the lands in winter/autumn) or towards improving water supplies in the lands areas in order to permit a larger proportion to winter/autumn plough?

According to Roe (1980) the second category of investment has been neglected over a long period, particularly because of a livestock bias:

"The separation of lands and cattle posts, in particular, decisively structured the access to improved water supplies in the lands areas. Borehole drilling was from the very first identified with livestock production and, as such, boreholes were located largely in grazing areas or at sandveld cattle posts. The resulting comparative shortage of permanent water supplies in the lands areas had the effect of all the more reinforcing the dependency of agriculture on the livestock sector" (pp. 26-27).

Moreover;

"The livestock sector was subsidized, through the use of government funds which favoured livestock development over agriculture, namely, the large-scale programs for sinking rural water supplies. Had the livestock sector borne the full cost of its development, investment in agriculture might well have looked more appealing" (p.29).

The development of arable agriculture has thus been positively held back over a long period of time, as a result of concentration on livestock production.<sup>14</sup> The question of this comparative subsidy is considered again later in this paper.

There remains the immediate issue of water investment versus the technological package. The lack of firm evidence on which to base a decision here is awkward. A Ministry of Agriculture paper of September, 1979,<sup>15</sup> indicates a figure of some 5,000 or 6,000 single row planters and cultivators to be distributed over a five - year period, and a figure as high as 10,000 has been mentioned. Given the supplementary costs of distribution and monitoring which have to be added to the cost of the equipment itself, this represented the most expensive specific project directed at the arable farmers in the Hardveld under ALDEP at that moment in time.

ALDEP plans to focus upon "those farmers cultivating between 0 and 10 hectares"<sup>15</sup>, an estimated 90 per cent of all landed rural households, the intention being that these should cultivate some 6 - 7 hectares out of cultivable areas of 10 ha. If we look back to Table 13, however, we see that about 80 per cent of land holders planted less than 6 ha. in 1971-72 and over 60 per cent less than 4 ha. The number already planting the necessary hectarage, and thus with the basic resources already with which to aim at increased yields through improved management and equipment may be limited. A much larger proportion may need to be given the resources to expand their cultivated hectarages. In terms of immediate need, at least, ALDEP may not be focussing on the most obvious target group. If the programme concentrates on the distribution of planters and cultivators, with accompanying extensions, to farmers already cultivating 6 - 7 ha, a very large proportion of farmers could certainly be missed; conversely, if there is concentration on the majority of farmers in the 1 - 5 ha. range, this must divert effort from the straight - forward package which has been identified.

To put this another way, the package is not immediately relevant to those householders who lack draught power, estimated by ALDEP to be in excess of 33,000.<sup>16</sup> Credit for the acquisition of oxen and a donkey distribution scheme (for draught power) under ALDEP are under discussion. The question is whether this will receive as much attention or be capable of being as rapidly implemented as the distribution of the technological package. A suggestion by Lipton (1978, Vol.1, p.182) for the purchase of cattle from large owners for distribution to those without has not met much response. In situations where there is general overgrazing any scheme which involves actual assistance for acquisition of cattle is invariably resisted, but little is done to control large individual accumulations of cattle which contribute most to overgrazing.

There is some danger, therefore, that the ALDEP package as it stands could lead to stratification of the rural economy (which is already proceeding apace with the spread of tractors), with some 10 or 20 per cent of "yeoman" farmers dominating the rural scene. Already of course, there is a strong division between those with and those without draught power, reflected particularly in the share cropping system referred to earlier. Because the former have, as it were,

just one hurdle to jump rather than two, the logistics of distribution to these farmers will be much more simple.

This could be aggravated by the extension strategy which it is suggested might be adopted under ALDEP. A step-by-step adoption of the technological/management package is proposed as follows:

1. Step 1: third furrow hand planting, followed by a cultivator, with the application of kraal manure on one quarter of the unit.
2. Step 2: use of planter/cultivator.
3. Step 3: introduction of fertilizers on part of the cropped area, and the use of certified seed on two hectares.
4. Step 4: achieved when the full package of improved practices is applied to the entire 6 ha. cultivated.

This may be associated with the revival of an old system of grading farmers in terms of progressiveness, referring to 'pupil', 'improved', 'progressive' and 'master' farmer as Steps 1, 2, 3 and 4 are achieved. Yields of maize and sorghum for the four steps are anticipated to be as in Table 18. The figures for Step 4 are deduced from Step 3, applied now over the full area.

Table 18. Proposed Step-by-step Increases in Farmer Productivity Under ALDEP.

	Maize		Sorghum	
	Yield kg/ha	Increase over Previous Steps kg/ha	Yield kg/ha	Increase over Previous Steps
Step 0	300	150	300	150
Step 1	450	50	450	50
Step 2	500	500	500	300
Step 3	1,000	1,000?	800	600?
Step 4	2,000?		1,400?	

Source: Ministry of Agriculture.

A number of criticisms might be made of the step approach. Some of the assumed increases appear unrealistic. And the sequence appears to reflect the conventional feeling that, irrespective of the conditions, farmers should progress towards the technical efficiency criterion of increasing yield per hectare, with the application of 'modern' inputs. If fertilizers are not economic, however, as seems possible, it would not be likely or desirable that a farmer progress to Step 3. Thirdly, the sequence does not refer to those who lack draught power, where the objective would be to increase the number of hectares cultivated, rather than yield per hectare (it is assumed that increased output should only come at the intensive margin, not the extensive margin, possibly a fundamental misinterpretation of the situation) or the possibility of increases in yield among those who broadcast and thus do not figure in the sequence (including many who employ tractors!).

Finally, the system will almost inevitably encourage extension officers ("Agricultural Demonstrators" in Botswana) to focus attention on a more limited number of farmers, especially those with the greatest resources, taking this focus away from the poorest sections of the farming community. Related to this, it may divert emphasis away from the group extension approach which it is also the intention to use. The group approach has a number of advantages:<sup>17</sup> if homogeneous groups are addressed and supervised collectively there is a greater chance of other members of the group following the innovators; the group approach must necessarily aim at the 'average' farmer, reducing the danger of inappropriate technical recommendations; and in the special context of Botswana where long distances are involved and contact with farmers circulating among several residences is particularly difficult, the group approach recommends itself most strongly.

#### Tractors versus Oxen

The underlying assumption of the ALDEP programme is that the farmers involved would ox - plough. But the choice between oxen and tractors for draught power is not straightforward. In the Barolongs tractorization is now the predominant form, and large scale methods and improved farming techniques have made the area the country's main producer of marketed grain. The terrain of the Barolongs is not representative of the Hardveld as a whole, but against this it is estimated that in Botswana

as a whole some 15 or 20 per cent of the households which plough do not use animal draught, and the proportion using tractors is increasing slightly.<sup>18</sup>

However, the increase in fuel prices has drastically raised the cost of tractor - ploughing to a current level of about 20 to 25 Pula per hectare. Without some form of tractor - sharing, at the very least, this would appear to make tractors uneconomic in the case of the large mass of producers with small acreages producing comparatively small surpluses of not very high - priced crops. Even the acquisition of tractors by larger farmers is not categoric evidence of profitability: the highest rate of default on National Development Bank loans for agriculture is on loans to large borrowers for the acquisition of tractors and ancillary equipment. Reasons given include lack of business acumen, whereby owners underestimate costs and undercharge for tractor services; prestige motives, with tractors purchased because people have funds available rather than themselves creating wealth (only about two-thirds of the tractors are said to be actually used in agriculture at all, perhaps in part a result of high running costs); and lack of servicing facilities available locally to the tractor owners, creating a problem of maintenance and use.<sup>19</sup>

It is important in any case to make a clear distinction between the economics of tractors in large-farm situations and small-farm situations. Given access to a large tract of land, tractors can certainly be highly profitable for the private operator, while large-scale commercial farming using tractors, as in the Barolong, can make an important contribution to one social goal in Botswana, that of increasing marketed output and reducing the necessity of expensive importation of basic foodstuffs. However, because large-scale production would create very little employment and do little to spread incomes, it is out of the question for Botswana to pursue this single objective; as we have seen a major objective has to be to create employment and increase incomes in the small-scale arable sector, in order that this sector can support the majority of rural households. Botswana has, therefore, to pursue a "multiple objective function", relying to an important extent on the commercial sector for

commercial output perhaps and simultaneously increasing small-scale production, partly for own-account consumption and partly to permit small marketable surpluses for cash.

The question, therefore, is whether tractors can be made economic in the small-scale sector. Here also there are certainly some technical advantages in using tractors; they can make effective use of the high-potential areas of more clayey soils which occur throughout the Hardveld; elsewhere they make possible fuller use of the rains through improved timing of operations; and they are particularly useful for de-stumping, a particular problem for small farmers, including female-headed households. However, there are three sorts of considerations which determine whether or not tractors can be used within the small-scale sector of agriculture: technical, economic (the relative costs and productivity of capital and labour) and managerial. Poor management of tractors, whether in Government tractor hire service schemes or in larger or smaller-scale settlement schemes, has been the principal cause of failure in agriculture projects involving a tractor component in most countries south of the Sahara since the War.

The main disadvantage of ox-drawn cultivation, as opposed to tractors, are the enormous demands made for grazing; and this is likely to be an increasing factor as land pressure increases. At the moment the position is unclear. Several Districts claim that there is virtually no allocable land left in the area; others see no problems of shortages in the short run. Allocation of land, on the other hand, is not the same as utilization, and where in one District the local authorities reported that virtually all land had been allocated, aerial photography suggested that only one in seven agricultural plots had been utilized that season.

In the long run, the position could be altogether different. This is suggested by some simple arithmetic, based on a calculation made by the ALDEP team.<sup>20</sup> Population projections indicate a rural population of some 100,000 farm families in the year 2000. The stated objective under ALDEP is that 60,000 of these would come under the ALDEP farm improvement programme by that date, each of these



planting 6 - 7 hectares and, with 3 - 4 hectares fallow, holding 10 hectares of arable land in all.

We can first test the feasibility of this assumption. The ALDEP papers state land availability in the Eastern Hardveld to be 3.5 million ha. of arable land and 1 million ha. of additional grazing land (these figures probably require verification). Rather than taking a uniform carrying capacity 1 LSU (Livestock Unit): 12 hectares, as in the ALDEP calculation, we take 1:8 for the arable land and 1:12 for the grazing land, and for convenience convert the grazing land to arable land - equivalent by applying a factor of two-thirds. This gives the total supply of land as 4,167 thousand ha.

Suppose that 20 per cent of the ALDEP farmers (12,000) use tractor power and have no grazing requirement at the lands. The other 48,000 ALDEP households each keep 8 oxen at the lands and require  $8 \times 8 = 64$  hectares for grazing, and 74 ha. in all. It would not be badly inconsistent with Table 13 to assume that the non - ALDEP households cultivate half the amount, 5 ha. (including fallow), and maintain 4 cattle in the area. This would require 37 ha. per household. Demand for land would then be 120, 3552, and 2960 thousand ha. for users of tractor power, for other ALDEP households, and for non - ALDEP households, or 6,632 thousand ha. altogether. Given the supply of land of 4,167 thousand ha., this implies a huge deficit of 2,465 thousand.

Alternatively, starting from the amount of land which is available ( $4,167 - 120 = 4,047$  thousand, excluding the land cultivated by tractor users), let  $X =$  no. of ALDEP households (excluding tractor users) and  $Y =$  no. of non - ALDEP households, both in thousands, so that

$$X + Y = 88$$

Land will be fully used up when

$$74X + 37Y = 4,047$$

giving  $X = 21.4$ ,  $Y = 66.6$

This implies 33,400 farmers under ALDEP, of which 12,000 use tractor

power and 21,400 oxen, and 66,600 farmers are left out of the scheme. This comparatively large proportion, two-thirds, of households planting no more than 2 or 3 hectares per annum, is clearly unsatisfactory. Without the tractor power component, land would be fully utilized with only 12,600 farmers included under ALDEP (with the same assumptions), and 87,400 outside the scheme.

The implication is that there might be a possibly quite sharp increase in the real or shadow price of land. This would not necessarily make tractorization economic: fuel and maintenance costs would remain high. But it would reduce the feasibility of the alternative, ox cultivation.

The other implication is a possibly quite serious increase in the stratification of the rural economy (already proceeding apace with the spread of tractors), with some 10 or 20 per cent of yeoman farmers dominating the rural scene. The rise in the demand for and price of land would stimulate the extension of 'sharecropping', increasing the squeeze on less viable farm units, including female-headed households.

The assumptions underlying the above calculations are, of course, extremely rough. More than this amount of land might be available. On the other hand it is assumed that supplementary cattle required for regenerating the ox team are kept elsewhere, and that livestock - keepers keep out of the areas earmarked for arable farmers. What produces the rather surprising result is a rather peculiar combination of circumstances: an attempt to cultivate where yields are low so that oxen are needed to expand acreage; but where even the cattle - carrying capacity is low, requiring a large number of hectares to sustain the oxen. What is needed to break the circle is either the intensification of cattle feeding, to reduce grazing area per LSU, which appears uncertain, or a means of reducing the number of oxen required for ploughing which was one of the objectives of the makgonatsotlhe, or the substitution of tractor services for oxen, particularly for weaker households: which raises all the problems of management referred to earlier.

The Relative Profitability of Livestock and Arable Farming in Botswana:  
Private versus Social Considerations.

Livestock - keeping has always been a much more attractive economic activity than arable production in Botswana, as shown for example by the rapid increase in the national herd from 1½ million in 1966 to some 3½ million or more in 1979. Small farmers who concentrate on arable production do so principally because they lack the assets to go into more lucrative livestock - keeping; and where surpluses are made in arable production, profits are frequently put into cattle, investment at the farm level being generally livestock - oriented. In contrast arable production in Botswana affords only low yields, an uncertain market for any surpluses, and is fraught with risk. Maize and sorghum are much more vulnerable to drought than cattle, and yields are frequently as low as zero even after considerable amounts of labour and effort have been expended, while at other times farmers may decide not to plant in the light of the emerging rainfall supply situation. When yields are more satisfactory this will still have required a considerable input of labour, especially compared to livestock activity. Though the distances involved daily in trekking cattle between water and grazing may be substantial, this work does not increase in proportion to herd size, and is therefore not labour-intensive. Hence success in livestock - rearing is not so much a matter of labour effort as of initial wealth, wealth from other sources such as mining wages, or civil service salaries, luck, and access to water, perhaps, or grazing.

No systematic calculation has been made as yet of the relative profitabilities of the two activities. One specific calculation by the IFPP Farm Management and Statistics Section in its 1977-78 Report gives estimates of total gross margin on an 8½ ha plot of traditionally grown crops as P133; for the same area under the 'Improved traditional system' as P250; and from livestock production P283. The figures are of course based on specific assumptions.

Given the riskiness, low yields, and low relative profitability of small - scale arable farming, it may be asked why Botswana should not concentrate much more on livestock production, and use exports of livestock products to pay for imported cereals (as Table 14 suggests individual farmers regularly do). The reasons are two-fold. First of all, due to current and imminent overgrazing, as

well as to the predictions of land shortage made previously, the national herd may be considered to have reached its limit already in aggregate (although a change in the size distribution of holdings within this total would no doubt increase welfare.) In this situation private benefit from increases in cattle holdings will not be matched by any social benefit, the increases being offset by a corresponding decrease in the number of other people's cattle which can be supported. The increase in social output may even be negative if there is a deterioration in the range which actually reduces its long run carrying capacity.

The second aspect is that, unless large sections of the population in Botswana are to receive unemployment benefit, a mix of economic activities is required which affords an adequate level of employment: but while arable farming employs people, cattle - rearing in general does not. Indeed some 80 per cent of the rural population are dependent upon arable farming, irrespective of the low quality of life which this occupation affords for a large proportion. Because of the low labour - intensity of livestock production, even if the national herd were not at its limit,<sup>21</sup> increased livestock production could not absorb the number of rural households involved.

We may add a third consideration. While in the past, livestock has been Botswana's principal export and foreign exchange earner, mining revenue has now more than equalled it in this respect, and prospects indicate that mining by itself can largely take care of Botswana's foreign exchange requirement in the future. In fact in the Botswana context mining and livestock production have similar characteristics, in different degrees, in that both are good foreign exchange earners but neither create a great deal of employment. The difference is that mining is not land - intensive, whereas livestock - production may actually divert scarce land production away from arable farming. Increases in mining revenue thus reduce the need for a livestock emphasis, even if livestock - rearing may be a superior earner of income than arable production.

Taking all the above considerations together, we need in cost-benefit terminology to apply a low shadow price of foreign exchange to livestock production, and take account of high external diseconomies from overgrazing involving an immediate or eventual reduction in cattle numbers elsewhere. At the same time a high premium on employment creation should be applied, implying a zero or even negative shadow price of labour.

If the above considerations are valid, it would be desirable to have a structure of relative prices and subsidies designed to promote arable agriculture and to reduce the (private) attractiveness of livestock production, and perhaps specifically to foster some kind of mixed farm pattern which affords income, employment and a balanced consumption pattern, and which is not 'land - hungry'. The price/subsidy structure should be such that this farm pattern is not unbalanced over time by a disequilibrating accumulation of cattle.

The actual pattern of prices and subsidies has, largely unintentionally, been very different from this. The policy with regard to arable production has been described as one of 'minimum intervention' and involves very little subsidy. The prices of grain are fixed by the Botswana Agricultural Marketing Board (BAMB) at a competitive replacement price i.e. import parity. Few arable inputs are subsidized. ALDEP proposals for subsidizing agricultural implements and draught power, e.g. via a donkey distribution scheme are not yet at the implementation stage. Seeds are not subsidized save in abnormal years and fertilizer subsidies (which would in case benefit better-to-do farmers) were discontinued in 1975. At the same time little or no credit has been offered to small arable farmers so far via the National Development Bank or the commercial banks, whereas these have found it cosier to make loans on a quite substantial scale to the livestock sector, particularly the large - scale commercial ranching sector, which has also benefited from infrastructural and other investment under the World Bank's Second Livestock Development Programme. Finally arable production has also suffered from lack of marketing facilities due to the underdeveloped system of local markets and the limited national purchasing network of BAMB. Long distances and poor roads are more of a problem for low-value grain production compared to livestock which

can be more easily trekked to marketing points.

In contrast livestock production has received a massive disguised subsidy through the differential access given to Botswana livestock products by the EEC, an indirect form of foreign assistance which has benefited livestock producers, particularly larger ones.<sup>22</sup> At the same time there has been since 1964 or so massive investment, public and private, in boreholes and dams for the livestock sector: investment which has in fact underlain the rapid increase in livestock numbers which occurred. This investment has generally included a major element of subsidy. Considerable bank lending has been made for the construction of private boreholes which has been of greatest benefit to larger livestock owners in both communal and commercial areas. TGLP has inevitably meant further assistance to these in the form of grants and loans. TGLP, of course, enjoyed a head start on the ALDEP under which assistance to arable producers is now being considered. In any case, of the total capital allocation of P.23.1 million for agricultural development in the current 5- year plan, 1976-81, P.17.7 million or 73 per cent was for livestock - related projects (Egner, 1979).

Given the level of food imports from South Africa, an argument from economic theory for protection of arable production could be employed as follows. Since land (if not absorbed by livestock) and labour resources in agriculture are not fully employed in Botswana, a degree of protection from South African imports, while raising food prices and reducing consumers' surplus to some extent, would create additional income and employment in agriculture, with a net benefit overall.<sup>23</sup> Since direct protection is not possible within the context of the Customs Union agreement, a way of taking advantage of the available mineral income tax revenue would be to support or subsidize agriculture by fairly generous expenditure on agricultural credit schemes, research, local road transport, and even agricultural price support schemes, especially support schemes which offer support in periods of drought, such as loan re-scheduling.

Since measures to increase grain output prices would benefit most the commercial farming sector and least small farmers with only small and periodic marketable surpluses, a more equitable procedure is to subsidize inputs, and particularly inputs employed by small farmers.

The intention under ALDEP is, in fact, to provide a 30 per cent subsidy on planters and cultivators, as well as generous subsidies on a wide range of other inputs. As discussed already, it is not certain that the ALDEP technological package will reach the poorest farm householders. The most obvious candidate for subsidy is seed production and distribution revealed by the Study of Constraints to be one of the most serious problems facing both sub-marginal farmers and farmers aiming at marketable surpluses. Shortage of seed is regressive in its impact on farmers, affecting the poorest and most vulnerable households in greatest degree.

It could be, of course, with rising prices of tractors and fuel for tractor - ploughing and eventually a rising shadow price of land required for grazing oxen, that domestic arable production is simply uneconomic as compared to the option of importing. Or that at least production by the more marginal farming households is non-competitive, requiring (to consumers) very expensive protection if the main target group is to be assisted. This needs to be systematically investigated. If production were indeed proved to be uneconomic, the prospects would be poor indeed for providing any viable form of paid or self - employment for the mass of the population in Botswana as an alternative to state cash hand - outs of dole paid for by mineral revenue. A labour - intensive public works programme has already been launched in late 1979, to cost one million pula, and this may be substantially extended. So long as this can be directed to socially - productive ends, adding to national 'output', it is valuable in itself. We may, on the other hand, be seeing the start of a national system of dole financed by diamond revenues and necessitated by a failure to provide sufficient employment and income opportunities.

footnotes

1. Real growth slowed to an annual rate of something less than four per cent during the period 1973-78, but will accelerate again with the new mining development to be referred to presently.
2. These figures probably exaggerate the trend, the first lying below the trend line and the second above, prior to the effects of the next drought.
3. Report of the Special Programming Mission to Botswana, IFAD, Rome, October 1979.
4. In addition to the approach to universal primary education already mentioned, about 85 per cent of the population was reportedly within 15 kilometres of a health facility in 1979.
5. At the current exchange rate of 1 Pula = \$1.138 this would be worth \$ 720
6. It may be asked why this process does not lead over time to one large herd with a single owner. The answer may lie in the existence of diseconomies of scale to balance the economies of scale posited, associated with the availability of water supplies or management and control of large herds, or certain social factors inhibiting the accumulation of holdings beyond a certain point. The precise way in which the distribution of holdings is affected is in any case uncertain: it may be that the main impact is at the lower end of the distribution as the number of small owners who retain viable herds is reduced. For some discussion of social factors affecting the building up of viable small herds in Botswana, see Duggan (1979).
7. This may change under a new more area-based programme which is under discussion, the Communal Area Planning and Development Programme (CAPAD).
8. However both these primary-product industries have important potential for generating important secondary activity. In both cases it is worth drawing attention to the example of India. Gems and jewellery emerged last year as India's most important export by value, exports having increased from Rs.400 million in 1970-71 to Rs. 7,250 million in 1978-79, gross of substantial import content. This trade consists almost entirely of cut diamonds, where India now has a world monopoly in cutting small stones. The expansion of the Indian industry depends upon success in getting further access to an apparently tightly controlled world supply of roughs. Clearly Botswana would have this access, if it could develop a trained labour force capable of competing with the Indian industry. The obvious advantage apart from the essential access to the basic material is that this activity would combine great labour-intensity with high value added. India has also been able to develop village industry leather tanning and both village and factory production of leather goods, with substantial success in export markets. Botswana, and other pastoral economies such as Somalia, should have a major comparative advantage in these areas if, once again, they are able to develop a trained workforce.

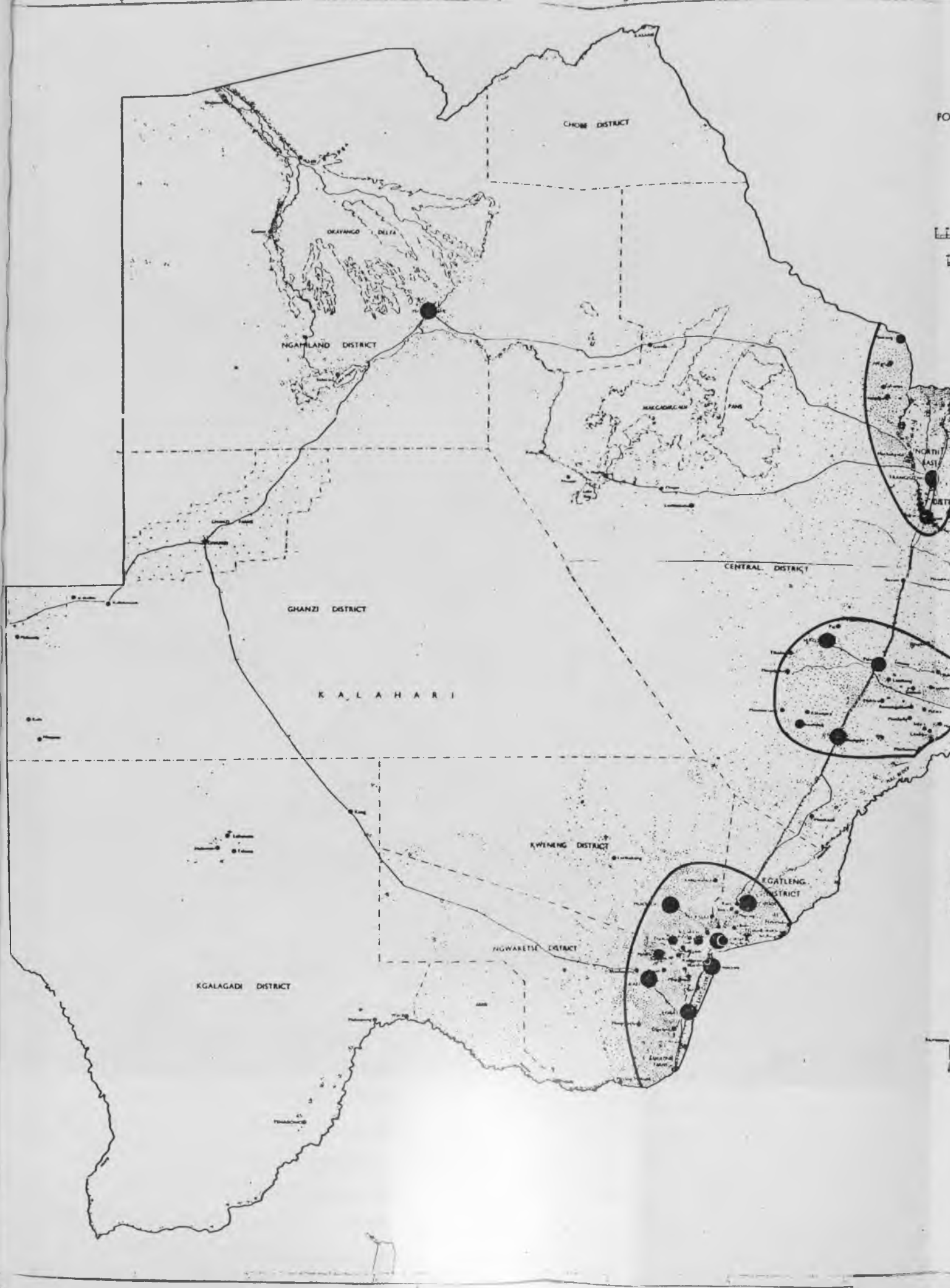


9. For some historical evidence on the negative impact of South African competition see Roe (1980).
10. In this respect the alternative way of spreading overhead costs, is preferable, in that it leaves the farm in the control of the small farmer. The difficulty in this case is inability to pay, given the predominantly subsistence nature of the activities of the small farmers. The provision of donkey draught may have advantages here because of the lower capital cost involved.
11. An experiment to break this circle is under way for assisted construction of small dug-out dams at the lands homesteads which, if successful, could transform the situation.
12. In the RIDS 43 per cent of households designated a woman as head and 29 per cent did not have a male member of working age present in the household.
13. There is a difficulty with the Safim planter, which is not very satisfactory for sorghum. A new EFSAIP planter, incorporating parts of the Safim but which avoids this defect, is not yet on the production line in any quantity.
14. Historically, of course, there was no diamond revenue to offset the need to obtain foreign exchange earnings through the livestock economy.
15. ALDEP, 1979.
16. This estimate is based on the RIDS figure of 50 per cent of households owning less than 10 cattle. It is quite likely to be an overestimate: the exact size of the problem may be more accurately assessed through village-by-village inquiry as the programme is being implemented.
17. For some discussion of these in the context of Kenya, see Institute of Development Studies, Nairobi, occasional paper No.12, S.R.D.P. second overall Evaluation of the Special Rural Development Programme, 1975.
18. ALDEP workshop paper, 1979
19. The Ministry of Agriculture has no Mechanical Field Service Division, while at the same time the private sector is not well developed.
20. ALDEP, 1979.
21. References to this limit assume the correctness of the widespread assumption that underground water availability does not permit further extension of grazing on the established pattern, something which requires substantiation by systematic investigation.
22. One estimate (Egner, 1979) was that, with EEC prices for Botswana beef at 25-30 per cent above world market prices combined EEC and government subsidies to the cattle industry might be running at P.25 million per annum.
23. This is the same argument once used by Dudley Seers (1959) as a possible argument for more permanent rather than infant-industry protection of manufacturing.

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