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Drought, Transfer Entitlements, and Income Distribution: The Botswana Experience

THEODORE R. VALENTINE*
California State University, Chico

Summary. — Using 1974–75 and 1985–86 income distribution survey data, with the latter supplemented by drought relief data, this paper presents an analysis of intertemporal rural household income distribution in Botswana. Despite the fact that the 1974–75 survey was conducted during one of the best agricultural production periods on record and the 1985–86 survey was conducted in the midst of one of the worst, after the rural economy had been weakened by a severe and prolonged drought, Botswana's rural income inequality did not appear to have increased significantly. There was no marked reduction in rural household real incomes. The explanation for this outcome is found to lie in the income-maintenance strategy pursued by rural households with strong support from transfer entitlement guarantees from private and public sources supplementing rural household incomes.

> Drought exposes the extent to which rural people are poor; its effects are determined by their incomes, by the extent to which those incomes depend on rainfall and by the options they have to seek alternatives when their primary sources of income collapse (Hay, Burke and Dako, 1985, p. 9).

1. INTRODUCTION

With economic stagnation and decline becoming commonplace and rural deprivation increasing at an alarming rate in Africa, Botswana's situation stands out as unique in at least two regards. First, Botswana's sustained pace of real economic growth and development have been exceptional, not only for Africa but for the whole of the developing world. Success in this area is credited to expanding revenues from the mineral sector and the strong macroeconomic management of the resulting reserves. Second, while experiencing severe and prolonged drought in the 1980s like many other countries in sub-Saharan Africa (Borton and Clay, 1986), Botswana was able to contain famine and maintain a reasonable level of equity (Asefa, 1991). Institutional structures which evolved over time to cope with drought and famine and the government's commitment to ensuring the entitlement[1] guarantees are credited with this success.

While much has been written about the success of the Botswana government's economic policy and drought relief effort in Botswana, in recent years little attention has been paid to income distribution, particularly in the rural economy. The few recent studies which have addressed the issue of income distribution (Curry, 1987b; Hay, Burke and Dako, 1985; Bank of Botswana, 1987) have concluded that the degree of income inequality in Botswana had increased significantly. These studies, however, suffer from major weaknesses resulting from analyses based on impressionistic information, with conclusions not supported by firm statistical evidence,[2] or calculations of rural household incomes which ignore noncash income and public transfers.[3]

Until recently intertemporal comparisons of Botswana's income distribution could not be

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carried out with a great deal of reliability because there was only one detailed income-distribution survey to rely upon, the 1974–75 Rural Incomes Distribution Survey (RIDS). The publication of the 1985–86 Household Incomes and Expenditures Survey (HIES) facilitates such intertemporal analysis (Central Statistics Office, 1976 and 1988).[4]

The aim of this paper is to fill a gap in the literature on income issues in Botswana by examining intertemporal changes in rural household incomes and rural income inequality. Data are drawn from the RIDS and HIES, with income data for the latter survey complemented by documentation from the drought relief program. Inasmuch as the RIDS was a rural income-distribution survey and does not provide income data on the urban sector, the analysis is restricted to the comparison in rural intrasectoral income distribution.

2. THE BOTSWANA CONTEXT

Botswana is a small land-locked country of roughly 1.3 million people inhabiting an area the size of Texas or France. The country is situated in Southern African, sharing international borders with: Zimbabwe to the east; South Africa to the south; Namibia to the west; and Zambia to the north. The Kgaladagi (Kalahari) Desert occupies much (about two-thirds) of its land area. Botswana is described as semi-arid, with the majority of the population residing in the country's eastern region where the climate is less harsh and the land more fertile than elsewhere. All of its neighbors have experienced periods of turmoil in recent years. The majority populations of Zimbabwe, Namibia and South Africa engaged in protracted liberation struggles and efforts to gain equality with their minority populations. Zambia has provided material support to these struggles, drawing the wrath of the neighboring minority regimes, and has recently experienced economic, political, and social difficulties of its own. Botswana, however, has remained an island of political stability and sustained and rapid economic growth.

Independence occurred in 1966 while the country was enduring its fifth consecutive year of severe drought. Botswana was then one of the poorest countries of the world, with a per capita gross domestic product (GDP) of $80 (at constant 1985–86 prices). Botswana had an agricultural-based economy. Livestock outnumbered people four to one. The main source of economic activity for the vast majority of the population was rainfed arable agriculture in a region with low soil fertility and a high frequency of rain failure. The government was heavily reliant upon a budgetary grant-in-aid from the United Kingdom for almost all capital expenditures and roughly 40% of recurrent government expenditures.

Few observers thought that Botswana would ever become an economically viable state. Yet, against almost overwhelming odds, Botswana's economic and social achievements have been phenomenal. During 1965–89, Botswana's real rate of GDP growth averaged roughly 13% per annum, the highest rate of economic growth recorded in the world over that quarter of a century (Republic of Botswana, 1991 and World Bank, 1991). This economic performance resulted in real GDP per capita being eight times higher in 1989 than in 1966, as real GDP in 1989 equalled approximately $1,600 in 1985–86 constant prices. Botswana moved from the ranks of the low-income countries to the middle-income countries as its per capita GDP at current prices grew comparable to those of Brazil, Malaysia, and the Republic of South Africa (Republic of Botswana, 1991; World Bank, 1991).

This record of economic growth was primarily attributable to earnings from diamond-mining industry and the government's strong macroeconomic management of the resulting reserves (Republic of Botswana, 1990; Harvey and Lewis, 1990). A series of mining projects which have come on stream since 1971 — the Orapa diamond mine (1971), the Selebi-Phikwe copper-nickel mine (1977), Letlhakane diamond mine (1977), and the Jwaneng diamond mine (1982), at the time the world's largest pipes — significantly contributed to changing the structure of the Botswana economy.

The minerals sector grew at 25.3% per annum during 1974–89, with its GDP share rising from about 13% to roughly 47%. Botswana became a major supplier of gemstone quality diamonds, raising its production to 11% of the total world market output. The expansion of the minerals sector and the resulting mineral revenues stimulated the growth of the nonmineral secondary sector and the tertiary sector.[5] In particular, mineral production activities and the resulting revenues stimulated infrastructure development and financed the expansion of government services. The transmission mechanism for economic growth from the mining sector to the other sectors of the economy was through the government's (recurrent and development) expenditures of mineral revenue, which accounted for over 50% (now approaching 60%) of government revenues.

In the 1970s the national economy in general

and the rural economy in particular benefited immensely from the income and wealth yielded by the increased value added in the national herd. The herd size expanded rapidly and weight-gained improved markedly as a result of exceptionally favorable climatic conditions. With high export prices to the European Economic Community (EEC) for Botswana beef, cattle provided an important source of household income and is a form of household wealth storage for rural households and for urban dwellers who maintained close ties with their home villages. Still, the rapid pace of mineral development, growth of mineral revenues, and the resulting foreign exchange reserves and large cash balances, diminished the importance of cattle as a foreign exchange earner and as a means of storing national wealth.

By 1990, the ratio of cattle to people had declined markedly, from four to one in the late 1970s to about two to one. The decline of this ratio reflected the impact of severe and prolonged drought on the national herd, increased offtake (partially related to climatic conditions and partially related to changes in beef prices) from cattle herds, limited carrying capacity of the land, limited availability of water, and the rapidly growing human population. In recent years, increased economic opportunities and returns to investments in urban areas have also acted to provide alternative avenues for acquiring assets, storing wealth, and generating income for the enterprising citizens with access to financial capital and to the urban elite.

3. RURAL SECTOR PERFORMANCE

While rural Botswana is a cattle economy, it is also an arable economy, although the value of arable production is much lower than that of livestock. Nevertheless crop production is vital for many of the poorer people and it is the single most common productive activity. Unlike much of Africa, where arable cultivation is traditionally carried out by hand on relatively small plots which are intensively cultivated for a few years and then abandoned, in Botswana the ox-drawn plow is used for repeated cultivation of extensive areas of arable land with rather low yields per hectare. There is a strong link between cattle rearing and arable production, and access to oxen for plowing is essential for any arable farmer (Colclough and McCarthy, 1980).[6]

As indicated above, the overall performance of the economy between 1974–75 and 1988–89 was quite impressive. Not all sectors of the Botswana economy, however, performed well. Real agricultural production fell from P87.7[7] million in 1974–75 to P54.3 million in 1987–88, or by 38.1%. This figure implies that production declined at roughly 3.3% per annum in absolute terms and nearly 8% per annum in per capita terms, as the rural population grew at 3.4% per annum. The decline was attributable to both the year-to-year uncertainties of rainfall and the adverse secular trends apparent in the rural sector.

(a) *Impact of the drought*

Botswana is no stranger to drought. Drought is a fact of life, as it is present in some form, on average, seven out of every 10 years, in three of these years it is severe and widespread. The longevity of most recent drought was unusual, however, lasting from 1982–83 to 1987–88. This was only the second drought in 65 years which lasted for five consecutive years or more.

There was a severe drought in 1979–80. The rural economy had just recovered from it when the devastating six-year drought afflicted the rural sector. For much of a decade, rural households found themselves saddled with the burden of coping with, or recovering from, drought. As a result of the severity and the prolonged nature of the drought, a significant number of rural households, particularly the small and asset-poor, lost sizeable portions of income from their usual sources and many of their productive assets, including cattle, making recovery much more difficult than usual.[8] Cattle population and cereal output declined for most of the drought period.

Following the 1961–66 drought, the national cattle herd built up steadily, reaching a peak of 2.97 million head in 1981. This rapid expansion of the national cattle herd and of beef exports, which was facilitated by favorable climatic conditions, was, in part, a response to the high export prices offered by the EEC. It contributed to the economic boom of the 1970s. Then came the drought decade of the 1980s and a 30% reduction in national herd size during 1982–88. Still in 1985–86, in the middle of the drought, half of all households, 56% of rural households and 32% of urban households, owned cattle (Republic of Botswana, 1991). After falling to roughly 2.25 million in 1987, the national herd size showed an upward trend, reaching about 2.6 million in 1990.

In addition to decimating the national herd size, drought served to concentrate cattle ownership in large herds, reversing the trend toward reduced inequality which occurred during the favorable climatic period of the 1970s. Many

rural households, with or without cattle are vulnerable to drought. The 30% reduction in cattle population which occurred during the drought fell disproportionately on households with smaller numbers of cattle. Many lower income households loss their entire herds.

The distribution of cattle over time is presented in Table 1. After showing a declining tendency between 1974–75 and 1980 (from 45% to 28%), the number of farming households with no cattle rose during 1980–88 (from 28% to 38%).

Though poorer households recouped some of their cattle losses at the end of the 1980s, and the distribution of cattle improved during the recovery period, there were signs that many households had begun to diversify away from cattle to smallstock, goats and sheep. Many of these households sought a more drought-resistant alternative to cattle. Small stock holding increased significantly in number among these households, particularly among households that lacked adequate access to water and grazing land.

With regard to crop production, comparing 1974–75 and 1985–86 is the tale of two rural economies: "it was the best of times, it was the worst of times." The RIDS was carried out during one of the best crop production years on record in Botswana. The level of crop production that year was 110.2 thousand metric tons. The only year which surpassed that production figure was 1976–77, with 121.7 thousand metric tons, a record harvest. In contrast to this, the HIES was undertaken when the rural sector was in the midst of a severe drought, weakened after four consecutive years of rain failure. 1982–83 through 1987–88 were among the worst on record for crop production. Crop production averaged 15.7 thousand metric tons over the drought period, with annual production ranging from a low of 7.3 thousand metric tons in 1984–85 to a "high" of 21.8 in 1987–88.

(b) *Secular trends in the rural economy*

The secular trends which adversely affected the rural economy were: rapid population growth (Botswana has one of the highest population growth rates in the world at 3.7% per annum), population structure (distribution), growth in the size of national herd and land utilization patterns, particularly with regard to grazing land. These trends have contributed to the low and declining rural labor productivity, as well as reducing the options available to rural households — especially the lower income, asset-poor households — in coping with rain failure.

In the case of population structure, concerns have been raised with regard to two variables: the proportion of female-headed households and the dependency rate. Both of these variables were, in part, related to the age-gender selectivity of rural-urban migration.

Over time, the proportion of rural households headed by females has risen considerably. The RIDS reported that, in 1974–75, about 40% of rural households were temporarily or permanently without adult male family members. By the time the HIES was conducted, in 1985–86, the proportion had increased to over 47%. These households tend to have lower incomes, possess fewer productive assets, lack access to productivity-raising technologies, and generally have more dependents to care for relative to the number of adults in the household.[9]

The HIES provides data on the age structure of the rural and urban sector and on children per household. In 1985–86 the dependency ratio (defined as the number of people below age 15 plus the number above 65 divided by the number 15–64), was 0.72 and 1.27 in urban and rural areas respectively. The ratio of children per adult was 0.714 and 1.099 in urban and rural areas respectively. These trends are related to two factors: (i) the age-gender selectivity of migration; and (ii) the fact that a significant proportion

Table 1. *The distribution of cattle by farming households for select years (percentages of all traditional farms)**

	1974–75	1980	1988
Farming households with no cattle	45	28	38
Farming households with fewer than 40 cattle	45	51	48
Farming households with 40–100 cattle	7	14	9
Farming households with more than 100 cattle	3	7	5

Source: Central Statistics Office (1976) and Republic of Botswana (1991).
*Excluding commercial farms.

of women who have children out of wedlock leave their children in their home-village to be reared by their grandmothers.

4. INCOME DISTRIBUTION ANALYSIS

It is generally hypothesized that there is a systematic tendency for inequality to increase with rapid economic growth, particularly when starting from a low economic base.[10] This is expected to be particularly true of rapid economic growth which is the result of a commodity boom, such as the mineral-led growth of Botswana, as the direct employment effect is minimal and the existing socioeconomic structure remains, more or less intact.[11] Higher income groups, possessing more income-generating assets (productive assets, human assets, or both), are in a better position to benefit from the increased national income. Inequality increases as the incomes of the asset-rich rise at a faster rate than those of the asset-poor.

In developing countries drought is generally associated with increased relative and absolute deprivation of the rural population.[12] Relative deprivation is likely to occur as a drop in rural household production caused by drought is normally associated with the worsening of income distribution both within the rural sector, as the income-generating activities and assets of the rural poor are more drought-sensitive than those of high-income rural households.

Given the losses in agricultural production, particularly the 30% loss in the national herd which fell disproportionately on lower income rural households, increased income disparities and increased (relative and absolute) deprivation have been hypothesized to have occurred in Botswana. Both intersectoral and rural intrasectoral income inequalities were expected to have worsened.

For example, Curry (1987a, 1987b) concluded that income inequality in Botswana has increased significantly due to what he saw as declining rural household income, and income distribution becoming inherently unequal as a result of structural imbalances in the economy, government policy choices, inequalities in asset ownership, land-use and water rights, and unequal access to the limited wage-employment opportunities.[13] Colclough and Fallon (1983) hypothesized that the worsening of the distribution of cattle ownership, resulting from the drought, was permanent and would lead to a permanent worsening of the distribution of income.

> There was a permanent worsening of the distribution of cattle ownership at this time. On the basis of our analysis of the links between cattle and household incomes, this obviously implies a movement in the distribution of total rural incomes in the same direction (Colclough and Fallon, 1983, p. 145).

This section takes a further look at income distribution in Botswana based on the latest available data. An intertemporal analysis of income distribution trends is undertaken to determine the extent of changes in income inequality. The data are drawn from the 1974–75 RIDS and the 1985–86 HIES.[14]

The analysis of income distribution begins with an examination of incomes by level and source for rural households. Table 2 presents data for mean and median monthly rural household income for 1974–75 and 1985–86.

The 1974–75 median monthly income for rural households reported in the RIDS was equivalent to P173 per month (at 1985–86 prices), compared to P132 in 1985–86. In percentage terms, rural income declined by about 24% or at an average rate of about 2.4% per annum. Given that different methodologies were used to calculate noncash income and for valuation of assets in the two surveys, and the likely omission of some noncash income and government transfers sources of income for the HIES, these figures are likely to overstate the magnitude of the income decline.[15]

Average household consumption probably declined less than income, if at all. Rural households across the income spectrum were able to borrow during the drought to support household consumption. Higher income households borrowed from established financial institutions, while lower income households borrowed from rural traders.[16] In addition, the provision of public goods and services had increased significantly between 1974–75 and 1985–86. Other

Table 2. *Mean and median monthly rural household income for 1974–75 and 1985–86 (Pula per month at 1985–86 prices)*

	1974–75	1985–86
Mean household income		
Cash income	173	136
Noncash income	120	83
All income	293	219
Median household income		
Cash income	69	53
Noncash income	104	79
All income	173	132

Source: Central Statistics Office (1976 and 1988).

things being equal, these would lead to lower transactions costs in rural areas, higher quality of life, and higher levels of total consumption for rural households.[17]

The measures of income inequality attainable from both the RIDS and HIES Gini coefficients and data on income share by income group are presented in Table 3.

These data suggest that between 1974–75 and 1985–86, there were no significant changes in rural income distribution. The bottom 40% income group received the same proportion of total rural income (12%) in both years. These data reveal a shift in income share away from the top 20% income group (from 58% to 56%) toward the middle 40% group (from 30% to 32%).[18]

For rural households, the Gini coefficient has actually declined, from 0.52 to 0.48.[19] A strict interpretation of these figures would imply that rural income distribution was actually more equitable in 1985–86 than in 1974–75. Given the sampling errors accorded with such surveys, however, the difference in these two figures is probably not significant.[20]

Despite the effects of prolonged drought on the rural economy, rural intrasectoral income disparities have not worsened significantly. These results are contrary to those found elsewhere in the literature and thus require investigation. The explanation lies in an analysis of income-maintained strategy pursued by rural households, private transfers from urban extended-family members to rural households, and public transfer entitlements under the drought relief program.

5. DIVERSIFIED INCOME SOURCES AND RISK-SHARING

Given the uncertainty and adversity confronting rural living, reliance on a single production strategy (and single income source) would involve a greater degree of income volatility and risk of substantial loss than does a multiple production and diversified income-generating activity. Diversification is the principal aspect of a income-maintenance strategy by which rural households manage, spread and share the risks involved in rural living.[21]

The income-maintenance strategy pursued by rural households in Botswana includes: (a) having household members involved in a number of activities in the home area; (b) sending some household members out of the home area to seek temporary employment (generally to South Africa or within the domestic rural area) and, most recently, permanent employment in large villages and towns within Botswana; and (c) engaging household members, and more recently the government, in cost-sharing arrangements.

Table 4 presents data on rural household income by source for 1974–75 and 1985–86. The average rural household receives income from five or six different income-generating activities, including not only from agriculture, but also from rural "informal" and small-scale enterprises activities (for convenience referred to as "other activities"), as well as wage employment.[22]

These data show that wage employment and livestock farming consistently provided the major sources of rural income. The share of "other activities" and private transfers switched rankings, with regard to the contributions to rural income in the two years. During the drought substantial public transfers entered into the income function. (The rankings of these sources differ significantly among income groups.)

In much of sub-Saharan Africa, (arable) agriculture is the basis for sustaining rural incomes and rural development occurs in response to the development of agriculture. This is not the case in Botswana, even during years of good rainfall.

Table 3. *Measures of rural income distribution for total household income 1974–75 and 1985–86*

	RIDS 1974–75	HIES 1985–86
Gini coefficient	0.52*	0.48† (0.56)‡
Percentage of income accruing to bottom 40%	12	12 (11)
Percentage of income accruing to middle 40%	30	32 (28)
Percentage of income accruing to top 20%	58	56 (61)

Source: Central Statistics Office (1976 and 1988).
*For rural households.
†For people living in rural households.
‡Brackets indicate national distribution figures.

Table 4. *Rural household income by source 1974–75 and 1985–86 (percentages of total income)*

Source	1974–75*	1985–86†
Wage employment	21.5	34.5
Livestock farming	35.0	20.2
Crop farming	10.8	3.2
Other activities‡	18.5	13.4
Private transfers (remittances)	14.2	23.8
Public transfers	—	4.9

Source: Central Statistics Office (1988), and Bank of Botswana (1987); Kossoudj and Mueller (1983).
*Weights readjusted after excluding the imputed value of an owner-occupied dwelling, which on average equalled 7% of earned income.
†Estimated based on HIES and Bank of Botswana (1987).
‡Largely self-employed income from beer brewing, hunting and gathering, trading, services, basket-weaving, pottery, building, carpentry, etc.

On average in 1974–75, a year of exceptional rainfall, crop production accounted for less than 11% of income, with crop and livestock farming combined accounting for roughly 46% of income. In 1985–86, in the midst of the drought, these declined to roughly 3% and 23% respectively.

Wage employment features prominently as a source of income in both years (at 21.5% and 34.5% respectively), perhaps more so than might be expected in a country where age labor in agriculture is not a major income alternative. To have wage employment as the major income source in a drought year, when many usual employment activities would be expected to disappear requires further explanation.

Government-related employment incomes feature prominently in both years. The main sources of wage employment in 1974–75 were government services, public capital infrastructural development projects, trade and commerce, and services, particularly in large villages, and casual/temporary employment in agriculture in freehold farming areas.[23] In 1985–86, the combination of the work program components of the government's drought relief program (to be discussed in the next section), government services, and public capital infrastructural development projects provided the major sources of employment income and stimuli to other employment opportunities.

"Other activities" include a wide variety of activities ranging from small-scale manufacturing, basically beer brewing, to hunting and gathering. Income derived from this source declined from roughly 19% in 1974–75 to about 13% in 1985–86. This trend was basically attributable to the income-dampening effect of drought. For the most part, however, even in nondrought years, these activities are associated with low marginal productivity of work time which yields a low level of return. There is generally an inverse relationship between the number of items included in the set of "other activities" a household engages in and its income status.

The percentage of rural household income from these sources in Botswana is significantly lower than that of many other countries in sub-Saharan African where the percentage ranges between 28 and 43% (Kilby and Liedholm, 1986; Edwards, 1987). In many of those countries, rural nonagricultural informal and small-scale activities are predicated upon either providing inputs (basically farm implements) for agriculture, servicing implements, or processing agricultural output. In Botswana, given the weaknesses of the crop production subsector, the fact that most beef processing occurs in urban areas, with hides being exported, and the penetration of imported goods into remote areas, the income linkages are very low; backward and forward production linkages are extremely limited. These factors act to minimize returns to investments in rural nonagricultural activities, and to minimize the magnitude of the multiplier effect.

The most significant change in income sources in the two periods is combined transfers, i.e. private plus public transfers, which of course are unearned income. Many rural households must supplement their earned incomes with unearned income in the form of private transfers (remittances) and, in most recent years, public transfers. In 1985–86, on average, unearned income accounted for twice the proportion of rural income that it did in 1974–75. For the typical rural household, family member migration and resulting private transfers (remittances) are integral parts of an income-maintenance strategy based upon the diversification of income sources and risk-sharing (Stark and Lucas, 1988).

Analyzing cross-sectional data from the Botswana's 1978–79 National Migration Study, Lucas and Stark (Lucas and Stark, 1985; Stark and Lucas, 1988) observed that private transfers are positively related to the degree of drought; the worse the drought in a given area, the higher the level of private transfers. The intertemporal data presented in Table 4 lend support to these findings. Private transfers were a much greater proportion of household income at the height of the drought in 1985–86, at roughly 24% as compared to 14% in 1974–75. In these two years there were significant differences in the size and

status of the remitting workforce. In 1974–75, the domestic wage workforce was quite small as was the size of Botswana's formal sector economy. A sizeable proportion of remittances came from temporary migrants in the mines and on commercial farms in South Africa (Lucas, 1985). Over time, migration to South Africa declined considerably, as employment in the domestic labor market has increased rapidly. In 1985–86 most of the private transfers probably came from the permanent (migrants) wage workforce in the domestic labor market. Temporary migrants generally have a higher propensity to save and remit than do members of a permanent wage workforce. The level of support indicates that permanent migrants in Botswana still maintain strong links with their extended families in rural areas.

The income-distribution effects of unearned income by income group, as well as other sources of income, are reported in the HIES. These data are presented in Table 5. The relevant data for private transfers are cash gifts received and gifts in-kind. The only public transfers identified by the HIES are food and school meals.

On average, in 1985–86 total (private and public) transfers accounted for 28% of rural household income. For households with monthly income levels below P200, 40% of income was unearned, the result of private and public transfers. The middle (P200–P500) income group reported unearned income equal to 32% of their income, as compared to 17% for households with income above P500.

In Botswana, at least during the drought period, transfer entitlements acted to redistribute the gains of economic growth and, through risk-spreading of extended family members, served as an insurance mechanism compensating for drought-related income losses.

Bearing in mind that much of what was reported as "wage employment" income, and cash earnings, is derived from make-work projects under the drought relief program (DRP), the dependence on public entitlements particularly for lower income households was much more pronounced than indicated by public transfer figures alone.

Although the HIES was undertaken in the midst of severe drought, the survey was not designed to identify the contributions of transfers to rural household income, particularly those derived from the DRP. For example, it would have been desirable to identify the extent to which the DRP directly contributed to incomes derived from wage employment. In an attempt to overcome these data limitations, the next section draws upon income-related data from the DRP.

6. TRANSFER ENTITLEMENTS UNDER GOVERNMENT DROUGHT RELIEF PROGRAMS

In an attempt to ameliorate the negative socioeconomic effects of drought, to provide safety-net support for rural households, and to facilitate the recovery process, the government introduced a number of rural support programs under the umbrella of the DRP.[24]

The four components of DRP were: (a) the food distribution component (food aid and direct feeding) for the most vulnerable segments of the rural population; (b) the work programs compo-

Table 5. *Break-down of rural household income in cash and kind by income category 1985–86 (in percentage)*

	Income (Pula per Month)				
	0–100	100–200	200–500	> 500	All households
Total income	100	100	100	100	100
Gross cash income	34	44	58	83	62
— Cash earnings	11	13	24	55	34
— Business profits	7	11	15	16	12
— Cash gifts received	16	20	19	12	16
Income in kind	66	56	42	17	38
— Own produce consumed	42	33	27	11	23
— Wages in kind	1	2	2	2	2
— Gift in kind	15	11	8	3	7
— Food aid	4	4	2	1	2
— School meals	4	6	3	1	3

Source: Central Statistics Office (1976 and 1988).

nent (labor-based relief program and hand-stamping program[25]); (c) the water relief program component for drilling boreholes for rural areas; and (d) the agricultural production programs component to encourage the population not to forsake the agricultural subsector and to expedite recovery from the drought by supporting asset maintenance and rebuilding — with the accelerated rainfed arable program (ARAP) being the most significant.

The DRP contained both relief and development elements, reflecting the overall objectives of the government's "relief-development strategy," contributing to support for short-term consumption/income-maintenance/employment efforts in drought-stricken rural areas as well as to facilitate recovery and rural development at the same time. The objectives of the DRP were to: contribute to nutritional welfare and health; prevent income erosion and to support the income-maintenance strategy of rural households; prevent the "whole family" migration and to facilitate the return to farming when the rains resumed; contribute to maintaining household consumption; contribute to maintaining and expanding employment opportunities; and contribute to maintaining and expanding investments at the household, community and national levels (Hay, 1986).

Components of the DRP provided direct support, in cash and/or kind, to supplement the incomes of the rural poor and small-holder farmers, as temporary measures to deal with the problem of drought-induced rural poverty. It is estimated that during the drought approximately 60% of the rural population benefited from the DRP. Indications are that the overall program has worked efficiently with most of those requiring assistance receiving some type of support, although a few were likely to have slipped through the safety net. This helped to minimize the outflow of labor from the rural areas during the drought period.

Table 6 presents data on government drought relief expenditures and accelerated rainfed arable program (ARAP) expenditures for 1979–80 through 1988–89, for the drought and post-drought recovery period. These data indicate the magnitude of public entitlement support to the rural economy during the drought period. The total amount of government development funds spent on drought relief and ARAP over the six-year drought program, 1982–83 through 1987–88, was P237.19 million. This was the equivalent of 14% of total government development expenditures for that period, which is not insignificant in a country where such expenditures were expanding at a very rapid rate. During the year of the HIES, total nonrecurrent drought expenditures as a proportion of total government development expenditures reached its peak at nearly 18%.

Table 7 presents data on total the drought relief expenditures, i.e., those of government combined with those of donors. Combined with donor funding (excluding donor support in-kind), the total nonrecurrent expenditures on drought relief was P263.69 million in current terms, or P151.66 million at constant 1979–80 prices. Over the same period, the total contribution of the agricultural sector to GDP was only P514.1 million in current terms, or P317.7 million at constant 1979–80 prices. In other words, real total nonrecurrent drought expenditure was equal to nearly half of the contribution of agricultural sector to GDP over the period.

From the time of inception in 1985–86, ARAP, whose grants could be used for the development and cultivation of 10 hectares of land or less, became a major component of the DRP. ARAP's major objective was to provide farmers with an incentive to keep plowing in the face of drought-related uncertainty and to expand the land under cultivation as the rural economy moved toward recovery. The array of grants included under this scheme were: grants for destumping, draught power, hire for plowing, support for planting and weeding, input procurement and distribution, water development for crop farming, and fencing.

ARAP's share of total nonrecurrent drought expenditures increased from 25% in 1985–86 to roughly 48% in 1988–89. In a sense ARAP may be viewed as a short-term government-funded insurance scheme to encourage farmers to engage in and stick to high-risk crop farming. In doing so the government has assisted the rural sector in short-term risk-sharing and cost-sharing.

With the exception of the direct component, all the other components of the DRP, at least in spirit, follow the government's principle that support for rural households should be linked with productivity-enhancing expenditures. There is some doubt whether the destumping subsidies or plowing grants associated with ARAP, for example, have in fact enhanced productivity. Furthermore, the low level of productivity and the fact that a day's wages on the labor-based relief program (LBRP) do not necessarily go hand-and-hand with an honest day's work, have made the program akin to a handout program. These problems reveal another government principle (a principle of the second-best) that it is better to pay rural sector dwellers to do something constructive than to have them dependent

Table 6. *Government drought relief and accelerated rainfed arable program (ARAP) expenditures, through drought and recovery periods (in millions of Pula)*

	1979–80	1980–81	1981–82	1982–83	1983–84	1984–85	1985–86	1986–87	1987–88	1988–89
Rainfall of previous year: arable areas	−26%	+7%	+28%	−16%	−18%	−21%	−38%	−34%	−19%	+41%
					Full drought program					
Drought Relief Program										
Food and work	2.03	1.61	0.62	4.22	8.60	18.75	17.70	14.09	25.97	25.09
IFP* or FRD†	0.30	0.43	0.56	2.87	2.27	3.56	2.58	5.69	5.16	7.54
recurrent expenditure	1.02	1.07	0.36	1.19	3.35	11.53	14.80	16.44	27.24	28.32
Agriculture and water										
Subtotal	3.35	3.11	1.54	8.28	14.22	33.84	35.08	36.22	58.37	60.95
ARAP	0.00	0.00	0.00	0.00	0.00	0.00	11.81	26.30	35.20	39.32
Total with ARAP	3.35	3.10	1.54	8.27	14.22	33.85	46.89	62.52	93.56	100.27
Total nonrecurrent drought expenditures	3.05	2.67	0.98	5.41	11.95	30.29	44.31	56.83	88.40	92.73

Source: Republic of Botswana (various years) and Rural Development Unit, Ministry of Finance and Development Planning, Botswana.
*International Food Program.
†Food resources Department.

Table 7. *Combined drought relief and ARAP programs expenditures, through drought and recovery period (in millions of Pula)*

	1979–80	1980–81	1981–82	1982–83	1983–84	1984–85	1985–86	1986–87	1987–88	1988–89
Rainfall of previous year: arable areas	−26%	+7%	+28%	−16%	−18%	−21%	−38%	−34%	−19%	+41%
					Full drought program					
Government development expenditure on drought program	3.05	2.67	0.98	5.41	11.95	30.29	44.31	56.83	88.40	92.73
Donor funding of drought program*	0.81	0.39	0.23	0.74	0.71	2.20	3.35	6.65	12.85	
Total expenditure on drought program	3.86	3.06	1.21	6.15	12.66	32.49	47.66	63.48	101.25	
Total government development expenditure	98.28	121.43	121.25	160.36	140.68	209.70	247.52	405.22	558.14	797.34
Government drought expenditure/ Total development expenditure	3.10%	2.20%	0.81%	3.37%	8.50%	14.44%	17.90%	14.02%	15.84%	11.63%
Donor funding/Total expenditure on drought	26.6%	14.6%	23.5%	13.7%	5.9%	7.3%	7.6%	11.7%	14.5%	

Source: Republic of Botswana (various years) and Rural Development Unit, Ministry of Finance and Development Planning, Botswana.
*Excludes donor support in-kind, i.e., food aid.

on welfare transfers, even if what is being done is uneconomic or is not being undertaken efficiently (Arup Atkins International, 1989).

The work program component of the DRP was significant because it was a direct source of cash earnings for poorer households and (in principle) the projects were to help provide rural community assets. Work programs were labor intensive in nature, with the guiding objective being that 78% of total expenditures must be disbursed directly to participants, the remaining 22% covering recurrent cost and capital requirements.

Table 8 presents information on disbursements, employment places, and the number of participants in the LBRP and hand-stamping program for 1982–83 through 1988–89.

The work programs component of the DRP is comprised of the LBRP and the hand-stamping program. The LBRP provided income support in the form of wages for public sector projects (road and dam construction, bush clearance, etc). The hand-stamping program was associated with school feeding as women were engaged to manually pound sorghum for school meals.

The number of man-days in a work-year varies widely, of course, depending on the type and level of economic activity. Assuming a work year equal to 200 days per year, the LBRP created roughly 26,413 full-time equivalent jobs per annum. The number of full-time equivalent work places created under the LBRP is quite significant when it is recognized that in 1985, formal sector employment, which does not take into account employment on DRP, totaled approximately 105,000 in Botswana.

Through the LBRP approximately P7.9 million were disbursed per annum to an average of 70,000 participants. Each participant was engaged for an average period of 76 days per annum. This allows one participant for each of the households in the poorest 40% income group, accounting for an average of 11% of the groups income. In practice, the participation rate varied widely from district to district.[26]

The daily wages paid in the work programs compared very favorably with wages (in cash and kind) from farm employment. For example, in 1982–83 the LBRP paid daily wages of P1.50 and hand-stamping paid P0.80 per bucket, with each bucket requiring about two hours to process. That year the average farm hired labor at a daily rate of P0.80 for tending to crops and P0.54 for tending livestock, with the average rate of P0.57. The top one-third of crop farms (in terms of production) paid P1.00 for tending crops, P0.69 for tending livestock, with an average rate of P0.77 (Ministry of Agriculture, 1983). The workday under the LBRP was six hours; in contrast

Table 8. *Disbursements made to drought victims through the labor-based relief program and hand-stamping program, 1982–83 to 1987–88*

LBRP	1982–83	1983–84	1984–85	1985–86	1986–87	1987–88
(1) Total disbursements to participants	2,792,457	5,045,318	5,933,747	7,273,494	8,448,210	13,220,110
(2) Total number of places	21,300	38,500	41,040	42,054	45,207	61,309
(3) Total number of participants	30,000	70,000	70,000	77,000	75,000	90,000
(2)/(3) Participants per place	1.41	1.82	1.71	1.83	1.66	1.47
(1)/(2) Disbursements per place	131.10	131.05	144.58	172.96	186.88	215.63
(1)/(3) Disbursements per participant	93.08	72.08	84.77	94.46	112.64	146.89
Wage rate per six-hour day (in pula)	1.50	1.75	2.00	2.00	2.25	2.50
Hand-stamping	1982–83	1983–84	1984–85	1985–86	1986–87	1987–88
(1) Total disbursements to participants	581,900	937,550	720,000	845,557	920,000	920,000
(2) Total number of places	3,200	4,300	3,356	4,014	4,320	4,550
(3) Total number of participants	6,000	7,000	5,000	7,000	7,500	8,000
(2)/(3) Participants per place	1.88	1.63	1.49	1.74	1.74	1.76
(1)/(2) Disbursements per place	181.84	218.03	214.54	210.65	212.96	202.20
(1)/(3) Disbursements per participant	96.98	133.94	144.00	120.79	122.67	115.00
Wage rate per bucket (in pula)	0.80	1.00	1.25	1.25	1.50	1.75
Totals of both support programs						
Total disbursements to participants	3,374,357	5,982,868	6,653,747	8,119,051	9,368,210	14,140,110
Total number of places	24,500	42,800	44,396	46,068	49,527	65,859
Total number of participants	36,000	77,000	75,000	84,000	82,500	98,000
Weighted average disbursement per place	137.73	139.79	149.87	176.24	189.15	214.70
Weighted average disbursement per place	93.73	77.70	88.72	97.28	113.55	144.29

Source: Republic of Botswana (various years).

the workday of a hired farm laborer ranged up to 10 hours of more strenuous work. These data indicate a large degree of unearned transfer payments in the work programs.

Between 1982–83 and 1988–89, the LBRP and hand-stamping program combined created an average of 30,560 full-time equivalent work places per annum. Through work-sharing arrangements in 1985–86 84,000 participants were assisted with the average participant receiving roughly P97 in support. By 1987–88, the number of participants had risen to 90,000 and the support per participant had increased to P144. With an estimated 188,000 individuals engaged in agriculture as family labor in the nondrought year 1981–82, the 84,000 participants in the work programs in 1985–86 was the equivalent of providing assistance to 45% of the family farm labor force.

It is significant that the work programs were designed on a cash-for-work basis instead of a food-for-work basis. In Botswana, the preference of cash-for-work over food-for-work was a result of at least four factors. First, the penetration of monetary activities into the rural sector and the fact that rural households generally purchase a significant part of their food requirements from small village trading stores made cash-for-work a viable option. Second, cash-for-work programs were administratively easier to manage than food-for-work programs. The former program conserved on the use of Botswana's scarce administrative manpower and eliminated the need for donor agencies to assist in administering the program.[27] Third, being in a strong financial position, the government was able to commit itself to cash programs, and thus did not have to rely heavily on donors food aid and support to distribute food. This is not to say, of course, that donors were not supportive of the government's DRP. Table 7 shows that on average between 1982–83 and 1987–88 donor funds accounted for over 10% of total expenditures on drought relief. This figure would have been even greater if donor support in-kind were included.[28] Finally, cash programs generate a greater multiplier effect, indirectly supporting other rural activities and facilitating recovery after the drought ends.

By injecting income supplements into the rural economy, the work programs undoubtedly created additional local purchasing power, helping to sustain employment opportunities and "other activities." Trade and commerce are two examples. Rural households normally spend a sizable proportion of their income on food purchases. Obviously the need to purchase food increased during the drought. A network of rural trading stores and cooperative shops exist. Through the provision of cash-for-work opportunities during the drought, the government indirectly helped these trading stores survive and maintain their profitability. As indicated earlier, traders in turn loaned their excess profits to lower-income rural households.

In 1985–86 the total monetary value of transfer entitlements injected into the rural economy by the DRP, excluding other government programs and employment related to the provision of government services and development projects, equalled 11.1% of total rural household income. Given the targeting of drought relief support to lower income households, the impact on this group's household income is likely to have been significantly greater than indicated by this figure. Unfortunately, the HIES does not allow us to identify sources of transfers or the contribution of drought relief support to income by household category.

From the data presented above, it is evident that government (and donor) drought relief support for the rural sector played a major role in sustaining the rural sector and rural household incomes during the six-year drought and into the recovery period. With much of this support targeted toward the rural poor and vulnerable groups, the distribution of income in Botswana has not worsened to the extent that trends in agricultural sector production and the sector's contribution to GDP would lead one to expect.

7. CONCLUSIONS

The Botswana case appears to yield results contrary to what would normally be expected in a country with rapid mineral-led economic growth and declining agricultural sector production, resulting from drought and secular changes. There is no evidence of a significant worsening of income inequality. The explanation lies in rural household income diversification which cushioned the decline of rural incomes and significant transfer entitlement guarantees from both private and public sources, supplementing rural incomes. Much credit is attributed to the government drought relief program.

Harvey and Lewis (1990, p. 281) express disappointment "that there was no evidence of improvement in rural income distribution, or of improvement in the income of the poorest 40%, despite all the announced intentions of the government in those fourteen years." I beg to differ. Given the severity and longevity of the drought, leaving rural households with a decade of coping with and recovering from drought, with the HIES undertaken in the midst of it all, it is

surprising that rural income distribution had not worsened significantly.

If absolute deprivation occurs where drought gives rise to, and reveals, entitlement failure, then Botswana's experience reveals a transfer entitlement guarantee system which has all but negated the income-reducing and income-distributional effects of drought. While rural poverty is not about to disappear and a large segment of the rural population is still living on the margin of subsistence, the government can take comfort from the fact that the income-maintenance system, in which transfer entitlements have increasingly played a major role, worked extremely well in providing down-side protection.

The ingredients for success of the income-maintenance system were as follows. First was what Holm and Morgan (1985) identified as Botswana's most important natural advantage in developing a drought response system: its drought proneness. The rural population and the government have had much practice at coping with rain failure, and by necessity have been required to develop strategies to minimize the possibilities for disaster. This experience has led to the evolution of appropriate institutional arrangements. At the household level, an income-maintenance system based on income diversification, risk-spreading and cost-sharing evolved. At the national level, a fairly efficient early-warning, monitoring procedure, resource-mobilization, and transfer entitlement system has evolved.

Second was the existence of strong linkages between the urban-based wage workforce and the rural population, with much of the urban labor force being first-generation, permanent wage earners and still considered part of the rural household decision-making unit. They remain an extension of the rural household; extended family members still have strong entitlement to the incomes of urban-based relatives in the form of private transfers. Through these linkages, rapid urban-based economic growth was transformed into rural household income growth, contributing to the stabilization of intersectoral and intrasectoral income differentials.

Third was the high level of cash balances and foreign exchange holdings which the government had in reserve — a result of the benefits of mineral-led growth and strong macroeconomic management. With finances at the time not proving to be a constraint on economic growth and development, the government was able to support a comprehensive drought relief program without squeezing the urban sector or reducing real urban incomes. This is not to say that the availability of finances was a sufficient condition to ensure transfer entitlement guarantees. As Sen (1981) points out, extreme absolute deprivation has been known to occur in circumstances where major sectors of an economy have experienced economic and production booms. Both willingness and ability are required to secure entitlement guarantees. The favorable financial position allowed the Botswana government to pursue a finance-intensive approach to drought relief, without posing short-term growth and income tradeoffs.

It should be recognized, however, that while the DRP was quite successful in providing short-term income support for rural households, the objective of ensuring that income support be associated with investment in long-term productive capacity was probably not achieved. A study of the long-term effects of the public transfer entitlements is a subject for future research.

NOTES

1. The concept of "entitlements" here is used as adopted within the analytical framework of Sen (1981 and 1983), where entitlements refer to "the set of alternative commodity bundles that a person can command in a society using the totality of rights and opportunities that he or she faces" (Sen, 1983, p. 754). Within this framework famine is associated with entitlement failure.

2. In the absence of detailed statistical data, relying upon impressionistic data, Curry (1987a and 1987b) concludes that income inequality in Botswana has increased significantly. Hay, Burke and Dako (1985) adopt a more cautious approach, pointing out that a number of indicators suggest that rural incomes have declined, but hesitate to speculate on the extent to which this had occurred.

3. The data from the "Rural Economic Survey" (Bank of Botswana, 1987) lend some support to the Curry conclusion of drastically declining rural incomes and significantly widening income disparities. That survey, however, with the exception of incomes from livestock and crop production, focuses on the monetarized rural economy, ignoring nonmonetarized (in-kind) sources of income and public transfers. This limits its contribution to the income-distribution debate.

For further discussion on the survey's shortcomings see Harvey and Lewis (1990).

4. A household expenditure survey was carried out in 1978–79 as part of the National Migration Study. Unfortunately, the study had to be organized in such a way as to concentrate on obtaining accurate immigra-

tion statistics, and rather less attention was paid to the household expenditure part of the work. The expenditure data from this latter study were thought to be understated and were never published.

5. The secondary sector is comprised of the minerals industry, manufacturing, and construction. The tertiary sector is comprised of water and electricity supply, commerce, transport and communication, finance, social and personal services and government services.

6. Colclough and McCarthy (1980) write that: "Furthermore, mixed pastoral and arable production provides some security against the extreme uncertainties of Botswana's rainfall. Livestock rearing, which depends more on the total rainfall in any year than on its seasonal variation, is a more resilient activity in the face of climatic uncertainty than is arable farming. In years of good rainfall, when crops grow to harvest, people live off the arable produce while the numbers of cattle, sheep, and goats increase. In bad years, when the crops totally fail, livestock are available for consumption-especially smallstock — or, more usually in the case of cattle, for sale to purchase food. Only in times of successive and severe drought, such as was experienced during the mid-1960s, does a significant proportion of the cattle herd die as a result of lack of grazing or water" (p. 111).

7. Botswana's national currency is the pula. In December 1990 one pula (P1) was equal to roughly $0.53 (US dollars).

8. While the drought effects on rural activities, primarily arable agriculture and livestock raising, have been devastating, the toll in terms of human life and property was minimal. This is a result of the scope and efficiency of the government's drought relief program. For discussion of the institutional and efficiency aspects of the Botswana drought relief program see: Quinn *et al.* (1988), Hay, Burke and Dako (1985), Holm and Cohen (1986), Holm and Morgan (1985), and Morgan (1986).

9. There are indications that the focus on the issue of rural population structure on agricultural production may be misplaced. Lucas (1981) and Mueller (1984) are of the opinion that population structure is a reflection of weaknesses within the rural sector itself. For example, Lucas (1981) writes: "It is not . . . surprising that men find [migration to South Africa to take-up] mine work extremely attractive . . . (T)he ability of crop farming in the tribal areas, as presently organized, to meaningfully absorb extra labour of either sex is negligible. Only if other inputs are simultaneously increased can such absorption be seriously contemplated" (p. 56). For further discussion, see Mueller (1984) and Watanabe and Mueller (1984).

10. See Lecaillon *et al.* (1984) for a discussion of this and other hypotheses of relationships between growth, poverty and inequality, and supporting empirical evidence.

11. For example, Lewis (1984, p. 158) writes: "Mining development, it seems, generally lead to a form and pace of use of mineral rents that returns the country to external payments equilibrium with a pattern of resource use that makes the distribution of income worse, the economy less diversifies, export earnings more concentrated in primary products, and (possibly) the growth rate of the nonmining sectors of the economy lower than they would be without the mineral developments."

12. For discussions on relative and absolute deprivation, see Sen (1981 and 1983).

13. Curry (1987b) paints the following picture of economic growth and development trends in Botswana: "Aggregate economic growth without broad social and economic development centralizes benefits among relatively few people and virtually disenfranchises the majority from progress. Benefit-sharing in Botswana is far from even, or even reasonably equitable. A growing inequality in asset ownership — mainly land, cattle, and access to water — as well as in productive employment, could threaten Botswana's growth and stability. That (mineral-led) pattern of growth is producing two Botswanas — one rich and the other poor — and this poverty amidst plenty is disillusioning many Botswana. Their disillusionment could threaten the foundation upon which progress has been based. What emerges is the intrinsic need for enlightened policies to widen access to employment and income-earning, and asset accumulation" (p. 487).

14. See Valentine (1990) for a detailed discussion on comparing the results of the two surveys.

15. In comparison to the HIES, the RIDS put much more emphasis on valuation of imputed income, and went to great lengths to estimate the value of many types of items in rural household income. For example, values were imputed for owner-occupied housing (which accounted for a relatively large proportion of income of low-income households) and gains in weight of cattle (which accounted for a relatively large proportion of income of high-income households). The HIES was much more cautious in its approach regarding the types of items for which imputed valuations were made. The differences in approaches are related to two factors: (a) the rural economy had become more monetarized between the period of the two surveys; and (b) there was a conscientious attempt on the part of the HIES advisors to minimize the extreme difficulties encountered by the RIDS in undertaking substantial calculations of imputed incomes for a large range of nontraded goods, for which the reliability of the results would be questionable. For discussion see: Harvey and Lewis (1990) and Valentine (1990).

16. The Bank of Botswana (1987) study provides information on the level and sources of rural borrowing. Rural traders took part of their profits made during the drought and gave credit or loaned them to poorer rural households, with interest of course.

With the exception of higher income rural house-

holds, credit from financial institutions is not available. Most of the borrowing done by lower income households is from rural traders, and at least in 1985–86, was done for consumption purposes, to purchase assets or make improvements on land.

Borrowing for consumption by rural households is not uncommon during periods of uncertainty and drought, in the long term the capacity to borrow for this purpose may prove important for agricultural/rural production and mitigating against emigration from rural areas.

17. See Harvey and Lewis (1990) for discussion of the expansion of public goods and services in rural Botswana over this period.

18. The factors contributing to the shift in income share away from the top income group toward the middle group are unclear. The differences in treatments of cattle wealth in the two surveys may be a major explanatory factor. It is uncertain, however, what impact the addition of imputed valuation of the net gains in cattle weight would have had on income levels and income distribution. Net gains in weight were likely to be negative for almost all farmers in the drought year of 1985–86. While the proportion of net weight losses were generally inversely related to income levels (status), income from cattle is quite skewed toward higher income groups.

19. The value of the Gini coefficient at 0.48 in 1985–86 was significantly smaller than the Gini coefficient of 0.73 reported by the Bank of Botswana (1987) in its rural economy survey. As indicated above, however, that survey focuses on the monetarized rural economy, ignoring non cash (in-kind) sources of income and public transfers. Income (distribution) surveys on Botswana have shown that cash income is much less equitably distributed than total household income, i.e. cash and noncash. Lower income households generally received a much larger proportion of their incomes in a noncash form as compared to higher income households. The percentage of income received by lower income rural households in noncash form was 71% in 1974–75 and over 61% in 1985–86, according to the RIDS and HIES respectively.

20. It should be noted that the income distribution data used to calculate the Gini coefficient in the two surveys were not the same. The RIDS coefficient was based on per household income distribution data, while the HIES was based on per person data. There is evidence that strong positive correlation is likely to exist between household income and household size, with the result being that a Gini coefficient calculated on per person income distribution data may be expected to be lower than one calculated on a per household basis. For further discussion on this point see Lecaillon *et al.* (1984).

21. For general discussions of rural household coping strategies in drought periods, see Fleuret (1986) and Corbett (1988). For a detailed discussion on work-sharing, risk-sharing, and cost-sharing in the rural economy in Botswana, see Ministry of Agriculture (1989).

22. In theory, the income-security-minded household will divide the time and efforts of its members among the various income-generating activities available to it up to the point where it equalizes the expected marginal returns (addition to income).

23. For a detailed discussion on wage employment sources in 1974–75, see Colclough and Fallon (1983).

24. For discussions of institutional characteristics of drought relief programs in Botswana, see Asefa (1991), Hay, Burke and Dako (1985), Quinn *et al.* (1988), Holm and Morgan (1985), and Morgan (1985).

25. Hand-stamping is a process, generally undertaken by women, where grain is manually pounded to separate the grain from its shell. This is a stage of the manual mealing process.

26. Hay, Burke and Dako (1985), in their study of the socioeconomic assessment of drought in Botswana which used survey data collected for six villages, found that household participation rates varied from as high as 72% to low as 13%.

27. Both Holm and Morgan (1985) and Harvey and Lewis (1990) indicate that the ability of the government to hire expatriate manpower to coordinate activities such as drought relief greatly assisted in the efficiency of the government program. In part, this was related to the favorable financial position of the government.

28. Holm and Morgan (1985) indicate that on a per capita basis donor support to Botswana's drought relief effort was much higher than some other African countries that were in a less untenable financial position. Donors like to be identified with a successful program.

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