DRAFT

Environmental Profile

of

The Kingdom of Lesotho

prepared by the

Arid Lands Information Center
Office of Arid Lands Studies
University of Arizona
Tucson, Arizona
85721

AID RSSA SA/TOA 77-1
National Park Service Contract No. CX-0001-0-0003
with the U.S. Man and the biosphere Secretariat
Department of State
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THE UNITED STATES NATIONAL COMMITTEE FOR MAN AND THE BIOSPHERE
Department of State, IO/UCS
WASHINGTON, D. C. 20520

An Introductory Note on Draft Environmental Profiles:

The attached draft environmental report has been prepared under a contract between the U.S. Agency for International Development (AID), Office of Forestry, Environment, and Natural Resources (ST/FNR) and the U.S. Man and the Biosphere (MAB) Program. It is a preliminary review of information available in the United States on the status of the environment and the natural resources of the identified country and is one of a series of similar studies now underway on countries which receive U.S. bilateral assistance.

This report is the first step in a process to develop better information for the AID Mission, for host country officials, and others on the environmental situation in specific countries and begins to identify the most critical areas of concern. A more comprehensive study may be undertaken in each country by Regional Bureaus and/or AID Missions. These would involve local scientists in a more detailed examination of the actual situations as well as a better definition of issues, problems and priorities. Such "Phase II" studies would provide substance for the Agency's Country Development Strategy Statements as well as justifications for program initiatives in the areas of environment and natural resources.

Comments on the attached draft report would be welcomed by USMAB and ST/FNR and should be addressed to either:

James Corson
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IO/UCS/MAB
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Washington, D.C. 20520

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Office of Forestry, Environment, and Natural Resources
U.S. AID
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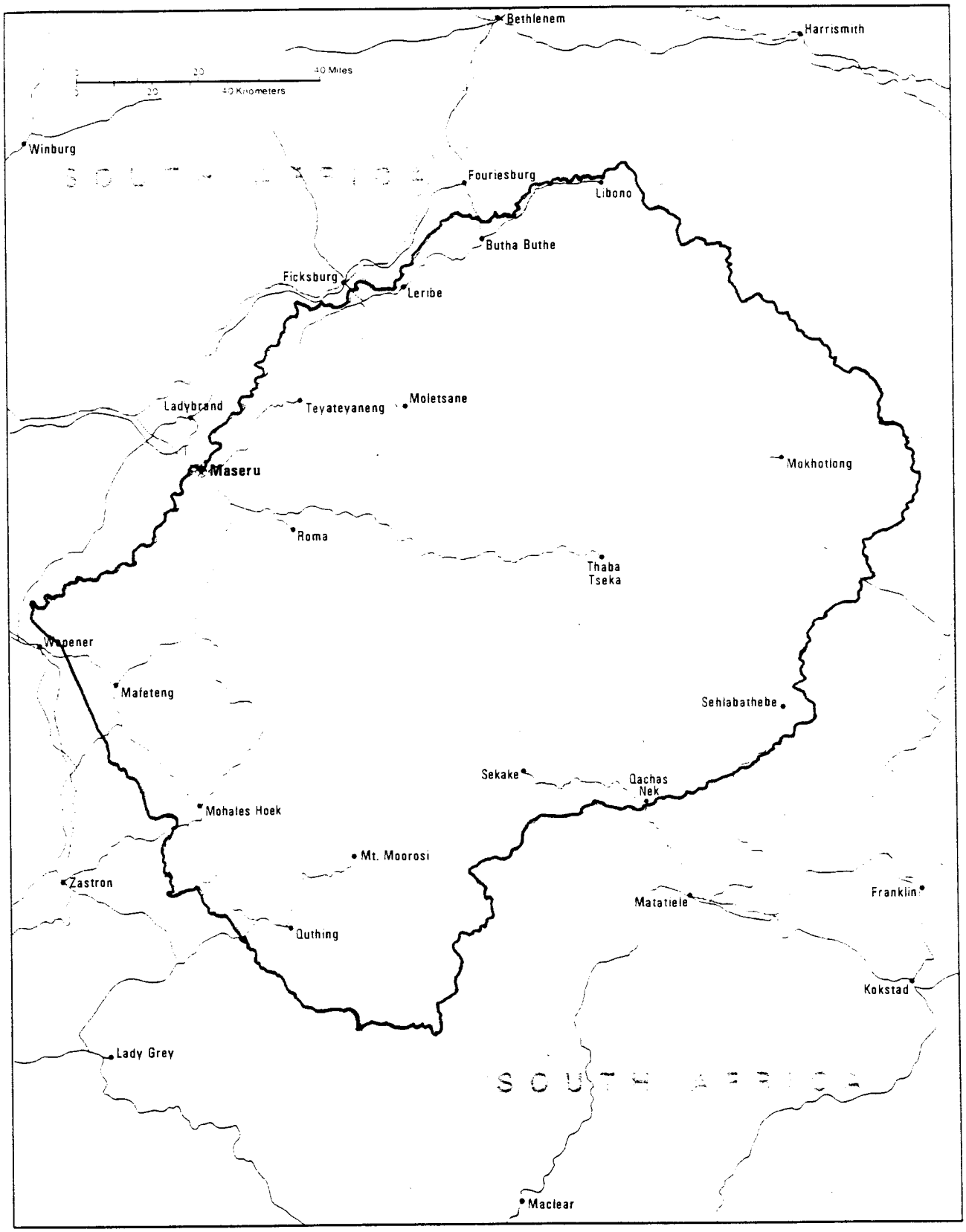

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Lambert Conformal Projection
Standard parallels 6° and 30°
Scale 1 : 500,000

Railroad
Road

SUMMARY

The Kingdom of Lesotho is a tiny, land-locked enclave, completely surrounded by South Africa. It lies atop the highest part of the Drakensberg escarpment and on the eastern edge of the South African plateau. The eastern two-thirds of the country is mountainous with elevations in excess of 3,350 m, heavy rainfall and a barren, bleak landscape of rocks and grasslands. The western third of the country descends through hills and is marked by many deep cut valleys that are arid or receive much less rainfall than the mountainous region. Lesotho is economically one of the world's least developed countries; some have listed its resources as people, water, and scenery. Soils of the mountains are fertile and black and support a rich montane grassland; soils of the western region are sandier, easily erodable and support a poorer grassland. The marked physical contrast between the eastern and western half of the country also is reflected in the distribution and density of the population, which is almost entirely Basotho. More than two-thirds of the population live in the western lowlands and a few upland valleys, while much of the bleak and inhospitable eastern region has a very small population. Population pressure has resulted in serious soil erosion in the settled regions. These problems have been compounded by an unusual land tenure system that requires cultivation of the land and permits unlimited communal grazing privileges. Population pressure and declining productivity have resulted in the country's inability to feed or support itself. This has precipitated an annual migration of nearly 20 percent of the labor force to South Africa, upon whom they are dependent for paid employment in the mining industry.

Lesotho faces a difficult future because only about 12 percent of the country is arable, there are few natural resources and agricultural productivity is very low and declining. The country does have abundant water resources, although soil erosion and heavy river sediment loads have prevented effective harnessing of this resource for hydroelectric purposes. Numerous agricultural improvement and conservation programs have been implemented, although positive results from these programs are many years away. Lesotho's main economic asset may be its scenic beauty, which because of poor roads and other factors has not yet been exploited extensively. Lesotho's main environmental problems, approximately in order of severity, are the following:

Soil erosion. Loss of soil and declining soil productivity are Lesotho's most serious environmental problems. Gully or "donga" formations were recognized a century ago, and have steadily worsened. Numerous conservation efforts have failed to reverse the trend. Much responsibility for soil erosion appears to lie with the land tenure system which is no longer

suitable for Lesotho's rapidly growing population. The land tenure system urgently needs restructuring. Erosion is also augmented by frequent and sudden changes in climatic cycles that precipitate renewed gully erosion.

Overgrazing and loss of native flora and fauna. Overgrazing is recognized as an important contributing factor to soil erosion and loss of native flora and fauna. Part of the responsibility for overgrzing lies with a land tenure system that allows unrestricted grazing privileges. Other factors include an increasing human population and the resultant increase in livestock numbers which now far exceeds carrying capacity. Many of the most valuable native species in highlands have now been replaced by inferior species as a result of overgrazing.

Overpopulation. Lesotho has a very high population growth rate. Most of the population is crowded into the western third of the country, placing even greater pressure on limited resources. Most of the resident population is engaged in agriculture, but because of a serious shortage of land, permanent damage caused by soil erosion increases pressures on arable land. About half of the male labor force now undertakes an annual migration to South Africa where they are employed in mining.

Lack of skills in administration, planning, and policy. Lesotho has a chronic shortage of personnel skilled in administration, planning, policy and various technical fields. This is viewed as a major constraint to successful implementation of beneficial environmental programs, and a constraint in the agricultural sector where production is very low and knowledge of important new techniques are badly needed.

1.0 Introduction

This draft environmental profile summarizes information available in the United States on the natural resources and environment of the Kingdom of Lesotho. The report reviews the major environmental problems of the Kingdom of Lesotho and the impact of the development process upon resources and the environment. This draft report represents the first step in developing an environmental profile for use by the U.S. Agency for International Development (U.S. AID) and government officials of Lesotho. The next step in this process should be a field study to evaluate the information presented here, to obtain additional information, and to define the issues, problems, and priorities in greater detail. This entire process should help provide direction in future efforts to deal with the management, conservation, and rehabilitation of the environment and natural resources.

The information and interpretations in this report are preliminary and are not intended to attain the detail and accuracy required for development planning. The report represents a cooperative effort by the Man and the Biosphere (MAB) project staff of the Arid Lands Information Center (ALIC). This report was prepared by Steven L. Hilty, and edited by Mercy A. Valencia. The resources of ALIC, the University of Arizona Library, and the cooperation of James Corson, AID/MAB Project Coordinator, and other AID personnel are gratefully acknowledged.

Comments on the attached draft report would be welcomed by USMAB and DS/ST and should be addressed to either:

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2.0 General Description

2.1 Geography and Climate

2.1.1 Size and Location 1/

The Kingdom of Lesotho is a tiny mountainous country completely surrounded by South Africa. Located approximately beween 28 and 31° S and 27 and 30° W, Lesotho forms the highest part of the Drakensberg Escarpment on the eastern rim of the South African plateau (Fig. 1). Its area is 30,344 square km, or about the same size as Belgium and twice the size of nearby Swaziland. Lesotho forms an enclave within the Republic of South Africa and is one of only two independent states in the world that is completely encircled by another country (the other is San Marino in western Europe). This fact emphasizes Lesotho's tremendous dependence on South Africa. Lesotho's boundaries are encircled by three of South Africa's provinces: Natal, the Orange Free State, and Cape Province.

2.1.2 Relief and Geographical Features 2/

About two-thirds of Lesotho is very mountainous, a fact that has earned it the nickname, "the Switzerland of South America." Elevations in the rugged eastern half of the country are mostly above 2,400 m and the highest peak in continental South Africa, Mont Aux Sources, exceeds 3,350 m along the eastern border of Lesotho. Many high peaks in this region are often covered with snow. The remainder of Lesotho has the general form of a shallow basin, gradually sloping downward toward the western border. The Drakensberg Range forms the entire eastern and northeastern boundary and terminates abruptly in a long escarpment just east of the border. Several spur ridges, such as the Maluti (or Maloti) Mountains, arise near the northeastern end of the Drakensberg Range and

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1 Sources: Encyclopedia Britt. 1975.
Europa Publ. 1978, 1980.
Smit. 1967.

2 Sources: Europa Publ. 1978, 1980.
Kurian. 1980.
Smit. 1967.

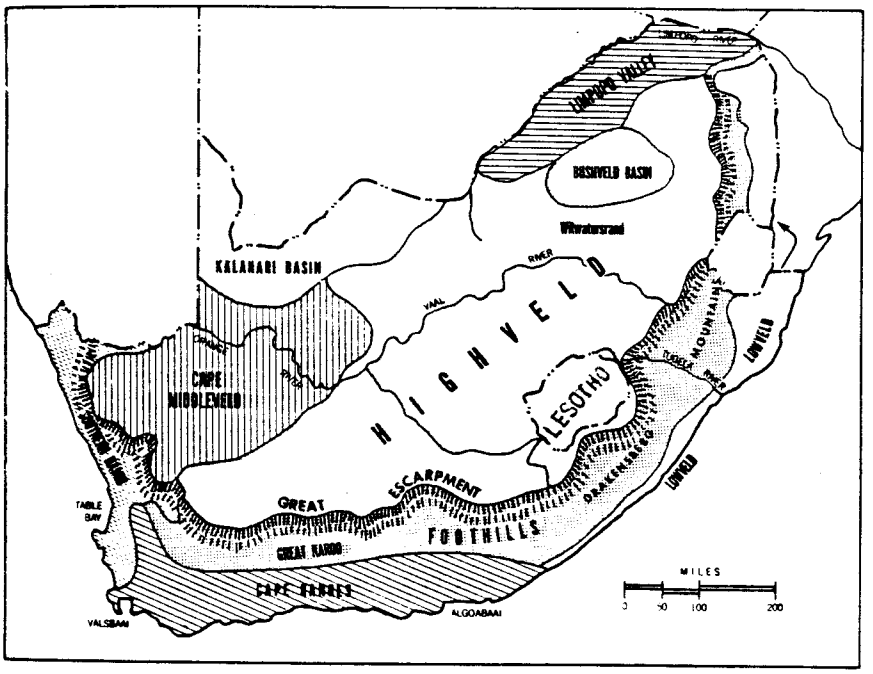

Figure 1. Location of Lesotho in Relation to Major Topographic Features of Southern Africa

Source: American University. 1971.

trend southwesterly across the entire length of the country. The southwesternmost section of the Maluti Mountains is known as the Thaba Putsoa Range and a southeastward trending spur from the Maluti is known as the Central Range (see Fig. 1 and 2). Although these mountainous regions are strongly dissected by narrow, steep-sloped valleys, they have generally retained a plateau-like appearance. In the extreme northeastern corner where the Maluti Range joins the larger Drakensberg Range, a large plateau is formed; it lies between 2,700 and 3,200 m. This plateau is the source of South Africa's two largest rivers, the eastward-flowing Tugela and the westward-flowing Orange River, as well as tributaries of the Caledon which drain the entire northern slope of Lesotho. The northwest-facing slope of the plateau-like Maluti Mountains also forms a long escarpment that stretches from northeast to southeast across most of the country.

Westward the land descends through a foothill zone of rolling country between 1,800 and 2,100 m to a narrow lowland zone at about 1,500 to 1,600 m along the northwestern and western border. The mountains, foothills, Orange River Valley, the lowlands, and the border lowlands comprise five topographical and geographical regions that can be distinguished (Fig. 3). They are discussed separately below.

2.1.2.1 Mountains

This region comprises about 58 percent of the country but contains only a small fraction of the population. It is a region of rugged relief, bleak climate and heavy annual rainfall. The plateau-like mountains, most of which lie above 2,700 m, are characterized by very steep slopes and deep valleys. In general the slopes are too steep and the soils too shallow and infertile for cultivation. Despite this fact, subsistence agriculture is often practiced, resulting in serious soil erosion.

2.1.2.2 Foothills

This region lies between about 1,800 and 2,100 m in elevation and forms an irregular zone between the lowlands to the west and the mountains to the east (Fig. 3). This is the main watershed of the

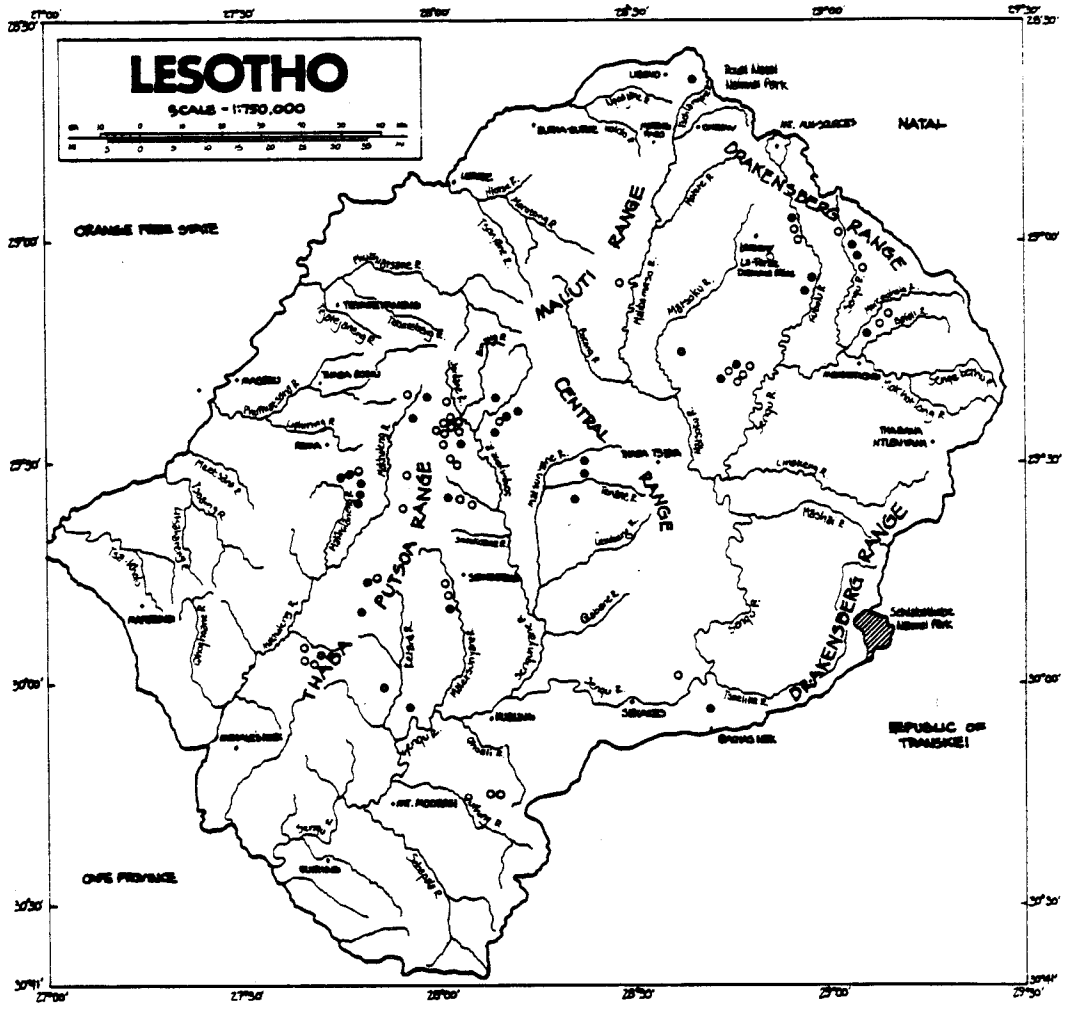

Figure 2. Map of Lesotho Showing Location of Principal Mountain Ranges

Source: Beverly. 1979.

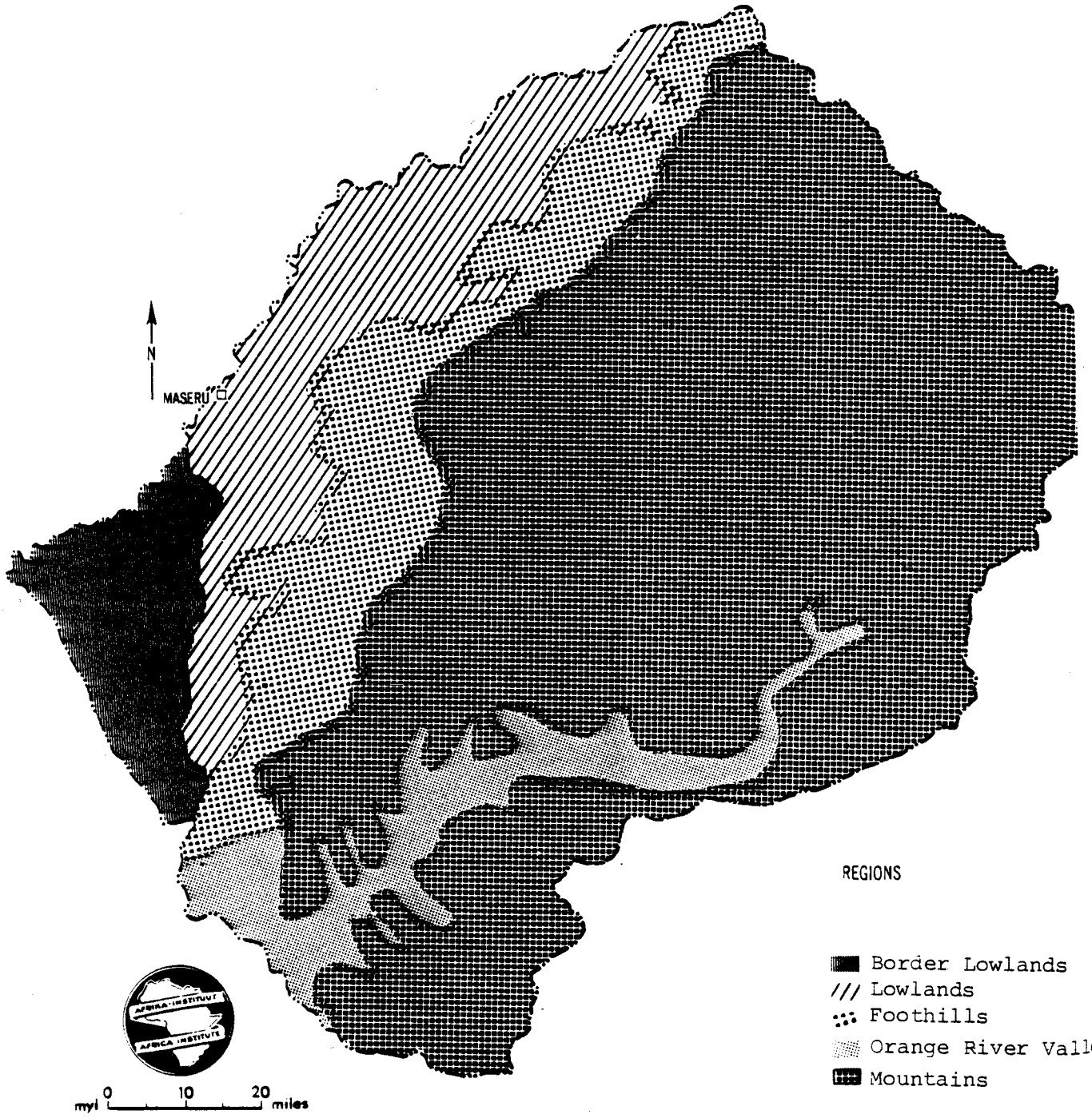

Figure 3. Five Major Geographical Regions: Border Lowlands, Lowlands, Foothills, Orange River Valley, and Mountains

Source: Smit. 1967.

Maluti Mountains and stretches for a distance of about 240 km along their northwest-facing slopes. The foothills zone comprises only about 15 percent of the land surface but contains some of the most fertile soils in the country and is fairly densely settled. Most of this area is under cultivation.

2.1.2.3 Orange River Valley

The Orange River Valley forms a long narrow wedge from west to east across the southern part of the country. Elevation and climate of this zone are similar to the lowlands northward but differ markedly from the adjacent mountain slopes. The region supports a fairly dense population and several important crops are grown here, including maize, kaffircorn and summer wheat. This region comprises about nine percent of the total land area.

2.1.2.4 Lowlands

This hilly region adjoins the Caledon River and stretches from the northeastern border of the country westward and southward to the western border. It comprises about 11 percent of the surface area and lies between about 1,500 and 1,850 m in elevation. This is the site of the capital city, Maseru, and is the most densely populated region in the country. The lowlands differ from the next region, the border lowlands, in having slightly higher rainfall and more fertile soil. Maize and kaffircorn, rather than wheat, are the main crops.

2.1.2.5 Border Lowlands

This small region forms the extreme northwestern tip of the country. It comprises only six percent of the total area and lies mostly at about 1,500 m elevation. It is the driest region of the country, and is characterized by an impoverished sandy soil which has been seriously eroded. Wheat is the principal crop.

2.1.3 Rivers, Lakes, and Drainage 3/

The main river systems are shown in Figure 4. The Caledon and Orange Rivers, together with their tributaries, drain over 90 percent of the country. The Caledon River forms the entire northern boundary of Lesotho, and drains the northwest-facing escarpment of the Maluti Mountains, as well as much of the lowland and border lowland areas. The largest proportion of the country is drained by the Orange River and its two main tributaries in Lesotho, the Makhaleng and Singunyane Rivers. This river system drains almost all of the eastern, central, southern, and western parts of the country. The Orange River, the largest river in southern Africa, takes its sources from the western slopes and plateaus of the Drakensberg Range. The abrupt, east-facing Drakensberg escarpment along the eastern border of Lesotho is drained by the Tugela River which flows eastward across the Republic of South Africa to the Indian Ocean.

There are no lakes of any importance in Lesotho.

2.1.4 Climate 4/

The climate of Lesotho is notably varied because of great variation in relief, but is generally dry and rigorous with extremes of heat and cold. The climate of the lower elevations is subtropical; that of higher elevations is more typical of temperate latitudes.

The tropical belt of high atmospheric pressure that circles the globe between about 25° and 30° south latitude dominates the climate of the South African landmass. During the austral winter it is continuous over both the land and sea but during

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[3] Sources: Europa Publ. 1978, 1980.
Kurian. 1980.
Smit. 1967.
U.S. Dept. State. 1979.

[4] Sources: Eckert. 1980.
Europa Publ. 1980.
Kurian. 1980.
Schulze. 1976.
Smit. 1967.

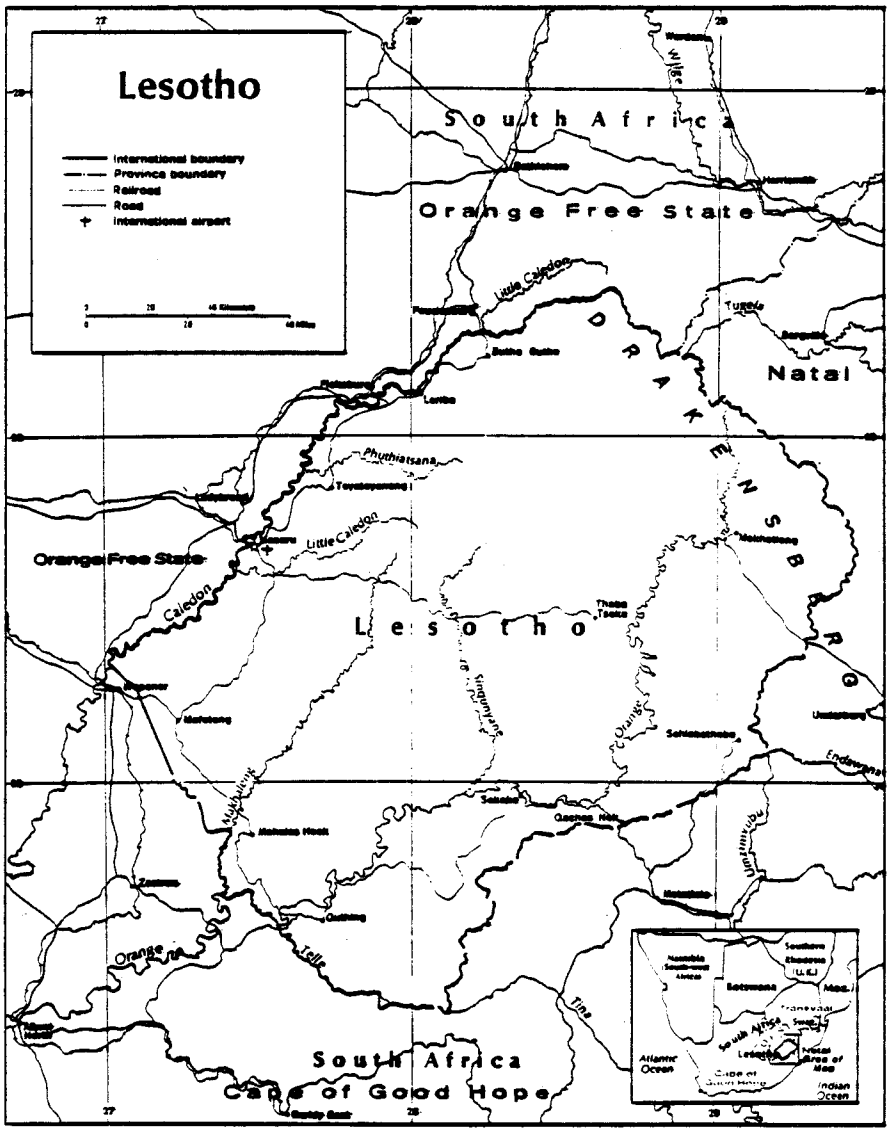

Figure 4. Major Rivers and Drainage Systems

Source: U.S. Department of State

the summer months is replaced by a low pressure center that dominates the climate of the landmass. The interaction of these two wind systems, together with relief and elevation are the major factors influencing Lesotho's climate.

Temperature. Temperatures are strongly influenced by elevation, in general being highest in the west and gradually decreasing eastward with increasing elevation (Fig. 5). Mean annual temperatures in the western lowlands range from 32°C (90°F) in the summer to -6.6°C (20°F) in the winter. Mean temperatures in the highlands range from 15.5°C (60°F) to as low as -18°C (0°F). The mean annual temperature at Maseru, the capital, is 15.2°C (60°F). The average number of days per year with a minimum temperature of less than 0°C (-18°C) increases from 50 in the west to 90 or more in the east (Fig. 6). This factor has a great influence on farming in Lesotho and limits most agriculture to the western and lower elevation regions of the country. Additional temperature data is shown in Appendix I.

The average date for the first frost occurrence is May 1st in the west, and about April 10th in the eastern highlands. Last frost is about September 20th in the west, October 10th in the east. This gives an average of about 140 days with frost in the west but up to 180 days in the east (Fig. 7). However, unexpected frost occasionally occurs at other times of the year, for example even during January, and may damage crops.

There is considerable variation in the above generalizations about temperatures and as noted by Smit (1967), cold-air drainage from mountain slopes into low-lying river valleys can result in temperatures far lower in the valleys than on the higher slopes. For example, temperatures of -15°C (5.5°F) can be expected in some valleys while the higher slopes may experience temperatures no colder than 0°C (32°F). This phenemona also has a marked effect on the settlement and land use patterns. Similarly, in the very deep east-west valleys such as the upper portion of the Orange River, the south-facing slopes get almost no sun in winter and the snow takes much longer to melt than on north-facing slopes. The northern slopes are therefore more intensively cultivated and overgrazed, and are affected by erosion and scrub encroachment to a much greater extent than the southern slopes.

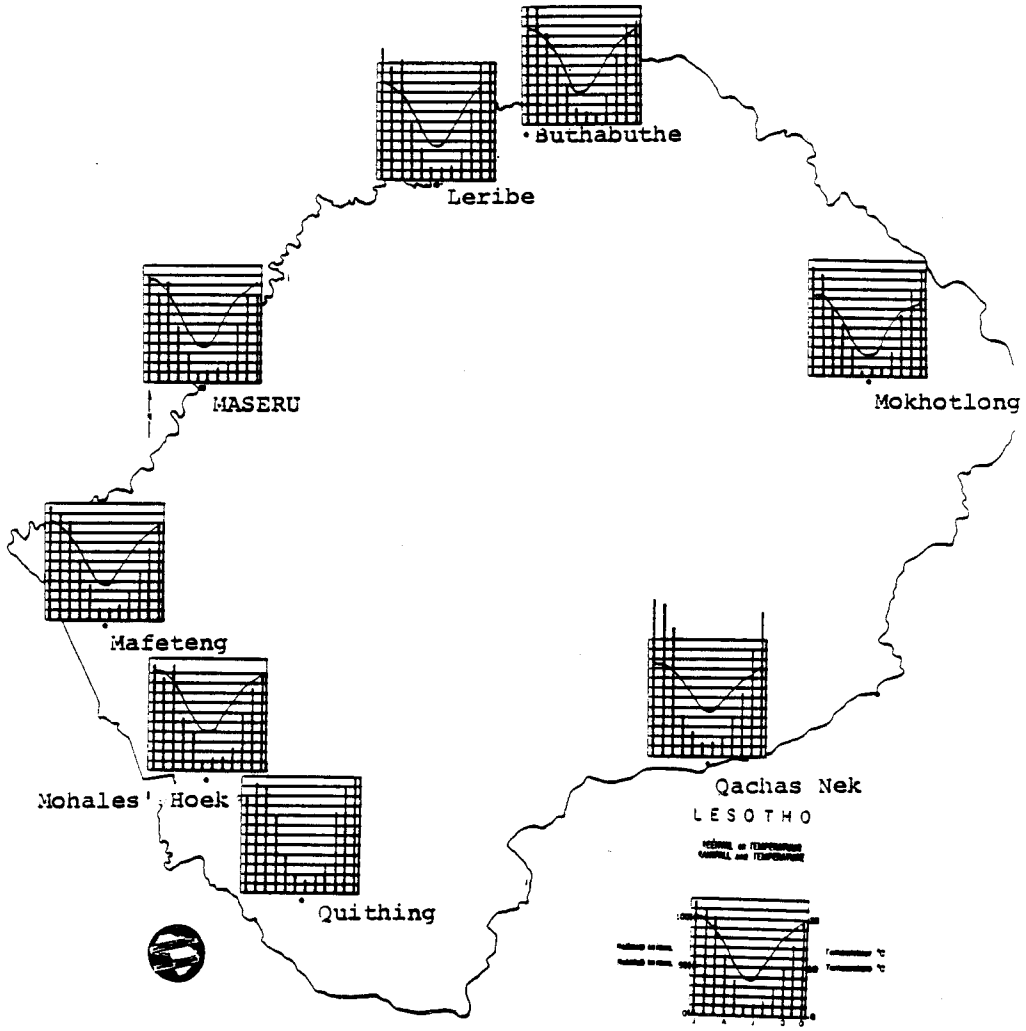

Figure 5. Mean Annual Temperature and Rainfall at Selected Localities

Source: Smit. 1967.

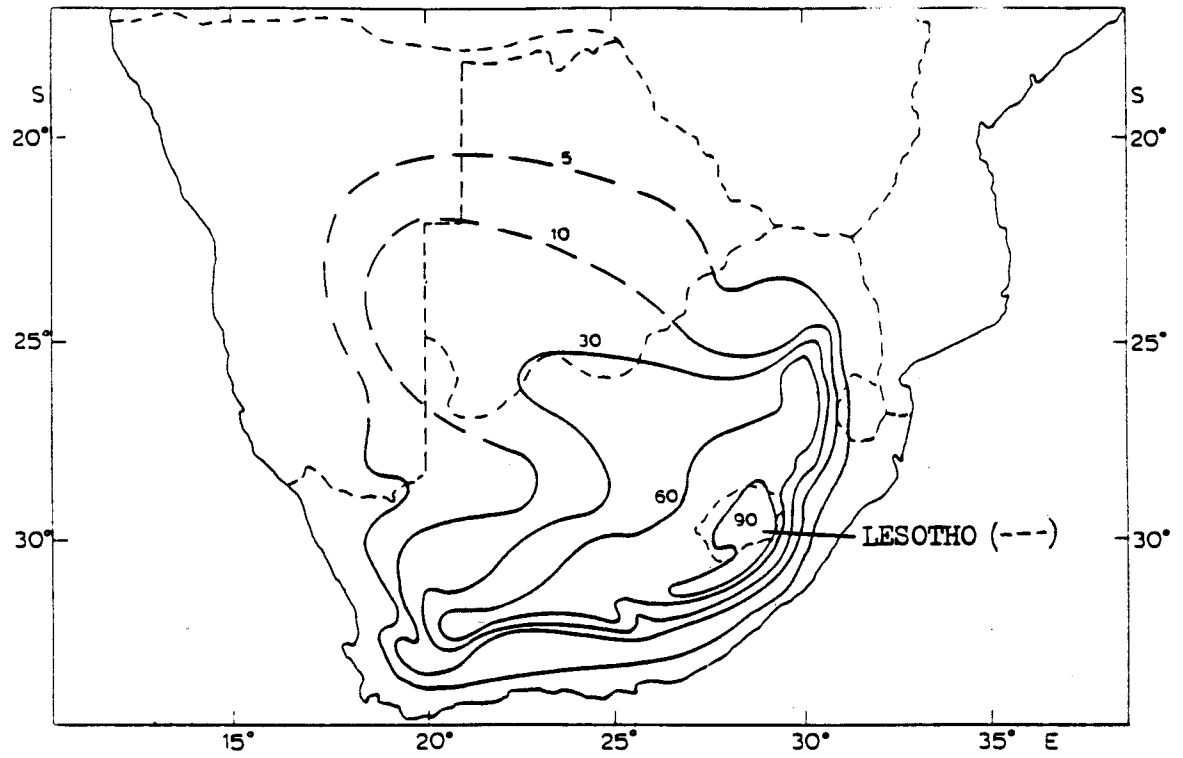

Figure 6. Average Number of Days per Year with Minimum Temperature 0°C.

Source: Schulze. 1972.

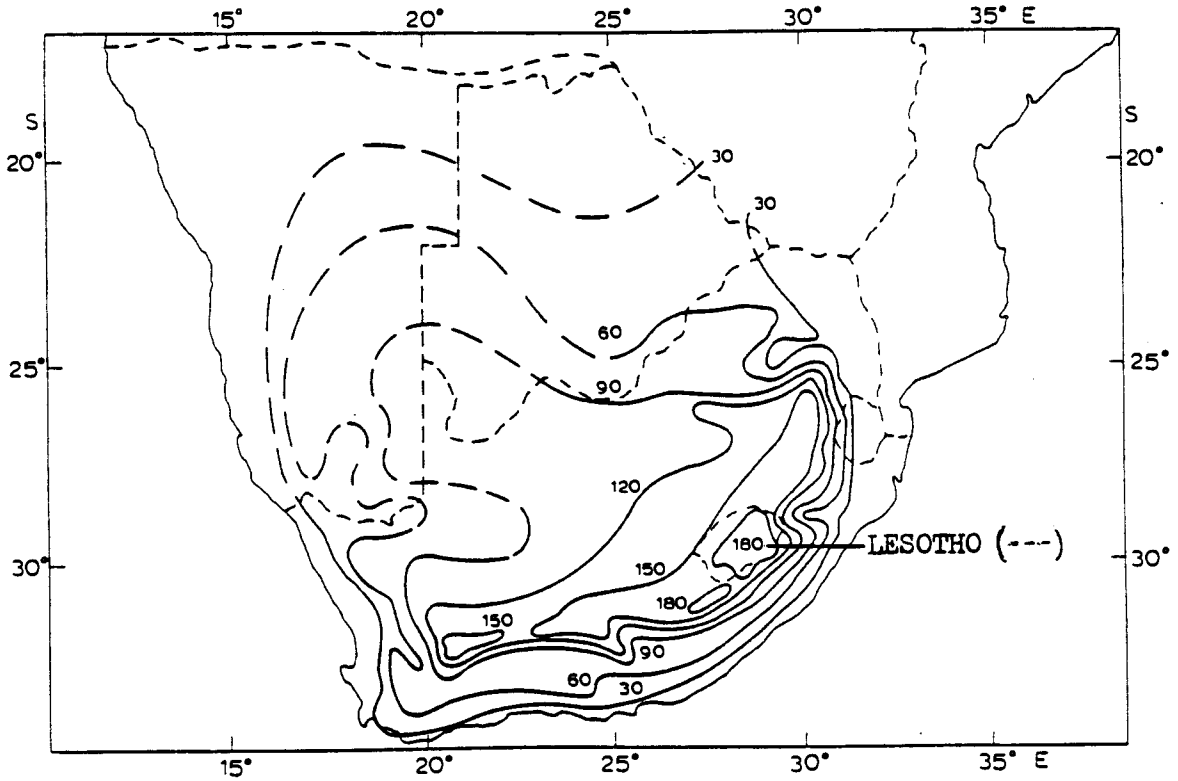

Figure 7. Average Duration of Frost Periods

Source: Schulze. 1972.

Rainfall. Rainfall is largely seasonal in nature and is strongly affected by topography. In general the western half of the country would be classified as arid or semiarid, and the eastern-most regions as humid. The driest regions are in the west where rainfall averages less than 600 mm (24 in) in the deep interior valleys (Fig. 5). Near Mokhotlong rainfall is only 560 mm (22 in). By contrast rainfall eastward, especially at higher elevations, increases sharply. The highest rainfall occurs along the eastern boundary of the Drakensberg Plateau, with annual values reaching 1,500 mm (60 in). In the western part of the country rainfall also decreases markedly from north to south with the least rainfall recorded in the Orange River Valley.

In most of the country rainfall is strongly seasonal with about 60 percent of the annual total falling between November and March. Most rainfall occurs during thunderstorms. There are on average more than 100 thunderstorms per year, the highest in southern Africa (Fig. 8). Because of the high elevation of most of the country, hail occurs an average of eight times per year, and often damages crops. This is the highest reported frequency of hail in southern Africa (Fig. 9). Snow falls an average of eight times per year in the eastern mountains and occasionally even in the western lowlands. Although snow falls chiefly during June and July it can occur any time of year at high elevations. There are no data on the annual amount of snowfall, although at times snow falls continuously for many days. These conditions may result in heavy livestock losses and even occasional loss of human life.

Lesotho, like the rest of southern Africa and other countries of similar latitude, is periodically subject to severe and sometimes prolonged droughts. According to Dyer and Tyson (1977 in Eckert 1980) temporal cycles of precipitation have persisted over southern Africa for at least a century. The prolonged wet or dry periods appear as oscillations of 20-year lengths (Fig. 10). Further, the cycles are shown to include Lesotho, although the pattern is clear mainly since about 1945. Whether the absence of cycles prior to this period is a real phenemona, or due to a lack of accurate data is uncertain. Also, the wet-dry oscillations of 9-10 years appear to be as important as longer term 20-year

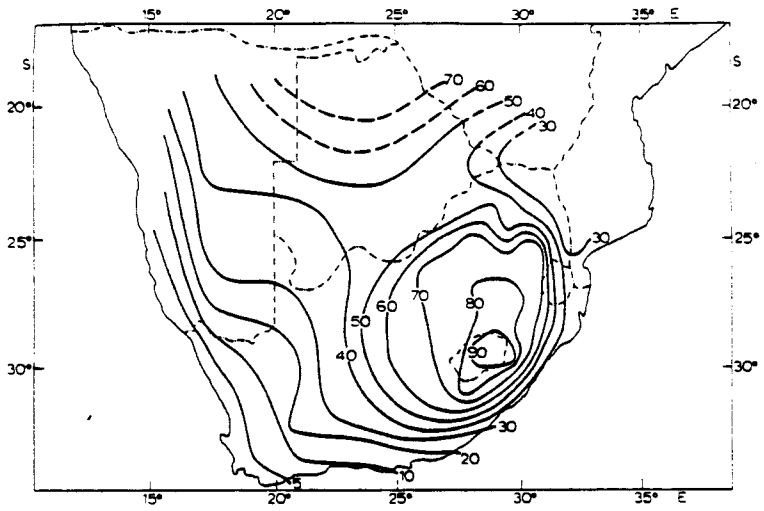

Figure 8. Annual Average Number of Days with Thunderstorms

Source: Schulze. 1972.

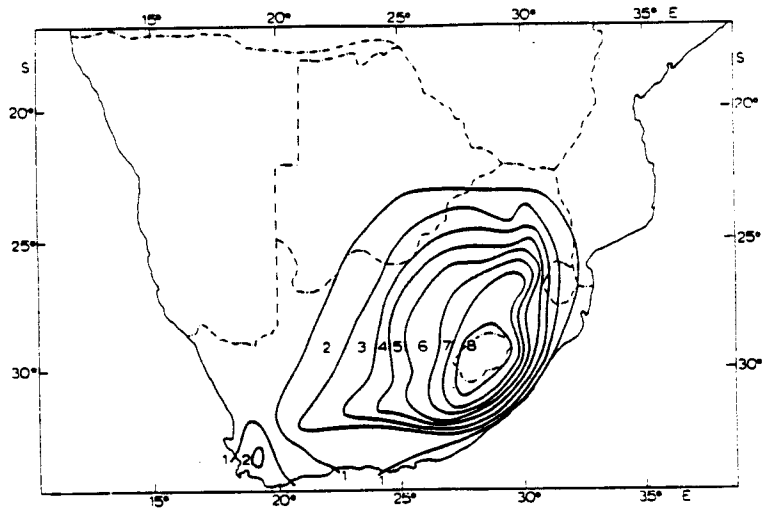

Figure 9. Annual Average Number of Days with Hail

Source: Schulze. 1972.

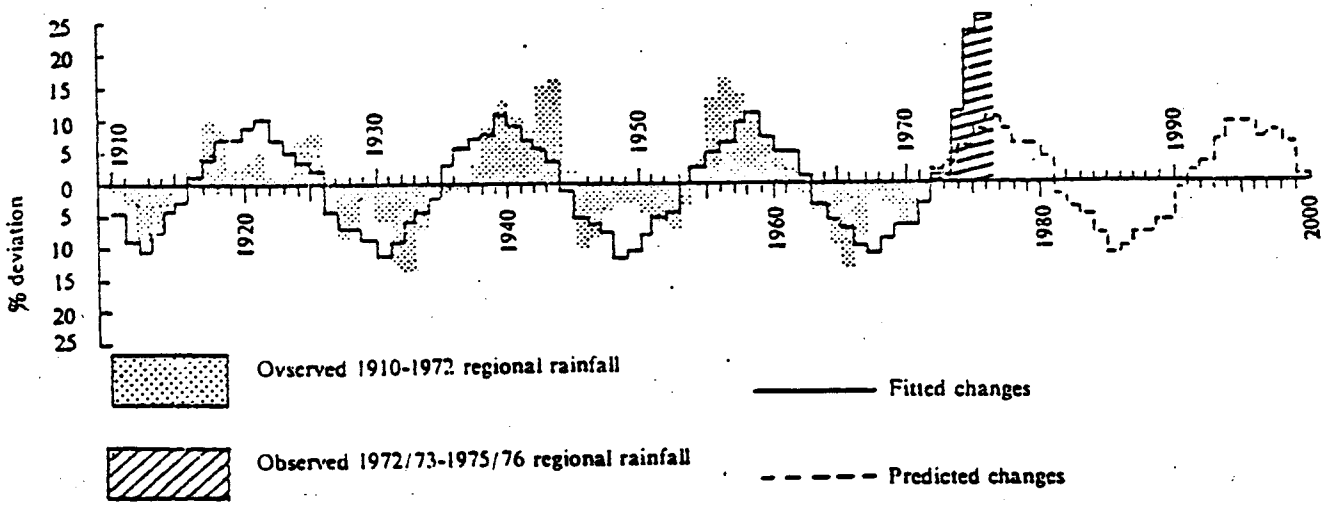

Figure 10. Temporal Cycles in Annual Precipitation for the Highveld of South Africa, 1910 - 1975

Source: Eckert. 1980.

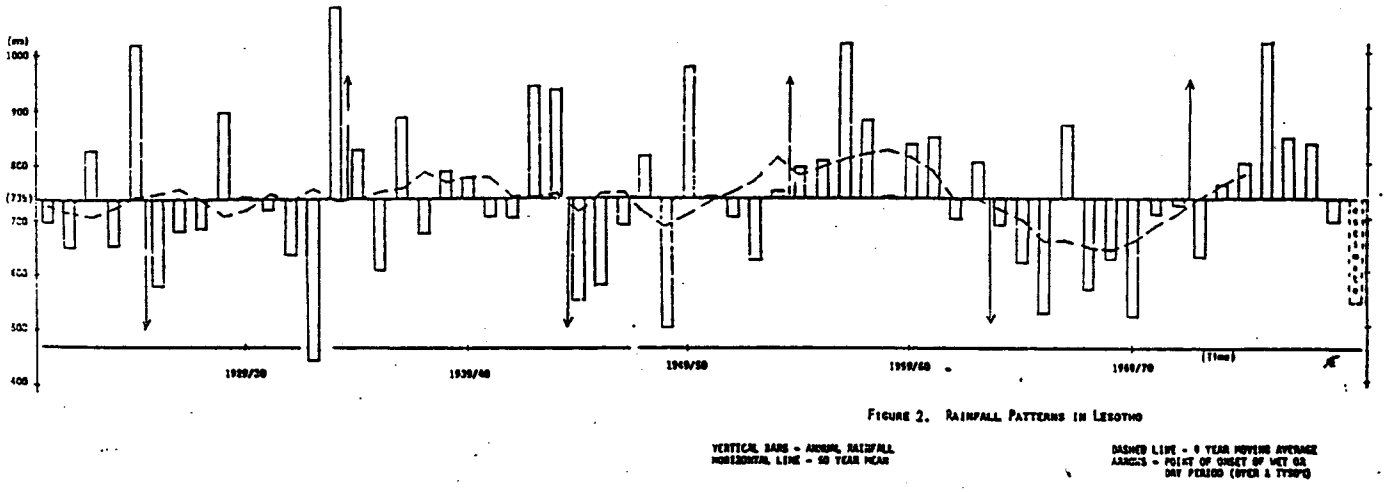

FIGURE 2. RAINFALL PATTERNS IN LESOTHO

Figure 11. Temporal Cycles in Annual Precipitation for Lesotho, 1929/30 - 1969/70

Source: Eckert. 1980.

cycles in Lesotho (Fig. 11). Eckert (1980) also reports that there are important differences between districts in Lesotho with regard to the magnitude of the oscillation, and in the severity of the intervening dry periods. For example, Butha-Buthe and Leribe, with relatively high precipitation during the wet season, experience a much smaller average drop in precipitation during dry period levels than other areas. Similarly, rainfall during drought periods appears to affect the summer rainfall totals (Nov. - Feb.) to a greater extent than the winter totals (20 percent vs. an average drop of 13.6 percent in winter rainfall totals). It is also pointed out that during clusters of dry years, the more southern districts experience a sharper decline in total annual precipitation than the northern ones. The north to south gradient, although small, suggests that during prolonged dry periods growing conditions are progressively poorer in the more southern districts.

Clearly an understanding of wet-dry climatic oscillations has imporant implications for agriculture in Lesotho. For example, these data suggest winter crops are less susceptible to a possible dry spell than summer crops; likewise the northern districts are more insulated from potential drought disaster than the southern districts. Additional precipitation data is given in Appendix I.

2.2 Population

2.2.1 Colonial History [5]

The history of Lesotho and its people is closely linked to the history of the Zulu nation and the South African Boer trekkers of the early nineteenth century. As a result of raids by Zulu and Ndebele (Matabele) tribes, the Basotho clans occupying present day Lesotho were widely scattered and disorganized. The Basotho leader Moshoeshoe (Moshesh) I, beginning in about 1820,

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[5] Sources: Collier's Encyclopedia. 1972.
Europa Publ. 1980.
Kurian. 1980.
U.S. Dept. State. 1979.

started unifying the remnants of these Basotho clans. During a series of wars between 1856 and 1868 the Basotho lost much territory to the Boer-run Orange Free State. In 1868 the country known as Basutoland was annexed by Great Britain at the request of Chief Moshoeshoe I, who wanted to escape domination from neighboring Boer republics. However, in 1871 the country was transferred to the Cape Colony without Basuto consent.

After various civil disturbances, Basutoland was again restored to British control in 1884. When the Union of South Africa was established in 1910 Lesotho became a High Commission Territory under the British high commissioner to South Africa. British colonial policy was largely one of indifference or neglect and the actual government was left to local chieftains who opposed all attempts to modernize or centralize the administration. The only provision of the proteatorate agreement that was ever strictly observed by the British was the provision that no white person be allowed to acquire land in Basutoland and that the land tenure system remain unchanged. Basutoland was ultimately given its first constitution in 1959 and finally guided to independence by Britain in 1966. Following independence Lesotho joined the United Nations and the Organization of African Unity.

After independence the Basutoland National Party (BNP), led by Chief Leabua Jonathan, gained political control. Jonathan, as prime minister staged a successful coup in 1970 after apparently losing an election. He has shown reluctance to relinquish his control and authority; he presently remains in power. The constitution was suspended in 1970 and the government is now run by decree.

2.2.2 Population Growth, Distribution, and Characteristics 6/

The population of Lesotho was estimated at 1,098,000 in 1978. This figure is based on the last official census held in 1966 when the

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[6]Sources: Kurian. 1980
Europa Publ. Ltd. 1980
U.S. Dept Commerce. 1980a, 1980b

population was 852,361 (Kurian 1980). U.S. Dept. of Commerce figures (1980) give the estimated population in 1979 as 1,305,000. Further data on population since 1950 is shown in Table 1. The average annual growth rate of 2.2 percent has been constant since 1965 but is up from an estimated rate of 1.6 percent in the 1950-55 period (Table 1). The average annual growth rate is based on an annual birth rate of about 37 per 1,000 (Table 2). Some additional vital statistics are shown in Table 2.

More than half of the population is concentrated in the lowlands along a narrow corridor averaging 40 km (25 mi) wide along the Caledon River. The overall population density is about 38-40 persons per square km (98 per sq mi) although as shown in Figure 12, the population density varies widely with locality. For example, the density exceeds 200 persons per square mile in several lowland areas but averages less than 50 per square mile in the mountainous regions. According to Smit (1967), when the population density is expressed in relation to area under cultivation, the de facto density rises to about 630 per square mile of cultivated land (based on 1966 census data). The population of each district in Lesotho is shown in Table 3.

The urban population is only 3.1 percent of the total and has no significant influence on the population density map (Fig. 12). There are no towns over 30,000 population, although the urban growth rate is four percent, double the national average.

The median age of the population is rising, reflecting a declining birthrate. In 1975, 38 percent of the population was in the under-14 age group, down from 43 percent in 1970. Similarly the 15 to 64 age group comprised 57 percent of the total in 1975, as compared to 51 percent in 1970. Those over 65 comprise about five percent of the total.

Because Lesotho is overpopulated and very poor there has been a continuous temporary and permanent emigration to South Africa to seek work. Most seek work in the mines, a predominantly male-dominated occupation, and emigration has led to a decided skew in the male/female ratio. Currently the ratio is about 43.2:56.8 in favor of females.

Table 1. Midyear Population Estimates and Average Annual Period Growth Rates: 1950, 1955, and 1960 to 1979. Population in thousands, rate in percent.

Year	Population	Year	Population	Period	Average annu growth ra
1950	726	1970	1,066	1950-55	1.6
1955	786	1971	1,090	1955-60	1.8
1960	859	1972	1,115	1960-65	2.1
1961	875	1973	1,141	1965-70	2.2
1962	893	1974	1,166	1970-75	2.2
1963	912	1975	1,193	1975-79	2.2
1964	932	PROJECTED ESTIMATES			
1965	952				
1966	974	1976	*1,220*		
1967	996	1977	*1,248*		
1968	1,019	1978	*1,276*		
1969	1,042	1979	*1,305*		

Source: U.S. Department of Commerce. 1980.

Table 2. Vital Population Statistics

BENCHMARK DATA

1.	Enumerated population, census of April 12, 1976	1,213,960
2.	Adjusted population, census of April 12, 1976	NA
3.	Births per 1,000 population, 1971	37
4.	Deaths per 1,000 population, 1971	14
5.	Annual rate of growth, 1966-76 (percent)	2.3
6.	Life expectancy at birth	NA
7.	Infant deaths per 1,000 live births, 1971	114

PROJECTED ESTIMATES

8.	Population, July 1, 1979	*1,305,000*
9.	Births per 1,000 population, 1978	*36-37*
10.	Deaths per 1,000 population, 1978	*13-14*
11.	Annual rate of growth, 1978 (percent)	*2.1-2.4*

Source: U.S. Department of Commerce. 1980b.

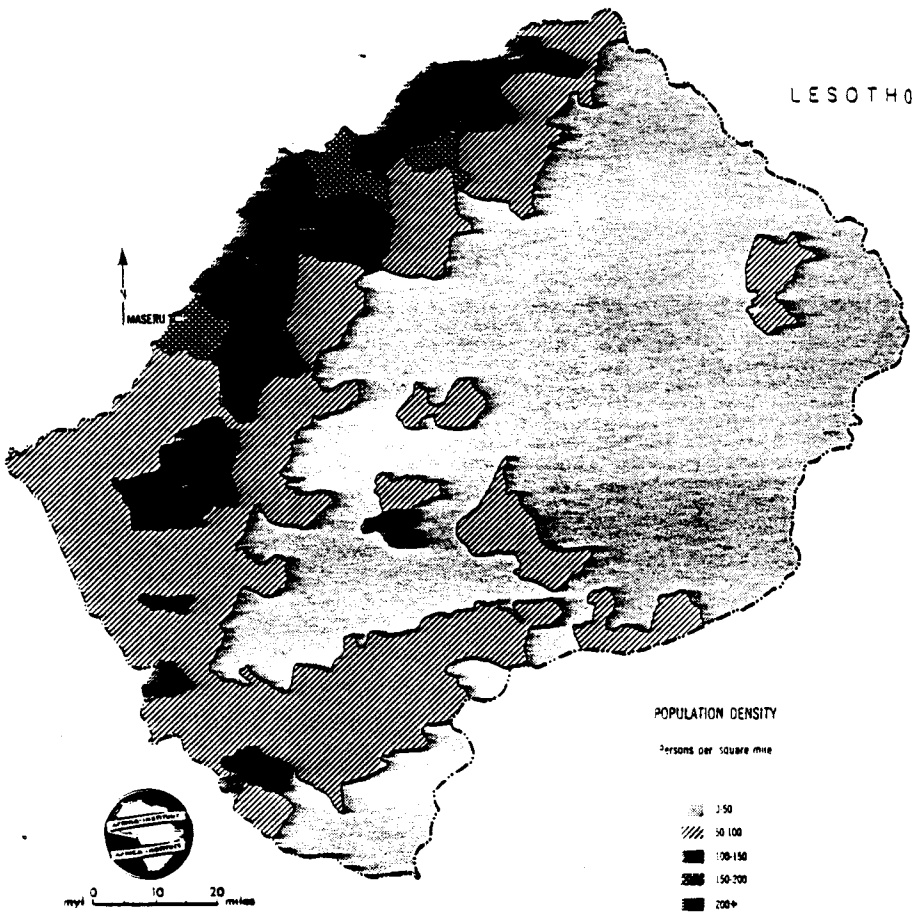

Figure 12. Population Density (Based on 1966 Census Data)

Source: Smit. 1967.

Table 3. Area and Population (top) and Population by District (bottom)

AREA AND POPULATION

Area	Population (census results)†				Density (per sq. km.) 1976
	April 14th–24th, 1966			April 12th, 1976	
	Males	Females	Total		
30,355 sq. km.*	465,784	503,850	969,634	1,216,815	40.1

* 11,720 sq. miles.

† Including absentee workers in South Africa, numbering 117,273 (males 97,529; females 19,744) in 1966.

DISTRICTS

(Census of April 12th, 1976)

Each District has the same name as its chief town.

	Population*
Maseru	257,809
Berea	146,124
Butha-Buthe	77,178
Leribe	206,558
Mafeteng	154,339
Mohale's Hoek	136,311
Mokhotlong	73,508
Qacha's Nek	76,497
Quthing	88,491
Total	1,216,815

* Including absentee workers in South Africa.

Capital: Maseru, population 45,000 in 1976.

Source: Europa Publ. 1980.

At any given time close to 200,000 Basuto workers are estimated to be employed in South Africa. Nearly 50 percent of the male labor force may leave the country each year to seek work in South Africa. Many of this group are recruited by the National Recruitment Corporation on behalf of South African employers. Women also contribute to emigration totals and a 1966 Lesotho census showed 97,000 men and 20,000 women were out of the country. According to a South African census conducted at the same time, 130,000 men and 70,000 women claimed they were born in Lesotho.

Lesotho adopted an official family planning policy on the recommendations of a national population commission in 1974. Family planning activities are coordinated with the International Planned Parenthood Federation.

Except for a few thousand Europeans and Asians, the population is entirely of Basotho stock. The Sotho consist of a number of tribes of the southern Sotho linguistic stock who are united by a common loyalty to the royal house of Moshoeshoe. The group that formed the nucleus of the nation is the Kwena, composed of Molibeli, Monahong, Hlakwana, Kxwakxwa and Fokeng tribes. Two main groups that were politically absorbed into Lesotho society, but were not part of the original group loyal to Moshoeshoe are the 1) Natal Nguni, who include the Phetla, Polane, and Phuti, and 2) the Mahlape tribe of the Natal Nguni and the Cape Nguni. Although all of these groups are not fully assimilated culturally, they speak the same language. In 1969-70 there were about 2,000 Europeans, 300 Asians and 1,000 of mixed racial origin. In 1976 there were 308 U.S. citizens in Lesotho; 280 of these were private citizens.

The dominant religion is Christianity and is followed by over 70 percent of the population. About 30 percent are Roman Catholics (figures vary among sources), approximately another 40 percent ar Protestants. The largest Protestant de ination is the Church of Lesotho founded by th Paris Evangelical Missionary Society. They claim 22 percent of the population as followers. Nearly 30 percent of the population follows African traditional religions and cults.

Sotho (Basotho, Basuto) society combines modernism and traditionalism to a high degree. Authority is

exercised through the traditional paramount chief (the King) and his court, down through senior chiefs, subchiefs, headmen, and at the village level subheadmen. Villages are composed primarily of clans and families which cluster together in numerous small rural villages. Many villages range in size from one large to four or five extended families, with an average of 30 to 50 immediate families. Two distinct features of rural social life are the Lesotho pony and blanket. The small Sotho ponies are renowned for surefootedness, and are the main form of transportation; the multi-colored blankets are worn as cloaks and are of great value in a country where there is sharp climatic variation.

The official languages are English and Sesotho, with the latter being spoken by virtually everyone. Sesotho, also called Sotho and Suto, is a member of the Bantu family of languages.

2.2.3 Health and Nutrition 7/

Lesotho's mountain geography and temperate climate produce a healthy environment and one in which health problems are significantly different from most African countries. Nevertheless, the general health standard of the population is not good. Chronic undernourishment and malnutrition contribute to a low resistance to such diseases as tuberculosis, typhoid and gastroenteritis.

Next to undernourishment or malnutrition-related diseases, the most serious health problem is venereal disease. An estimated 25 percent of Lesotho's migratory workers have venereal disease, and at least ten percent have tuberculosis. Workers and their families are also subject to the stress of changing roles, family breakdown with resultant problems in mental and cardio-vascular health. Other health problems of importance in Lesotho are chronic rheumatism, infections of the respiratory tract, and dyspepsia.

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7 Sources: Government of Lesotho. 1976.
Kurian. 1978.
New Encyclopedia Britannica. 1975.
U.S. Dept. of Health, Educ. and Welfare. 1981.
U.S. AID. 1980, 1981.
World Bank. 1975.

A major goal of the health sector is to improve the general health of the population by upgrading the preventative and curative services. Achievement of this goal is hampered by budget and personnel limitations, population growth, geography, endemic diseases and the special problems of migratory laborers.

Budget constraints have slowed development of the health sector in several ways. The main constraint appears to be heavy dependence upon government financing because less than 15 percent of the Lesotho health sector revenues are generated by private user fees. At the same time government expenditures in the health sector have not grown because of recurrent costs of development projects. Improvement of the health status of Lesotho's population is also impeded by low salaries paid to health workers which have encouraged qualified professionals to seek employment outside Lesotho, or leave the health field for other more remunerative positions. At present the government of Lesotho relies heavily upon privately financed health facilities, especially foreign missionary groups. Some of these groups are also experiencing cutbacks in funding.

According to USAID (1980) Lesotho has only about 70 physicians (28 are Basotho), 290 nurses, 350 nurse clinicians and 1,000 traditional medicine practioners for its 1.2 million people. Expansion of this force, especially high level training for physicians, technicians and nurses, will come slowly because of the high cost of training, whether overseas or in local institutions.

Accessibility to health services is also a serious problem because of the large rural population, mountainous terrain and lack of roads and transportation.

Over 90 percent of Lesotho's health care expenditures by its citizens is for curative care rather than preventative medicine. Most of Lesotho's most common health problems are ones that can be handled more cost effectively by preventative measures. However, a stronger preventative medicine program is not likely to be developed in the next few years because of budget restrictions.

Lastly, the population is increasing by 2.3 percent a year, a rapid rate of increase. In 1979 the government established a family planning program with information and materials available to interested persons. The Prime Minister announced the objective of reducing population growth from 2.3 to 2.1 percent. The Lesotho Family Planning Association (LFPA) has responsibility for working toward this objective and is training nurses in family planning methods. Expansion of family planning programs has been inhibited to some extent by certain missionary groups that are influential in Lesotho, and also by social and economic factors that place a positive value on having a large famly. Nevertheless, training of nurse clinicians continues and limited progress in family planning techniques continues, mostly under sponsorship from USAID.

Steps are being taken in other health care areas to upgrade health care including increasing physicians pay by 100 percent per year and nurses by 50 percent. User fees for health facilities may also be increased, and efforts are being made to more effectively use government and private donor financial assistance in health care personnel training, upgrading of hospital laboratories and expansion and improvement of village water supplies and sanitary waste disposal.

No information is available on the daily per capita food intake in Lesotho. Staple articles in the diet are corn and sorghum. Malnutrition is a serious problem among younger children. The usual manifestation of malnutrition is kwashiorkor which results in retarded growth, skin and hair pigmentation changes, anemia, and apathy. A nutritional study conducted in 1976 indicated that over one-fifth of Lesotho children up to five years of age had sufficiently poor growth to indicate a long term lack of calories and/or protein. These findings, however, suggest some improvement over pre-1956 results.

2.3 Land Use and Agriculture

2.3.1 Land Tenure 8/

No Mosotho can claim personal ownership of land which is held in trust for the nation by the king. Residential rights, a prior condition for obtaining land cultivation rights, are generally available to married males which entitles them to seasonal user rights for as many as three arable fields.

Private land rights for cultivation are seasonal. At the end of a growing season all land rights revert to the national trust although livestock are permitted to graze whatever is left in the cultivatable field. Grazing rights on all land not cultivated are communal and no upper limits are placed on the number of livestock owned or permitted to graze an area. Finally, land left uncultivated for more than three years can be revoked by the village chief for reallocation. Sharecropping is also practiced. Farmers owning oxen offer ploughing and planting services to others in return for a share of the crop.

The concept underlying Lesotho's unique land tenure system is that land is a national and social asset to be enjoyed by the entire Basotho nation. Further, land ownership or rural settlement by foreigners is not permitted. Lesotho law also draws a distinction between urban and rural land; urban occupancy rights are granted to foreigners, mostly to missions and to traders. In rural areas chiefs allocate arable land to families according to the families' subsistence needs. Lesotho's unusual land tenure system was adequate for a traditional agricultural society where there were few additional needs beyond pure subsistence, and where land was relatively abundant. Although the system has serious deficits, it has prevented the accumulation of land by a few prosperous Basotho farmers or wealthy foreign speculators. This would probably have resulted in more efficiency and greater

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8 Sources: Europa Publ. 1980.
Kurian. 1978.
U.S. AID. 1980, 1981.
World Bank. 1975.

productivity but would also have created a large landless class. The 1970 census revealed that there were no great inequities in the distribution of land. The average landholding per family head is about 4.9 acres (1.9 ha).

During the last decades rapid population growth and the resulting pressure on land have resulted in a sharp decrease in the size of family holdings. In many cases family allotments are far below that needed to provide even minimum subsistence. Communal pastures have also come under increasing pressure as more and more people have bought cattle. This, together with the traditional preference of the Basotho for quantity of cattle rather than quality, has resulted in serious overstocking and is now a major cause of soil erosion. Further, under traditional pasturage systems, fencing is not allowed, which makes range and pasture management all but impossible. Uncontrolled breeding has also contributed to a steady decline in livestock quality.

Not surprisingly, the present land tenure system is viewed by most foreigners, including potential donors, as a major impediment to progress in land management and soil conservation. The lack of land tenure security has also resulted in great reluctance by farmers to make any permanent land improvements. The absence of a negotiable land title has also meant that farmers have no equity to offer against credit for agricultural implements, seed, fertilizer and basic items. This lack of incentive has led to a vicious circle which, in the absence of agricultural development, has led to a stagnation in production and steady depletion of soil fertility.

The Land Act of 1979 increases the security of tenure for existing holders of arable land by clearly defining an allocation, and recording the rights of inheritance. But under this system those without land may henceforth be excluded from land rights. The act also provides for the granting of agricultural leases. A lessee will be entitled under specified conditions to exclusive possession of the land, to dispose of his interest, to encumber the land by mortgage, and to sublet. An important aim of the 1979 Land Act is to encourage the development of modern farming techniques and soil conservation through the incentive of land tenure security.

There is evidence that traditional attitudes toward communal grazing on mountain pastures may also be changing. The government of Lesotho is acutely aware that in order to check erosion, drastic changes will be required. The Land Husbandry Act of 1969 empowered the government to draft regulations that will make fencing of pastures possible. The benefits of this have already been demonstrated in a few cases, and the government believes this will lead to more rapid acceptance of change by the traditionally conservative rural population.

2.3.2 Agriculture

Agriculture is the largest productive sector in Lesotho; it provides an important source of income for about 85 percent of the people and contributes about 45 percent of the GNP. Most of this production is for direct home consumption and only about one-third is sold (World Bank 1976). However, despite the heavy dependence upon agriculture, some sectors such as crop production have been stagnant for a number of years. Only about 13 percent (360,000 ha) of land is considered even marginally suitable for agricultural crops (Table 4) and the soil fertility of much of this is now seriously depleted, or the soil is badly eroded. Additionally, some of the soils are fragile or have physical properties that make them difficult to use under traditional agricultural methods. These factors, combined with mountainous terrain and unpredictable weather have resulted in notably low yields for Lesotho's traditional crops of maize, sorghum, wheat, and beans (World Bank 1981). Annual production estimates for these four crops are shown in Table 4 (years 1976-78) and Table 5 (years 1950-72).

The steady growth in population over the last few decades has led to a reduction in land allocated per family and an increase in the number of completely landless families. Despite this apparent competition for land, the area in cultivatable crops has declined by more than 100,000 ha, or about 30 percent. Area under cultivation in 1977 to 1978 was as much as 20 percent below the area cultivated in 1950!

According to the World Bank (1981) the decline in cultivated areas is due primarily to a withdrawal of labor from farming. The reason for this

Table 4. Land Use and Principal Crops

LAND USE
('000 hectares)

	1972	1977
Arable land*	360	355
Permanent meadows and pastures†	2,500	2,500
Other land	175	180
TOTAL	3,035	3,035

* FAO estimate. † Unofficial estimate.

Source: FAO, *Production Yearbook.*

PRINCIPAL CROPS
('000 metric tons)

	1976	1977	1978*
Wheat	61	50	50
Maize	126	70	100
Sorghum	62	50	50
Dry Peas	7	7	7

* FAO estimates.

Source: FAO, *Production Yearbook.*

Source: Europa Publ. 1978.

Table 5. Crop Statistics, 1950 - 1972

CROP STATISTICS, 1950-1972

	1950	1960	1970	1971	1972
Acres planted ('000)					
Maize	443	404	319	370	296
Sorghum	139	169	204	210	173
Wheat	122	167	263	272	235
Peas	21	43	30	35	30
Beans	6	14	40	44	37
Barley and oats	8	11	3	..	..
Crop production ('000 m.t.)					
Maize	214	121	67	121	64
Sorghum	49	54	57	78	59
Wheat	50	58	58	76	57
Peas	8	12	5	5	4
Beans	1	1	4	4	3
Yields (200 lb./acre)					
Maize	5.3	3.7	2.3	3.6	2.4
Sorghum	4.0	3.8	3.1	4.1	3.8
Wheat	4.5	3.8	2.4	3.1	2.7
Peas	4.5	3.3	1.8	1.6	1.4
Beans	1.5	1.6	1.0	1.1	1.0

Source: World Bank. 1976.

withdrawal appears to be the relatively low returns from crop production compared to those engaged in migratory labor such as mining in South Africa. Estimates of wage returns for crops vary from 2-15 cents per hour versus 56 cents per hour for mine workers.

Since the 1950s the government has attempted to boost crop production by sponsoring a variety of development schemes. These include the Tebetebeng Pilot Project, 1953-60; Thaba Phatsoa Project, 1963-77; Liphiring Project, 1971-77; Ratau Cropland Scheme, 1976-77; the Thaba Bosiu Project, the Sengu River Project, and the Leribe and Khomokhoana Projects.

The record of all of these projects has been disappointing. The most recent project is the Basic Agriculture Services Program (BASP), aimed at providing training and technical assistance as well as equipment repair and road building in the lowlands. This project also faces difficulties but may strengthen the Agricultural Ministry's management and services to families (World Bank 1981).

Irrigation has not provided a satisfactory solution for increasing crop production for several reasons. Notably, the area of potentially irrigable land is limited to about 17,000 ha. The winters are too cold for most field crops that would benefit from irrigation, and the high silt load of rivers contributes to a short life for reservoirs and pumping equipment.

2.3.3 Livestock [9]

Livestock have traditionally played a major role in the economy and social life of Lesotho. Ownership of livestock is unequal with a relatively small proportion (about eight percent) of households owning approximately half of the country's livestock. Commonly held livestock include cattle, sheep, angora, goats, pigs, poultry, fish, horses, and donkeys. All livestock owners enjoy usufruct grazing rights (World Bank 1981).

According to census figures, the number of livestock has gradually increased over the years

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9 Source: World Bank. 1976, 1981.

(Table 6), but the recorded exports suggest that the cash output from livestock has not kept pace with the increase in animals. Further, under present husbandry practices, the number of livestock exceeds the carrying capacity of the land. This has led to a serious deterioration of mountain pastures and uncontrolled erosion. The problem of increased cattle numbers is compounded by an absence of grazing control, a consequence of the traditional land tenure system (see Sect. 2.3.1). Together with uncontrolled breeding, this has affected the quality and productivity of the animals. The deteriorating ecological situation in the mountains has led to a movement of people into the lowlands and foothills, adding to the land pressures there. In 1960 nearly 30 percent of the population lived in the mountains. By 1970 the figure was only 20 percent. Today it is believed even less. Also, in absolute numbers the population of the mountain areas has decreased.

The national cattle herd is about 0.5 million, and contains a large proportion of old cows and old oxen. Poor nutrition, especially during severe winter weather, causes large losses and results in poor reproductive performance. Fortunately, however, there is an almost total lack of serious animal disease. Overall the country imports large amounts of meat and dairy products, and since 1975 not less than 30,000 live cattle annually. Egg production of about 5.4 million eggs per year from a total flock of 0.25 million birds is sufficient to meet current demand.

2.3.4 Farm Size [10]

According to the 1970 agricultural census, there were about 187,500 farm households in Lesotho; about 185,000 have land for crop cultivation. Most landless farm households own some livestock that is grazed on communal land. The average farm holding is 5 to 5.5 acres of arable land, 3 head of cattle and 10 to 12 sheep and goats. Mountain farms are smaller, four acres (1.7 ha) but have more livestock. The smaller total income from lowland farms is offset by a larger number of people that seek outside employment to supplement their income. Additional characteristics of farm households are shown in Table 7.

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[10] Source: World Bank. 1976, 1981.

Table 6. Numbers of Livestock and Exports, 1950, 1960, 1970

(In thousands)

Livestock	1950	1960	1970
Cattle	401	546	551
Sheep	1,564	1,466	1,655
Goats	637	672	974
Horses	103	135	110
Donkeys	59	97	90
Mules	3	7	4
Pigs	36	61	66
Chickens	..	771	841

Exports	Average 1949-51	Average 1959-61	Average 1969-71	1972
Cattle (thousand head)	10.6	10.2	11.8	8.9
Wool (million pounds)	12.1	7.1	9.2	7.9
Mohair (million pounds)	1.6	1.5	2.2	1.8

Table 7. Size of Holdings of Farm Households, 1950, 1960, 1970

Size of Holdings (acres)	1950		1960		1970	
	No. of Holdings	% of Holdings	No. of Holdings	% of Holdings	No. of Holdings	% of Holdings
0.0 - 3.9	53,520	36	68,746	44	92,481	50
4.0 - 7.9	59,620	40	55,747	36	63,131	34
8.0 - 14.9	29,920	20	24,879	16	24,861	13
15.0 - and over	6,740	4	5,915	4	4,603	3
Total	149,800	100	155,287	100	185,076	100

Source: World Bank. 1976.

The main constraint to modern development on farms, aside from the land tenure system (Sect. 2.3.1) has been lack of knowledge of modern farming practices. Other constraints have been lack of credit and marketing facilities, and a shortage of male labor, as well as a shortage of draft animals during the critical field preparation and planting periods.

2.3.5 Recent Land Use Trends in Agriculture

The traditional system of animal husbandry evolved around a pattern of lowland and mountain grazing areas (winter and summer) with communal privileges strictly enforced by village chiefs. The human population growth in the last decades and concomitant increases in cattle and other livestock numbers have brought a serious imbalance to this traditional system.

In the last few years livestock numbers have declined, apparently because of widespread and serious deterioration in the condition of Lesotho's grassland. The latter are unusual in their floristic composition and are outstandingly productive. Quantitative information is scanty but the decline possibily began nearly a half century ago. There are also serious changes in floristic composition of the grasslands. Most notable are decreases in the more acceptable (palatable) plants, and an increase in unacceptable or less acceptable plants, as well as an increase in bare ground. The loss of soil between surviving tussocks of grass (pedestalling) is especially noticeable in mountain pastures, as are the more obvious forms of soil erosion.

According to World Bank (1981), if the country's grasslands can be restored, it would be possible to carry present livestock numbers comfortably. Some areas will require up to five to seven years of rest, or even longer for grassland recovery. The success of this kind of program depends primarily upon changing the people's traditional attitudes before appropriate grasssland management can be applied. It is clearly a social problem as well as a technical one. Probably one quarter to one third of the grassland in the country needs resting for rehabilitation. For this to be achieved without worsening conditions elsewhere, livestock numbers will probably have to be reduced. Incentives to control stock numbers,

and limit unproductive stock may be needed, as well as improved breeding programs and supplemental feeding during severe weather. Some of these alternatives are discussed in the World Bank report (1981; p. 14-15).

3.0 Environmental Resources

3.1 Geology and Soils

3.1.1 Geologic Formations 11/

The sub-continental land mass of southern Africa is largely underlain by Precambrian formations and has been relatively stable for long periods of time. Throughout southern Africa the Precambrian formations are extensively exposed and the younger geological formations form only a relatively thin cover over these older rocks.

In Lesotho the old Precambrian shield is overlain by the Karroo System, corresponding in European stratigraphy to Upper Carboniferous strata. The Karroo System occupies a unique position in South African geology in that it is very widespread, with some part of the Karroo Sequence occurring in every country. The Karroo System underlies the whole of Lesotho and most of South Africa, and in both countries is younger than the periods of major earth movements that have affected the subcontinent.

The Karroo System consists of a series of four major terrestrial sediments which are from top to bottom: the Stormberg Series, Beaufort Series, Ecca Series, and Dwyka Series. The Stormberg Series, lying at the heart of the Karroo Basin, is the only series present in Lesotho (Fig. 13). It is completely surrounded by the Beaufort Series and is essentially horizontal. The extent of the Stormberg Series corresponds closely to Lesotho's boundaries in addition to a small portion of adjacent Orange Free State in the Republic of South Africa, and the mountains of the Drakensberg Range. The Stormberg Series has a maximum thickness of about 2,800 m (9,000 ft), the upper half of which is composed of lava.

The Stormberg Series is itself composed of four superimposed groups. They are from top to bottom: the Drakensberg-volcanic formations (basaltic

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11 Sources: Mountain. 1968.
Pelletier. 1964.
Smit. 1967.
United Nations. 1973.

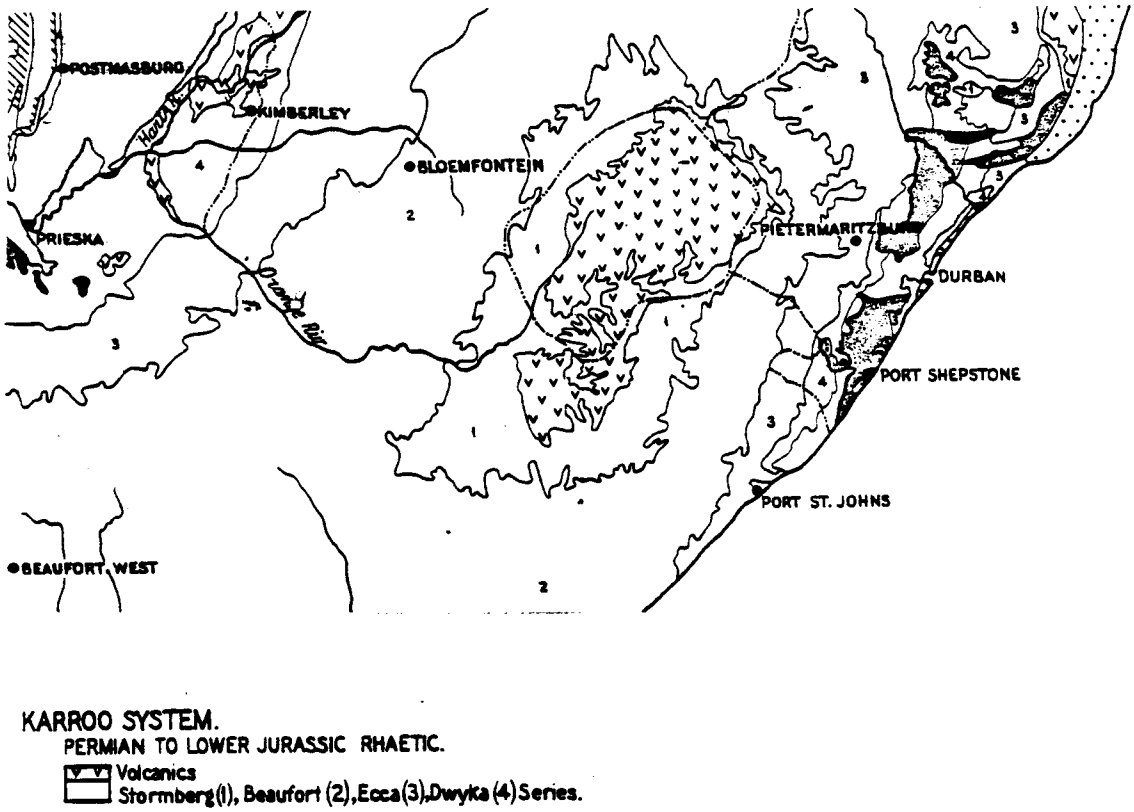

Figure 13. Geologic Map of Lesotho (-••-•••-) and a Portion of Adjacent South Africa. For explanation of terms see text.

Source: Pelletier. 1964.

lavas 2,000 m thick), the white feldspathic cave sandstones, the Red Beds (sandstones and clayey shales about 500 m thick), and the Molteno Beds (also sandstones and clayey shales about 500 m thick).

The Molteno Beds, at the base of the Stormberg Series, contain inferior layers of coal that have proved workable in places in Lesotho. The Drakensberg volcanics, the thickest formation and lying at the top, give rise to the Basuto Highlands and the Drakensberg ranges of the Great Escarpment in the eastern Transvaal. These lavas form some of the most magnificent mountain scenery of southern Africa, and reach heights of over 3,300 m (11,000 ft).

Except in the extreme south of Lesotho, the Karroo System is generally intruded by a multitude of dolerite sills and dykes. In addition to the Stormberg Series, the upper portion of the Beaufort Series (second from top of the four major terrestrial sediments forming the Karroo System) occurs along the extreme northwest border of the country. Its location can be seen in Figure 14.

3.1.2 Minerals [12]

The mineral industry of Lesotho consists almost exclusively of diamond production. Diamond-bearing kimberlite was first discovered in the country in 1947 but until recently, diamond mining was limited to primitive diggings. Despite government encouragement, private investment in mining so far has been small, due largely to discouraging exploration results. The Letseng-la-Terai Diamond Mine in the Maluti Mountains, was developed by De Beers Consolidated Mines, Ltd., and is the only currently active mining-company operation. The mine reached planned production level in September 1977 by treating 680,000 tons of ore and recovering 22,688 carots of diamond. The government has 25 percent equity in this operation and will receive 50 to 60 percent of the

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[12] Sources: Bureau of Mines. 1976.
Europa Publ. 1980.
Kurian. 1978.
Letterman and Mittleman. 1979.
Morse. 1981.
Pelletier. 1964.
World Bank. 1975.

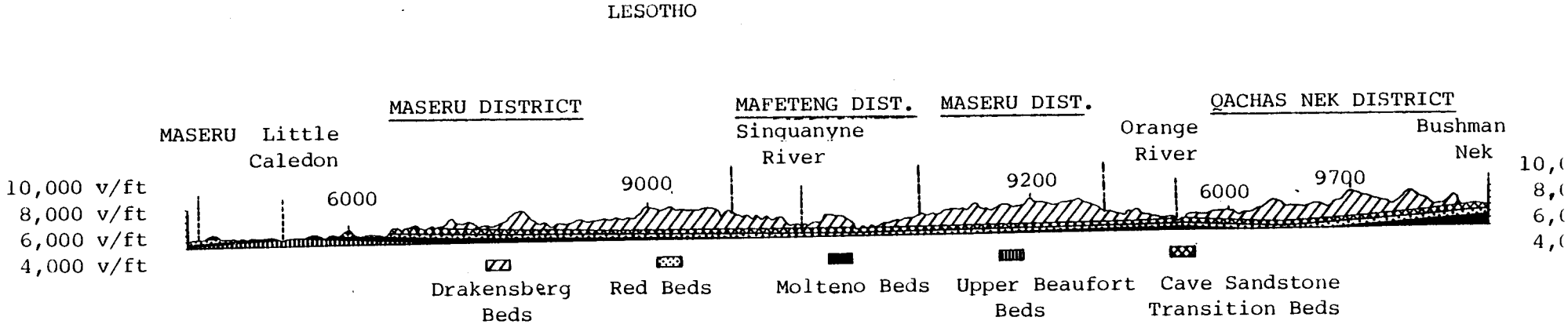


Figure 14. Geologic Cross Section

Source: Smit, 1967.

profits through dividends, taxes, and export levies when the capital costs to De Beers have been recovered.

Two kimberlite pipes were identified as diamondiferous at the Letseng-la-Terai Diamond Mine. Both pipes penetrate 1.5 km vertically into Karroo Stormberg basaltic lavas. The hard blue kimberlite of the main pipe was overlain by a meter of altered basalt followed by basaltic gravel. The mine is a circular open pit and has an estimated minimum life of eight years. Employment at the mine is expected to reach 400.

Total diamond production in 1977, according to Morse (1981) reached 42,090 carots, valued at $6.4 million, up from 5,016 carots at $0.4 million in 1976. These figures are at considerable variance with those reported by Europa (1980) in Table 8.

Table 8. Diamond Production

Year	1972	1973	1974	1975	1976	1977	1978
Diamonds (carats)	9,019	8,588	11,798	3,466	7,050	14,977	67,222

Source: Europa. 1981.

There is no other known mineral resource of commercial quality in Lesotho. According to Pelletier (1964), prospects for the discovery of significant mineral deposits are limited, and reside primarily in post-karroo intrusives such as diamond-bearing kimberlite pipes or perhaps carbonites. Otherwise, the rocks of Lesotho, mostly volcanics of the Stormberg Series, are younger than the major periods of mineralization. Coal deposits, if present in commercial quantities, may lie at the base of the Karroo System and be too deep to mine. However, exploration and feasibility studies have been undertaken recently to ascertain the commercial viability of Lesotho's coal deposits.

Lesotho produces no petroleum and all petroleum products must be imported through South Africa. Petroleum exploration in Lesotho was conducted on a limited basis in 1977. Other exploration programs are underway to access the country's prospects for additional mineral wealth. A number of new kimberlite pipes have been discovered, but more work is needed to determine if they contain diamonds in exploitable quantities.

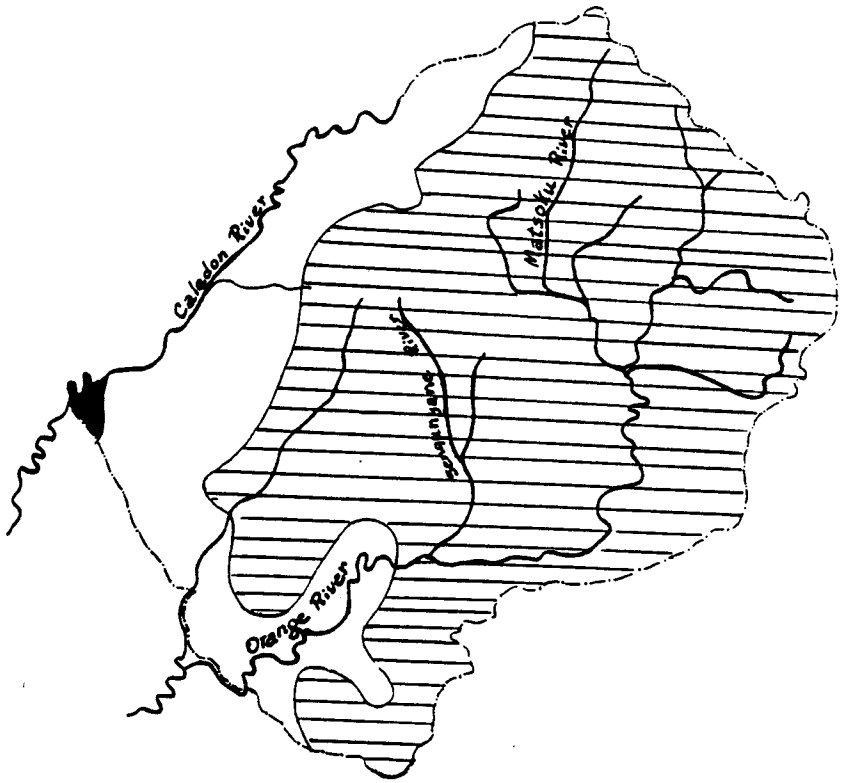
3.1.3 Soils

Soils have been rather thoroughly inventoried in Lesotho but much of the information was not available for this report. The data presented below are extracted from the FAO-UNESCO Soil Map of the World (1973) for Africa, and indicate that relatively few soil types are present in Lesotho. The distribution of these soils is shown in Figure 15.

Solodic Phanosols. Solodic Phanosols occur only in the extreme northwestern tip of Lesotho. They are confined to lowlands along the Caledon River in Lesotho although they are geographically widespread in many other parts of Africa including South Africa. Solodic Phanosols often flood during rainy periods because their B horizon is composed of a fine and impermeable texture. They are often used for dry season pasture and are especially suitable for rice because of natural flooding. Their suitability for other crops is limited, although phanosols can be used for other purposes by implementing light surface drainage. Sodic Phanosols in Lesotho are of medium grain texture and primarily on level or occasionally undulating ground. Lithosols and other orthic solonitz occur in association with solodic phanosols (FAO-UNESCO, 1973).

The soils of the lowlands have been abused and are now too poor to be highly productive. Generally they are completely lacking in nitrogen and are insufficient for tuberous crops such as sweet potatoes. Potassium levels are usually sufficient for wheat and maize. Soils of the lower-lying zones are often too acidic for good crop production (Smit 1967).

Eutric Planosols. This soil is very similar to the previous and is the dominant soil of the lowlands and foothills (Fig. 15). It is widely used to cultivate a variety of crops and occurs on slightly undulating to hilly slopes. Three other soils, chromic cambisols, lithosols and solonetz occur in association with eutric planosols. According to Smit (1967), the foothill soils have not been eroded or exhausted to the same extent as soil of the lowlands. These foothill soils often rest on clay or other impermeable layers, resulting in poor drainage, and in this respect are much like solodic phanosols of the lowlands.



Solodic Phanosols: medium grained, level to hilly

Eutric Planosols: medium to fine grain, hilly

Lithsols, Chromic Cambisols and Luvisols: fine grained, hilly to steep

Figure 15. Major Soil Types

Source: FAO-UNESCO. 1973.

Lithosols, Chromic Cambisols and Luvisols. These soils occur in association in the highlands of Lesotho. Lithosols are usually rocky or stony and occur on steep slopes or rugged dissected topography where crop cultivation is not possible. In Lesotho most Lithosols are not suitable for agriculture and should be left under natural conditions. Chromic Cambisols occur in the drier highlands of Lesotho and are covered by a subtropical steppe with thornbushes; they are used primarily for summer pasturage. Chromic Cambisols have a high agricultural potential but in most areas they cannot be used for such purposes because of steep relief and rockiness. In Lesotho it is unlikely that they are suitable for anything other than extensive livestock raising, although in zones where irrigation is possible they are excellent for a variety of crops and citrus. Luvisols have properties resembling those of Chromic Cambisols and are usually used for pasturage. Where irrigation is possible a variety of crops can be grown successfully. As with the previous two soil types, they are fine-grained and occur primarily in hilly or steep mountainous regions. According to Staples and Hudson, in Smit (1967)..."the dominant feature of these soils in the highlands is that they exhibit a greater or lesser degree of podsolisation, that is, they are highly leached soils formed under grassland and contain an accumulation of dark-coloured acid humus in the surface layer. Beneath the darker top-soil is a lighter-coloured horizon of coarser texture varying greatly in its thickness. Beneath this again is decomposing rubble of the basalt rock." The parent rock of the mountain soils is volcanic lava. These soils are shallow and seldom reach a depth of more than 0.5 m (18 in). Along the southern mountain slopes, which receive less sun and are covered by snow in the winter, the soil is mainly black and covered with grass. Soil on the northern slopes are brown and often support a vegetation of inferior bitter Karroo shrubs and minor grass types.

The mountain soils also are easily saturated because they are so shallow and have poor internal drainage. Many areas become boggy and support a very fine type of grass. When these soils dry out they are usually overgrazed, rapidly lose their structure, and become sandy and subject to wind erosion. Soil creep is common along steep slopes because the soil is loose and underlain by an

impermeable layer that is often water-logged. When Lesotho's mountain soils are cultivated they erode easily and expose bare rock surfaces.

3.2 Water Resources

3.2.1 Water Resource Data

The high mountains of Lesotho are a rich source of flowing water but despite this, much of the country suffers from frequent droughts. Difficult topography limits opportunities for irrigation to some 41,000 acres. Water supplies for domestic use are insufficient and often exceed existing capacity even though there are no large water consuming industries or urban centers in Lesotho. The most important river water sources are the Orange and Caledon Rivers. Annual and monthly flow data are given by Smit (1967) for the Orange River (Fig. 16). Binnie and Parsons (1972) and Jacobi (1977) summarize hydrologic data at 19 locations in Lesotho's river systems. Sampling was carried out by the Lesotho Hydrological Department from 1970 to 1973 and 1976 to 1977. Some data from these sources are presented in the next section. Van der Leeden (1975) gives no surface or ground water data pertinent to Lesotho, nor does he list the number of water wells or amount or rate of groundwater withdrawal. According to United Nation's data (1973) a total of 200 wells had been drilled in Lesotho, but no systematically collected data on water-tables or their fluctuations were available. Wells in Lesotho are drilled mainly for domestic use in rural communities, or for individual families. Until 1973, approximately 12 new wells were drilled each year. Several towns, including Butha Buthe, Teyateyaneng, Mafeteng, Mohales Hock and Quthing, draw part of their water supply from underground sources. As far as is known, there are no extensive underground aquifers in the country and most rock formations are more or less impermeable (see map, Fig. 17). Low water yields are obtained in dikes, sills, contact zones, fractures and faults.

Yearly flow of river is noticeable variable because of frequent and severe droughts (see Fig. 16). For many years plans have been proposed to harness the water resources of Lesotho's major rivers. Because of rugged terrain and limited amount of relatively level arable land there are

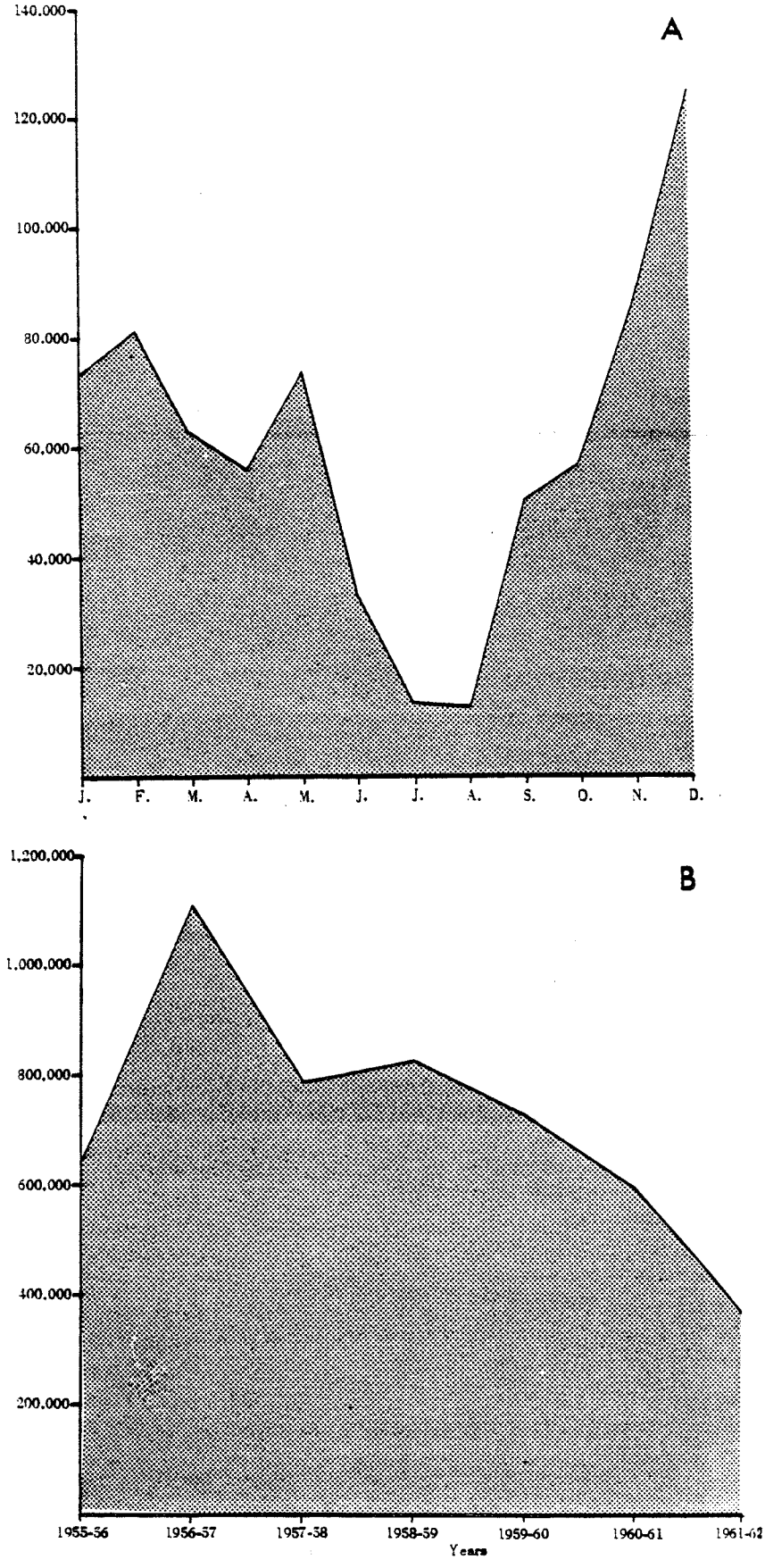
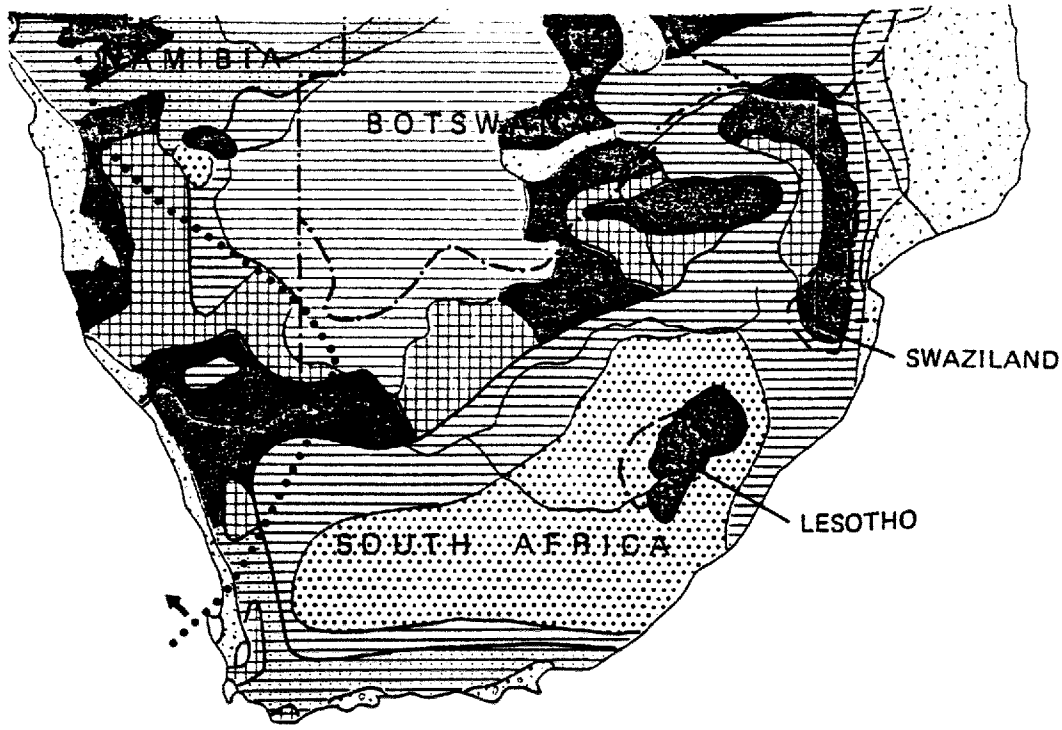


Figure 16. A. Average Monthly Flow in Morgen Feet (1000 cu. yd.), Orange River at White Hill (1955-56 to 1961-62)

Figure 16. B. Yearly Flow in Morgen Feet, Orange River at White Hill (1955-56 to 1961-62)

Source: Smit. 1967.



AQUIFERS WITH INTERSTITIAL POROSITY

***Continental intercalaire*, Nubian Sandstones, sandstone Karroo and other Pre-Cretaceous or Cretaceous continental sandstones**

FORMATIONS WITH LITTLE OR NO POROSITY EXCEPT LOCALLY IN CERTAIN FAVOURABLY SITUATED WEATHERED OR FISSURED ZONES

Eruptive volcanic rocks

Annual rainfall less than 100 mm

Figure 17. Groundwater Aquifers, Lesotho

Source: United Nations. 1973.

major obstacles to the construction of any dams in Lesotho. During 1971-73, plans were developed for the Malibamatso Project Dam which was to be financed in part by water sales to Africa. The project, however, was never finalized according to World Bank (1975).

Many mountain rivers have very steep narrow valleys and clear silt-free water, making them suitable for hydropower but unsuitable for irrigation because of the steep terrain. Silt loads are very high in the lowlands section of the river because of widespread erosion.

According to Van der Leeden (1975) Lesotho has an installed thermal generating capacity of three megawatts.

Data on water quality and water supply were not available to this report.

The chief national organization concerned with hydrology in Lesotho is the Hydrological Survey, Ministry of Public Works, P.O. Box 20, Maseru, Lesotho. Several international organizations that effect hydrological data and cooperate in African hydrology, are listed in Appendix II.

3.2.2 Suspended Sediment Loads in Lesotho Rivers [13]

Suspended sediment loads in rivers are important indicators of soil loss. In the past, gully formation, due to a variety of causes such as cropping and formation of trails and paths on stream banks, overgrazing, and natural phenomena such as storms, climatic cycles and natural soil erodibility, has contributed enormously to suspended sediment loads in Lesotho's rivers. There are now an estimated 20,000 to 30,000 gullies in the lowlands of Lesotho. Soil loss from gullies or dongas, has been augmented by sheet and rill erosion, the other two major phases of the erosion or degredation process. In an attempt to document erosion rates through suspended sediment loads in rivers, there has been intermittent sampling at 19 locations in Lesotho's river system. Samples were taken by the Hydrological Department in 1970-73 and again

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[13] Sources: Binnie and Partners. 1972.
Jacobi. 1977.

during 1976-77. According to Jacobi (1977) there is sufficent data for analysis for only four locations. Binnie and Partners (1972) also provide estimates of probable sediment loads arriving from various points in the Caledon River (Table 9).

Table 9. Sediment Load Estimate for Several Rivers

Location	Drainage area sq km	Runoff cu m (x10^6)	Sediment yield tons (x10^6)	Tons sq km per year	Tons per acre per year
Jacobi (1972) 1971-76 data					
Puthiatsana at Mapoteng	386	100.2	1.146	2,968	13.2
Little Caledon at Masianokeng	945	191.7	1.870	1,979	8.8
Matsoku at Seshote	662	145.4	0.216	327	1.5
Malibamatso at Paray	3,240	1,006..0	0.710	219	1.0
Binnie and Partners (1972)					
Caledon River at Jammerdrift	13,320	1,147.9	14.372	1,079	4.8
Left Bank Caledon (Lesotho)	6,570	760.0	11.491	1,749	7.8
Right Bank Caledon (S. Africa)	6,750	387.9	2.882	427	1.9
Orange River at Aliwal North	37,200	4,856.5	32.364	870	3.9

3.2.3 Irrigation

Lesotho has very little land suitable for agriculture. Thirteen percent is considered marginally suitable but only 0.4 percent is classified as good land for agriculture. Moreover, the agricultural sector is subject to serious and frequent droughts. Irrigation has not offered a quick solution to increased crop production despite abundant river water resources during most of the year (Fig. 16). The area of potentially irrigable land is limited to about 17,000 ha and the winters are too cold for most field crops. Further, in the lowlands where river water for irrigation is most needed, the high river water silt load contributes to short effective lives for

dams and pumping equipment. Nearly two dozen such irrigation schemes mentioned by the World Bank (1981) have failed or are running at a loss. The main thrust of future irrigation development is likely to favor intensive horticultural crops to replace those now imported from South Africa (World Bank 1981).

3.3 Vegetation

3.3.1 Flora and Vegetation Communities

The principal natural vegetation community of Lesotho is grassland, often including forbs and scattered shrubs and trees. There is a broad agreement that at least three major grassland associations (veld types of Acocks, 1953, and others) occur in Lesotho, although terminology and definitions differ considerably (e.g. compare Smit 1967, Werger 1978, and Rattray 1960). Differences between grasslands are due primarily to climatic difference. Werger (1978) provides a broad overview of the forest and grassland types in southern Africa, including Lesotho, and cites a larger body of literature on the Afromontane vegetation in South Africa. Among the most detailed is that of Killick (1963).

Descriptions of the main grassland associations are given below. These are taken from Rattray (1960) and include 1) Cymbopogon-Themeda grassland of lower elevations, 2) Themeda, or Tristachya or mixed Themeda-Tristachya grassland of milder elevation, 3) Themeda-Festuca of the high alpine regions, and 4) a mixed Themeda-Tristachya called Ngongoni veld, along the extreme eastern border near the Drakensburg Escarpment (See Figure 18). Examples of Themeda triandra Grassland and Themeda-Festuca Grassland are shown in Figures 19 and 20 respectively. An alpine bog and heath on the Drakensburg summit are shown in Figure 21 and 22 respectively.

1) Cymbopogan-Themeda. Major species are: Themeda triandra, Cymbopogon plurinodis, Setaria flabellata, Elyonurus argenteus, Heteropogon contortus, Eragrostis racemosa, Tristachya hispida.

   Themeda triandra and other climax species tend to be replaced (due to disturbance) by Eragrostis chloromelas, E. plana and E. curvula, except on black soils where Themeda is persistent.

This is a fairly short, tufted grassland which becomes very dense on the heavy black soils, and is regarded by Acocks as a climax grassland where conditions are either too dry or too frosty or both for the development of trees. The type occurs at altitudes from 4,500 to 6,500 feet (1,400 to 2,000 metres) with a rainfall varying from 18 to 30 inches (460 to 760 millimetres).

It provides "sweet" to "semi-sour" grazing, suited to both cattle and sheep, with a carrying capacity of 1 to 3 morgen (0.85 to 2.6 hectares) per beast (7 sheep = 1 beast). The "sour" areas are unable to maintain livestock in sound condition, without supplementation, during winter. Rotational grazing, providing occasional summer rest, maintains the grass cover in vigorous condition. Occasional spring burning after summer rest is beneficial.

2) Themeda-Tristachya. Major species are: Themeda triandra, Tristachya hispida, Trachypogon spicatus, Heteropogon contortus, Eragrostis racemosa, Digitaria tricholaenoides.

This is a dense grassland which occurs at 5,300 to 7,000 feet (1,600 to 2,000 m) with a rainfall of 30 to 37 inches (760 to 940 millimetres) annually. Acocks considers it to be a climax grassland where conditions are too dry or too frosty or both for the development of trees. Where the rainfall is highest, the dominant grass is often Tristachya hispida. Otherwise Themeda is dominant. Of the remaining grasses, a number become unpalatable at maturity, namely trachypogon spicatus, Andropogon appendiculatus, Rendlia nelsonii, Monocymbium ceresiiforme, Elyonurus argenteus, Alloteropsis semialata and Harpechloa falx. The more palatable species are Eragrostis spp., Brachiaria serrata and Digitaria spp. The grass flora is rich and the basal cover is as high as 30 percent. The country is rolling with a few rocky outcrops supporting a shrubby type of

vegetation often consisting of Rhamnus prinoides, Hallera lucida, Kiggelaria africana, Myrsine africana and Rhus spp. This type is classed as a "sour" highland grassland suited to cattle and sheep farming. Carrying capacity and management are similar to the next two types.

3) Themeda-Festuca. Major species are: Themeda triandra, Elyonurus argenteus, Heteropogon contortus, Andropogon spp., Festuca costata, F. scabra, F. caprina, Danthonia disticha, Eragrostis spp.

This is a short, dense, alpine grassland which occurs at 6,000 to 7,000 feet (1,800 to 2,000 metres) and above, with a rainfall ranging from 23 to 75 inches (580 to 2,900 millimetres). Acocks considers it to be a climax grassland where conditions are too dry or too frosty or both for the development of trees. Where over-grazing has taken place, Eragrostis spp. together with a number of shrubs have replaced the Themeda. Chrysocoma tenuifolia is one of the most common shrubs.

At high altitudes of over 8,000 feet (2,400 metres), the Themeda gives way to Festuca spp., Poa spp., Danthonia disticha, Pentaschistis spp., Agrostis spp., Koeleria cristata, Helictotrichon spp. and Bromus spp. which form a short close turf. The soils are dark and turfy and usually shallow on the steep slopes which characterize this grassland. The type is suited to cattle and sheep farming, although sheep predominate. It is subject to encroachment by the macchia type of vegetation and has a carrying capacity and management similar to the next grassland association.

4) Mixed Themeda-Tristachya (Ngongoni Veld). Major species are: Themeda triandra, Tristachya hispida, Trachypogon spicatus, Heteropogon contortus, Eragrostis racemosa, Monocymbium ceresiiforme.

Grasses such as Themeda, Tristachya and Trachypogon tend to be replaced in many parts by Aristida junciformis and Eragrostis plana where injudicious management has taken place. Localized invasions by shrubs such as Athanasia acerosa, Cliffortia linearifolia and Rubus cuneifolius also occur under these conditions.

This is a short dense, tufted grassland derived from temperate forest dominated by Podocarpus latifolius, which occurs at altitudes ranging from 2,000 to 7,000 feet (600 to 2,100 m). It provides "sour" grazing suited to both cattle and sheep. The carrying capacity during summer is 1 to 2 morgen (0.85 to 1.7 hectares) per beast (7 sheep = 1 beast). It cannot maintain livestock in sound condition, without supplementation during winter. A system of rapid rotational grazing, providing at the same time periodic rests of a full growing season, maintains this grassland in full vigour. Burning in spring after summer rest is usually essential.

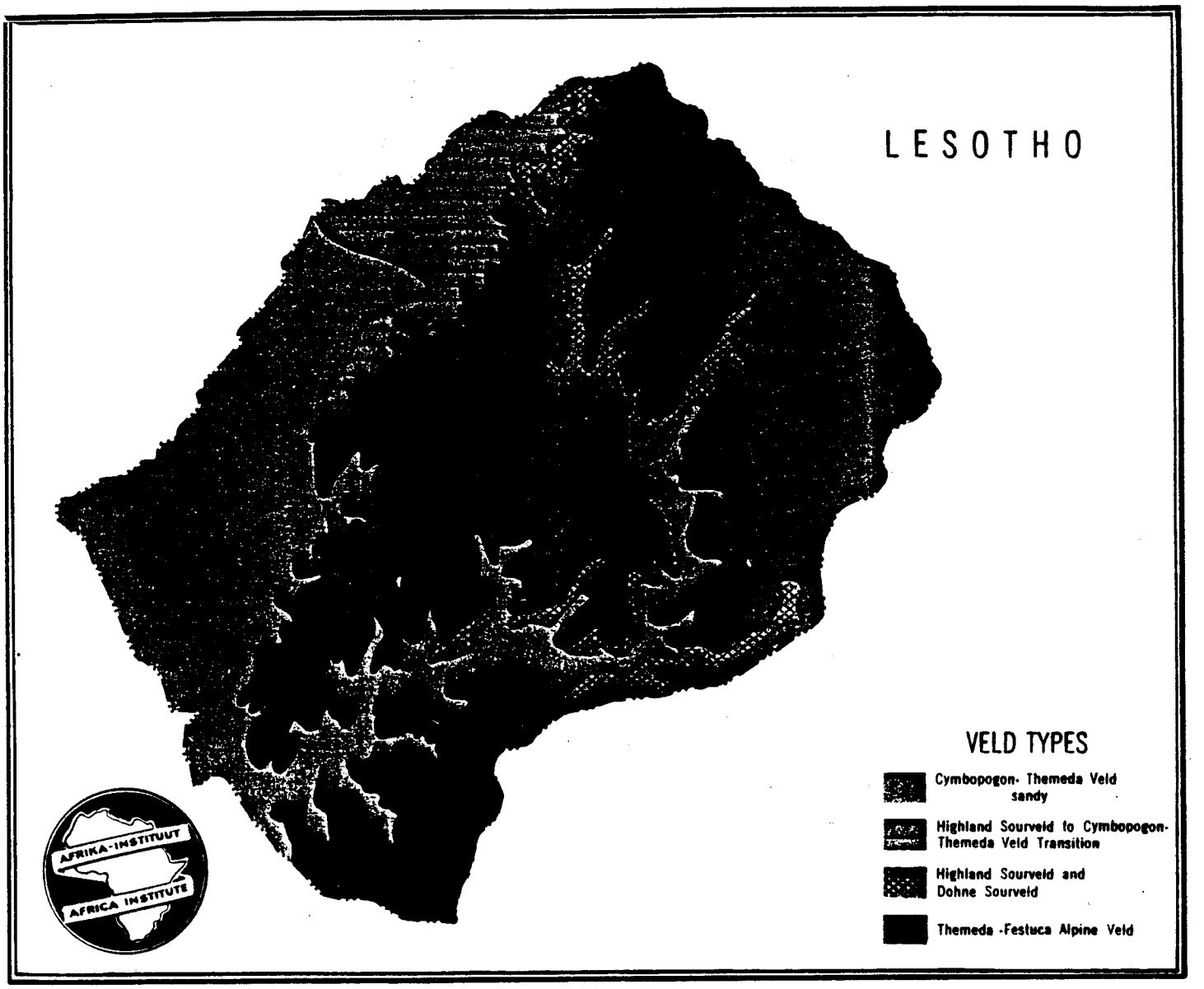

Figure 18. Vegetation Communities. See text for explanation of community types

Source: Smit. 1967.

Figure 19. Spurs of the Little Berg Projecting into Natal from the main Drakensberg Escarpment between Cathin Peak (3060 m) and Ndedema Falls. The Grassland is Chiefly Themeda triandra Grassland

Source: Werger. 1978.

Figure 20. Themeda-Festuca Grassland in the Mokhotlong River Valley in Eastern Lesotho

Source: Werger. 1978.

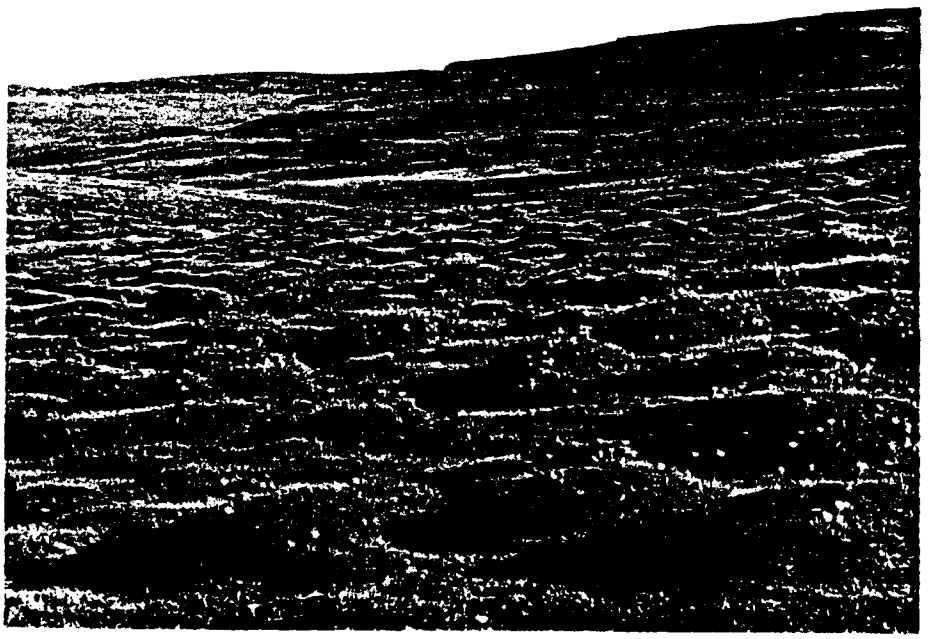

Figure 21. An Alpine Bog with Raised Hummocks or Thurfur in the Maluti Mountains, 30 km. NW of Mokhotlong, Eastern Lesotho. The White Composite is Athrixia fontana. Dark Patches in the Background are Helichrysum trilineatum heath

Source: Werger. 1978.

Figure 22. Erica dominans Heath on the Summit of the Drakensberg south of Mount Aux Sources at c.3048 m.

Source: Werger. 1978.

Many south African botanists believe that the natural grass vegetation represents a fire sub-climax (to shrubs) grassland (e.g. Rattray 1960, Killick 1963). The Themedra triandra grassland (Fig. 19) is a particularly stable community, prevented from successional development by recurrent grass fires. Lightening induced fires are frequent in the Drakensburg Range and it is likely that grassland has been the predominant community in this zone ever since the climate included a dry season (Werger 1978). This process has doubtless been augmented by a millenia of man-induced burnings. Burning probably was done first to flush game for food or as a stratagem in intertribal warfare. Later, burning of grasslands probably was done to clear land for cropping, to encourage tender shoot growth for grazing animals, and to control noxious or undesirable shrubs.

Themeda grassland, when protected from fire, is rapidly invaded by shrubby species of Hyparrhenia.

Agriculturally, the most important types of natural pastures are red grass (Themeda triandra), known to the Basotho as seboku; sour grass (Festuca caprina), known as letsiri; and the bitter karoo shrub (Chysocoma tenuifolia), known as sehalanala. Where red grass is dominant, the pasture is known as "sweet veld." This type of grass was formerly common but has been largely destroyed by over-grazing. In the lowlands it has been almost completely replaced by inferior grasses.

Sour grass is of poorer quality than red grass for grazing, and usually grows over basalt rocks at elevations greater than 2,725 m (9,000 ft) on north-facing slopes and above 2,100 m (7,000 ft) on south-facing slopes. Sour grass provide good summer forage but as it matures, it becomes tough and unpalatable and then does not support livestock. Sour grass cannot withstand heavy grazing and it is largely extirpated near settlements. It survives primarily in rocky areas not grazed by cattle, or in areas protected from burning.

Much of the original grassland has now been replaced by bitter karoo bush. It appeared conspiciously at the turn of the century in the Maluti Mountains and by the 1930s covered an estimated 13 percent of the mountain area of

Lesotho. It has increased even more today and according to Smit (1967) the carrying capacity of the land has been reduced by about half of the 1930 level. Areas that have suffered most include the relatively dry Orange River Valley, and it's main tributaries, especially the Semena and Sequnyane Rivers, the more densely populated areas of Kokhotlong District, and areas near settlements in the mountains (Smit 1967).

Few trees are indigenous to the Lesotho highlands. Factors that appear to limit or prevent tree growth include very shallow rocky soil, strong winds and the high, cold, inhospitable climate of the mountains. In lower-lying valleys most native trees have been erradicated and replaced by introduced willow and popular. These species have been planted widely in the mountains but are subject to depredation by humans for fuelwood, and are damaged by animals and stunted by the climate. Native trees of highland zones are confined primarily to remote valley bottoms (e.g. Figure 23), and even here are often destroyed by fire.

3.3.2 Endangered Flora

The spiral aloe (Aloe polyphylla), an endemic plant of the Lesotho highlands, has long been considered the rarest aloe in the world. It is listed by the 1973 IUCN Endangered Species Convention (Appendix I) and Jacot-Guillarmod (1975) believed the total population to be less than 500 plants. A recent, year-long survey by Beverly (1979) has confirmed a large number of extant sites, several heretofore unknown, as well as a number of probable sites based on reliable sources (Fig. 24). Nevertheless, the spiral aloe deserves attention because it has been extirpated in many areas. The smaller ones are particularly vulnerable because they are often sold to tourists or taken to the Orange Free State, South Africa, to be sold. It's attraction lies largely in the unusual spiral growth forms (Fig. 25).

3.3.3 Reforestation Programs

In 1972 the Government of Lesotho, together with Anglo American Corporation and DeBeers Consolidated Mining agreed to finance the Lesotho Woodlot Project for the purpose of planting woodlots or stands of trees around the country.

Figure 23. Trees in valleys on edge of Drakensberg Escarpment near Mount Aux Sources, 3272 m (10,700 ft).

Source: Werger. 1978.

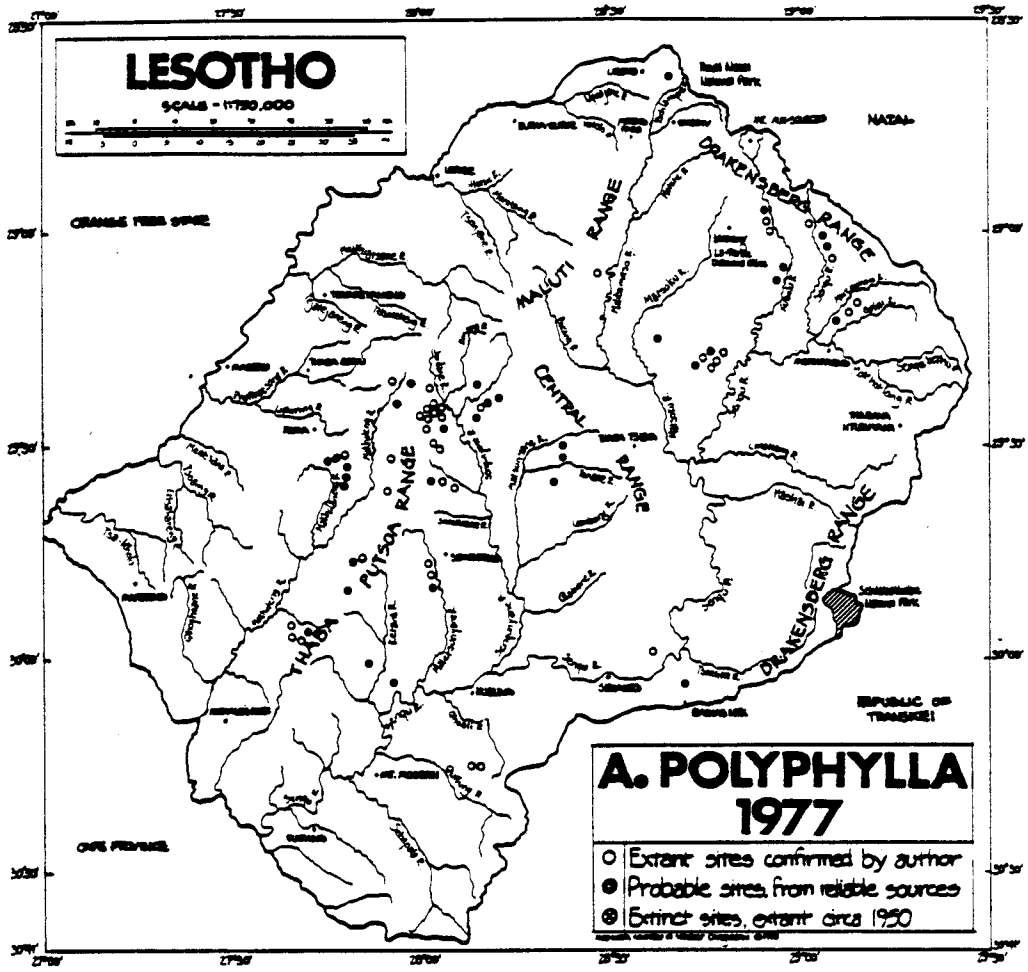

Figure 24. Distribution of Aloe polyphylla in Lesotho

Source: Beverly. 1979.

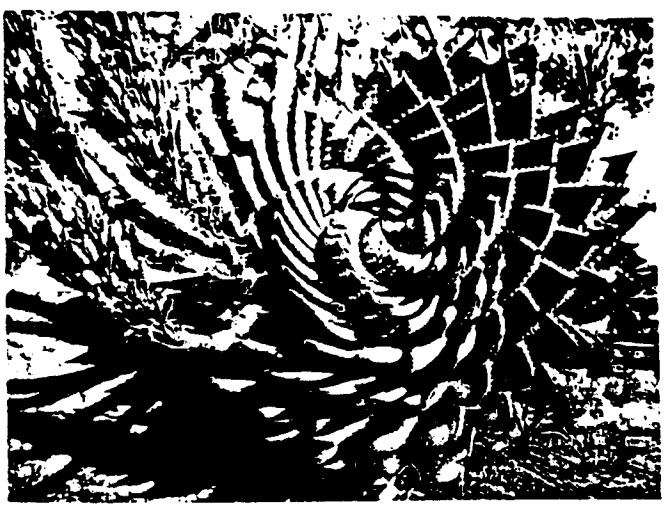

Figure 25. A (left). Aloe polyphylla with Dessicated Capsules Containing Seed, a March - April Condition

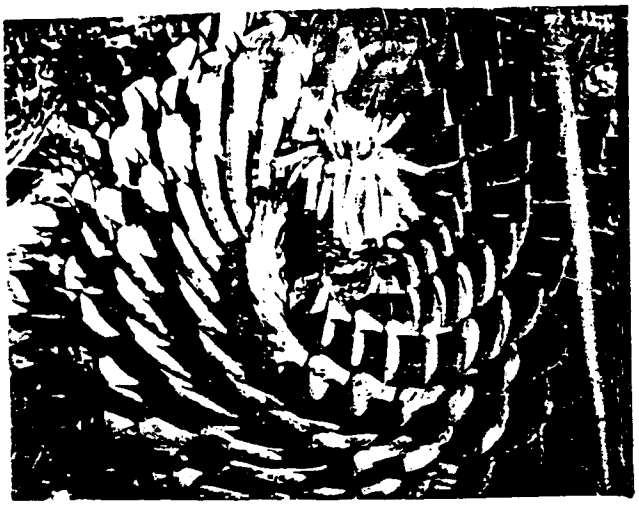

Figure 25. B (right). Early Stages of Flowering during the First Week of April

Source: Beverly. 1979.

Financing by these three groups was undertaken for a period of 12 years with costs shared approximately equally. As of 1979 about 3½ million (3,500,000) trees were planted, covering nearly 2,500 ha. Rotation period for the trees, over 90 percent of which are fast growing eucalyptus, is estimated to be about 12 years, after which they will be felled to produce fuel and poles. In addition, eucalyptus have a coppice or shoot regeneration property when cut so than many will not have to be replanted. About four percent of the trees used are wattles, which although they do not regenerate, are easily proliferated by seed. Unfortunately, wattle is a favorite dietary item of rats and destruction immediately after planting can be severe. Both species of trees can be grown on degraded soils no longer suitable for agriculture because they can tap fertile zones and moisture at depths below those reached by agricultural crops. Good survival and growth during the first two to three years before the roots reach these zones has been a problem. All woodlots are located on the west-facing, and lower elevation side of Lesotho where the greatest number of people are concentrated. Trees are planted up to 2,000 m in elevation with a few experimental plantings up to 2,600 m.

The woodlot project is supplied by six nurseries, with a capacity of about one million trees per year for use by the project, plus sales to other government divisions and private persons. The National University in the Roma Valley also runs an experimental area where a wide variety of trees are planted and their programs monitored.

In addition to the problem of seedling tree destruction by rats, there has been difficulties in the use of fertilizers. Experiments have led to the use of finely-perforated polythene or plastic bags which regulate the flow of fertilizer.

The project appears to have been well-received by the people of Lesotho and there has been an increasing number of requests for woodlots from villages. Six hundred additional hectares were due to be planted in 1979.

It is believed the project will play an important role in energy development, soil fertility and soil conservation. Fuel traditionally has been supplied by brush and manure and removal of the

latter reduces opportunities for increasing soil fertility. Thus, woodlots provide fuelwood, a needed commodity, reduce pressure on manure fuel, and aid in soil conservation. Fellings are due to begin in 1985, and villagers will buy their fuelwood at cost price which is a fifth the cost of imported fuel (Anonymous 1979).

3.4 Fauna and Conservation Measures

3.4.1 Native Terrestrial Fauna

Lesotho does not have a diverse terrestrial fauna. Among the factors that limit faunal diversity include the country's very small size, temperate latitude, high average elevation, and limited number of native habitats which are primarily grassland or grass and shrubs. Lesotho's environment has been greatly abused and altered by human activities during the past century and this has probably contributed to a loss of diversity.

Terrestrial faunal surveys of Lesotho are almost nonexistant, although a wealth of data exists for neighboring South Africa, including the provinces that border Lesotho. The author knows of no regional or national inventory of any major vertebrate group. However, a comprehensive study of Lesotho birdlife entitled An Annotated Checklist to the Birds of Lesotho, is being prepared by Kurt Bonde of Denmark (Amer. Birds 1982).

A list of 41 larger mammals of probable occurrence in Lesotho is shown in Table 10. Several species on this list may have ranged only to the borders of Lesotho and it is not known to what extent they may have occurred inside Lesotho.

Little information was available on the present status of mammals in Lesotho. The IUCN Red Data Book (1978) lists two endangered species in Lesotho, the Cheetah (Acinonyx jubtus) and Leopard (Panthera pardus). No specific information on the occurrence of either species in Lesotho was given. Both may no longer occur in Lesotho. IUCN information on these species is given in Appendix III. In the lowlands between Maseru and Roma, an area devoted entirely to grassland and agricultural crops, Christopher Dunford saw no evidence of any larger mammals in February, 1982 (pers. comm.).

Table 10. Mammals of Lesotho.

A question mark (?) indicates uncertain undocumentation
(may never have occurred)

Small Antelope		
Red Duiker	Cephalophus natalensis	(formerly?)
Common Duiker (Grimm's Duiker)	Sylvicapra grimmia	
Klipspringer	Oreotragus oreotragus	
Steenbok	Raphicerus campestris	
Medium-sized Antelope		
Mountain Reedbuck	Redunca fulvorufula	
Vaal Rhebon	Pelea copreolus	
Bushbuck	Tragelaphus scriptus	
Large Antelope		
Eland	Taurotragus oryx	(formerly?)
Blesbok	Damaliscus dorcas phillipsi	(formerly?)
Black Wildebeest (White-tailed Gnu)	Connochaetes gnou	
Primates		
Chacma Baboon	Papio ursinus	
Blue Monkey (Samango Monkey)	Cercopithecus mitis	(formerly?)
Vervet Monkey (Black-faced Monkey)	Cercopithecus althiops	(formerly?)
Small Carnivores		
Black-banded Jackel	Canis mesomelas	
Cape Fox	Vulpes chama	
Bat-eared Fox	Octocyon megalotis	(northwest only)
Zorila (African Skunk)	Ictonyx striatus	
White-naped Weasel (African Striped Weasel)	Poecilogale albinucha	
Spotted-necked Otter	Lutra maculicollis	
Cape Clawless Otter	Aonyx capensis	
Honey Badger (Ratel)	Mellivora capensis	
Genet	Genetta sp.	
Aardwolf	Proteles cristatus	
African Wild Cat	Felis lybica	
Serval	Felis serval	(formerly?)
Caracal (African Lynx)	Felis caracal	
White-tailed Mongoose	Ichneumia albicanda	(formerly?)
Marsh Mongoose (Water Mongoose)	Atilax paludinosus	
Large Gray Mongoose (Egyptian Mongoose)	Herpestes ichneumon	

Slender Mongoose	Herpestes sanguineus	
Yellow Mongoose (Bushy-tailed Meerkat)	Cynictis penicillata	
Leopard	Panthera pardus	(formerly)
Cheetah	Acinonyx jubatus	(formerly?)
Brown Hyaena	Hyaena brunnea	(formerly?)
Rodents		
Spring Hare	Pedetes capensis	
Greater Cane Rat	Thyronomys swinderianus	
Crested Porcupine	Hystrix africae-australis	
Miscellaneous Small Mammals		
Hedgehog	Erinaceus frontalis	
Aardvark (Antbear)	Orycteropus afer	
Rock Dassie	Procavia capensis	
Hare	Lepus spp.	

Source: Extracted from Hanks (1974).

The entire avifauna of South Africa, south of about 17° S is surveyed in Roberts Birds of Southern Africa. Originally published in 1940, and revised in 1957 and 1970 by McLachlan and Liversidge, this work incudes all species found in Lesotho, although because of it's broad scope, it is of limited use in documenting the status of Lesotho avifauna. There is extensive literature on South African birds, for example Skead (1967), Mackworth-Praed and Grant (1963), Digby and Robson (1981), Prozesky (1974), Snow (1981), Clancey (1964), and S.A. Ornithological Society List Committee (1969). Several South African ornithology and wildlife journals publish research results from southern Africa. Examples include the Ostrich, Bookmakierie, and African wildlife. However, little has appeared in these journals on birds or wildlife in Lesotho. At present, ornithological publications most useful to Lesotho are Skead's Ecology of Birds in the Eastern Cape Province (1967a) and Cyrus and Robson's Bird Atlas of Natal (1981). Quickelberg (1972) reported the results of two ornithological expeditions in Lesotho, and Dove (1971) discussed the status of the Red-billed Firefinch (Laganosticta senegala) in Lesotho. The International Union for the Conservation of Nature and Natural Resources (IUCN, 1966) lists only one bird (See Appendix V), the African Lammergeyer (Gypaetus barbatus meridionalis), as endangered in Lesotho. This species is also rare or very thinly spread throughout its wide range. Tables 10-12 present lists of birds for three important habitats in eastern Cape Province, lying adjacent (south) to Lesotho. These habitats are grassland, karoo, and fynbos. The list for each habitat, is drawn from a larger area than Lesotho, and from a lower average elevation. Therefore the lists probably include more species than are actually present in Lesotho. The karoo list is of particular interest because originally karoo was scarcely present in Lesotho, but now occupies more than 30 percent of the land surface. Doubtless major changes in species composition and abundance have occurred, and birds such as bustards, cranes, larks, pipits and chats which favor open karoo-type vegetation have probably prospered.

Increased settlement has probably resulted in the disappearance of large, open country birds such as the Ostrich (Struthio camelus). If it survives at all, in Lesotho it probably occurs only on a

few farms where formerly domesticated birds have been allowed to range free.

Brief comments on the status of all eastern Cape Province birds are given in Skead (1967) in Tables 11, 12 and 13.

Little or no information on reptiles, amphibians and fish, or their status was found.

The Nile Crocodile (Crocodylus niloticus) is listed as vulnerable throughout its range by the IUCN, although specific information on its status in Lesotho was not given. The population in adjacent Natal, South Africa is considered to be fewer than 800 animals. Natal, because of much lower average elevation than Lesotho, also is probably a far more favorable habitat for survival of the Nile Crocodile than Lesotho. IUCN data on the Nile Crocodile is given in Appendix IV.

Fish diversity is presumed to be low because of average high elevation and limited extent of the waterways. It is not known if a freshwater fisheries industry exists.

Lesotho did not participate in any International Conservation Conventions in Africa or elsewhere in 1980 (Commission on National Parks and Protected Areas 1980).

3.4.2 National Park System [14]

Information is available on Lesotho's first national park, the Sehlabathebe Mountain National Park, established in 1970. It is located in Qacha's Neck District, at the junction of the Rast Grigualand, Transkei, Natal, and Lesotho boundaries in the Drakensberg Range. The average elevation of the park is 2,400 m (7,800 ft).

Geology. The most important geological features of the park are sandstone caves and arches sculptured by wind. A few caves and arches contain Bushman paintings, some of which are in good

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[14] Sources: IUCN. 1977.
Kurian. 1980.
Lesotho Park Administration. n.d.

Table 11. Birds of the grasses (dry veld and wet grasses)[1], Eastern Cape Province, South Africa. Two hundred and twelve species are listed from this habitat.

		Dry Veld	*Wet Reeds and Marshes*			*Dry Veld*	*Wet Reeds and Marshes*
1	Ostrich	×	—	63	Green-backed Heron ...	—	×
55	Black-headed Heron ...	×	×	65	Rufous-bellied Heron ...	—	×
56	Goliath Heron	—	×	66	Dwarf Bittern	—	×
57	Purple Heron	—	×	67	Little Bittern	—	×
61	Cattle Egret	×	×	69	Black-crowned Night Heron	—	×
62	Squacco Heron	—	×				
71	Bittern	—	×	199	African Crake	×	×
72	Hamerkop	—	×	200	Striped Crake	—	×
73	Marabou Stork	×	—	202	Baillon's Crake	—	×
78	White-bellied Stork ...	×	—	203	Black Crake	—	×
80	White Stork	×	—	204	White-winged Crake ...	—	×
81	Hadedah	×	×	205	Red-chested Flufftail ...	—	×
88	Spurwinged Goose ...	×	×	206	Buff-spotted Flufftail ...	×	×
89	Egyptian Goose	×	×	207	Striped Flufftail	×	—
96	Yellow-billed Duck ...	—	×	208	Purple Gallinule	—	×
97	Red-billed Teal	—	×	209	Lesser Gallinule	—	×
99	Hottentot Teal	—	×	210	Moorhen	—	×
102	Southern Pochard ...	—	×	211	Lesser Moorhen	—	×
104	Maccoa Duck	—	×	212	Red-knobbed Coot ...	—	×
105	Secretary Bird	×	—	214	Crowned Crane	×	×
106	Cape Vulture	×	—	215	Wattled Crane	×	×
111	Egyptian Vulture	×	—	216	Blue Crane	×	—
112	Palm-nut Vulture	×	—	217	Kori Bustard	×	—
113	Peregrine	×	—	218	Ludwig's Bustard ...	×	—
114	Lanner	×	—	219	Stanley Bustard	×	—
115	Hobby	×	—	220	Karoo Korhaan	×	—
116	African Hobby	×	—	222	White-bellied Korhaan ...	×	—
120	Western Red-footed Kestrel	×	—	223	Blue Korhaan	×	—
122	Greater Kestrel	×	—	225	Black Korhaan	×	—
123	Rock Kestrel	×	—	227	Black-bellied Korhaan ...	×	—
125	Lesser Kestrel	×	—	228	African Jacana	—	×
129	Yellow-billed Kite ...	×	—	229	Lesser Jacana	—	×
130	Black-shouldered Kite ...	×	—	230	Painted Snipe	—	×
133	Black Eagle	×	—	242	Crowned Plover	×	—
134	Tawny Eagle	×	—	243	Black-winged Plover ...	×	—
139	Booted Eagle	×	—	249	Great Snipe	—	×
142	Martial Eagle	×	—	250	Ethiopian Snipe	—	×
145	Brown Snake-eagle ...	×	—	264	Wood Sandpiper	—	×
146	Black-breasted Snake-eagle	×	—	275	Cape Dikkop	×	—
149	Fish Eagle	—	×	276	Burchell's Courser ...	×	—
152	Jackal Buzzard	×	—	277	Temminck's Courser ...	×	—
154*b*	Steppe Buzzard	×	—	278	Double-banded Courser ...	×	—
167	Marsh Harrier	×	×	282	Black-winged Pratincole ...	×	—
168	Pallid Harrier	×	—	307	Namaqua Sandgrouse ...	×	—
169	Black Harrier	×	×	311	Speckled Rock Pigeon ...	×	—
170	Montagu's Harrier ...	×	—	314	Red-eyed Dove	×	—
176	Grey-winged Francolin ...	×	—	316	Cape Turtle Dove ...	×	—
178	Red-winged Francolin ...	×	—	317	Laughing Dove	×	—
181	Cape Francolin	×	—	360	Grass Owl	×	—
183	Natal Francolin	×	—	361	Marsh Owl	×	×
188	Red-necked Francolin ...	×	—	368	Spotted Eagle-owl ...	×	—
189	African Quail	×	—	371	European Nightjar ...	×	—
190	Harlequin Quail	×	—	373	Fiery-necked Nightjar ...	×	—
191	Blue Quail	×	×	380	Black Swift	×	—
192	Helmeted Guineafowl ...	×	—	383	White-rumped Swift ...	×	×
194	Hottentot Button-quail ...	×	—	384	Horus Swift	×	—
196	Kurrichane Button-quail	×	—	385	Little Swift	×	—
197	Kaffir Rail	—	×	386	Alpine Swift	×	—
198	Corn Crake	×	×	404	European Bee-eater ...	×	—

		Dry Veld	Wet Reeds and Marshes			Dry Veld	Wet Reeds and Marshes
412	European Roller	×	—	630	Desert Cisticola	×	—
418	Hoopoe	×	—	631	Cloud Cisticola	×	—
430	Ground Hornbill	×	—	634	Ayres's Cisticola	×	—
445	Ground Woodpecker ...	×	—	635	Pale-crowned Cisticola ...	×	—
456	Singing Bush Lark ...	×	—	637	Neddicky Cisticola ...	×	—
466	Clapper Lark	×	—	639	Wailing Cisticola	×	—
463	Thick-billed Lark ...	×	—	646	Levaillant's Cisticola ...	×	×
461	Karoo Lark	×	—	647	Croaking Cisticola ...	×	—
474	Spike-heeled Lark ...	×	—	648	Lazy Cisticola	×	—
475	Long-billed Lark	×	—	649	Tawny-flanked Prinia ...	×	×
484	Chestnut-backed Finch-lark	×	—	666	Yellow Flycatcher ...	×	×
				686	Cape Wagtail	×	×
485	Grey-backed Finch-lark ...	×	—	692	Richard's Pipit	×	—
486	Black-eared Finch-lark ...	×	—	693	Long-billed Pipit	×	—
473	Rudd's Lark	×	—	694	Plain-backed Pipit ...	×	—
488	Red-capped Lark	×	—	696	Striped Pipit	×	—
490	Pink-billed Lark	×	—	697	Rock Pipit	×	—
493	European Swallow ...	×	×	701	Yellow-breasted Pipit ...	×	—
495	White-throated Swallow ...	×	×	703	Orange-throated Longclaw	×	—
498	Pearl-breasted Swallow ...	×	×	704	Yellow-throated Longclaw	×	—
502	Greater Striped Swallow	×	×	707	Fiscal Shrike	×	—
503	Lesser Striped Swallow ...	×	×	746	Pied Starling	×	—
504	Cliff Swallow	×	—	780	White-browed Sparrow-weaver	×	—
506	Rock Martin	×	×				
507	House Martin	×	—	786	Cape Sparrow	×	—
509	African Sandmartin ...	×	×	797	Spotted-backed Weaver ...	×	×
510	Banded Sandmartin ...	×	×	799	Cape Weaver	×	×
522	Pied Crow	×	—	800	Yellow Weaver	×	×
523	Black Crow	×	—	803	Masked Weaver	×	×
524	White-necked Raven ...	×	—	804	Thick-billed Weaver ...	×	×
540	Rockjumper	×	—	805	Red-billed Quelea ...	×	×
559	Cape Rock Thrush ...	×	—	806	Red-headed Quelea ...	×	×
560	Sentinel Rock Thrush ...	×	—	808	Red Bishop-bird	×	×
564	Mountain Chat	×	—	810	Cape Bishop-bird ...	×	×
568	Capped Wheatear ...	×	—	812	Golden Bishop-bird ...	×	×
569	Buff-streaked Chat ...	×	—	813	Red-collared Whydah ...	×	×
570	Familiar Chat	×	—	816	Red-shouldered Whydah	×	×
572	Sickle-winged Chat ...	×	—	818	Long-tailed Whydah ...	×	×
575	Ant-eating Chat	×	—	846	Pin-tailed Widow-bird ...	×	—
576	Stone Chat	×	—	849	Black Widow-bird ...	×	—
603	Great Reed-warbler ...	×	×	855	Cape Siskin	×	—
604	Cape Reed-warbler ...	×	×	857	Cape Canary	×	—
606	African Marsh-warbler ...	—	×	858	Forest Canary	×	—
607	European Marsh-warbler	—	×	859	Yellow-eyed Canary ...	×	—
				860	Black-throated Canary ...	×	—
609	African Sedge-warbler ...	—	×	861	Black-headed Canary ...	×	—
616	Fan-tailed Warbler ...	×	×	863	Bully Canary	×	—
618	Grassbird	×	—	866	Yellow Canary	×	—
629	Fan-tailed Cisticola ...	×	—	871	Lark-like Bunting ...	×	—

[1]An open habitat interrupted by bush clumps, scattered bushes, and patches of scrub. Dominated by Karoo shrubs and inferior perennial grasses, this habitat was formerly Themeda trianda grassland but through generations of abuse and neglect has given way to open karooveld. The area occupied by karoo in Lesotho has increased dramatically in the last half century.

Source: Skead. 1967.

Table 12. Birds of the Karoo in Eastern Cape Province, South Africa

1	Ostrich
55	Black-headed Heron
61	Cattle Egret
73	Marabou Stork
80	White Stork
81	Hadedah
105	Secretary Bird
106	Cape Vulture
111	Egyptian Vulture
113*a*	Peregrine
114	Lanner
122	Greater Kestrel
123	Rock Kestrel
125	Lesser Kestrel
129	Yellow-billed Kite
130	Black-shouldered Kite
133	Black Eagle
134	Tawny Eagle
142	Martial Eagle
152	Jackal Buzzard
154*b*	Steppe Buzzard
165	Chanting Goshawk
169	Black Harrier
192	Helmeted Guineafowl
216	Blue Crane
217	Kori Bustard
218	Ludwig's Bustard
219	Stanley Bustard
220	Karoo Korhaan
225	Black Korhaan
242	Crowned Plover
275	Cape Dikkop
276	Burchell's Courser
277	Temminck's Courser
278	Double-banded Courser
282	Black-winged Pratincole
307	Namaqua Sandgrouse
311	Speckled Rock Pigeon
314	Red-eyed Dove
316	Cape Turtle Dove
317	Laughing Dove
318	Namaqua Dove
365	Pearl-spotted Owl
378	Spotted Eagle-owl
371	European Nightjar
372	Rufous-cheeked Nightjar
380	Black Swift
383	White-rumped Swift
384	Horus Swift
385	Little Swift
386	Alpine Swift
404	European Bee-eater
412	European Roller
445	Ground Woodpecker
456	Singing Bush Lark
459	Fawn-coloured Lark
506	Rock Martin
509	African Sandmartin
540	Rockjumper
564	Mountain Chat
566	Karoo Chat
568	Capped Wheatear
569	Buff-streaked Chat
570	Familiar Chat
571	Layard's Chat
572	Sicklewinged Chat
575	Ant-eating Chat
576	Stone Chat
583	Karoo Robin
613	Cinnamon-breasted Warbler
619	Rufous-eared Prinia
726	Karoo Green Warbler
663	Chat Flycatcher
692	Richard's Pipit
693	Long-billed Pipit
694	Plain-backed Pipit
695	Buffy Pipit
703	Orange-throated Longclaw
707	Fiscal Shrike
722	Bokmakierie
735	Wattled Starling
746	Pied Starling
751	Malachite Sunbird
760	Lesser Double-collared Sunbird
764	Dusky Sunbird
780	White-browed Sparrow-weaver
786	Cape Sparrow
789	Scaly Weaver
820	Red-headed Finch
857	Cape Canary
860	Black-throated Canary
861	Black-headed Canary
866	Yellow Canary
871	Lark-like Bunting
872	Rock Bunting
873	Cape Bunting
460	Sabota Lark
461	Karoo Lark
463	Thick-billed Lark
466	Clapper Lark
474	Spike-heeled Lark
475	Long-billed Lark
484	Chestnut-backed Finch-lark
485	Grey-backed Finch-lark
486	Black-eared Finch-lark
488	Red-capped Lark
490	Pink-billed Lark
493	European Swallow
495	White-throated Swallow
498	Pearl-breasted Swallow
502	Greater Striped Swallow
503	Lesser Striped Swallow
504	Cliff Swallow

Source: Skead. 1967.

Table 13. Birds of Macchia or Fynbos[1] West of Port Elizabeth in Eastern Cape Province, South Africa

105 Secretary Bird ...
106 Cape Vulture ...
114 Lanner ... ...
123 Rock Kestrel ...
125 Lesser Kestrel ...
129 Yellow-billed Kite
130 Black-shouldered Kite
133 Black Eagle ...
142 Martial Eagle ...
152 Jackal Buzzard ...
154*b* Steppe Buzzard ...
169 Black Harrier ...
171 Gymnogene ...
176 Grey-winged Francolin
178 Red-winged Francolin
188 Red-necked Francolin
189 African Quail ...
192 Helmeted Guineafowl
Stanley Bustard ...
225 Black Korhaan ...
316 Cape Turtle Dove
317 Laughing Dove ...
380 Black Swift ...
383 White-rumped Swift
385 Little Swift ...
386 Alpine Swift ...
390 Speckled Mousebird
392 Red-faced Mousebird
418 Hoopoe ... ...
493 European Swallow
495 White-throated Swallow
498 Pearl-breasted Swallow
502 Greater Striped Swallow
503 Lesser Striped Swallow
506 Rock Martin ...
509 African Sandmartin
511 Black Rough-winged Swallow ...
524 White-necked Raven
544 Black-eyed Bulbul
546 Terrestrial Bulbul
551 Sombre Bulbul ...
553 Olive Thrush ...
570 Familiar Chat ... ...
576 Stone Chat ...
581 Cape Robin ...
583 Karoo Robin ...
622 Bar-throated Apalis
627 Bleating Bush Warbler
637 Neddicky ...
648 Lazy Cisticola ...
651 Karoo Prinia ...
665 Fiscal Flycatcher ...
672 Cape Flycatcher ...
692 Richard's Pipit ...
703 Orange-throated Long-claw ... ...
707 Fiscal Shrike ...
709 Boubou Shrike ...
722 Bokmakierie ...
737 Cape Starling ...
745 Red-winged Starling ...
748 Cape Sugarbird ...
750 Gurney's Sugarbird
751 Malachite Sunbird
758 Greater Double-collared Sunbird ... ...
760 Lesser Double-collared Sunbird ... ...
765 Grey Sunbird ...
771 Collared Sunbird ...
772 Black Sunbird ...
775 Cape White-eye ...
786 Cape Sparrow ...
810 Cape Bishop-bird
825 Swee Waxbill ...
843 Common Waxbill
846 Pin-tailed Widow-bird ...
857 Cape Canary ...
858 Forest Canary ...
859 Yellow-eyed Canary
667 Streaked-headed Seed-eater

[1]Macchia or fynbos is a dense woodland up to 3m high, or when disturbed, 1 - 2m high, that varies from very dense to light, open and grassy. In Lesotho it is a minor habitat that formerly may have been grassland. Botanically, the species composition of Macchia or Fynbos is well characterized but it is often disturbed by grazing animals and by burning.

Source: Skead. 1967.

condition. The park consists primarily of mountain ridges and valleys that are grass-covered in summer, and snow- and ice-covered in winter. There are numerous small streams and pools.

Flora. The flora of the park has not been fully inventoried. During the warmer months the park is noted for it's range of colorful flowers. A recently-described species of water-lily, Aponogeton ranunculiflorus, grows in rocky pools and is believed to be endemic to the region.

Fauna. There are few game animals in the park although reintroductions of some species have been proposed. Large mammals are presently limited to Grey Rhebuch (=Mountain Reedbuck, Redunea fulvorufula ?) and Black Wildebeest (Connochaetes gnou). The diversity of birds is surprising, and includes White Stork (Ciconia ciconia), Black-headed Heron (Ardea melanocephala), Bald Ibis (Geronticus calvus), and Cape Vulture (Gyps coprotheres). The Lammergeyer or Bearded Vulture (Gypaetus barbatus), a rare vulture-like eagle that has nearly disappeared because of the spread of modern civilization, still occurs within the park. In southern Africa it is now confined almost entirely to the Drakensberg Mountains.

There are three rivers in the Sahlabathebe region that are reputed to be good trout rivers. Fishing is permitted in the Ledooa, Tsoelikana, and Tsoelike Rivers. A Lesotho license is required, only rod and reel may be used, and there is a limit of ten trout greater than ten inches in length per day. Smaller fish must be returned. The Oreodaimon quathlambae, a small minnow-like fish, is endemic to several areas of the Tsoelikana River within the park. This species was once believed extinct.

Inquiries about lodging or other park information can be obtained by writing: Park Administrator-Sehlobathebe, COMRUDEV, P.O. Box 686, Maseru, Lesotho.

No additional information on the status of Sehlabathebe National Park or any other proposed or established parks in Lesotho was available for this report. According to Kurian (1980) there are plans for a second national park on the Queme plateau. The IUCN (1977) World Directory of National Parks lists no parks for Lesotho.

3.4.3 Fisheries

No information was available on fisheries or fisheries mangement.

3.4.4 Tourism

Lesotho's scenic beauty, including spectacular Schlabathebe National Park, offers great opportunities for tourism, and the tourism industry is encouraged. Luxury hotels have been built, principally with South African backing, and there are plans for a ski resort in the Maluti Mountains. At present however, casinos in luxury hotels in Maseru are the most important source of tourist interest. There were an estimated 132,000 tourist arrivals in 1978, mostly from South Africa (Europa 1980).

4.0 Environmental Problems

This section reviews environmental problems in Lesotho. The two most important problems are soil erosion and a lack of water resource conservation. Remarkably, there has been a longer list of publicly-funded projects for soil and water conservation than for any other set of agricultural development programs. Projects were undertaken by the British as early as the mid-thirties and have continued without interruption to the present. Yet, problems of controlling soil erosion and of water conservation are larger than ever before. Agricultural output per hectare of land is so low, and most farms so small that conventional conservation programs do not appear to be economically viable. Agricultural production has fallen so low that maintenance costs of conservation programs are now greater than net farm output; conservation programs have become a public liability. Lesotho is thus faced with the problem of justifying costly conservation projects, which at least in the short-run are not cost effective. In the long term, if these efforts are not undertaken, future productivity may be even further jeopardized. There is some question of whether it is already too late to begin an effective soil conservation program. In light of present conditions, benefits from soil and water conservation programs implemented at this point will not be derived for some time.

The third serious environmental problem in Lesotho is loss of native flora and fauna. The problem of loss of native flora is treated in Sections 3.3.1 to 3.3.3; loss of native mammals and other fauna is discussed in Section 3.4.1.

4.1 Origins of the Soil and Water Conservation Problem [15]

It is widely agreed that soil erosion and inability to control water resources are the major environmental problems. The causes are less clear, although certainly traceable in part to Lesotho's unique land tenure system that prevents outright land ownership and discourages individual incentive for capital improvement. Communal grazing privileges have aggravated the problem by encouraging ownership of as much cattle and livestock as possible without regard to soil maintenance. Other factors include unsound and inadequately controlled farming practices and poor maintenance of physical

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[15] Sources: U.S. AID. 1980.
World Bank. 1981.

conservation works. Some attribute the lack of interest in soil and water conservation, and resultant decline in agricultural productivity to sociological factors such as the tendency for the Basotho to be herdsmen rather than farmers.

In similar light, many Basotho depend upon work in South Africa mines for their primary source of income, and thus devote only minimal labor to agricultural or conservation works whose beneficial results are not easily discerned. Furthermore, a lack of effective commodity price controls and policies have resulted in excess price variation and discouraged interest in land husbandry.

Of these contributing causes, overgrazing resulting from overstocking is viewed as the main factor causing severe soil erosion in grazing areas and on cropland. On shallower, poorer soils the grass is trampled and cropped with such regularity that there is little chance for regeneration. As a result, the surface soil is exposed and compacted, runoff increases and rill and gully erosion follow.

All of these causes, either directly or indirectly have played a role in the spectacular gully or donga formation that now plagues large areas of the country. Donga formation now appears to be in a temporary equilibrium, or arrested state, but it is believed that any sudden extreme of climatic change between consecutive seasons (e.g. wet cycle followed by several dry years) could easily precipitate a new phase of severe donga activity.

4.1.1 Soil Conservation: Problems and Policies 16/

One of the most obvious consequences of the traditional land tenure system in Lesotho is that soil erosion in now a very serious and widespread problem. Unfortunately, soil erosion in Lesotho has a long history. It has been recognized as a major problem since the early 1900s.

Soil erosion involves the separation of soil particles by wind, gravity, water, ice or some combination of these forces. In Lesotho, erosion by water is by far the most important; soil erosion by wind accounts for only a small

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16Sources: Anonymous. 1980.
U.S. AID. 1980.
World Bank. 1981.

percentage of soil loss, primarily during the spring (Sept.-Oct.) windy period. This is a problem mainly in the Makkaleng Lowlands and the dissected Molteno Plains in the southwest.

Soil erosion severely affects both the mountain grazing lands, which account for 75 percent of total land area, and the limited arable lands, which comprise 13 percent of the total and are located mainly in the lowlands. Annual soil loss due to sheet erosion on arable land is estimated to be more than 70 metric tons per hectare. In addition, it is estimated that four percent of the arable land has been lost to gullies and another 0.25 percent (1,000 ha) is lost each year to new gullies or gradual expansion of old ones. In the highlands, where overgrazing is the most serious cause of erosion, there is about one million head of livestock which should require about four million hectares of rangeland. This is about four times the one million hectares actually available.

In an effort to encourage conservation activities and an interest in maintenance of the land, the Lesotho government passed the Land Act of 1979. This act increased the security of existing allottees' tenure to arable fields by clearly defining an allocation and recording the rights of inheritance to allocations. However, landless people were henceforth excluded from land rights; landless account for more than 13 percent of rural households. The 1979 Land Act also provided for the granting of agriculture leases--the primary purpose being to foster development of "modern" farming techniques.

One important element of the 1979 Land Act provides that allottees and leessees will not have to cultivate their land on an annual basis in order to maintain their rights, although Legal Notice No. 15 apparently seeks to deny this right (World Bank 1981). This could lead to an increase in fallow land, or to a system of sub-letting land to the landless, or to those with the capacity to farm more than their allotment. In either case, these avenues could lead to greater productivity by people that really want to use the land.

It is significant that the government of Lesotho now recognizes the value of watershed planning. New projects such as woodlot forestation are gaining acceptance and will aid in the

government's soil conservation efforts. It is essential however, that government lead watershed rehabilitation efforts and also seek participation and support from farmers.

4.1.2 Water Conservation

Water conservation and watershed management are vital to soil erosion control. The first overall assessment of soil and water resource conditions in Lesotho was that of Pim (1935). This report documented the severity of soil erosion and lack of water conservation, and recommended a comprehensive soil and water conservation program. Its plans included contour terrace construction, grass buffer strips on slopes and stream banks, solid grass zones in high risk erosion areas, planting of trees in and around gullies, and dam construction. The British government committed itself to a long term program of soil and water control and some areas were substantially improved by the mid-1950s. The most serious impediment to the success of this program was maintenance of the installed structures and the vegetation zones. As a result of poor maintenance, the various anti-erosion works and water conservation structures, such as terraces, grass buffer strips, and earth dams, deteriorated and erosion problems continued to increase. Progress on soil resource mapping was made during the 1960s but very few hydrologic studies were undertaken in catchment areas where projects were proposed. Consequently, because of technical errors, poor construction and poor maintenance, many original structures were almost totally ineffective. Furthermore, little effort was made to demonstrate how soil and water conservation structures could relate to improved crop production and more effective farming practices (World Bank 1975; Node and Seckler 1979).

Post-independence conservation efforts included several large scale, area-based projects. The most important of these were: (1) the Leribe-Khomokhoana Rural Development Project, (2) Sengu River Agricultural Extension Project, (3) Thaba Basiu Rural Development Project, and (4) the Thaba Tseke Mountain Development Project. Each of these projects set unrealistic goals in very short time periods. Consequently most have failed to significantly control soil erosion and conserve water resources.

Current water resource problems include very rapid water runoff in badly eroded areas, high suspended sediment loads in rivers, and a lack of water storage facilities capable of supplying irrigation projects and basic agricultural and human consumption needs. The high suspended sediment loads in rivers, particularly at the lower ends, has greatly hampered plans for proposed hydroelectric projects and forced Lesotho to turn to South Africa for it's major supply of hydropower.

The combined problems of soil and water conservation are viewed as a major constraint to successful progress in agriculture and socio-economic welfare in Lesotho. Success in both areas also has been limited by a lack of effective institutions to plan and implement integrated conservation and agricultural programs and successfully carry them out.

4.1.3 Administrative Planning and Policy Problems

Administrative problems with agriculture programs and soil and water conservation in Lesotho are of three basic types; ineffective organizational structure, a serious shortage of skilled personnel, and lack of a strong data base. According to U.S. AID (1980)....

> "organizations are often not structured in a manner to most effectively achieve their tasks, and essential coordinating linkages with other organizations or offices within the sector are frequently weak or nonexistent. One of the most serious institutional deficiencies is the shortage of skilled personnel. Not only are there limited numbers of people but the level of skills are inadequate and the type of skills inappropriate. This problem is pervasive in planning, technical and managerial areas."

A lack of physical access to many areas and inadequate or no water resources data has also hampered planning and implementation of projects. Archaic land tenure patterns, and land allocations, and resistance to adoption of new programs also have contributed to the government's inability to successfully implement and maintain

conservation projects. There also has been little effort placed on educational programs that demonstrate the value of soil and water conservation programs to agriculture. Likewise, there are few financial incentives that would encourage inproved land management and crop production (U.S. AID 1980).

4.1.4 Overpopulation and Human Resources

According to early censuses, Lesotho's population grew at an average annual rate of only 0.7 percent between 1936 and 1956, but from 1956 to 1966 the rate of increase was much higher--about 2.9 percent a year. The figures given here are approximate, but clearly indicate differences in growth rates between the two periods. Recent growth rate estimates suggest the population is still growing at a rate well above two percent per year, moderate by African standards but nevertheless significant for a country that has so few natural resources and relatively little arable land.

During earlier periods, most of the population increase was permanently absorbed by the South African labor force. But since the 1950s, South Africa has exerted greater control over movements of laborers and has made permanent settlement by Basotho citizens in South Africa much more difficult. This policy change is believed to have contributed substantially to the dramatically higher rate of population increase from the 1950s to the present (World Bank 1975).

Lesotho's rapid population increase has brought increasing pressures on its limited land resources. During the last two decades average family holdings of cropland decreased from 6.2 acres to 4.9 acres. In 1950, seven percent of rural households had no land at all; by 1970 this figure had risen to 13 percent.

With increasing land shortage and limited opportunities for employment outside agriculture, Lesotho is faced with too many people and too few means to support them. Increased human density has placed more pressure on available arable land, and has contributed to a rise in livestock numbers. This cycle of events is accelerating, and is believed to be an important contributing factor to the environmental problems of overgrazing, soil erosion and loss of native flora and fauna.

In an effort to curb rapid population growth, the Lesotho Family Planning Association has taken an active role in family planning education. At the private level, they are reported to have had some success in operating family planning clinics.

For social and religious reasons, the Government of Lesotho has not given open support to family planning. However, the government is not opposed to family planning and recognizes the need to control population growth. Also, because of South Africa's racial policies, the Government of Lesotho has not encouraged emigration. In light of limited natural resources, and the small arable land base, overpopulation must be viewed as an important environmental problem in Lesotho. Any efforts, whether officially sanctioned or not, that help to reduce population numbers must be considered as potentially beneficial in the long term.

4.2 Urban and Rural Environmental Pollution

No information was available on problems of urban pollution, rural pollution, or specific government policies on these matters. These problems are not believed to be of importance in Lesotho.

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Appendix I

Climatic Table for Mokhotlong, Lesotho

Appendix I

Climatic Table for Mokhotlong, Lesotho

Latitude 29°17'S, longitude 29°05'E, elevation 2,375 m.

Month	Temperature (°C)				Precipitation					Aver. cloud-iness (tenths)	
	mean		extreme		mean (mm)	max. (mm)	min. (mm)	days > 1 mm	max. in 24 h (mm)		
	max.	min.	max.	min.						08h	14h
Jan.	24	9	33	2	96	151	55	13	33	4	6
Feb.	24	9	35	1	85	153	24	12	45	4	6
Mar.	22	7	28	− 1	63	141	22	10	33	4	5
Apr.	20	4	27	− 6	34	75	5	6	31	3	4
May	16	−1	26	−12	26	131	0	3	78	3	4
June	14	−4	23	−12	5	21	0	1	9	2	2
July	14	−5	23	−12	10	48	0	2	23	2	3
Aug.	17	−2	24	−13	15	71	0	2	33	2	3
Sept.	20	2	27	− 8	20	121	0	3	35	2	3
Oct.	22	6	31	− 7	57	128	17	8	76	4	5
Nov.	22	7	31	− 4	83	179	32	12	34	4	5
Dec.	23	9	33	0	92	177	32	12	35	4	6
Annual	20	3	35	−13	586	806	285	84	78	3	4
Rec. (yrs.)	25	25	25	25	25	25	25	25	25	25	10

Source: Griffiths. 1972.

Appendix II

International Organizations That Collect Hydrological Data on Lesotho

ORSTOM, Service hydrologique
19 rue Eugene Caniere,
Paris 75018, France

United Nations Development Program
Maseru, Leostho

UNESCO Field Service,
Office for Africa,
P.O. Box 50592,
Nairobi, Kenya

World Meterological Organization
Hydrology and Water Resources Dept.,
P.O. Box 1
1211, Geneva 20, Switzerland

Water Resources Section,
Resources and Transport Div.,
United Nations,
New York, New York, U.S.A.

Economic Commission for Africa,
P.O. Box 3001
Addis Ababa, Ethiopia

Food and Agricultural Organization (FAO)
Via dell Ferne di Caracalla
Rome, Italy

Appendix III

Mammals Listed by the IUCN Red Data Book, 1978

CHEETAH

Acinonyx jubatus (Schreber, 1776)

Order CARNIVORA Family FELIDAE

STATUS Vulnerable. Severely reduced and faces a prospect of increasing attrition and even more limited distribution as the human population expands into its favoured habitats. Even inside national parks and game reserves its prospects cannot be regarded as good.

DISTRIBUTION The African race, A. j. jubatus: south of the Sahara from Nigeria, Sudan and Somalia to southern Africa. At present, survives throughout much of its former range, but in much reduced numbers and seems to diminish even where protected in national parks and reserves. Its distribution is discontinuous and numbers vary from common to rare - or even absent in some areas where it was formerly common.(3) The Asiatic race, A. j. venaticus formerly occurrred from Sind, Afghanistan and southern Russia westwards to Syria and Palestine, and thence (although some authors regard this as a separate race A. j. Hecki) westwards across North Africa to Rio de Oro. Now known certainly only in Iran and on the Turkmen/Afghan border.(1; 4)

POPULATION The remaining African populations may total less than 15.000, within a probable range of 8000-25,000. Rough estimates of population sizes, based on informed local opinion and, for order of magnitude purposes only, indicate less than 2000 in Kenya, less than 200 in Uganda, less than 1000 in Tanzania, about 500 in Angola, less than 1000 in Zambia, 200 in Mozambique, 50 in Malawi, 2000 in Botswana, 400 in Rhodesia, 1500 in South West Africa, 700 in South Africa, less than 1000 throughout the Sahel zone, a few hundred in the savanna woodland zone of west Africa, rather more than 1000 in Sudan, around 1000 in Ethiopia, 300 or so in Somalia, and 300 or less in Zaire. In rough terms, these figures almost certainly represent half the cheetah totals in Africa in 1960, and present figures could well be reduced by one half within another 10 years, perhaps by 1980, as a result of degradation or loss of habitat, and over-hunting, particularly by ranchers. Two animal dealers are believed to have caught 3000 cheetahs in Namibia since 1962, either for export to the world's zoos and safari parks or for translocation to other parks of Africa.(3; 5; 6) Iran: now estimated at more than 250. (E. Firouz 1976, pers. comm.)

HABITAT Open semi-arid grasslands (but seldom areas of tall grass) scrubland (occasionally quite dense) and various types of savanna woodland, in all cases essentially in association with medium or small-sized herbivores; exceptionally, forest margins but never forest itself. These habitats are being reduced by agriculture, degradation of rangelands and competition from domestic stock following upon increasing occupation by human communities. Loss and degradation of habitat and associated depletion of prey species have been the principal factors in the cheetah's decline.(3)

CONSERVATION MEASURES TAKEN Totally protected in almost every country except South Africa and Namibia, where it is still considered vermin (amending legislation pending). Ranching interests in Kenya, Tanzania, Zambia, Rhodesia and Angola, Namibia and South Africa, however, often destroy cheetah suspected of marauding livestock. The cheetah occurs in less than half the parks and reserves of Africa, and totals no more than 3000 animals in these protected areas. Moreover, when it is reduced to relict populations in isolation from each other, it becomes

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LEOPARD

Panthera pardus (Linnaeus, 1758)

Order CARNIVORA Family FELIDAE

STATUS Vulnerable. Exterminated from large parts of its former range and depleted elsewhere. In some areas persecution and loss of habitat have taken a severe toll; at least five geographic races are threatened with extinction. But it is still widespread and maintaining good numbers, even increasing when not persecuted.

DISTRIBUTION Africa, and most of southern Asia from Turkey across the USSR and China to Korea, southwards to Arabia, Sri Lanka and Java. Now very local and rare in the desert areas of northern Africa and the Middle East. Much the most widespread of the felids; it is still common where prey is plentiful and protection assured, but has declined significantly and sometimes critically in about half of Africa. Exterminated from large parts of its former range in southern Africa, eastern Africa (notably Somalia and Ethiopia), and certain sectors of west Africa (especially in the coastal states). Depleted elsewhere, notably parts of Kenya, northern Tanzania, western Zambia, Ngamiland in Botswana, parts of Angola and Mozambique, also Chad, Mali and Senegal, and parts of the coastal states of West Africa.

POPULATION The leopard has had to give way to the advance of agriculture, deforestation, and depletion of its prey. In areas taken over for agriculture and stock-raising it has been either exterminated or depleted; but it is still widespread and maintaining good numbers where it persists. During the 1960's leopards were relentlessly trapped to meet a worldwide demand for their furs, and some populations were severely reduced. Efforts were made to correct this situation in several countries, notably Tanzania, Zambia and Botswana, e.g. through national predator management policies. In parts of southern Africa, the leopard is still considered vermin.(3-10) In moderately favourable habitats of the Zaire basin rain forest, it maintains a density of one to five or even three sq.km, and in optimal habitats even one to every sq.km. In the miombo woodland zone poaching pressure has varied greatly, and in large areas density rises to one animal per five sq.km. because of tsetse fly, and dry and infertile soils, the miombo biome will be little affected by human activities except for the 10-15 per cent which constitute alluvial floodplains or "dambo" drainage systems. In South Africa thick thornbush in the Kruger Park and an abundance of impala prey permit densities of two leopard to three sq.km, possibly higher, in a few optimal localities, with an estimated minimum of 650 animals occupying the Park's 1,817,000 ha.

HABITAT Leopards inhabit a variety of biomes, from tropical rain forest, miombo woodland, savanna and rocky areas with heavy or scattered vegetation to the high, cold regions of the Himalayas, and the suburbs of Nairobi. In general, they are still widely found in all biomes of Africa south of the Sahara except for outright desert. One important factor is cover, both for hunting and for lying-up to feed and rest. Human modification of savanna ecotypes tends to the removal of trees and bush, although the leopard has proved to be exceptionally resilient and tolerant of changes to its habitat.

CONSERVATION MEASURES TAKEN The leopard is widely protected as a game animal; where not protected, as in Nigeria, South Africa and Namibia, it is fully protected in parks and reserves. Where it is still not protected or where it preys on man's increasing herds of domestic stock it has been persecuted severely. International

action has been necessary to curb the drain on protected populations from illegal trapping and smuggling through these same countries into the world trade channels. The International Fur Trade Federation imposed a three-year voluntary ban on its members' use of leopard skins, from September 1971 to September 1974, which operated moderately well in the United Kingdom, marginally well in the Federal Republic of Germany and Switzerland, and scarcely at all in France, Italy, Spain, Scandinavia and Japan. In 1973, the demand for leopard skins was higher than ever before. Demand is perhaps twice as high in the principal consumer countries as five years ago, except for Japan which bought hardly any spotted furs in the late 1960's but is now buying heavily. Included in Appendix I of the Convention on International Trade in Endangered Species of Wild Fauna and Flora, 1973; trade in these animals between acceding nations is subject to severe restriction, trade for primarily commercial purposes is banned.

CONSERVATION MEASURES PROPOSED The leopard should remain in Appendix I of the International Convention until the livestock industry in Africa and Asia is prepared to admit that the wildlife conservationists have an interest as legitimate as that of the ranching community. It should likewise be banned to the international fur trade until major producer and consumer countries indicate their readiness to accept controls to regulate a sustained-yield offtake. In Africa much severer penalties are required to deter poaching and preventive killing by livestock owners.

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singularly susceptible to disease, carnivore competition, shifts in prey community make-up, changes in vegetation configuration, and other natural limiting factors. In the main, its stability in protected areas shows a decline. Included in Appendix I of the Convention on International Trade in Endangered Species of Wild Fauna and Flora, 1973; trade in these animals between acceding nations is subject to severe restriction, trade for primarily commercial purposes is banned. The International Fur Trade Federation operated a three-year voluntary ban among its membership on the use of cheetah furs in 1971/74. The moratorium has worked moderately well in certain countries but has been widely disregarded in France, Italy, Spain, Scandinavia and Japan, where the demand for spotted fur has increased. Fully protected by law in Iran and the USSR, also in several reserves in Iran.

CONSERVATION MEASURES PROPOSED In terms of adaptability to change, the cheetah is one of the most vulnerable mammals. Conservation requirements, particularly outside parks and reserves, include more careful enforcement of protective laws and regulations, supervision of control so that only individual nuisance animals are removed when depredation occurs, control of over-grazing, and protection of wild prey species to reduce risk of predation on domestic animals. At the same time, the legitimate interests of ranchland communities in Africa should be recognized especially in those areas where pastoralists are attempting upgraded livestock husbandry and sometimes need to protect themselves in the event of undue predation.

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Reptiles Listed by the IUCN Red Data Book, 1975

NILE CROCODILE

Crocodylus niloticus Laurenti, 1768

Order CROCODYLIA Family CROCODYLIDAE

STATUS Vulnerable. Numbers have been drastically reduced almost everywhere, largely during the last 20 years to supply leather to meet a world wide demand.

DISTRIBUTION All of Africa except the northwest and central Sahara; also Malagasy Republic but probably few in the Comores. Formerly along the south coast of the Mediterranean and east to Syria; also in the Seychelles. Now extinct in Cape Province and rare in Natal south of Tugela river, South Africa.

POPULATION Destruction of habitat, e.g. damming of rivers, draining of swamps and lakes, and other human pressures, militate against any rehabilitation of the species. All reports agree that populations can only be restored by stringent conservation measures. The total adult population in Natal is considered to be fewer than 800 animals.

HABITAT Large rivers and lakes, fresh water marshes, river mouths and estuaries, rarely in mangrove swamps.

BREEDING RATE IN WILD Extensive literature, not yet reviewed.

CONSERVATION MEASURES TAKEN In Appendix I of the Convention on International Trade in Endangered Species of Wild Fauna and Flora. Protected under class "B" by the African Conservation Convention of 1968. Protected in Uganda. However, in many African States the Nile Crocodile still has no legal protection, although it is legally protected in most National Parks and Game Reserves. Importation into the United States is prohibited under provision of the Endangered Species Act. South Africa has set up a research programme aimed at saving the species and restocking in areas where it has been exterminated.

CONSERVATION MEASURES PROPOSED Enforced protective legislation should be in operation throughout the entire geographical range. The collecting of crocodiles and their eggs should be controlled. State Game Departments should assume responsibility for controlling crocodile rearing and restocking projects. The IUCN Survival Service Commission, through its Crocodile Specialists Group, offers advice to interested Government agencies for such projects.

NUMBERS IN CAPTIVITY Still to be reviewed.

BREEDING POTENTIAL IN CAPTIVITY Rearing of Nile Crocodiles under controlled conditions has been shown to be quite feasible.

REFERENCES 1. King, F.W. and Brazaitis, P. (1971). Species identification of Commercial Crocodilian Skins. Zoologica 56(2): 15-70. New York.

2. Cott, H.B. and Pooley, A.C. (1972). The Status of Crocodiles in Africa. IUCN Publ. N.S. Suppl. Paper 33: 97 pp.

RDB-3. IUCN © 1975. 9(2)F Code: 2.2.2.1.6 V

Appendix V

Birds Listed by the IUCN Red Data Book, 1966

AFRICAN LAMMERGEYER

Gypaëtus barbatus meridionalis Keyserling and Blasius 1840

Order FALCONIFORMES Family ACCIPITRIDAE

Present distribution:
Localized in suitably mountainous country from Abyssinia and southern Arabia to Basutoland. Recorded from Yemen, Eritrea, Ethiopia, Kenya, Uganda, Tanzania, Basutoland and the Republic of South Africa.

Former distribution:
Not known to have been any different from the above, except that it formerly ranged farther south in South Africa and was originally described from the Sundays River, Cape Province.

Status:
Rare and decreasing in numbers in most of its range, although still a great deal less uncommon and apparently not threatened in Ethiopia.

Estimated numbers:
Not known and very difficult to estimate, because of the inaccessibility of the terrain preferred by the birds and the large territory occupied by a pair.

Breeding rate in wild:
One egg constitutes a normal clutch.

Reasons for decline:
Shooting and poisoning. Poison baits indiscriminately spread to kill jackals and other vermin are frequently taken by the birds.

Protective measures taken:
Fully protected by law over much of its range, but difficult to curb the main threat above mentioned.

Protective measures proposed:
None known.

Number held in captivity:
Not known but frequently seen in zoos.

Breeding potential in captivity:
Nil.

Remarks and references:

Status category: 2(b)P* Code number: B/33/GYPAE/BAR/MER

Current U.S. AID-Funded Projects in Lesotho, 1981

COUNTRY/BUREAU LESOTHO
PROJECT NUMBER 632003100
PROJECT TITLE THABA BOSIU RURAL DEVELOPMENT
PROJECT SUMMARY JOINT IBRD/AID PROJECT ASSISTS GOVERNMENT OF LESOTHO RURAL DEVELOPMENT PROGRAM BY INCREASING AGRICULTURAL PRODUCTIVITY WHILE REDUCING SOIL EROSION IN AREA NEAR MASERU. INCREASES CROP AND ANIMAL PRODUCTION IN 300000A DRY FARMING RIVER CATCHMENT AREA. AID INPUTS ADDRESS PROBLEM OF SOIL EROSION: DEVELOPS OVERALL DEVELOPMENT/CONSERVATION PLAN FOR AREA; CONSTRUCTS NEEDED STRUCTURES, ROADS; PROVIDES TRAINING, RESEARCH; PLANTS TREES, GRASS. PROJECT ALSO PROVIDES FARM CREDIT AND MARKET SERVICES, DATA COLLECTION, EVALUATION SERVICE. DEVELOPS TESTING PROGRAM FOR CONSERVATION-ORIENTED INTEGRATED FARMING SYSTEMS: LAND USE PLANS, TRAINING BASOTHO, MAINTENANCE PROGRAMS, RESEARCH/DATA BASE DEVELOPMENT LEAD TO MORE EFFICIENT LAND USE PRACTICES.

COUNTRY/BUREAU LESOTHO
PROJECT NUMBER 632004800
PROJECT TITLE LAND AND WATER RESOURCE DEVELOPMENT
PROJECT SUMMARY TECHNICAL CADRE OF TRAINED OFFICERS IS PROVIDED TO WORK WITHIN THE SOIL CONSERVATION DIVISION TO SUPPORT LESOTHO'S LONG TERM NEED TO INTEGRATE CONSERVATION METHODS INTO ITS CROP AND LIVESTOCK DEVELOPMENT PROJECTS. THESE TECHNICIANS, BY WORKING WITH EXISTING PROJECTS OF THE MINISTRY OF AGRICULTURE (MOA) PROVIDE IN-SERVICE STAFF DEVELOPMENT AND TRAINING IN THE ENTIRE SPECTRUM OF CONSERVATION METHODOLOGY- THROUGH CONTACTS WITH PEOPLE AND CHIEFS, GROUP MEETINGS AND DISCUSSIONS, THE PREPATATION OF LAND USE AND CONSERVATION PLANS FOR SPECIFIC AREAS AND THE ACTUAL INSTALLATION AND OPERATION OF THESE PLANS AS WELL AS THE CONTINUING FOLLOW-UP NEEDED.

COUNTRY/BURLAU LESOTHO
PROJECT NUMBER 632006600
PROJECT TITLE NUTRITION PLANNING AND RESEARCH OPG
PROJECT SUMMARY PLANNING ASSISTNACE INC. PROVIDES TECHNICAL ADVISORS TO GOVERNMENT OF LESOTHO FOR THE PURPOSES OF ESTABLISHING AND STAFFING A CENTRAL NUTRITION OFFICE WHICH WILL PROVIDE MANAGEMENT AND GUIDANCE OF FOOD AND NUTRITION PROGRAMS AT A NATIONAL LEVEL. 24 BASOTHO HIRED FOR CENTRAL OFFICE RECEIVE ON-THE-JOB AND PARTICIPANT TRAINING IN PLANNING/MANAGEMENT TECHNIQUES AND RESEARCH METHODOLOGY. REPLACEMENT OF ADVISORS WITH TRAINED BASOTHO RESULTS IN COMPLETE AFRICANIZATION OF STAFF BY END OF YEAR 1. SEPARATE RESEARCH AND PROGRAM ADMINISTRATION BRANCHES ESTABLISHED WITHIN CENTRAL OFFICE. NAT'L NUTRITION/FOOD INTAKE SURVEYS CONDUCTED; LIBRARY & STATISTICAL DATA BASE COMPILED; ANNUAL PLANNING CONFERENCE HELD.

COUNTRY/BUREAU LESOTHO
PROJECT NUMBER 632003000
PROJECT TITLE SOUTHERN AFRICA DEV PERSONNEL AND TRNG
PROJECT SUMMARY OPEX PERSONNEL AND TECHNICAL ADVISORY ASSISTANCE PROVIDED TO LESOTHO TO DEVELOP THE INSTITUTIONAL CAPABILITIES OF THE GOVERNMENT MINISTRIES. PROJECT DESIGNED TO PROVIDE SELECTED U.S. PERSONNEL TO FILL ESTABLISHED POSITIONS IN AGENCIES AS AN AID TO LOCALIZATION. THEY REPLACE LOCAL PERSONNEL WHO REQUIRE OUT-OF-COUNTRY TRAINING, DEVELOP AND TEACH INSERVICE COURSES, ASSIST WITH LOCALIZATION PLANS WITHIN AGENCIES AND PROVIDE ON-THE-JOB TRAINING TO LOCAL PERSONNEL WHO REQUIRE EXPERIENCE FOR MORE RESPONSIBLE POSITIONS. PROJECT EMPHASIZES INCREASED MANPOWER WITHIN THE AGRICULTURE SECTOR BECAUSE 80% OF THE POPULATION IS SUPPORTED BY AGRICULTURE. USAID PROVIDES 27 MAN YEARS OF SERVICES TO NINE SENIOR LEVEL POSITIONS IN AGRICULTURE PLANNING/CONSERVATION AND EDUCATION ADMINISTRATIONAND OUT-OF-COUNTRY TRAINING TO 15 NATIONALS WHO OCCUPY VITAL DEVELOPMENT POSITIONS. HOST GOVERNMENT FINANCES BASIC LOCAL SALARIES, PROVIDES HOUSING AND FURNISHINGS FOR U.S. EXPERTS.HOST GOVERNMENT ALSO RESPONSIBLE FOR RECRUITING AND FINANCING LOCAL COSTS FOR IN COUNTRY PARTICIPANT TRAINEES, PROVIDES CLASSROOM SPACE AND TEACHING MATERIALS. OTHER DONORS CONTRIBUTING TECHNICAL ASSISTANCE INCLUDE THE UNITED NATIONS AGENCIES, UNITED KINGDOM, CANADA, REPUBLIC OF SOUTH AFRICA, THE FEDERAL REPUBLIC OF GERMANY, FRANCE, ISRAEL, SWEDEN, NETHERLANDS, TAIWAN AND AUSTRIA. PRIMARY BENEFICIARIES ARE THOSE PARTICIPATING IN AND RECEIVING BENEFITS FROM DEVELOPMENT PROJECTS. PROJECT ENCOURAGES PARTICIPATION OF WOMEN IN DEVELOPMENT BY CREATING MORE SEMI-PROFESSIONAL POSITIONS AND ATTRACTING VOLUNTARY SERVICE ORGANIZATIONS WHICH ENCOURAGE FEMALE PARTICIPATION.

COUNTRY/BUREAU LESOTHO
PROJECT NUMBER 632005800
PROJECT TITLE RURAL HEALTH DEVELOPMENT
PROJECT SUMMARY @LESOTHO IS PROVIDED WITH GRANT, TECHNICAL ADVISORY ASSISTANCE, IN-COUNTRY AND U.S. PARTICIPANT TRAINING TO IMPLEMENT RURAL HEALTH DELIVERY SYSTEM. ACTIVITIES WILL BE DIVIDED INTO 2 PHASES AND WILL BE ADMINISTERED BY MINISTRY OF HEALTH (MOH). DURING FIRST PHASE, U.S. HEALTH ADMINISTRATOR-PLANNERS AND MANAGEMENT SPECIALISTS WILL ASSIST MOH TO UPGRADE ITS ADMINISTRATIVE, MANAGEMENT AND PLANNING CAPABILITIES. U.S. PARTICIPANT AND THIRD COUNTRY SHORT-TERM OBSERVATION TOURS WILL ALSO BE PROVIDED. @FOLLOWING FIRST PHASE, EVALUATION WILL BE CONDUCTED TO DETERMINE IF PHASE I DEVELOPMENT ACTIVITIES SHOULD CONTINUE OR WHETHER PROJECT SHOULD BE MODIFIED OR TERMINATED. SECOND PHASE WILL CONSIST OF IMPLEMENTATION OF RURAL HEALTH DELIVERY SYSTEM. SYSTEM WILL EMPLOY PHYSICIAN-EXTENDER APPROACH THROUGH TRAINING OF PARAPROFESSIONAL HEALTH WORKERS. THREE TYPES OF WORKERS WILL BE TRAINED - NURSE CLINICIANS, NURSE ASSISTANTS AND VILLAGE HEALTH WORKERS. NURSE CLINICIANS WILL HAVE CAPABILITY TO DIAGNOSE AND TREAT 90% OF PATIENTS SEEKING CARE AT RURAL OUTPATIENT CLINICS/HOSPITALS AND WILL SUPERVISE ACTIVITIES OF NURSE ASSISTANTS AND VILLAGE HEALTH WORKERS. NURSE ASSISTANTS WILL ALSO BE STATIONED IN CLINICS/HOSPTIALS AND WILL PROVIDE BASIC NURSING PROCEDURES AND TREATMENT FOR 10-15 UNCOMPLICATED PROBLEMS COMMONLY PRESENTED AT OUT-PATIENT CLINICS. VILLAGE HEALTH WORKERS WILL PROVIDE PREVENTATIVE/PROMOTIVE SERVICES AND WILL HAVE CAPABILITY TO TREAT 7 UNCOMPLICATED PROBLEMS COMMON AT VILLAGE LEVEL. DELIVERY SYSTEM WILL INCLUDE MATERNAL CHILD/FAMILY PLNNG, NUTRITION, TUBERCULOSIS AND IMMUNIZATION CAMPAIGNS. PROJ ANTICIPATES TOTAL OF 55 NURSE CLINICIANS, 95 NURSE ASSISTANTS, AND 104 VILLAGE HEALTH WORKERS WITH PERMANENT TRNG PROG IN PLACE. @ PHAL (PRIVATE HEALTH ASSOC OF LESOTHO) WILL FUND INITIAL TRNG OF NURSE ASSISTANTS. HOST-COUNTRY WILL PROVIDE PERSONNEL, LONG-TERM MAINTENANCE AND COSTS OF VILLAGE HEALTH WORKER TRNG. USAID WILL ALSO FINANCE VEHICLES, TRNG/OFFICE SUPPLIES AND EQUIPMENT AND CONTRACEPTIVES. @ PRIMARY BENEFICIARIES INCLUDE MOH AND RURAL HEALTH PERSONNEL. SECONDARY BENEFICIARIES ARE LESOTHO'S RURAL POPULATION.

COUNTRY/BUREAU LESOTHO
PROJECT NUMBER 632008000
PROJECT TITLE NATIONAL UNIVERSITY OF LESOTHO
PROJECT SUMMARY @GRANT AND TECHNICAL ASSISTANCE (TA) TO GOVERNMENT OF LESOTHO (GOL) INITIATED CAMPUS DEVELOPMENT PLANS FOR MASERU CAMPUSOF NATIONAL UNIVERSITY OF LESOTHO (NUL) AND FOR THE INSTITUTIONAL DEVELOPMENT OF THE DIVISION OF EXTRA MURAL STUDIES (DEMS) OF NUL'S TECHNICAL/VOCATIONAL INSTITUTIONS. PROJECT ASSISTS DEMS OPERATIONS, DEVELOPS FUTURE PROGRAMS AND DESIGNS DDEMS CAMPUS IN MASERU. @ACTIVITIES INCLUDE: 1. DEVELOPING A MASTER PLAN FOR THE MASERU CAMPUS. 2. COMPLETING DEFINITIVE ARCHITECTURAL AND ENGINEERING PLANS. 3. COMPLETING A CURRICULUM AND TRAINING DEVELOPMENT PLAN WHICH CAN BE USED BY GOL AND NUL IN SCHEDULING FUTURE DEVELOPMENT. 4. TRAINING 4 RESIDENTS OF BASOTHO IN SPECIFIED AREAS OF COMMUNITY COLLEGE AND ADULT EDUCATION FOR ADMINISTRATIVE FUNCTIONS. 5. PROVIDING SHORT-TERM CURRICULUM ADVISORS WORKING WITH A LIMITED QUANTITY OF BOOKS AND EQUIPMENT. 6. BUILDING 2 STAFF HOUSES FOR US ADVISORS. @PRIMARY BENEFICIARIES WILL BE PERSONS WHO DID NOTCOMPLETE SECONDARY SCHOOL AND OTHERS (ACADEMICIANS) NEEDING TECHNICAL/VOCATIONAL EDUCATION. SECONDARY BENEFICIARY WILL BENEFICIARY WILL BE GOL GAINING A POTENTIAL OF TRAINED MID/HIGHER LEVEL EMPLOYEES. @OTHER DONORS INCLUDE GOVERNMENT OF DENMARK (GOD) PROVIDING $325000 FOR SUPPORTING AN INSTITUTE OFLABOUR STUDIES, A COMPONENT OF DEMS, AND CONTRIBUTING TO CONSTRUCTION OF MASERU CAMPUS SITE. @USAID INPUTS INCLUDE PROGRAM DEVELOPMENT ADVISOR, PROJECT ANALYST AND EVALUATOR, US TECHNICIANS PROVIDED THROUGH AN OPEX CONTRACT. THESE WILL BE FUNDED BY AID; ALSO PARTICIPANT TRAINING, COMMODITIES, ARCHITECTURE/ENGINEERING CONTRACT, STAFF HOUSING, LOCAL COSTS. HOST COUNTRY AND REGIONAL OFFICES (OSARAC) WILL SELECT TRAINEESIN CONSULTATION WITH US TECHNICIANS; WILL PARTICIPATE IN THEREVIEW AND IMPLEMENTATION OF PLANNING, STAFFING, EVALUATION.

COUNTRY/BUREAU LESOTHO
PROJECT NUMBER 632006100
PROJECT TITLE INSTRUCTIONAL MATERIALS RESOURCE CENTER
PROJECT SUMMARY @GRANT TO THE GOVT OF LESOTHO TO ASSIST IN THE ESTABLISHMENT OF AN INSTRUCTIONAL MATERIALS RESOURCE CENTER (IMRC) IN THE NATIONAL TEACHER TRAINING COLLEGE (NTTC). THE IMRC PROVIDES THE GOL MIN OF EDUC (MOE) WITH A CURRICULAR MATERIALS DEVELOPMENT, TESTING & PRODUCTION AGENCY TO COMPLEMENT AN ON-GOING MULTI-DONOR (UK, UNDP, UNESCO, DENMARK, PEACE CORPS) NATIONAL CURRICULUM REFORM PROGRAM. THE PRE-SERVICE PRIMARY & JR SECONDARY TEACHER TRAINING PROGRAM OF THE NTTC WOULD BE UTILIZED AS AN OUTLET FOR THE ACTUAL IN-SERVICE TESTING OF THE PROTOTYPE LEARNING MATLS DEVELOPED BY THE IMRC. THE IMRC WOULD, THEREFORE, BE DETERMINING THE ACCEPTIBILITY OF PROTOTYPE LEARNING MATLS FOR SUBSEQUENT MASS DISTRIBUTION TO LESOTHO'S PRIMARY & SEC SCHOOLS WHILE SIMULTANEOUSLY PROVIDING THE NTTC WITH NECESSARY PRE-SERVICE TEACHER TRAINING MATLS. THE IMRC WILL ALSO DEVELOP PROFESSIONAL PERSONNEL WHO COULD BE USED TO DEVELOP & PRODUCE

PROTOTYPE MATLS FOR OTHER INSTRUCTIONAL SYSTEMS IN THE MOE AND IN OTHER GOL MINISTRIES. @THIS PROJECT SUPPLIES 2 US CURRICULUM & MATLS DEVELOPMENT SPECIALISTS TO: 1.ASSIST THE NTTC WITH ESTABLISHING AND OPERATING THE IMRC;2.ASSIST WITH ESTABLISHING LINKAGES BETWEEN THE IMRC AND THE MOE & MOE CURRICULUM UNIT;3.PROVIDE IN-SERV TRAINING FOR PROFESSIONAL & TECH STAFF OF THE IMRC,TRAINING FOR MOE CURRICULUM STAFF,GUIDANCE FOR SUBJECT PANELS,AND TRAINING FOR CURRIC WRITERS;4.ASSIST THE NTTC & MOE WITH IDENTIFYING QUALIFIED CANDIDATES FOR PARTICIPANT TRAINING UNDER THIS PROJ;AND 5.DEVELOP A PROJ PAPER FOR A POSSIBLE PHASE II OF THIS PROJ(GIVEN ACCEPTABLE PROGRESS & A FAVORABLE EVAL OF THIS PROJ).THE ABOVEMENTIONED PARTIC TRAINING IS FOR 6 IMRC PERSONNEL IN THE AREAS OF GRAPHIC ARTS,PRINTING,PHOTOGRAPHY,CRAFTS,AND A/V TECHNOLOGY.CURRIC MATLS PRODUCTION & DEMO EQUIPMENT ARE ALSO SUPPLIED BY THE PROJ GRANT ALONG WITH THE SERVICES OF SHORT-TERM CONSULTANTS SPECIALIZING IN A/V,PRINTING,GRAPHIC ARTS,AND INSTRUCTIONAL DESIGN. @PROJECT'S PRIMARY BENEFICIARIES ARE BASOTHO YOUTH WHO WILL BE EDUCATED BY A CURRICULUM MORE APPROPRIATE TO THEIR ENVIRONMENT AND PARTICULAR LEARNING NEEDS.

COUNTRY/BUREAU LESOTHO
PROJECT NUMBER 632006500
PROJECT TITLE LESOTHO FARMING SYSTEMS RESEARCH
PROJECT SUMMARY @GRANT PROVIDED TO GOVERNMENT OF LESOTHO TO DEVELOP SUITABLE FARMING SYSTEMS FOR ALL REGIONS OF LESOTHO.PROJECT WILL BE IMPLEMENTED IN 5 PHASES BY AN UNIDENTIFIED CONTRACTOR (PROBABLY WASHINGTON STATE UNIVERSITY).DURING PHASE 1 OF THE PROJECT,THE CONSTRUCTION OF STAFF HOUSING,FIELD SHEDS,AND AN OFFICE/LIBRARY EXTENSION WILL BEGIN,AND PROCUREMENT OF COMMODITIES SUCH AS VEHICLES,LAB AND FIELD RESEARCH EQUIPMENT,AND LIBRARY BOOKS,WILL BE INITIATED.@DURING PHASE 2,3 PROTOTYPE AREAS WILL BE SELECTED FOR RESEARCH ON ALTERNATIVE FARMING METHODS FROM ON-GOING PROJECTS.EXISTING RESEARCH DATA WILL BE COLLECTED AND ANALYZED,AND A LIBRARY WILL BE DEVELOPED FOR THE FARMING SYSTEMS RESEARCH SECTION OF LESOTHO'S MINISTRY OF AGRICULTURE (MOA).CONSERVATION ACTIVITIES SUCH AS LAND USE PLANS AND SOIL SURVEYS,WILL BEGIN IN PROJECT AREAS.@PHASE 3 OF THE PROJECT WILL INCLUDE THE DEVELOPMENT OF A FORMAL SYSTEM OF DOCUMENTING AND REPORTING RESEARCH RESULTS.BASELINE STUDIES OF SMALL FARMERS' FARMING PRACTICES,INCOMES,AND SOCIAL ATTITUDES WILL BE CONDUCTED AT 2 DIFFERENT TIME PERIODS FOR COMPARISON.CONSULTANTS WILL CONDUCT AN ENGINEERING ANALYSIS OF THE MOST EFFECTIVE TILLAGE/CULTIVATION PRACTICES AND TECHNIQUES.FARMING SYSTEMS USING ALTERNATIVE TECHNOLOGIES AND FARM MANAGEMENT PRACTICES FOR VARYING PHYSICAL ENVIRONMENTS AND SOIL TYPES,WILL BE DEVELOPED,AND FIELD TESTS CONDUCTED.MOA PERSONNEL WILL BE TRAINED (16 LONG-TERM AND 10 SHORT-TERM) TO TAKE POSITIONS IN THE FARMING SYSTEMS RESEARCH SECTION OF THE MOA.@DURING PHASE 4,ALTERNATIVE STRATEGIES TO FOSTER MOA-FARMER COMMUNICATION WILL BE DEVELOPED AND FARMERS WILL BE ENCOURAGED TO ADOPT THE NEW FARMING SYSTEMS.@PHASE 5 OF THE PROJECT WILL INCLUDE AN EVALUATION OF FIELD TESTS,WITH MODIFICATIONS AND RECOMMENDATIONS MADE.THE CAPABILITY WILL BE DEVELOPED,WITHIN THE MOA,TO REPLICATE THE NEW FARMING SYSTEMS,AND TO CONTINUE RESEARCH DATA COLLECTION.@HOST COUNTRY PROVIDES PERSONNEL,TRNG SUPPORT FOR PARTICIPANTS,LAND,& AN OPERATIONS FUND CONTRIBUTION.AID PROVIDES COMMODITIES SUCH AS FIELD RESEARCH EQUIPMENT.@PRIMARY BENEFICIARIES WILL BE THE TRAINED MOA RESEARCH STAFF,WHILE BASOTHO FARMERS ALSO BENEFIT.

COUNTRY/BUREAU LESOTHO
PROJECT NUMBER 632006400
PROJECT TITLE AGRICULTURAL SECTOR ANALYSIS
PROJECT SUMMARY RESEARCH/TECHNICAL ASSISTANCE (TA) GRANT PROVIDED TO GOVT OF LESOTHO (GOL) TO DEVELOP ITS CAPACITY TO IMPLEMENT, UPDATEAND UTILIZE SECTOR ANALYSIS AS A PLANNING TOOL IN EVALUATINGALTERNATE STRATEGIES FOR ECONOMIC AND SOCIAL DEVELOPMENT IN THE AGRICULTURAL SECTOR, AND TO ESTABLISH A US UNIVERSITY-GOL LONG-TERM INSTITUTIONAL RELATIONSHIP. @PROJECT ACTIVITIES WILL START WITH A LESOTHO AGRICULTURAL SECTOR ANALYSIS (LASA). AS A RESULT OF LASA, A MINIMUM OF 6 BASOTHO PERSONNEL CURRENTLY EMPLOYED BY THE MINISTRY OF AGR (MOA) AND THE CENTRAL PLANNING AND DEVELOPMENT OFFICE (CPDO) WILL RECEIVE ACADEMIC DEGREES IN AGR ECONOMICS OR RELATED FIELDS. @IN THE FIRST PHASE OF LASA ACTIVITY, 2 BASOTHO TRAINEES WILL RECEIVE ON-CAMPUS INSTRUCTION, AND A COMPREHENSIVE SEARCH OF RELEVANT LITERATURE WILL BE PERFORMED BY THE UNIVERSITY LASA TEAM IN THE US AND GREAT BRITAIN. IN LESOTHO, A SIMILAR SEARCH WILL BEGIN UNDER THE DIRECTION OF THE LESOTHO LASA TEAM LEADER. @IN PHASE II OF LASA, AN AGR SECTOR REVIEW (ASR) WILL BE PREPARED JOINTLY BY UNIVERSITY PERSONNEL AND APPROPRIATE PERSONNEL FROM THE GOL. THE ASR WILL ANALYZE THE EXISTING DATA BASE IN ORDER TO ADDRESS SOME OF THE IMMEDIATE POLICY NEEDS OF THE GOL FOR PROGRAMMING IN THE AGR SECTOR. BASED ON INFORMATION GAINED IN PHASE I AND II, INCLUDING THE PRIORITIES OF THE GOL, DATA NEEDS, AND LEVEL OF ANALYTICAL SKILLS AVAILABLE IN LESOTHO, AN AGR SECTOR ANALYSIS (ASA) WILL BE PREPARED JOINTLY DURING PHASE III BY PERSONNEL FROM THE US UNIVERSITY AND THE MOA AND CPDO. IN ADDITION, AN AGR LIBRARY WILL BE ESTABLISHED IN THE MOA AND CPDO. IN ADDITION, AN AGR LIBRARY WILL BE ESTABLISHED IN THE MOA. IT IS PLANNED THAT PHASE I WILL LAST 10 MONTHS AND PHASE II APPROX 6 MONTHS AND PHASE III 33 MONTHS. @BENEFICIARIES WILL BE THE POOR MAJORITY AND WOMEN WHOSE INCOMES FROM AGR WILL IMPROVE; AND ALSO AGR TRAINEES. @PROJECT WILL BE IMPLEMENTED JOINTLY BY GOL, AID AND

COUNTRY/BUREAU LESOTHO
PROJECT NUMBER 632007600
PROJECT TITLE LESOTHO ROADS
PROJECT SUMMARY USAID GRANT OF $26M TO GOVERNMENT OF LESOTHO(GOL) CONTRIBUTES 82% SHARE OF ENGINEERING DESIGN AND CONSTRUCTION COSTS ASSOCIATED WITH BUILDING OF SOUTHERN PERIMETER ROAD THAT WILL LINK ISOLATED MOUNTAINOUS SOUTH AND SOUTHEAST REGIONS OF COUNTRY TO MORE DEVELOPED WESTERN LOWLANDS AND CAPTIAL OF MASERU. PROJECT DESIGNED TO HELP AMELIORATE EXISTING EMERGENCY SITUATION OF LESOTHO CITIZENS BEING DENIED UNIMPEDED ACCESS AT BORDER CROSSINGS INTO TRANSKEI BANTUSTAN. IT SHOULD ALSO PROMOTE ECONOMIC AND INFRASTRUCTURAL DEVELOPMENT OF THIS REMOTE REGION. LESOTHO'S REFUSAL TO RECOGNIZE TRANSKEI INDEPENDENCE HAS EXACERBATED CURRENT SITUATION;SOUTH AND SOUTHEAST LESOTHO ARE READILY ACCESSIBLE NOW ONLY THROUGH TRANSKEI AND SOUUTH AFRICAN TERRITORY. USAID EFFORT SUPPORTS UN SECURITY COUNCIL CALL FOR EMERGENCY PROGRAMMED ASSISTANCE. FEASIBILITY AND ENVIROMENTAL IMPACT STUDIES HAVE CONFIRMED DESIRABILITY OF ROAD PROJECT. @FOUR-YEAR PROJECT ENVISIONS DESIGN AND ENGINEERING PHASE TO BE FOLLOWED BY TWO AND ONE-HALF YEAR CONSTRUCTION PERIOD THAT WILL TRANSFORM THE CURRENT 209.3 KM, MOSTLY SINGLE-LANE,EARTH TRACK FROM QUTHING TO QACHA'S NECK INTO155.2 KM OF TWO-LANE,ALL WEATHER ROAD WITH PAVED AND GRAVEL SEGMENTS; MODIFICATION AND REMEDIAL WORK ON EXISTING SEAKA BRIDGE; AND DESIGN AND PREPARATION OF TENDER DOCUMENTS FOR 50.3 KM SEGMENT FROM MOHALE'S HOEK TO QUTHING.@THE GOL MINISTRY OF WORKS WILL OVERSEE CONSTRUCTION AND PROVIDE MAINTENACE,RECEIVING TECHNICAL ASSISTANCE TO INITIATE A ROAD MAINTENANCE TRAINING PROGRAM. GOL ALSO PROVIDES LABOR,FACILITIES,REIMBURSEMENT OF OWNERS,AND LOCAL SHARE OF PROCUREMENT COSTS. PROJECT COSTS INCLUDE BUILD-IN INFLATION ESTIMATES. WAIVER IS BEING SOUGHT TO PERMIT PURCHASE OF REPUBLIC OF SO AFRICA VEHICLES AND CONSTRUCTION COMMODITIES TO FACILITATE PROCUREMENT AND EXPEDITE PROJ COMPLETION.@BENEFICIARIES ARE THE 165,000 CITIZENS OF REGION WHO WILL ENJOY REDUCED DEPENDENCE ON CRO SS-BORDER TRAVEL,IMPROVED ACCESS TO MARKETS BOTH TO SELL AND PURCHASE GOODS,IMPROVED SOCIAL BENEFITS,AND ENHANCED DVLP PROSPECTS FOR REGIONS' AGR MINERAL, AND TOURISM POTENTIAL.@ADDITIONAL ROADS LINKING REGION PLANNED BY OTHER DONORS.

COUNTRY/BUREAU LESOTHO
PROJECT NUMBER 632006900
PROJECT TITLE SOUTHERN AFRICA MANPOWER DEVELOPMENT
PROJECT SUMMARY GRANT IS PROVIDED TO THE GOVERNMENT OF LESOTHO (GOL) TO ALLEVIATE THE CONSTRAINT TO DEVELOPMENT IMPOSED BY THE EXTREME SHORTAGE OF TRAINED MANPOWER IN THE PUBLIC SECTOR THROUGH TRAINING GOL SENIOR PERSONNEL. THE GOL'S NATIONAL MANPOWER DEVELOPMENT SECRETARIAT WILL COORDINATE THE TRAINEE SELECTION, WHILE AID WILL DIRECT-HIRE A PERSONNEL/HUMAN RESOURCE SPECIALIST TO MANAGE THE PROJECT. @A TOTAL OF 48 BASOTHO PUBLIC SECTOR PERSONNEL WILL RECEIVE PARTICIPANT TRAINING IN THE US AND AFRICA. US OPERATING PERSONNEL (OPEX) WILL BE PROVIDED TO FILL THOSE GOVERNMENT POSITIONS LEFT VACANT, E.G., DIRECTORS OF WATER AND POWER AND OF AGRICULTURAL RESEARCH, MANPOWER PLANNER, ORGANIZATION AND METHODS EXPERT, FINANCIAL CONTROLLER, RURAL DEVELOPMENT PROJECTS OFFICER, CURRICULUM DEVELOPMENT AND PROJECTS EVALUATION ADVISORS, ETC. BOTH LONG-TERM ACADEMIC AND SHORT-TERM, NON-ACADEMIC PARTICIPANT TRAINING WILL BE OFFERED, PREFERABLY IN THIRD-COUNTRY AFRICAN INSTITUTIONS, SINCE THE TRAINING AND STAFF EXPERIENCE IS LIKELY TO BE MORE AFRICAN-ORIENTED AND THE COST LIKELY TO BE LESS. APPROXIMATELY 480 BASOTHO WILL BE TRAINED IN SOME 18 IN-COUNTRY OR IN-REGION TRAINING PROGRAMS AND COURSES AIMED AT UPGRADING OR EXPANDING SPECIFIC SKILLS AND ADMINISTRATIVE OR MANAGERIAL FUNCTIONS. THESE PROGRAMS WILL TAKE PLACE IN STAFF TRAINING INSTITUTIONS IN THE REGION SUCH AS THE NATIONAL UNIVERSITY OF LESOTHO, LESOTHO AGRICULTURAL COLLEGE, LESOTHIOLI TECHNICAL INSTITUTE, AND THE LESOTHO INSTITUTE FOR PUBLIC ADMINISTRATION, AS WELL AS ON-THE-JOB UNDER THE SUPERVISION OF THE OPEX TECHNICIANS. THIRD, SOME SIX ADDITIONAL PROJECTS ARE EXPECTED TO SPIN-OFF THIS EFFORT AND RECEIVE DONOR SUPPORT. THESE WILL BE CONSIDERED WHEN OPEX TECHNICIANS IDENTIFY PROGRAM NEEDS WHICH GO BEYOND THE SCOPE OF THIS PROJECT, REQUIRING THE PROVISION OF COMMODITIES AND A NUMBER OF TECHNICAL EXPERTS AND TRAINING OPPORTUNITIES. FINALLY, THE PROJECT WILL ALSO CONTRIBUTE TO LONG-TERM IMPROVEMENTS IN GOL INSTITUTIONAL CAPACITY IN POTENTIALLY ALL MAJOR DEVELOPMENT SECTORS, WITH TECHNICAL ASSISTANCE BEING PROVIDED BY THE OPEX PERSONNEL. @THE GOL WILL PROVIDE SALARIES AND OTHER PERSONNEL SUPPORT.

COUNTRY/BUREAU LESOTHO
PROJECT NUMBER 632020900
PROJECT TITLE COTTAGE MOHAIR INDUSTRY (OPG) (PVO)
PROJECT SUMMARY OPERATIONAL PROGRAM GRANT (OPG) TO THE COOPERATIVE FOR AMERICAN RELIEF EVERYWHERE (CARE) TO PROVIDE SUPPORT FOR CARE'S PROGRAM TO DEVELOP A HANDSPUN MOHAIR YARN INDUSTRY IN THE VILLAGES OF LESOTHO. CARE WILL IMPLEMENT THE PROJECT. @SPECIFIC ACTIVITIES TO BE UNDERTAKEN INCLUDE TRAINING OF APPROXIMATELY 5,000 RURAL PERSONS IN SPINNING RAW MOHAIR INTO QUALITY YARN AND DEVELOPMENT OF APPROXIMATELY 50 COOPERATIVES TO PROVIDE SUCH SERVICES AS PROCURING RAW MOHAIR, PROVIDE CREDIT TO SPINNERS, AND COLLECT, GRADE, AND STORE FINISHED YARN. A SECONDARY COOPERATIVE ORGANIZATION WHICH WILL EVENTUALLY ADMINISTER THE PROJECT WILL ALSO BE ESTABLISHED. @AID FUNDS, WHICH WILL CONSTITUTE APPROXIMATELY 10% OF OVERALL PROJECT FINANCING, WILL BE USED TO PROCURE RAW MOHAIR AND TO PROVIDE

COUNTRY/BUREAU LESOTHO
PROJECT NUMBER 632021000
PROJECT TITLE TITLE II COMMODITY WAREHOUSING (OPG) PVO
PROJECT SUMMARY OPERATIONAL PROGRAM GRANT (OPG) TO CATHOLIC RELIEF SERVICES/LESOTHO (CRS) TO PROVIDE SUPPORT FOR THE CONSTRUCTION OF WAREHOUSES NEEDED FOR THE STORAGE OF PL 480 TITLE II COMMODITIES. THE SPECIFIC OBJECTIVE OF THE GRANT IS THE CONSTRUCTION OF APPROXIMATELY 30,000 SQUARE FEET OF STORAGE SPACE IN 6 LOCATIONS IN LESOTHO. THE SPACE IS NEEDED TO ENSURE THAT THERE ARE NOT DISRUPTIONS OF TITLE II PROGRAMS AND THAT THERE ARE SUFFICIENT COMMODITIES ON HAND TO COPE WITH ANY EMERGENCY SITUATIONS WHICH MAY ARISE. TO ACHIEVE THE ABOVE OBJECTIVE, CRS WILL CONTRACT FOR THE CONSTRUCTION OF WAREHOUSES IN MASERU, LERIBE, BUTHA-BUTHA, THABA-TSEKA, QUTHING, AND QACHA'S NEK; MAKE DIRECT PURCHASES OF SCALES, DUNNAGE AND ANCILLARY EQUIPMENT; AND CONDUCT FREQUENT VISITS TO PROJECT SITES TO MONITOR THE RATE OF PROGRESS AND QUALITY OF CONSTRUCTION.

COUNTRY/BUREAU LESOTHO
PROJECT NUMBER 632006600
PROJECT TITLE NUTRITION PLANNING AND RESEARCH
PROJECT SUMMARY Grant is provided to Planning Assistance, Inc. (PA) to assist the Government of Lesotho (GOL) in institutionalizing a planning and management capability for food and nutrition.@PA will recruit an expatriate advisor to provide planning and management assistance to a Central Office for Food and Nutrition (COFN) to be created by GOL, and will help GOL to recruit two professionals and one support staff person to run COFN. These persons will be Basotho (Lesotho nationals). They will receive PA advisory assistance as well as on-the-job and short-term training in planning and management and in research techniques, to develop their capability to run COFN without PA help.@With PA assistance, COFN will make an evaluative review of existing food and nutrition data collection systems, and will assemble basic statistical data and analyses from GOL ministries and Lesotho organizations for dissemination to all agencies involved in food and nutrition work. COFN will also establish a basic food and nutrition library and encourage its use by ministries and organizations. COFN will provide assistance to two survey teams (to include staff from the National University of Lesotho) which will be recruited to conduct household budget and food distribution channel surveys as part of a comprehensive study of the national food system. To facilitate coordination of food and nutrition programs, COFN will prepare a mailing list of relevant ministries and organizations, provide management assistance to agency chiefs, and conduct field visits to monitor program implementation. In addition, COFN will participate in inter-agency coordination meetings, provide staff support to the national food and nutrition committee, and organize annual food and nutrition planning conferences. COFN will also prepare a monthly newsletter to inform cooperating ministries and organizations on program planning and operations, results from food and nutrition analyses, and summaries of food and nutrition statistical information.@PA will assist the GOL in developing and implementing a strategy for project transition.

COUNTRY/BUREAU LESOTHO
PROJECT NUMBER 632008800
PROJECT TITLE RURAL WATER/SANITATION
PROJECT SUMMARY Grant is provided the Government of Lesotho to upgrade the institutional capability of the Village Water Supply System (VWSS) of the Ministry of Regional Development (MORD) to design, construct and maintain new and existing water supply systems.@Training of VWSS personnel will include B.S.-level engineering studies at U.S. institutions for three Senior Technical Officers (STO) and technical diploma training in engineering for 20 Technical Assistance Officers (TAO) at Lerotholi Polytechnic. In-service training will be provided annually for 33 TAO's, 36 VWSS laborers and STO's. Training and tools will be provided to 547 select villagers, known as "waterminders", to perform minor system maintenance. One regional and three district maintenance centers will be constructed, enabling the VWSS to provide better system maintenance and support to village waterminders. The Ministry of Health (MOH) will provide a health education specialist to coordinate water-related health and sanitary education and to ensure that all proper health measures are taken prior to system construction, thus establishing a basis for improved coordination between MOH and MORD. In addition, VWSS organizational, management, and operational procedures for system identification, design, and maintenance will be improved, including improvement of support capabilities such as financial record-keeping and inventory management.@Construction will include installation of 142 new community water supply systems, rehabilitation of 68 existing failed systems, and the introduction of latrines into areas where their usage was previously nonexistent. All systems will develop naturally potable water sources to lessen contamination hazards and will be one of three types: (1) simple protected springs without distribution; (2) high level spring cappings with storage and gravity conveyance pipeline and distribution; and (3) hand pumps on boreholes placed in village centers of usage. The systems, which will be built on a self-help basis, will serve minimum domestic needs of 225 villages with a population of 400, for a total of 90,000 persons, most of whom will be women.

COUNTRY/BUREAU LESOTHO
PROJECT NUMBER 632021500
PROJECT TITLE LAND CONSERVATION AND RANGE DEVELOPMENT
PROJECT SUMMARY Grant is provided to the Government of Lesotho (GOL) to strengthen the Ministry of Agriculture's (MOA's) capability to conserve and develop national farmland and rangeland resources. The MOA will implement the project.@A total of 16 Basotho will receive M.S. and B.S. training in the U.S. and another 20 will receive diploma and certificate in Africa in areas such as range management, conservation, engineering, and soils. Returned trainees will be assigned to the MOA's Conservation Division and will gain on-the-job training with the help of expatriate personnel. U.S and Lesotho short-term training and study tours will be given to 158 Basotho. To introduce an organized system of comprehensive on-farm planning, 20 Planning Teams will be organized to develop 2,400 on-farm plans which integrate land use, cropping, and conservation needs for 6,100 ha. Conservation plans from previous A.I.D. projects (6320031, 6320048, 6320064) will be expanded by surveying and mapping an additional 150,000 ha, of which two-thirds will be rangeland and one-third cropland. Twenty-five new area conservation plans will be developed for another 50,000 ha. Structures such as dams and silt traps will be constructed to protect 60,000 ha from erosion, and new terraces will be built to protect 4,000 ha of land. Construction and maintenance of these structures will be accomplished by 100 Basotho who will be temporarily employed each project year. A rangeland area will be selected and developed. This will include establishment of a Grazing Association (GA); completion of range reconnaissance surveys and grazing management and animal health plans; and development of a marketing program for GA members. The experience obtained from this first rangeland area will serve as the basis for the establishment of a second near the project's end. A report analyzing land and livestock management policies, such as those affecting land use and controlled grazing, will be issued and recommendations made for policy changes or for new policies. Before the second rangeland management plan commences, GOL and USAID will review all relevant policies and regulations.

COUNTRY/BUREAU LESOTHO
PROJECT NUMBER 632020600
PROJECT TITLE RENEWABLE ENERGY TECHNOLOGY
PROJECT SUMMARY Grant to the Government of Lesotho (GOL) to meet expanding energy demands, especially of the poor, in ways minimizing national requirements for scarce, non-renewable energy. Project purpose will be met by disseminating renewable energy technologies (RET) in pilot rural areas. Project will be implemented by a U.S. contractor with assistance from the Ministry of Rural Development (MORD) and three Peace Corp volunteers.@After village/project personnel consultations to assess local energy needs, any of four village RET's will be introduced: (1) wood and dung burning stoves designed to utilize these available energy sources for cooking and heating; (2) pedal power grain grinding for cheap and efficient grain processing; (3) thatch insulation and weatherization to minimize heat loss caused by metal roofs; and (4) passive solar greenhouses to extend seedling production and winter gardening, complementing MORD's communal garden program.@Two other research and development (R&D) technologies also will be developed. (1) A medium-sized, 100 cow anerobic digester system to be constructed at the Masianokeng village will produce 450 gallons of sludge fertilizer per day and will determine the feasibility of replacing diesel fuel with methane gas. (2) To evaluate the cost and reliability of hydro vs. diesel-produced electricity, a 3-5 kw hydroelectric scheme will be provided for the Rampai health clinic.@A R&D laboratory will be established to test prototype RET units; evaluate local RET unit construction and technical performance; upgrade training programs; and construct and operate the aforementioned R&D technologies. In addition, an energy conserving house will be constructed for the Project Manager to serve as an example of RET potential to the urban Basotho.@In-country RET training and related equipment will be provided for 140 Village Energy Technicians (VET's) selected by their villages. Trained VET's will return to their villages to demonstrate RET capabilities and to provide their skills to other villagers for a fee. The training of eight MORD/project staff will develop MORD's institutional capacity for RET dissemination.

Appendix VII

Supplementary Bibliography

1. General
2. Health
3. Agriculture
4. Biological Resources and Environment
5. Hydrology
6. Soils
7. Geology

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