ARUSHA REGION
INTEGRATED DEVELOPMENT PLAN

VOLUME ONE

ARUSHA REGION TODAY: 1981

Prepared By
THE REGIONAL DEVELOPMENT DIRECTORATE
ARUSHA REGION
With The Assistance Of
THE ARUSHA PLANNING AND VILLAGE DEVELOPMENT PROJECT

Regional Commissioner’s Office
Arusha Region
P.O. Box 3050
ARUSHA

September 1981
During the four year period beginning in July 1979 Arusha Region has been assisted by the USAID-sponsored Arusha Planning and Village Development Project in the implementation of a large number of village development activities and in the preparation of the Region's Integrated Development Plan. It is a great pleasure to me that this Plan has now been completed and that I am able to write this short forward.

The Arusha Region Integrated Development Plan includes a comprehensive description of the current status of development in the Region, an analysis of constraints to future development, and the strategies and priorities that the Region has adopted for guiding its future development. It also includes a review of projects in the Region's Five Year Development Plan as well as priority projects for long term investments.

The preparation of the Plan has involved many meetings at the Regional, District and village level, and the goals, strategies, objectives and priority projects included in the Plan fully represent the decisions of the officials involved in those meetings. I am confident that the Plan will provide a very useful frame of reference for guiding the economic and social development of Arusha Region over both the medium-term five year period and the next 20 years. The total size of the identified projects and programmes is well beyond the normal scope of the financial resources of the Regional budget. Therefore, one function of this document is also to present the necessary facts and justification for attracting assistance from potential sources outside of the Region to carry out priority projects which address the specified development objectives of the Region. The Plan is by no means exhaustive, and there is room for interested organizations to explore other potential investments. Our Plan is therefore a base for future comprehensive planning.

I would like to take this opportunity to congratulate the Regional Planning Office staff and the team from Development Alternatives, Inc., which undertook the implementation of the Arusha Planning and Village Development Project, for their hard work and many accomplishments and to thank all those Regional Government, Ministry, Parastatal, and Party officials who, in one way or another, gave them the necessary assistance and cooperation.

J. A. Mhaville
REGIONAL COMMISSIONER
ARUSHA
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CHAPTER ONE
INTRODUCTION

Arusha Region is located just south of the equator, near Mt. Kilimanjaro, in the north-central Tanzania. The region is endowed with natural beauty, diverse topography, varied climate and vegetation, and potential to develop its agriculture, livestock, and natural resources.

Tanzania became independent in 1961, and Arusha was established as a separate region in 1963 (see Annex A for a historical chronology of Arusha Region). Since independence, the Government of Tanzania has adopted agrarian-based socialism as a model for development. Its main goals are elimination of privilege and exploitation and improved quality of life in rural villages. To reach these goals, the government has initiated a program of villageization to improve local decision making and access to government services; the concept of ujamaa, where rural villages share in the process and benefits of development; and the decentralization of authority to increase its responsiveness to the particular needs of rural villages. The underpinnings of the government's philosophy of development were articulated in the Arusha Declaration in 1967.

This document sets forth where Arusha Region is today; it begins with a statistical summary of Arusha Region and its six rural districts -- Arumeru, Hanang, Kiteto, Mbulu, Monduli, and Ngorongoro.
ARUSHA PLANNING AND VILLAGE DEVELOPMENT PROJECT
Livestock, Wildlife and Land Use Survey, February 1980

ARUSHA REGION AND DISTRICTS

Figure 2

--- Boundary of census zone
--- District boundaries

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CHAPTER TWO
SUMMARY STATISTICAL PROFILE
ARUSHA REGION

Location: North-central Tanzania, bordered by Kenya on the northeast, and Tanzanian regions of Kilimanjaro, Tanga, Dodoma, Shinyanga, and Mara.

Size: 82,428.5 sq km.

Climate: Mild, average temperature 22° C. Variation in rainfall between the mountains and the lowlands, ranging from 500 to 1,000 mm a year.

Natural Resources:
- National forest -- 2,345.0 sq km (3 percent of the total land area).
- National Parks and Ngorongoro Conservation Area -- 8,809.0 sq km (10.7 percent of total land area). Wildlife population -- 2 million.
- Lakes and dams -- 3,571.0 sq km (4 percent of total land area).
- Cultivable land -- 8,506 sq km (10.3 percent of total land area).
- Grazing land (including Ngorongoro Conservation Area) -- 66,559 sq km (80.7 percent of total land area).

Population: 1981 -- 1,035,761 (1978 -- 928,478) -- 92 percent located in rural areas, annual growth rate 3.8 percent; thus, the population in all districts will double by the year 2000.

Administrative Structure: A regional government overseeing 1 town council, 6 districts, 26 divisions, 128 wards, and 463 villages.
Physical Infrastructure: Airports -- one international, numerous small airstrips.

Roads -- 4,562 km of which 243 km are tarmac, 1,539 km murram/gravel, and 2,780 km earth.

Water systems -- almost 48 percent of the population is provided with safe water.

Dams -- 12.

Hotels -- 21 tourist hotels and 114 guest houses.

Health facilities -- 9 hospitals, 10 health centers, 122 dispensaries, and 60 village health posts.

Schools -- 2,474 primary classrooms, 10 secondary schools, 15 technical schools, and 2 colleges.

Businesses -- 190 village shops, 85 cooperative shops, 26 corporations, 161 grinding mills, 254 bars, 199 stores, 14 hardware stores, and 8 pharmacies.

Principal Economic Activities

Agriculture: Produces about 40 percent of the gross regional product. In 1979-1980, 579,000 tons of agricultural commodities were produced, earning about 650 million Tsh.

(in tons)

- Main food crops: Maize 324,250
  Mixed Beans 50,315
  Millet 8,810

- Main cash crop: Coffee 17,956
  Wheat 95,014
  Seed beans 27,770
  Sorghum 45,639
Livestock: Produces about 40 percent of the gross regional product.

Wildlife and Tourism: Produces about 5 percent of the gross regional product.

Employment Structure: 95 percent of the people are agriculturists/pastoralists; 1.3 percent (12,174 posts), civil servants. The remainder are employed by parastatals or private enterprises, or are self-employed.

Quality of life Indicators:

- Health -- life expectancy 51 years.
- Infant mortality rate -- 130 deaths per 1,000 births.
- Percentage of school-age children enrolled in primary school -- 91 percent.
- Food production in kilocalories per capita per day -- 3,818.
<table>
<thead>
<tr>
<th>District</th>
<th>Total (sq km)</th>
<th>Cultivable Land (sq km)</th>
<th>Percent Cultivate Land</th>
<th>Grazing Land (sq km)</th>
<th>Percent Grazing Land</th>
<th>Natural Resources (sq km)</th>
<th>Percent Natural Resources</th>
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<tbody>
<tr>
<td>Arusha Urban</td>
<td>82.5</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Arumeru</td>
<td>2,896.0</td>
<td>1,251</td>
<td>43.20</td>
<td>1,241</td>
<td>42.8</td>
<td>404</td>
<td>14.00</td>
</tr>
<tr>
<td>Hanang</td>
<td>8,405.0</td>
<td>3,362</td>
<td>40.00</td>
<td>2,494</td>
<td>29.7</td>
<td>2,549</td>
<td>30.30</td>
</tr>
<tr>
<td>Mbali</td>
<td>7,652.0</td>
<td>3,000</td>
<td>39.20</td>
<td>2,778</td>
<td>36.3</td>
<td>1,874</td>
<td>24.50</td>
</tr>
<tr>
<td>Monduli</td>
<td>14,201.0</td>
<td>525</td>
<td>3.70</td>
<td>12,614</td>
<td>88.8</td>
<td>1,062</td>
<td>7.50</td>
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<tr>
<td>Ngorongoro</td>
<td>14,036.0</td>
<td>168</td>
<td>1.20</td>
<td>12,481</td>
<td>88.9</td>
<td>1,387</td>
<td>9.90</td>
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<tr>
<td>Kiteto</td>
<td>35,156.0</td>
<td>200</td>
<td>0.57</td>
<td>34,951</td>
<td>99.4</td>
<td>5</td>
<td>0.01</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>82,428.5</strong></td>
<td><strong>8,506</strong></td>
<td><strong>10.30</strong></td>
<td><strong>66,559</strong></td>
<td><strong>80.7</strong></td>
<td><strong>7,281</strong></td>
<td><strong>8.80</strong></td>
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Total Land = District Figure
Percent Under Cult. = Ecosystems, Kiteto revised by Sargeant
Natural Resource = Sargeant
Grazing = Residual
### Table 2: Population

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<td>Arumeru</td>
<td>238,020</td>
<td>82.2</td>
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<td>Hanang</td>
<td>231,292</td>
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<td>Kiteto</td>
<td>59,790</td>
<td>1.7</td>
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<tr>
<td>Mbulu</td>
<td>193,775</td>
<td>25.3</td>
<td>214,075</td>
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<td>Monduli</td>
<td>71,725</td>
<td>5.1</td>
<td>81,760</td>
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<tr>
<td>Ngorongoro</td>
<td>47,031</td>
<td>3.4</td>
<td>50,644</td>
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<tr>
<td>Arusha Urban</td>
<td>86,845</td>
<td>947.9</td>
<td>100,128</td>
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<tr>
<td>TOTAL</td>
<td>928,478</td>
<td>11.3</td>
<td>1,035,761</td>
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### Table 3: Administrative Structure

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<tr>
<th>District</th>
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<tr>
<td>Arumeru</td>
<td>6</td>
<td>30</td>
<td>133</td>
</tr>
<tr>
<td>Hanang</td>
<td>4</td>
<td>28</td>
<td>112</td>
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<tr>
<td>Kiteto</td>
<td>4</td>
<td>16</td>
<td>51</td>
</tr>
<tr>
<td>Mbulu</td>
<td>4</td>
<td>21</td>
<td>91</td>
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<tr>
<td>Monduli</td>
<td>3</td>
<td>13</td>
<td>37</td>
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<tr>
<td>Ngorongoro</td>
<td>3</td>
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<td>29</td>
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<tr>
<td>Arusha Urban</td>
<td>2</td>
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<td>10</td>
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<tr>
<td>TOTAL</td>
<td>26</td>
<td>128</td>
<td>463</td>
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### Table 4: Crop Production, 1979-1980

<table>
<thead>
<tr>
<th>District</th>
<th>Maize (tons)</th>
<th>Mixed Beans</th>
<th>Coffee (tons)</th>
<th>Wheat (tons)</th>
<th>Sorghum (tons)</th>
<th>Seed Beans</th>
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<tbody>
<tr>
<td>Arumeru</td>
<td>29,926</td>
<td>16,395</td>
<td>12,229</td>
<td>3,124</td>
<td>1,300</td>
<td>--</td>
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<td>Hanang</td>
<td>124,909</td>
<td>12,943</td>
<td>--</td>
<td>69,301</td>
<td>23,230</td>
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<td>Kiteto</td>
<td>3,900</td>
<td>162</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>2,616</td>
</tr>
<tr>
<td>Mbulu</td>
<td>148,710</td>
<td>17,817</td>
<td>--</td>
<td>22,238</td>
<td>19,815</td>
<td>6,236</td>
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<tr>
<td>Monduli</td>
<td>10,478</td>
<td>2,998</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>10,643</td>
</tr>
<tr>
<td>Ngorongoro</td>
<td>6,327</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>1,198</td>
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</table>

### Table 5: Food Crop Surplus/Deficit, 1979-1980

<table>
<thead>
<tr>
<th>District</th>
<th>Total Food Crop Production (Maize and Mixed Beans) (tons)</th>
<th>Spoilage (tons)</th>
<th>Total Available (tons)</th>
<th>Rural Food Demand (tons)</th>
<th>Food/Deficit Surplus (tons)</th>
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<tbody>
<tr>
<td>Arumeru</td>
<td>46,321</td>
<td>6,948</td>
<td>39,373</td>
<td>45,267</td>
<td>(5,894)</td>
</tr>
<tr>
<td>Hanang</td>
<td>137,852</td>
<td>20,678</td>
<td>117,174</td>
<td>42,550</td>
<td>74,624</td>
</tr>
<tr>
<td>Kiteto</td>
<td>4,062</td>
<td>609</td>
<td>3,453</td>
<td>10,976</td>
<td>(7,523)</td>
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<tr>
<td>Mbulu</td>
<td>166,527</td>
<td>24,979</td>
<td>141,548</td>
<td>36,467</td>
<td>105,081</td>
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<tr>
<td>Monduli</td>
<td>13,476</td>
<td>2,021</td>
<td>11,455</td>
<td>12,795</td>
<td>(1,340)</td>
</tr>
<tr>
<td>Ngorongoro</td>
<td>6,327</td>
<td>949</td>
<td>5,378</td>
<td>9,032</td>
<td>(3,654)</td>
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### Table 6: Livestock Population in Animal Units (AU)

<table>
<thead>
<tr>
<th>District</th>
<th>Cattle</th>
<th>Sheep</th>
<th>Goats</th>
<th>Total AU</th>
<th>AU per ha</th>
</tr>
</thead>
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<tr>
<td>Arumeru</td>
<td>118,842</td>
<td>38,559</td>
<td>32,139</td>
<td>189,540</td>
<td>0.9</td>
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<tr>
<td>Hanang</td>
<td>276,231</td>
<td>31,306</td>
<td>45,558</td>
<td>353,077</td>
<td>1.4</td>
</tr>
<tr>
<td>Kiteto</td>
<td>351,151</td>
<td>9,871</td>
<td>18,778</td>
<td>379,800</td>
<td>8.4</td>
</tr>
<tr>
<td>Mbulu</td>
<td>177,295</td>
<td>25,155</td>
<td>51,598</td>
<td>254,048</td>
<td>1.7</td>
</tr>
<tr>
<td>Monduli</td>
<td>191,433</td>
<td>28,187</td>
<td>40,859</td>
<td>260,479</td>
<td>5.5</td>
</tr>
<tr>
<td>Ngorongoro</td>
<td>133,030</td>
<td>30,305</td>
<td>34,360</td>
<td>197,795</td>
<td>7.0</td>
</tr>
</tbody>
</table>
Recently completed studies have identified population growth and the resulting pressures on the land as the most critical development problem in Arusha Region. Arusha has one of the highest growth rates in the world, and it is expected that the population will double in the next 20 years.

Most of the population is dependent on the land for income. This rapid population growth rate has therefore intensified the competition for land, creating serious consequences for the quality of the land and its productive potential.

Because of the diversity of the agro-ecological zones, the productive systems employed, and the need to adopt measures to reverse the rapid deterioration of the land, the region has directed development resources to specific geographic areas, with a focus on integrated land use planning.

**Population Growth**

Compared with other areas of similar size, Arusha Region has one of the highest population growth rates in the world. The region's population increased at an average annual rate of 3.8 percent between 1967 and 1978, compared with the national average of 3.2 percent (see Table 7).

Even using conservative projections that assume a constant fertility rate and no immigration, the region's population will double in the next two decades, as will the population in each district (see Table 8).
<table>
<thead>
<tr>
<th>District</th>
<th>Average Annual Intercensal Growth Rate (%)</th>
<th>1978 Population (000's)</th>
<th>1978 Pop/Km^2</th>
<th>Current Estimated Growth Rate*</th>
<th>Estimated Population June 1981 (000)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tanzania Mainland</td>
<td>1.8 3.1 3.2</td>
<td>17,043.8</td>
<td>19.3</td>
<td>3.3</td>
<td>18,716.6</td>
</tr>
<tr>
<td><strong>Arusha Region</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>by District</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Arusha Urban</td>
<td>3.2 3.7 5.8</td>
<td>86.8</td>
<td>947.9</td>
<td>5.0</td>
<td>100.1</td>
</tr>
<tr>
<td>Arumeru</td>
<td>3.2 3.7 3.1</td>
<td>238.0</td>
<td>82.2</td>
<td>3.3</td>
<td>261.5</td>
</tr>
<tr>
<td>Hanang</td>
<td>2.4 4.3 5.5</td>
<td>231.3</td>
<td>27.5</td>
<td>4.1</td>
<td>259.9</td>
</tr>
<tr>
<td>Kiteto</td>
<td>1.4 4.1 4.9</td>
<td>59.8</td>
<td>1.7</td>
<td>4.4</td>
<td>67.8</td>
</tr>
<tr>
<td>Mbulu</td>
<td>2.4 4.3 1.5</td>
<td>193.8</td>
<td>25.3</td>
<td>3.5</td>
<td>214.1</td>
</tr>
<tr>
<td>Monduli</td>
<td>1.4 4.1 4.3</td>
<td>68.9</td>
<td>5.1</td>
<td>4.6</td>
<td>81.8</td>
</tr>
<tr>
<td>Ngorongoro</td>
<td>1.4 4.1 4.3</td>
<td>47.0</td>
<td>3.4</td>
<td>2.6</td>
<td>50.6</td>
</tr>
</tbody>
</table>

* Current estimated annual rate of growth includes rate of natural increase and net migration.
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Arusha Urban</td>
<td>86.8</td>
<td>111.3</td>
<td>131.5</td>
<td>155.5</td>
<td>183.4</td>
</tr>
<tr>
<td>Arumeru</td>
<td>238.0</td>
<td>297.7</td>
<td>351.6</td>
<td>415.9</td>
<td>490.5</td>
</tr>
<tr>
<td>Hanang</td>
<td>231.3</td>
<td>292.1</td>
<td>345.0</td>
<td>480.0</td>
<td>481.2</td>
</tr>
<tr>
<td>Kiteto</td>
<td>59.8</td>
<td>75.5</td>
<td>89.2</td>
<td>105.5</td>
<td>124.4</td>
</tr>
<tr>
<td>Mbulu</td>
<td>193.8</td>
<td>244.7</td>
<td>289.0</td>
<td>341.9</td>
<td>403.2</td>
</tr>
<tr>
<td>Monduli</td>
<td>71.7</td>
<td>87.0</td>
<td>102.8</td>
<td>121.6</td>
<td>143.4</td>
</tr>
<tr>
<td>Ngorongoro</td>
<td>47.0</td>
<td>59.4</td>
<td>70.1</td>
<td>83.0</td>
<td>97.9</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>928.5</strong></td>
<td><strong>1,167.7</strong></td>
<td><strong>1,379.0</strong></td>
<td><strong>1,631.3</strong></td>
<td><strong>1,923.9</strong></td>
</tr>
</tbody>
</table>
A number of factors have contributed, and will continue to contribute, to this rapid population growth. Because it is one of the most developed regions in Tanzania, Arusha attracts immigrants from other poorer regions. Already Arusha has the lowest mortality rate of any region, and continually improving health services and educational opportunities can be expected to reduce the rate of infant, child, and adult mortality further. Lastly, there are indications that fertility rates have increased as a result of better maternal and child health care.[1] It is not likely that the population growth rate will decrease unless strong measures are taken to control it.

Resulting Land Pressure

There are four primary uses of land in the Arusha Region: agriculture, livestock, wildlife, and forests. Each makes an important contribution to the economy. While accurate estimates of actual land use by activity are difficult, livestock, wildlife, and forests use far more land than agriculture, which uses only five percent of the Region's land area. (For further details see section 3, Directly Productive Sectors.)

Continual friction among these land users, with agriculture gradually encroaching into the lands used by the others, has reduced the productivity in each activity. Of perhaps greater importance, this growing pressure on the land has begun to destroy it. The encroachment of agriculture into pastoral areas is breaking up the traditional livestock production systems; agricultural yields are falling because of incursions by livestock and wildlife; forests are being destroyed to provide energy sources to the growing population and the accompanying economic activities. The seriousness of this environmental destruction cannot be over-emphasized.
Preliminary investigations indicate further that problems of soil fertility and erosion, flood and droughts, bush encroachment, crop predation by birds and wildlife, and overgrazing are widespread. At the same time, decreases in production from areas already under cultivation as a result of this resource deterioration require that more areas be cultivated. Thus the whole process of expansion is accelerated and intensified. Each successive move is into increasingly marginal, lower potential, and more vulnerable environments.

The areas into which subsistence and mixed farms and larger commercial operations have expanded and continue to expand are not empty unused lands. Usually they are the homeland of pastoral people and include grazing areas, watering places, and settlements. Agricultural expansion into these areas adversely affects the land-use practices of these pastoralists. Both groups compete for land, and the range deteriorates because of overgrazing by the herds kept by the sedentary agriculturalists. Range deterioration in the dry season engenders the collapse of livestock systems and causes crop failure. The ensuing decrease in productivity, coupled with the continued population growth, leads to movement into new areas, which are again marginal for crop cultivation, and the cycle spirals deeper and deeper.

In short, as a result of the growing population and concomitant economic activity, land is becoming a scarce and a valuable asset. More ominously land can be overused and destroyed, and this process is already underway in the Arusha Region.[2]

Agro-Ecological Zones

In January and February 1980, Arusha Region was surveyed by air in order to identify major vegetation zones, water resources, land use patterns, types of settlements, and wildlife and domestic
stock distribution. The data were tabulated and grouped into obvious land units based on vegetation, soil cultivation patterns, and other natural divisions. This regional inventory is summarized below.

Arusha Region is roughly divided into two parts: the highlands which include numerous mountains such as Mt. Meru, Olmalasin, Hanang, and Oldeani that are covered by forests and are a source of many rivers and streams and the lowlands which are characterized by plains and scattered hills covered with bush and grasslands. From east to west the topography changes immensely. East of the rift wall the landscape gently undulates with occasional extinct volcanoes offering contrast. Immediately west of the rift wall are hills. Here are located the massif of the Ngorongoro Crater highlands, the Gol mountains, and the Loliondo hills. The three western districts--Ngorongoro, Mbulu, and Hanang--all have areas of extensive inselbergs and predominant scarps as well as low, flat lands around soda lakes. In contrast, the three eastern districts--Monduli, Kiteto, and Arumeru--are characterized by gently rolling hills.

The Region has diverse and abundant natural water sources which are distributed over 70 percent of the area (see Figure 3). The hilly areas have numerous rivers and natural water pools and the low lying lands of the rift valley are littered with lakes. Compared to other districts, Ngorongoro and Kiteto are dry, especially in parts of the Conservation Area west of the Ngorongoro massif and in southern Kiteto.

Climate

Although there are zonal climatic variations, Arusha has moderate, salubrious temperatures. The average annual temperature is 21°C in the highlands and 24°C in the lowlands. The average annual rainfall in the lowlands is between 500 - 800 mm; in the
ARUSHA PLANNING AND VILLAGE DEVELOPMENT PROJECT

Livestock, Wildlife and Land Use Survey, February 1980

NATURAL WATER RESOURCES

Figure 3

- lake
- swamp
- flowing river or stream
- river pool or water hole

Boundary of census zone
District boundaries

ECOSYSTEMS LTD
highlands it is between 800 - 1,000 mm. The rains are divided into two periods: the short rains which fall between October and December, and the long rains which may begin as early as January or February and end in May or June.

Vegetation Zones

Four natural vegetation zones—wooded bushlands, wooded grasslands, bushed grasslands, and open grasslands—cover 80 percent of the Region. The districts differ strikingly in the characteristics of their dominant vegetation (see Figure 4). Ngorongoro has vast areas of open grasslands with wooded grasslands and bushlands in the hills. Mbulu and Hanang have similar vegetation consisting of bushed and wooded grasslands. Monduli is similar to Ngorongoro in that it has extensive areas of open grassland, but dissimilar in that it also has a high proportion of bushed and wooded grasslands; the rest of the district is covered with wooded bushlands and bush. Vast areas are devoid of any human use (perhaps because of tsetse infestation) but are well-utilized by wildlife. Arumeru is unique; more than half of the area is cultivated, and what is left consists of bushed and open grasslands.

Soils

Soils have been classified by color—gray, gray/brown, brown, and red/brown. The extensive areas of gray soils, which are derived from recent volcanic ash, are limited to the north-western parts of the Region, west of the rift and in the Ngorongoro massif. Brown soils cover large areas in the center part of the Region and west of Arusha Town. The south and south-eastern areas are characterized by gray/brown and red/brown soils.

Soil erosion is widespread throughout the Region and is strongly associated with soil type (see Figure 5). The gray soils which occur mainly in flat areas suffer from eroded pools
MAJOR VEGETATION ZONES

Figure 4

- Boundary of census zone
- District boundaries

lake
swamp
grassland
wooded grassland
wooded bushland
woodland
bushed grassland
bushland
thicket
forest
agriculture
SEVERITY OF SOIL EROSION

Figure 5
and erosion fans. Brown soils are susceptible to gullying, eroding trails, and to bare ground erosion. The gray/brown and red/brown soils show no positive association with any of the erosion types. As can be seen from the attached figure, erosion is particularly severe in the heavily settled central part of the Region and in areas heavily utilized by stock. The south is relatively free from erosion and the west is associated with the rift system and Gol mountains.[3]

**Land Use Planning**

To address the problem of deteriorating land quality and productivity, the Region and six districts have adopted land use planning and conservation as the basic idea around which regional planning and development will occur. Specifically, a decision was made to concentrate development resources into designated geographic areas (land planning units) because of the diversity of agro-ecological zones, methods of agricultural production, and limited resources. Based on satellite imagery aerial surveys and topographic maps, the agro-ecological zones have been aggregated into land planning units, defined by vegetation, physical land forms, and slope angles as well as by social and political considerations such as agricultural practices and administrative boundaries. For example, the Ngorongoro Conservation Area is one land planning unit.

Planning units comprise land units which are relatively stable physical entities that may be combined in different ways to suit particular planning needs.[4] The selection of geographic areas in which to concentrate development activities and rationale for it was left to each district. Arumeru district has designated an entire planning unit as an area of concentration; Hanang, Mbulu, Kiteto, and Monduli have decided to concentrate on villages representative of the various agro-ecological zones in their districts with the objective of replicating the results in similar environments; and, Ngorongoro district has decided to concentrate on accessible areas.[5]
Arusha Region's wealth and contribution to national development goals lie in its natural resources. Though production is declining, Arusha produces a larger agricultural surplus than any other region. Competing for land is the livestock industry which is traditional but still accounts for an estimated 40 percent of the gross regional product. Roughly 90 percent of all energy consumed comes from wood supplies, and it appears that the forestry reserves are rapidly being depleted. The natural water resources of the Region suggest a high potential for fisheries; and beyond tourism, the Region's wildlife potential is largely untapped. Though the full complementarity between these natural resources and industrial development has not been realized, Arusha is the second largest industrial center in the country, contributing to the drive for self-sufficiency.

The economic and social infrastructure which supports these directly productive activities and which contributes to the quality-of-life of rural villages continues to deteriorate because of inadequate resources for rehabilitation and maintenance. There is overwhelming evidence in the Region that past development investments in roads, water, health, and education will be lost unless priority is placed on making available the resources necessary for maintenance and operations from the recurrent budget. Without such resources, the infrastructure of the Region will continue to deteriorate, thwarting production and quality-of-life goals.
DIRECTLY PRODUCTIVE SECTORS

Agriculture

Agriculture is one of the two most important economic activities in the Arusha Region in terms of the number of people involved and income generated. Although there are no precise figures for agricultural production, it is estimated that 95 percent of the population practice some mixture of agricultural and livestock production and that agricultural commodities contribute about Tsh 650 million or around 40 percent of the gross regional product.[6] About five percent of the total land area is used for agricultural production. Table 9 shows the area devoted to agriculture by district and the average farm size. Most farming is on small holdings of four hectares or less, and the major agricultural centers are in Arumeru, Hanang, and Mbulu districts. In the drier districts of Monduli, Kiteto, and Ngorongoro, there has been some farming on marginal lands. These dry areas are suitable for drought resistant crops, and research is in progress on how they should be introduced. About 85 percent of the agricultural production in the Region is of a subsistence nature. Eight crops occupy over 95 percent of the cultivated land, and three crops grown mainly as cash crops (wheat, seed beans, and coffee) occupy about 33 percent of the cropland (see Figure 6).

The Region has estimated agricultural production using official market figures. Table 10 provides recent estimates of agricultural production using aerial surveys and analyzing pricing policies of the official market. This estimate is 70 percent greater than that of the Region.
ARUSHA PLANNING AND VILLAGE DEVELOPMENT PROJECT
Livestock, Wildlife and Land Use Survey, February 1980

MAJOR CROP COMBINATIONS

---- Figure 6

major crops
- maize
- wheat
- beans

minor crops
- bananas
- castor oil
- wood lots
- pigeon peas
- tobacco
- marrow

--- Boundary of census zone
--- District boundaries
### Table 9: District Cropland and Farm Size*

<table>
<thead>
<tr>
<th>District</th>
<th>Cropland (hectares)</th>
<th>Average Farm Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arumeru</td>
<td>56,086</td>
<td>0.8</td>
</tr>
<tr>
<td>Hanang</td>
<td>171,090</td>
<td>2.9</td>
</tr>
<tr>
<td>Kiteto</td>
<td>8,330</td>
<td>1.7</td>
</tr>
<tr>
<td>Mbulu</td>
<td>142,990</td>
<td>3.5</td>
</tr>
<tr>
<td>Monduli</td>
<td>26,742</td>
<td>1.2</td>
</tr>
<tr>
<td>Ngorongoro</td>
<td>8,333</td>
<td>2.5</td>
</tr>
</tbody>
</table>


### Table 10: Crop Production in Arusha Region, 1979-1980*

<table>
<thead>
<tr>
<th>Crop</th>
<th>Production (tons)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maize</td>
<td>324,250</td>
</tr>
<tr>
<td>Wheat</td>
<td>95,014</td>
</tr>
<tr>
<td>Sorghum</td>
<td>45,639</td>
</tr>
<tr>
<td>Finger Millet</td>
<td>8,810</td>
</tr>
<tr>
<td>Pigeon Peas</td>
<td>9,276</td>
</tr>
<tr>
<td>Coffee</td>
<td>17,956</td>
</tr>
<tr>
<td>Seed Beans</td>
<td>27,770</td>
</tr>
<tr>
<td>Mixed Beans</td>
<td>50,315</td>
</tr>
<tr>
<td>TOTAL</td>
<td>579,030</td>
</tr>
</tbody>
</table>

* Merritt Sargent, Table XVIII.
Food Crops

The two main food crops consumed on-farm are maize and mixed beans. Table 11 provides recent estimates of the number of tons of food crops produced in each district, the amount lost in spoilage, and the rural food demand. It shows that at the present time the Region produces a food surplus of 43 percent.

Using a factor of 180 kg. per person, the current rural population consumes about 160,000 tons of foodstuff annually. The population projections for the Region, are 1.2 million people in 1985 and 1.4 million people in 1990. In order to maintain current food supply levels for this growing population, an additional 36,000 tons of food grains will be needed in 1985 and by 1990 an additional 170,000 tons. This requires an increase in production of 10 and 20 percent respectively, or a reduction of the food supply the Region exports to the rest of the nation.

Tanzania can be divided into three groups with respect to food production and consumption: food exporting regions, food deficit regions, and moderate surplus or deficit regions. As Table 12 shows, Arusha is the predominant food exporting region, and the port towns of Tanga and Dar es Salaam are the main food deficit areas.

Export Crops

The volume of crops produced for export has decreased over the last decade in Arusha Region and for the nation as a whole. During this time world prices for the commodities were increasing, with the exception of sisal. Table 13 shows the change in producer prices of maize, major food crops, and export crops over the last decade. The price of maize, the major food crop, increased by 47 percent in real terms over the decade, while the real price of competing crops such as tobacco and cashew nuts
<table>
<thead>
<tr>
<th></th>
<th>Ngorongoro</th>
<th>Mbulu</th>
<th>Hanang</th>
<th>Monduli</th>
<th>Kiteto</th>
<th>Arumeru</th>
<th>Region</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Cropland (ha)</td>
<td>8,333</td>
<td>142,990</td>
<td>171,090</td>
<td>26,742</td>
<td>8,330</td>
<td>56,084</td>
<td>413,569</td>
</tr>
<tr>
<td>Major crop areas (ha)</td>
<td>7,800</td>
<td>137,844</td>
<td>163,220</td>
<td>25,753</td>
<td>7,697</td>
<td>54,850</td>
<td>397,164</td>
</tr>
<tr>
<td>Food crop production (tons)</td>
<td>6,327</td>
<td>166,527</td>
<td>137,852</td>
<td>13,476</td>
<td>4,062</td>
<td>46,321</td>
<td>374,565</td>
</tr>
<tr>
<td>Spoilage (tons)</td>
<td>949</td>
<td>24,979</td>
<td>20,678</td>
<td>2,021</td>
<td>609</td>
<td>6,947</td>
<td>56,184 (15%)</td>
</tr>
<tr>
<td>Rural food demand (tons)</td>
<td>9,032</td>
<td>36,467</td>
<td>42,550</td>
<td>12,795</td>
<td>10,976</td>
<td>45,267</td>
<td>157,087 (42%)</td>
</tr>
<tr>
<td>Surplus (tons)</td>
<td>(3,654)</td>
<td>105,081</td>
<td>74,624</td>
<td>(1,340)</td>
<td>(7,523)</td>
<td>(5,894)</td>
<td>161,294 (43%)</td>
</tr>
<tr>
<td>Official Market</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>70,000 (19%)</td>
</tr>
<tr>
<td>Unofficial Market</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>91,294 (24%)</td>
</tr>
</tbody>
</table>

* Merritt Sargent, Table XIX.
Table 12: Food Status, (Cereals)* Tanzania Regions, 1978/1979

<table>
<thead>
<tr>
<th>Food Surplus Regions</th>
<th>Food Deficit Regions</th>
<th>Marginal Regions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Region</td>
<td>% Surplus</td>
<td>Region</td>
</tr>
<tr>
<td>Arusha</td>
<td>42.7</td>
<td>Dar es Salaam***</td>
</tr>
<tr>
<td>Dodoma</td>
<td>27.8</td>
<td>Tanga</td>
</tr>
<tr>
<td>Ruvuma</td>
<td>22.4</td>
<td></td>
</tr>
<tr>
<td>Iringa</td>
<td>20.2</td>
<td></td>
</tr>
<tr>
<td>Mbeya</td>
<td>17.2</td>
<td></td>
</tr>
<tr>
<td>Kilimanjaro</td>
<td>12.0</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td></td>
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<tr>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

Cereals include paddy rice (converted to rice equivalents at 65%), wheat (converted to wheat flour equivalent at 75%), wheat flour, maize (converted to sembe equivalent at 95%), and sembe.

** James Mudge, et al., "Tanzanian Development Performance and Implications for Development Assistance," Agency for International Development, November 1980, p. 109. This table is based on official data, i.e., food marketed through the official market channels, and does not include the parallel market.

*** Excludes cereals traded externally so the actual food deficit of Dar es Salaam and the Coast is considerably understated.
Table 13: Comparison of Producer Prices for Select Crops*

(Tsh/kg. at constant 1979/80 prices)

<table>
<thead>
<tr>
<th>Crop</th>
<th>Average Producer Price</th>
<th>Average Producer Price</th>
<th>% Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maize</td>
<td>0.68</td>
<td>1.00</td>
<td>47</td>
</tr>
<tr>
<td>Wheat</td>
<td>1.49</td>
<td>1.35</td>
<td>-9</td>
</tr>
<tr>
<td>Groundnuts</td>
<td>2.45</td>
<td>4.00</td>
<td>63</td>
</tr>
<tr>
<td>Castorseed</td>
<td>1.44</td>
<td>1.00</td>
<td>-31</td>
</tr>
<tr>
<td>Sunflower</td>
<td>1.19</td>
<td>1.50</td>
<td>26</td>
</tr>
<tr>
<td>Sesame</td>
<td>2.96</td>
<td>3.50</td>
<td>18</td>
</tr>
<tr>
<td>Cotton</td>
<td>2.87</td>
<td>3.00</td>
<td>5</td>
</tr>
<tr>
<td>Cashewnuts</td>
<td>2.48</td>
<td>1.70</td>
<td>-32</td>
</tr>
<tr>
<td>Tobacco - Flue</td>
<td>13.77</td>
<td>8.80</td>
<td>-36</td>
</tr>
<tr>
<td></td>
<td>- Fire</td>
<td>4.80</td>
<td>30</td>
</tr>
<tr>
<td>Pyrethrum</td>
<td>8.57</td>
<td>6.50</td>
<td>-24</td>
</tr>
</tbody>
</table>

declined substantially. The Ministry of Agriculture has given the following explanation for the decline of export crops:

- Emphasis on food production;
- Increased producer prices for food crops making them more attractive to cultivate;
- Progressive export taxes that preclude farmers from obtaining an increased share of the export realization price;
- High marketing costs of parastatals;
- The high official value of the Tanzanian shilling relative to major currencies; and
- Absence of programs to promote and develop export crops.

Livestock

Along with agriculture, livestock is the major enterprise of the people of Arusha Region. It is the main source of food, wealth, and employment in many rural areas. Recent land use surveys indicate that over 7 million hectares or about 80 percent of the land area is available for livestock grazing. Much of this land, however, cannot be used for grazing because of tsetse infestation, lack of water, and soil erosion. In reality, about 60 percent of the land area is used for grazing. The value of the grazing land varies greatly from district to district. In the agricultural districts—Arumeru, Hanang, and Mbulu—grazing is confined to steep slopes and less fertile and eroded areas unsuitable for crops. In the three range districts—Kiteto, Monduli, and Ngorongoro—the animals go wherever forage is produced.[7]

The total livestock population in Arusha Region and the distribution by district is summarized in Table 14.
Table 14: Livestock Population by District*

<table>
<thead>
<tr>
<th>District</th>
<th>Cattle Indigenous</th>
<th>Cattle Exotic</th>
<th>Sheep Indigenous</th>
<th>Sheep Exotic</th>
<th>Goats Indigenous</th>
<th>Goats Exotic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arumeru</td>
<td>190748</td>
<td>23353</td>
<td>218720</td>
<td>687</td>
<td>214252</td>
<td>374</td>
</tr>
<tr>
<td>Arusha</td>
<td>8790</td>
<td>726</td>
<td>5839</td>
<td>-</td>
<td>6418</td>
<td>-</td>
</tr>
<tr>
<td>Hanang</td>
<td>489287</td>
<td>235</td>
<td>208700</td>
<td>-</td>
<td>303714</td>
<td>-</td>
</tr>
<tr>
<td>Kiteto</td>
<td>408321</td>
<td>-</td>
<td>65807</td>
<td>-</td>
<td>125108</td>
<td>-</td>
</tr>
<tr>
<td>Mbulu</td>
<td>310182</td>
<td>1225</td>
<td>167691</td>
<td>-</td>
<td>343989</td>
<td>-</td>
</tr>
<tr>
<td>Monduli</td>
<td>334981</td>
<td>15102</td>
<td>187905</td>
<td>-</td>
<td>272376</td>
<td>-</td>
</tr>
<tr>
<td>Ngorongoro</td>
<td>234069</td>
<td>273</td>
<td>202037</td>
<td>-</td>
<td>229736</td>
<td>-</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>2026292</strong></td>
<td></td>
<td><strong>1057386</strong></td>
<td></td>
<td><strong>1496039</strong></td>
<td></td>
</tr>
</tbody>
</table>

* 1978 Livestock Census.
Livestock density varies greatly from district to district as Table 15 and Figure 7 illustrate. The low level of rainfall in the range districts limits the production of forage. That and lack of water holes, especially in the dry season, leads to unequal grazing pressure. There is some dispute among experts in range management as to whether the Region should encourage destocking in those areas that have high ratios of animal units per hectare and poor forage, or if the feed should be supplemented. Whatever strategy is ultimately adopted, it is clear that measures need to be taken to ensure that the stock are fed and cared for in a way that improves production.

Table 15: Distribution of Stock in Animal Units (AU)*

<table>
<thead>
<tr>
<th>District</th>
<th>Cattle</th>
<th>Sheep</th>
<th>Goats</th>
<th>Total I.U</th>
<th>AU per ha</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arumeru</td>
<td>118,842</td>
<td>38,559</td>
<td>32,139</td>
<td>189,540</td>
<td>0.9</td>
</tr>
<tr>
<td>Hanang</td>
<td>276,231</td>
<td>31,306</td>
<td>45,558</td>
<td>353,077</td>
<td>1.4</td>
</tr>
<tr>
<td>Kiteto</td>
<td>351,151</td>
<td>9,871</td>
<td>18,778</td>
<td>379,800</td>
<td>8.4</td>
</tr>
<tr>
<td>Mbulu</td>
<td>177,295</td>
<td>25,155</td>
<td>51,598</td>
<td>254,040</td>
<td>1.7</td>
</tr>
<tr>
<td>Monduli</td>
<td>191,433</td>
<td>28,187</td>
<td>40,859</td>
<td>260,479</td>
<td>5.5</td>
</tr>
<tr>
<td>Ngorongoro</td>
<td>133,030</td>
<td>30,305</td>
<td>34,360</td>
<td>197,795</td>
<td>7.0</td>
</tr>
</tbody>
</table>

* Merritt Sargent, Table 5.

Accurate data on livestock production are not available. Estimates of current production levels can be derived from an examination of the admittedly incomplete parastatal figures. (These figures are incomplete, because they only include livestock sold through the official market.)[8] The amount of meat available annually to consumers is about 10,300 tons (Table 16),
Table 16: Arusha Region: Red Meat Production*

<table>
<thead>
<tr>
<th></th>
<th>Ngorongoro</th>
<th>Mbulu</th>
<th>Hanang</th>
<th>Monduli</th>
<th>Kiteto</th>
<th>Arumeru</th>
<th>Region</th>
</tr>
</thead>
<tbody>
<tr>
<td>No./Cattle</td>
<td>234342</td>
<td>320407</td>
<td>489522</td>
<td>350083</td>
<td>624644</td>
<td>214101</td>
<td>2233099</td>
</tr>
<tr>
<td>4% Offtake</td>
<td>9374</td>
<td>12816</td>
<td>19581</td>
<td>14003</td>
<td>24986</td>
<td>8564</td>
<td>89324</td>
</tr>
<tr>
<td>100kg meat per animal</td>
<td>937400</td>
<td>1281600</td>
<td>1958100</td>
<td>1400300</td>
<td>2498600</td>
<td>856400</td>
<td>—</td>
</tr>
<tr>
<td>No./Sheep</td>
<td>202037</td>
<td>167691</td>
<td>208700</td>
<td>187905</td>
<td>65</td>
<td>218720</td>
<td>1050860</td>
</tr>
<tr>
<td>6% Offtake</td>
<td>12122</td>
<td>10061</td>
<td>13522</td>
<td>11274</td>
<td>3948</td>
<td>13123</td>
<td>—</td>
</tr>
<tr>
<td>10kg meat per animal</td>
<td>121220</td>
<td>100610</td>
<td>125220</td>
<td>112740</td>
<td>39480</td>
<td>131230</td>
<td>—</td>
</tr>
<tr>
<td>No./Goat</td>
<td>229736</td>
<td>343989</td>
<td>303714</td>
<td>272376</td>
<td>125180</td>
<td>214252</td>
<td>1489247</td>
</tr>
<tr>
<td>5% Offtake</td>
<td>11487</td>
<td>17199</td>
<td>15186</td>
<td>13619</td>
<td>6259</td>
<td>10713</td>
<td>—</td>
</tr>
<tr>
<td>10 kg meat per animal</td>
<td>114370</td>
<td>171990</td>
<td>151860</td>
<td>136190</td>
<td>62590</td>
<td>107130</td>
<td>—</td>
</tr>
<tr>
<td>Total Meat Supply kg.</td>
<td>1173490</td>
<td>1554200</td>
<td>2235180</td>
<td>1649230</td>
<td>2600670</td>
<td>1094760</td>
<td>10307530</td>
</tr>
</tbody>
</table>

* Sargent, op. cit., Table XXI. The offtake rates were estimated based on the AP/VDP Village profile. They are the rates given by villagers and are only indications of actual rates.
Figure 7

Density of Cattle

Density per Km²

- > 100
- 50 - 100
- < 50

- Boundary of census zone
- District boundaries
and about 700,000 liters of milk are produced daily (Table 17). This translates to 30 grams of meat per person per day and .75 liters of milk per person per day, an amount well above the World Health Organization's recommended minimum levels.[9]

Only a very crude estimate of the gross value of livestock production can be made. At an average price of Tsh 14/kg., red meat production can be valued at around Tsh 150 million. Milk production can be estimated at around Tsh 500 million annually, assuming that the milk produced gets into market channels. These estimates do not include production of poultry or eggs, swine, or the value of skins and hides, for there was not sufficient information to make even crude estimates.[10]

Industrial Development

Industrial development in Tanzania places priority on self-sufficiency in supplying basic producer goods such as steel, cement, and chemicals, and on providing consumer goods and services necessary for meeting basic needs of food, housing, transport, health, and education. In recent years, industrial development has emphasized large-scale, publicly owned enterprises to the neglect of district and village-based activities. However, there has been, and will continue to be, a role for private enterprises of all sizes, with the arrangements worked out on a case-by-case basis. The Arusha Region is interested in expanding private sector industrial production from small to large-scale, and is presently negotiating with a U.S. firm to develop a $330 million soda ash plant on Lake Natron to produce fertilizer, and with a private international corporation to build a $42 million phosphate operation on Lake Eyasi.

The Region is second only to Dar es Salaam in the level of industrial investment and production. There are 16 large-scale industries in the Region. (Table 18 lists the corporations and
Table 17: Arusha Region: Daily Milk Production*

<table>
<thead>
<tr>
<th>Ngorongoro</th>
<th>Mbulu</th>
<th>Hanang</th>
<th>Monduli</th>
<th>Kiteto</th>
<th>Arumeru</th>
<th>Region</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lactating Cows</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Indigenous</td>
<td>44885</td>
<td>69121</td>
<td>99410</td>
<td>76184</td>
<td>99276</td>
<td>49496</td>
</tr>
<tr>
<td>Exotic</td>
<td>49</td>
<td>375</td>
<td>13</td>
<td>2777</td>
<td>—</td>
<td>6238</td>
</tr>
<tr>
<td>Production**</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2 litres/day</td>
<td>89770</td>
<td>138242</td>
<td>198820</td>
<td>152368</td>
<td>198552</td>
<td>98992</td>
</tr>
<tr>
<td>5 litres/day</td>
<td>245</td>
<td>1875</td>
<td>65</td>
<td>13885</td>
<td>—</td>
<td>31190</td>
</tr>
<tr>
<td>Less 25%</td>
<td>67511</td>
<td>105088</td>
<td>149614</td>
<td>124690</td>
<td>148914</td>
<td>97637</td>
</tr>
</tbody>
</table>

* This table was derived from the 1978 Livestock Census and M. Jacob et al., "Assessment of the Arusha Livestock Situation and Recommendations for Use in the Arusha Region, 1980-85 Livestock Plan," April 1980.

** It is generally accepted that indigenous cattle produce 2 litres per day and about 25 percent of that would go to calves.
Table 18: Large-scale Industries Located in Arusha Region*

<table>
<thead>
<tr>
<th>Name of Industry</th>
<th>Products</th>
</tr>
</thead>
<tbody>
<tr>
<td>Emco Industries</td>
<td>Soaps, sweets</td>
</tr>
<tr>
<td>Tanzania Breweries</td>
<td>Beer</td>
</tr>
<tr>
<td>Tanzania Food Corporation</td>
<td>Biscuits, sweets</td>
</tr>
<tr>
<td>Alfi East Africa</td>
<td>Dental cream, toothbrushes</td>
</tr>
<tr>
<td>Tanganyika Meerschaum Corp.</td>
<td>Tobacco pipes</td>
</tr>
<tr>
<td>Tanzania Litho</td>
<td>Printers</td>
</tr>
<tr>
<td>Tanganyika Extract Co. Ltd.</td>
<td>Pyrethrum</td>
</tr>
<tr>
<td>General Tyre (E.A.) Ltd.</td>
<td>Tyres, tubes</td>
</tr>
<tr>
<td>Kilimanjaro Textiles Ltd.</td>
<td>Textiles</td>
</tr>
<tr>
<td>Fibreboard E.A. Ltd.</td>
<td>Timber products</td>
</tr>
<tr>
<td>Philips Electronic E.A. Ltd.</td>
<td>Radio, music systems</td>
</tr>
<tr>
<td>National Milling Corp. Ltd.</td>
<td>Flour milling</td>
</tr>
<tr>
<td>Kilimanjaro Garments Ltd.</td>
<td>Garments</td>
</tr>
<tr>
<td>Sunflag (T) Ltd.</td>
<td>Textiles</td>
</tr>
<tr>
<td>Kilima Bottlers Ltd.</td>
<td>Soft drinks</td>
</tr>
<tr>
<td>Northern Dairies Ltd.</td>
<td>Dairy</td>
</tr>
</tbody>
</table>

products.) Most of the 165 small-scale businesses are situated in Arusha town. These small industries employ about 1.9 percent of the regional population.[11]

Considerably more is known about the development of small-scale industries in Arusha Region than elsewhere in Tanzania as a result of recent surveys undertaken on formal and informal small-scale activities by the Arusha Planning and Village Development Project. Currently, there are five institutions assisting in the development of small industrial activities in the Region. Elimu is exclusively involved in training, and has 15 post-primary technical schools scattered throughout the Region. The schools have been operating since 1975 and have an enrollment today of 525 students. They are designed to train young people in skills needed in the village. The Small Industry Development Organization (SIDO) has also been operating in Arusha Region since 1975, and has provided capital assistance and other help to about 41 projects that employ about 150 people. The Arusha Planning and Village Development Project has been working on small industries since 1979 and has concentrated on village-level projects which add value to agricultural commodities (maize mills) or provide products to increase agricultural production (ox-carts). So far 14 projects have been assisted, employing 96 persons. This figure will increase to 130 by April 1981. The project also intends to sponsor feasibility studies to attract investments in large-scale industries.

Two other institutions indirectly help the development of small industries—the Arusha Appropriate Technology Project (AATP) and the Tanzania Agricultural Machinery Testing Unit (TAMTU). Both work in the identification, research, and development of technologies appropriate to the needs and circumstances of the Region and nation. There are no figures on the number of projects
they have assisted or persons employed. It is doubtful if all five institutions have reached more than 1,000 people in the Region.

In short, the development of small industries in Arusha Region is still in its infancy. Over the past five years about Tsh 25 million have been spent on small industries in Arusha town (the Arusha industrial estate) and less than Tsh 2 million have been spent in rural areas. There are three main reasons that small industries, especially rural small industries, have developed slowly. Firstly, there have been no financial institutions clearly mandated with the responsibility for small-scale industrial development; secondly, the Region and districts have not provided administrative support to the sector, leaving the development to SIDO; and finally, the Village Cooperative Act of 1975, which stipulated that the village was the sole legal cooperative unit in rural areas, discouraged private enterprise.[12]

Actions to eliminate some of the constraints to the development of this sector have recently been taken. President Nyerere called for continuing participation of private entrepreneurs in running retail shops that sell essential commodities in towns, and has urged people with excess assets to invest them in productive enterprises. And recently, the government has published two booklets which stress the desirability of private investments and provide detailed technical information on how to go about investing in the country.[13]

Wildlife and Tourism

Arusha Region has a great deal of land set aside to support a diverse and abundant wildlife population. This land includes three National Parks (Lake Manyara, Arusha, and Tarangire) which cover 2 percent of the Region and contain 1 percent of the wildlife; the Ngorongoro Conservation Area (NCA) which covers 8 percent of the Region and holds 76 percent of the wildlife; 11
Game Controlled Areas (GCA) which cover 46 percent of the Region and hold 28 percent of the wildlife and 1 small Game Reserve, Mount Meru. About 44 percent of the land containing 4 percent of the wildlife lies outside any kind of wildlife management area.

Only non-intensive pastoral grazing, tourism, forestry, and perhaps mining are compatible with wildlife conservation. Thus the way land is used greatly affects the wildlife habitat. In the National Parks and the Ngorongoro Conservation Area land use is controlled by the law. In the former only wildlife conservation and tourism are permitted. Multiple land use is, in theory, permitted in the Ngorongoro Conservation Area, though in practice it is restricted to forestry, wildlife conservation, tourism, and stock rearing (mainly pastoral). Settlement and agricultural development are discouraged. In the Game Controlled Areas land use is not controlled and multiple land use patterns can be observed. Hunting is controlled, however, by setting quotas and issuing permits. In short, although the wildlife is only totally secure in 10 percent of the land area, this protects about 68 percent of the wildlife population in the Region. A large proportion of the securely protected wildlife are wildebeest, zebra, and gazelle.[14]

There are almost no reliable data to permit accurate analysis of the costs and benefits to the Region of wildlife conservation. In economic terms, the costs include the expenses of maintaining the National Parks, the NCA Authority, and the various Game Controlled Areas. It is unlikely that these expenses are covered by user charges (entrance fees, hunting licenses, and permits) and maintenance is probably subsidized by the responsible national and regional organizations.

The main reasons that tourists come to Arusha Region are because the abundant and varied wildlife viewing is unspoiled and uncongested settings are offered by the game parks. Most of the tourists come from Europe, the U.S.A., and Japan.
Trends in tourism to Tanzania and Arusha Region have been, and will continue to be, affected by two factors over which the Region has little control: increases in oil prices and the status of the border with Kenya. For the critical years during the major oil price escalations, 1973, 1974, and 1975, the percentage increases in tourism to Tanzania were 22, 22, and 18, respectively. This suggests very little demand sensitivity to price. Unfortunately, longer-run conclusions are difficult to draw, because the border with Kenya was closed in 1976. The following year the number of visitors fell by 49 percent. Since then there has been a promising rebound, but the number of visitors is still way below the preborder closure figures. Still most tourism forecasters predict that tourism to Tanzania has potential for expansion, because historically it has been increasing at almost double the rate of most long distance tourist destinations, and it appears to be relatively price elastic. Arusha Region has a predominant position in the national tourism industry by virtue of the fame of the National Parks located in the Region and attracts a large percentage of the total number of visitors to the country.

The basic tourism infrastructure in the Region is adequate to handle substantial increases in the volume of tourists without major new investments. But it is not well-maintained or efficiently managed. Of the 21 tourist hotels and lodges located in the Region, five are owned and operated by the Tanzanian Tourist Corporation (TTC), a nationally managed parastatal; the rest are privately owned. Most require some maintenance and suffer from a lack of supplies; all are underutilized. The majority of all wildlife safaris in the Region are handled by State Travel Service, a subsidiary of TTC, although there are about 15 private tour operators in the Region. There are sufficient vehicles to handle increases in the number of tourists if they were all operating. Now less than 50 percent are operating.
Kilimanjaro International Airport is a well-developed, underutilized facility. It offers infrequent but dependable international air service and frequent domestic service. Roads throughout the Region are in poor repair making access to tourist attractions difficult. In summary, there is considerable room for expanding the tourism industry bringing benefits to the Region in increased employment and possible improvements in the infrastructure.[15]

One might ask if an expansion of tourism in the Region could cover the costs of maintaining wildlife over the long term. The answer is probably not. A breakout of tourism receipts would probably show that only a small percentage of total tourism receipts in the Region directly supports wildlife in the form of park fees, licenses, permits, and so forth. User fees could easily be doubled or tripled and not deter international tourists, but hunting fees and associated safari packages are already so high the market is limited. Moreover, hunting fees are sent to the national organizing parastatal. It is not clear what percentage of the fee the Region in which the activity takes place actually receives. If the volume of tourists were to increase substantially and user fees were doubled, it might be possible to cover the costs of wildlife maintenance. But tourism today is unpredictable and should not be counted on to cover the costs of conserving wildlife in the Region.

Other Economic Activities

Other economic activities in Arusha Region that merit particular notation are forestry, fisheries, and beekeeping. While much of the work associated with these sectors is supplemental to the main source of income, there are a small number of individuals who derive their entire income from these sectors, particularly from forestry. The following paragraphs briefly describe the current status of these three sectors.
Forestry

Forestry and the use of forest products are governed by national legislation. The national Forest Division supervises three areas of activities in Arusha Region: Forest Reserves, plantations, and nurseries. There are 24 Forest Reserves in the Region occupying 253,396 hectares or about 3 percent of the land area. Most fall under the jurisdiction of the Catchment Forests Project which has as its primary purpose the protection of the forest resources. Almost none of the land is currently used and cannot be used for productive purposes. This is because some of the area is bush land or grassland and other areas are protected as National Parks.

Plantations have been established by the Forest Division throughout the Region with two purposes in mind: soil conservation and provision of fuel and poles. These plantations are, in essence, nurseries established to provide for commercial firewood, charcoal, and building demands of the local population. Table 19 shows the number and location of these plantations and of village woodlots.

<table>
<thead>
<tr>
<th>District</th>
<th>Forest Division Plantations</th>
<th>Village Plantations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arumeru</td>
<td>10</td>
<td>Very Few</td>
</tr>
<tr>
<td>Hanang</td>
<td>95</td>
<td>Few</td>
</tr>
<tr>
<td>Kiteto</td>
<td>10</td>
<td>Nil</td>
</tr>
<tr>
<td>Mbulu</td>
<td>400</td>
<td>50</td>
</tr>
<tr>
<td>Monduli</td>
<td>45</td>
<td>41</td>
</tr>
<tr>
<td>Ngorongoro</td>
<td>263</td>
<td>Unknown</td>
</tr>
</tbody>
</table>

Most of these plantations and village woodlots are only a few years old and few have been successful, due to high rates of crop failure at the time of planting and losses by fire, grazing, and willful cutting after planting.

Nurseries have also been maintained by the Forest Division at all District Headquarters for use in small government plantations, for township planting, and for sale to institutions and members of the public. It is estimated that 1.5 million seedlings are produced annually for distribution or sale by these tree nurseries.

Tree planting by private farmers is widespread especially in Arumeru, Mbulu, and Hanang districts. Trees are planted for a variety of purposes, but primarily as shade trees for coffee plants and as windbreaks.

It should be stressed that wood is the fuel for about 90 percent of all energy consumed in Tanzania. Relative to other regions Arusha still has abundant wood resources. (Figure 8 illustrates the various timber activities in the Region.)

There is a general belief that the forest stock is being depleted, but there are no reliable aggregate figures for this. An attempt has been made below to piece together what partial information there is on this subject.

The Forest Division controls the wood sold under license in the Region. The largest producer of wood sold under license is the Meru Plantation, which produces the equivalent of 60,000 m³ annually. In addition, amounts of less than 5,000 m³ are also sold under license. Much larger quantities of wood are cut for local consumption without license. Unfortunately, no reliable data are available on this activity.
TIMBER ACTIVITIES

Figure 8

- logging
- bush clearing
- charcoal burning

Boundary of census zone
District boundaries

ARUSHA PLANNING AND VILLAGE DEVELOPMENT PROJECT
Livestock, Wildlife and Land Use Survey, February 1980
The single largest user of wood in the Region is Fibreboards Africa Ltd. (FAL), a subsidiary of TWICO, which consumes about 20,000 m³ annually and would double its consumption if it were to operate at full capacity. Most of its wood comes from the Meru Plantation. In addition to this wood use, it is estimated that fuelwood consumption in the Arusha Region is close to 2 m³ per person per year, or a total consumption of about 1.8 million m³ per year.[16]

Roughly, then, it can be estimated that total consumption in the Arusha Region is just under 2 million m³ annually. What are the implications of this annual consumption rate of forest stocks in the Region? Presently, the Region has 235,396 hectares in Forest Reserves. Assuming the off-take rate on the Meru plantations is sustainable at 10 m³/ha./yr., and applying that to existing Forest Reserves in the Region yields a potential annual production of 2.4 million m³. It is unrealistically optimistic to assume that the non-plantation parts of the Forest Reserves could produce at the same rates as the plantations, but just how much less productive they might be is unknown. It is also unknown how much wood production is sustainable in lands not in the Forest Reserves. Without further information on these matters, it is impossible to make accurate estimates of whether forests are actually being depleted, to say nothing of the rate of depletion.

**Fisheries**

Fishing is a relatively new activity in Arusha Region and many fishermen appear to be migrants from other areas where fishing was traditionally practiced. Today small-scale fishing activities occur in most major rivers and lakes. The two main species caught are Tilapia and catfish. Table 20 provides what limited information is available on fish production in the Region.
<table>
<thead>
<tr>
<th></th>
<th>Nyumba ya Mungu (Kiteto)</th>
<th>Lake Babati (Hanang)</th>
<th>Lake Manyara</th>
<th>Lake Basotu (Hanang)</th>
<th>Lake Tlawi (Mbulu)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fishermen</td>
<td>210</td>
<td>264</td>
<td>Unknown</td>
<td>21</td>
<td>4</td>
</tr>
<tr>
<td>Fish (tons)</td>
<td>348.7</td>
<td>16.5</td>
<td>--</td>
<td>16.3</td>
<td>1.4</td>
</tr>
<tr>
<td>Value (Tsh 000)</td>
<td>489.5</td>
<td>--</td>
<td>--</td>
<td>26.8</td>
<td>7.9</td>
</tr>
</tbody>
</table>


With few exceptions fish culture in the Region has been a failure. There are no successful functioning fish ponds in the entire country and, consequently, there is no example to follow.

Experts agree that there is a potential for developing fisheries activities in the Region. Although historically funds allocated by the Regional budget for this sector have been scarce (no development funds have been allocated since 1974/75), natural resources officials and district planners have recommended that fresh water fishing in the Region's numerous lakes and streams be promoted and that villages be assisted in establishing a fishing industry. Sufficient bodies of water and technical knowledge are available. More important, the development of fishing and fish culture would not compete with traditional agricultural and livestock management practices. If consumer resistance to fish (especially in the Maasai districts) could be overcome, it would offer a nutritious supplement to the diet and a more effective and efficient use of the natural resources."17]
Beekeeping

Bee products (honey and beeswax) are dependent on flowering plants and, therefore, are seasonally produced. The normal honey collecting season in Arusha Region is June and July with a secondary season in December.

Both traditional and commercial harvesting is practiced in the Region. Traditional harvesting of wild bee honey in the cavities of trees and in man-made log hives is widespread, but most common in the highlands of Hanang and Mbulu districts. All of the hive contents are used by local people: the structure for torches and glue, the honey for food, medicine, and brewing honey beer (the largest use by far), the pollen and brood as food, and the bees for pollinating crops.

The Beekeeping Division of Arusha Region and several villages practice commercial production. It is in the initial stage of development and has had little success and poor financing. Commercial bee products for export are limited to honey and beeswax. The 1980 official price for honey was Tsh 10/kg., for beeswax it was Tsh 26/kg.

Precise statistics on the production of honey and beeswax are unavailable, but it is known that production from traditional hives far exceeds that from modern hives. Most beekeeping products are consumed locally, and there are only tenuous production links with the national and international economy. In short, the potential of bee products is extremely under-exploited.[18]
ECONOMIC AND SOCIAL INFRASTRUCTURE

Roads

Economic development in Arusha Region is dependent on a well-designed and maintained network of roads. At this stage of development there is no effective alternative to road transport. Both air and rail transport comprise a small part of the total internal and interregional communication system and are used primarily to supplement road transport.[19]

In constant shillings, expenditures on roads have declined to approximately 35 percent of the 1970 level, and the results are plain: widespread deterioration of the majority of all main trunk, feeder, and district routes in the Region. Resources have been steered to other sectors of the development budget and little attention has been given to ensuring that there is a sound transportation infrastructure, even at increased relative expense. Without one, the whole rural economy is vulnerable, and the ability of government to deliver vital services is adversely affected.

Because of the poor quality of the roads, there are frequent disruptions in intra-regional trade and public transportation systems. During the rainy season many roads become impassable, and the villages along them are completely isolated. Regardless of the time of year, vehicles experience frequent breakdowns and delays and rapid depreciation.

The maintenance, rehabilitation, and construction of regional roads is the responsibility of regional Comworks with District Comworks assisting in this process. Trunk roads are maintained by national programs; feeder roads by villages. Responsibilities and resources (i.e., equipment and manpower) are scattered, roles are
not clearly defined, and planning is done on an ad-hoc basis. The situation is even more critical than might appear for there is a lack of senior Comworks personnel to help solve these problems.

In addition to organizational and staffing problems, there is no accurate inventory of roads in the Region. Further, until recently the criteria for decisionmaking on road priorities had not been clear. Without an inventory of roads and criteria for decisionmaking, there have been severe discrepancies in district and regional planning. For example, the Region estimates there are 970 km. of district roads whereas the districts estimate there are 3,200 km. Such problems have impeded the development of a practical and feasible plan for road investments (though this deficiency is now being solved by the Region).

Whatever the actual mileage of roads, the Region at this time has financial resources, equipment, and trained staff to effectively maintain only 1,000 km. This is based on a recent calculation that estimated the average maintenance cost per km/year at about Tsh 7,000.[20] It does not include full overhead charges which drive the price up to about Tsh 9,735. Thus to maintain 1,600 km. costs about/Tsh 15 million. For FY 1980/81 works received only Tsh 6 million for road maintenance. Clearly, it is in no position to do much more than preside over the steady decline of the road network. It is simply a matter of time before many routes will deteriorate below a condition in which they can be maintained.

Other Transportation and Communication Systems

Arusha Region is most easily accessible by air and can be reached by flying to Kilimanjaro International Airport which is located half way between the towns of Arusha and Moshi. Only three international carriers—Ethiopian Airlines, British Airways, and KLM—fly into the airport. Their schedule is limited to
weekend flights and one mid-week flight. However, there are daily connections to Dar es Salaam on Air Tanzania where many other international airlines stop.

Arusha town, most of the Game Parks, and some of the larger regional towns have small airstrips. While there is no intra-regional commercial air service, one charter airline company located in Arusha town has small aircraft for hire.

Other communication services in the Region are limited. The telephone service works well locally, but long distance connections are not always clear or easily obtained. The mail service, both national and international, is slow. There is no television on mainland Tanzania, but a government-owned radio company, Radio Tanzania, broadcasts daily in English and Kiswahili. One English language newspaper is published daily and current editions of several international newspapers and magazines such as "Time" and "The Economist" are sometimes available.

Water

Access to clean water is critical not only for economic development, but in order to improve the well-being of the citizens. Government has set a goal of providing everyone with a safe and adequate water supply by 1991. Table 21 shows the current availability of water to the people of the Region.

The table indicates that over 116,000 people or almost 14 percent of the population have substantial difficulties getting enough water. An additional 294,440 people only have access to water from traditional sources such as rivers, spring water, canals, dams, and shallow wells. Therefore, only about 48 percent of the population are provided with safe water. A recent survey conducted by the Region has shown that even the percentage of population provided with safe water is probably an over-
Table 21: Water Sources Serving Arusha Region*

<table>
<thead>
<tr>
<th>District</th>
<th>Water Pipes</th>
<th>Deep Wells</th>
<th>Shallow Wells</th>
<th>Dams</th>
<th>Traditional Sources*</th>
<th>No Source Within 5 Km.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(number of people served by)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Arusha</td>
<td>10,585</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>26,594</td>
<td>--</td>
</tr>
<tr>
<td>Arumeru</td>
<td>151,141</td>
<td>2,585</td>
<td>2,109</td>
<td>--</td>
<td>67,484</td>
<td>12,404</td>
</tr>
<tr>
<td>Hangang</td>
<td>68,347</td>
<td>6,348</td>
<td>7,291</td>
<td>--</td>
<td>92,399</td>
<td>44,148</td>
</tr>
<tr>
<td>Kiteto</td>
<td>10,486</td>
<td>15,006</td>
<td>4,381</td>
<td>8,031</td>
<td>11,136</td>
<td>8,129</td>
</tr>
<tr>
<td>Mbulu</td>
<td>61,826</td>
<td>9,368</td>
<td>13,087</td>
<td>--</td>
<td>78,140</td>
<td>27,570</td>
</tr>
<tr>
<td>Monduli</td>
<td>35,772</td>
<td>5,805</td>
<td>--</td>
<td>8,477</td>
<td>--</td>
<td>16,604</td>
</tr>
<tr>
<td>Ngorongoro</td>
<td>17,742</td>
<td>1,493</td>
<td>--</td>
<td>1,608</td>
<td>18,694</td>
<td>7,494</td>
</tr>
<tr>
<td>TOTAL</td>
<td>355,899</td>
<td>43,605</td>
<td>26,868</td>
<td>18,116</td>
<td>294,447</td>
<td>116,349</td>
</tr>
</tbody>
</table>

* Public Expenditure Estimates for the year 1980/81 Vote 70: Arusha Region, Table A, p. 122.
estimation. Of a sample of 50 percent of the regional water systems, between 30 and 40 percent have significant maintenance problems which cause regular disruption in services and pollution.

The regional Maji staff (regional branch of the national water ministry) have the responsibility for undertaking any new water supply projects proposed by the Region or Ministry. The priority at this time is to reach the national goal, "Water for All" by 1991. To meet this goal they need to provide 246 villages or 53 percent of the 463 villages in the Region with water systems over the next 10 years. This is over 20 villages per year. The present rate of constructing water systems is about five new villages annually.

This emphasis on providing new water systems has created problems in maintaining existing water sources. On a national scale the rate of breakdown of existing systems is higher than the rate of construction of new sources resulting in fewer people actually being supplied with safe water each year. The principal reasons these systems have been breaking down are:

- Lack of qualified supervisory and technical staff in Maji;
- Poor maintenance of vehicles;
- Lack of self-help and village commitment to maintaining systems; and
- Lack of spare parts and fuel.[21]

Recent district development strategy papers have recommended that water needs be viewed in a larger context than just as a social service to be provided to the population. It should also be seen as a vital element in order for economic development to occur. Since all the districts recommend greater emphasis on directly productive activities, the development of necessary water
resources, such as irrigation schemes for agricultural projects or water holes for livestock development, should be more thoroughly integrated into the planning and development of these sectors.[22]

Health

In addition to providing access to clean water supplies for improved health and well-being, the Government has emphasized health care and disease control to assist people to realize their productive and social potential. Recent national and regional priority has been placed on preventive health care (instead of curative) and on the development of rural health centers.

While Arusha Region is one of the healthiest in the country as measured by several indicators (its infant mortality rate is 130 deaths/1000 births compared to the national average of 152, and life expectancy is 51 years against the national average of 47 years), the health status of the people is poor. The major health problems are the same as those that plague the nation and, for that matter, much of Africa: malnutrition, infectious disease, and poor hygienic practices. The Region has a particularly high incidence of eye diseases, dysentery, diarrhea, venereal disease, helminthiasis (worms), and cholera. Among children in the Region, measles, malaria, and malnutrition are constant threats to life.

Surveys of health facilities indicate that health care is geared towards curative services, and that these facilities and personnel are concentrated in urban or semi-urban areas. Table 22 provides a breakdown of the various types of health services available by district.
Table 22: Health Services in Arusha Region, 1980

<table>
<thead>
<tr>
<th>District</th>
<th>Hospital</th>
<th>Rural Health Centers</th>
<th>Dispensary</th>
<th>Village Health Post</th>
<th>Mobile Units</th>
<th>M.C.H.* Clinics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arumeru</td>
<td>2</td>
<td>2</td>
<td>27</td>
<td>--</td>
<td>--</td>
<td>16</td>
</tr>
<tr>
<td>Hanang</td>
<td>1</td>
<td>3</td>
<td>28</td>
<td>--</td>
<td>--</td>
<td>18</td>
</tr>
<tr>
<td>Kiteto</td>
<td>--</td>
<td>1</td>
<td>15</td>
<td>--</td>
<td>--</td>
<td>9</td>
</tr>
<tr>
<td>Mbulu</td>
<td>4</td>
<td>2</td>
<td>26</td>
<td>--</td>
<td>1</td>
<td>22</td>
</tr>
<tr>
<td>Monduli</td>
<td>1</td>
<td>2</td>
<td>15</td>
<td>--</td>
<td>1</td>
<td>14</td>
</tr>
<tr>
<td>Ngorongoro</td>
<td>1</td>
<td>--</td>
<td>11</td>
<td>--</td>
<td>1</td>
<td>--</td>
</tr>
<tr>
<td>TOTAL</td>
<td>9</td>
<td>10</td>
<td>122</td>
<td>60</td>
<td>3</td>
<td>83</td>
</tr>
</tbody>
</table>

*Maternal and Child Health Clinics

The population served by each type of health facility is shown in Table 23. It clearly illustrates the urban, curative focus.

Table 23: Population Served by Health Services, 1978

<table>
<thead>
<tr>
<th>District</th>
<th>Population per hospital bed</th>
<th>Population per health center</th>
<th>Population per dispensary</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arusha Urban Area</td>
<td>370</td>
<td>86,845</td>
<td>3,102</td>
</tr>
<tr>
<td>Arumeru</td>
<td>2,975</td>
<td>119,010</td>
<td>8,501</td>
</tr>
<tr>
<td>Hanang</td>
<td>1,836</td>
<td>77,097</td>
<td>8,260</td>
</tr>
<tr>
<td>Kiteto</td>
<td>--</td>
<td>59,790</td>
<td>3,737</td>
</tr>
<tr>
<td>Mbulu</td>
<td>474</td>
<td>96,888</td>
<td>8,074</td>
</tr>
<tr>
<td>Monduli/Ngorongoro</td>
<td>990</td>
<td>59,378</td>
<td>6,598</td>
</tr>
</tbody>
</table>
The health sector employs 15 percent of the regional manpower and is the second largest employer after education. It is augmented by 40 expatriates including 23 doctors. Urban centers and curative health services (hospitals) receive staffing priority, so while hospital and health centers are fairly well-staffed, rural dispensaries often fail to meet minimum government targets.

Table 24 points out that health care in the Region has not yet met the national commitment to focus on rural areas and preventative health measures. The population is still unaware that the major health problems of the Region are the result of nutrition and sanitation practices and exposure to infectious diseases, and the medical personnel have found it difficult to make the transition to rural, preventative health care in light of their training and experience and the existing hospital-based system.[23]

Table 24: Medical Staff in Arusha Region

<table>
<thead>
<tr>
<th>District</th>
<th>Hospital</th>
<th>Health Centers</th>
<th>Dispensaries</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arusha Urban Area</td>
<td>349</td>
<td>60</td>
<td>418</td>
<td>827</td>
</tr>
<tr>
<td>Arumeru</td>
<td>46</td>
<td>75</td>
<td>124</td>
<td>245</td>
</tr>
<tr>
<td>Hanang</td>
<td>108</td>
<td>143</td>
<td>123</td>
<td>374</td>
</tr>
<tr>
<td>Kiteto</td>
<td>--</td>
<td>55</td>
<td>42</td>
<td>97</td>
</tr>
<tr>
<td>Mbulu</td>
<td>334</td>
<td>46</td>
<td>104</td>
<td>484</td>
</tr>
<tr>
<td>Monduli</td>
<td>40</td>
<td>23</td>
<td>37</td>
<td>100</td>
</tr>
<tr>
<td>Ngorongoro</td>
<td>18</td>
<td>--</td>
<td>61</td>
<td>79</td>
</tr>
<tr>
<td>TOTAL</td>
<td>895</td>
<td>402</td>
<td>909</td>
<td>2,206</td>
</tr>
</tbody>
</table>
The main national and regional education objective is to provide free primary education for every child. Table 25 shows the number of children registered in each grade by district. The total represents about 91 percent of the school-age children in the Region.

The Region has 2,643 certified primary teachers and 1,432 student teachers, giving an average class load of 39 students. But it has been unable to provide universal primary education to date because of shortages of teachers, pupil absenteeism, inadequate funding for classroom construction, shortages of building materials, and lack of interest among some of the pastoral peoples.

Of the ten secondary schools in the Region, three are government schools. At the present time, just over 3,000 students are enrolled in these schools. There are only two colleges (these are vocational training institutions) with a combined enrollment of 485 students, and three boys' boarding schools that provide technical training. In addition, 15 of the primary schools have technical centers that provide training in masonry and carpentry, but they are poorly attended.

Arusha Region has made tremendous progress in the goal of universal literacy, but obstacles remain formidable. In 1980, there was a shortage of 1,400 teachers, in addition to expected shortages of school materials and equipment, shortages of classrooms or materials or funds to build them, and not enough housing for teachers. While most of these problems are attributed to inadequate funds, another serious problem concerns the attitude
### Table 25: Primary Enrollment in Arusha Region,* 1979

<table>
<thead>
<tr>
<th>District</th>
<th>I</th>
<th>II</th>
<th>III</th>
<th>IV</th>
<th>V</th>
<th>VI</th>
<th>VII</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arumeru</td>
<td>6,975</td>
<td>8,304</td>
<td>13,368</td>
<td>6,950</td>
<td>5,492</td>
<td>3,085</td>
<td>2,757</td>
<td>46,931</td>
</tr>
<tr>
<td>Hangang</td>
<td>8,865</td>
<td>8,530</td>
<td>10,071</td>
<td>5,142</td>
<td>4,372</td>
<td>3,372</td>
<td>2,055</td>
<td>42,434</td>
</tr>
<tr>
<td>Kiteto</td>
<td>1,222</td>
<td>1,894</td>
<td>2,272</td>
<td>1,546</td>
<td>1,488</td>
<td>845</td>
<td>548</td>
<td>9,815</td>
</tr>
<tr>
<td>Mbulu</td>
<td>5,952</td>
<td>6,235</td>
<td>13,231</td>
<td>5,641</td>
<td>4,454</td>
<td>3,611</td>
<td>2,000</td>
<td>41,175</td>
</tr>
<tr>
<td>Monduli</td>
<td>1,422</td>
<td>2,500</td>
<td>2,993</td>
<td>1,323</td>
<td>850</td>
<td>660</td>
<td>531</td>
<td>10,379</td>
</tr>
<tr>
<td>Ngorongoro</td>
<td>1,900</td>
<td>1,731</td>
<td>1,560</td>
<td>532</td>
<td>428</td>
<td>317</td>
<td>276</td>
<td>6,744</td>
</tr>
<tr>
<td>TOTAL</td>
<td>26,336</td>
<td>29,194</td>
<td>43,495</td>
<td>21,134</td>
<td>17,207</td>
<td>11,890</td>
<td>8,218</td>
<td>57,478</td>
</tr>
</tbody>
</table>

* This table excludes Arusha town.
of the public toward education. In many places school attendance is poor and erratic because parents, unaware of the importance of education, do not insist that their children attend school regularly.[24]
CHAPTER FIVE
RESOURCES FOR DEVELOPMENT

Tanzania has reached a critical point in its development path, resulting from an increasing deficit and a decline in foreign exchange earnings from earlier years. This national picture shows that Arusha Region cannot expect major increases in funds from the central government.

Within the national and regional planning structures and processes, a major emphasis in Arusha Region is how to better utilize existing resources while seeking new development resources. Although the government has decentralized, less than 10 percent of the government's resources are controlled by the Region; 90 percent come through the parastatals and line ministries. This calls for greater coordination so that these resources are channeled in support of regional development goals. In addition to better planning and use of financial resources, the Region has found significant potential for the better utilization of its manpower resources. The regional planning exercise is generating strategies and priorities for accomplishing the above and for tapping new sources of funds.

NATIONAL ECONOMIC STRUCTURE

For the first years after Independence, economic policy in Tanzania was much the same as in many other newly independent developing countries. It relied largely on market forces and stressed the dual objectives of growth in per capita income and national self-sufficiency in trained manpower. But as a result of a number of unfavorable developments, especially high investment costs in the agricultural sector and widening income differentials, the objectives and strategies were reassessed in 1967. New priorities were enunciated in the Arusha Declaration to create a
socialist society that emphasized rural development, self-reliance in development efforts, and the establishment of an educational system to meet the needs of the people. To accomplish these goals it was declared that the State, with guidance from the Party,[25] should play the leading role in the reform and creation of appropriate institutions. This led to the nationalization of large-scale industry, commerce and finance, the creation of numerous parastatal institutions, and the formation of ujamaa villages. Public sector ownership of production was stressed, and government control over domestic pricing and foreign exchange transactions were instituted.

Despite numerous institutional changes over the years, the structure of the national economy has remained centralized. There is a national planning system based on three planning time horizons: long-term perspectives, medium-term plans, and annual plans. The long-term plans are designed to guarantee a stable, continuous development of the economy. The first such plan covered the years 1964-1980. The second began in 1975 and will run through 1995. The medium-term plans cover five-year periods and are more precise in their objectives. It is believed that the long-term plans can only be reached in stages; the medium-term plans represent these various stages. The planning cycle that takes into consideration the current economic conditions is the annual plan.

Guidelines are issued by the government for preparing the five-year plans. These guidelines include:

- National targets to be achieved in each sector;
- National policy on various issues such as self-sufficiency in food;
- Specific instructions for each sector; and
- Tentative projections of total resources for the planning period.
REGIONAL DECISIONMAKING STRUCTURE

Within the decision parameters and processes established by the central government, regional decisionmaking begins with a dialogue between government and party officials and rural villages. Ideas are generated, reviewed, and approved moving from the village to the district and regional levels. The districts combine the approved projects into district plans which are synthesized and refined at the regional level for approval by the Regional Development Committee for submission to the Prime Minister's Office. This yearly process allows for village initiatives to be incorporated into the regional and national plans.

For longer-term planning and development the Regional and District Management Teams and Regional and District Development Committees, consisting of government, party and parastatal representatives as well as the appropriate Members of Parliament, form the statutory regional and district decisionmaking bodies. These committees review critical development issues, formulate policy decisions, and monitor and evaluate program and project ideas in support of these policies. Within these bodies, sector and issue-specific subcommittees are formed for developing activities in support of the longer-term regional and district strategies and priorities.

CURRENT ECONOMIC STATUS

During the 1970s, Tanzania's real gross domestic product (GDP) increased annually at 5 percent, which compares favorably with other low-income developing countries. While aggregate output rates were relatively good, population growth also increased. This has meant there has been a decline in growth of per capita output from 3.2 percent in the 1960s to 1.9 percent in the 1970s. Moreover, growth in the productive sectors of the
The economy was slow, and the rate of return on new investments was poor. Agriculture, the most important sector, grew by only 2.3 percent per year between 1966-1973, and exports declined to a level where in 1981 they will be only half as great as in the 1970-73 period.

In general, the pattern of growth through the 1970s has been one of recurring crises and recovery. Some of these crises have been caused by exogenous factors (severe drought in 1973, higher oil prices in 1974, the collapse of the East African Community in 1977, the war with Uganda in 1978-79, and another poor agricultural season in 1980). Each crisis was met with measures to expand production, restrict demand, and mobilize foreign resources. At the same time, there was little restraint on the growth of the public sector or increase in public recurrent expenditures, and the efforts to generate more revenue could not keep up with the increases in the recurrent and development budgets. Accordingly, the overall deficit rose from Tsh 600 million in 1972/73 to Tsh 1.1 billion in 1973/74 and Tsh 2.4 billion in each of the next two years. Public accounts deteriorated even further after the war with Uganda. An economic memorandum issued in April 1980 by the Government estimated the recurrent budgetary costs of the war at $300 million for FY 1978/79 alone. The inability of the economy to absorb such costs was aggravated by adverse international prices for Tanzania's main exports.

In response to this crisis, Tanzania recently concluded a standby arrangement with the International Monetary Fund (IMF) for the period up to July 1982. The basic objectives of the program were: to establish a sound basis for a balanced growth of domestic production especially by reversing the decline of exports; to curb external payments deficit and liquidate import payment arrears; and to reduce excess liquidity in the economy and ease pressure on prices. The agreement provided Tanzania with $235 million for the 15-month period, and the program was based on the assumption that there would be a sharp decline in imports and
other expenditures associated with the Uganda war and that substantial balance of payments support would be provided from sources other than the IMF. For the calendar year 1981, about $140 million is expected in balance of payments support to be derived in part from a World Bank structural adjustment loan. This is in addition to the normal flow of development assistance planned at about $200 million in grants and a similar amount in medium- and long-term loans.[26]

UTILIZATION OF EXISTING RESOURCES

Development in Arusha Region is constrained by available resources—land, manpower, capital stock—and how they are used. The question of land has been discussed elsewhere. Regarding the application of existing resources, several points should be made concerning resource utilization, resource allocation, development coordination, and the development and use of manpower.

As indicated above, central, regional, district, and village-level governments and parastatals are involved in development activities in the Region. A critical question is whether these organizations are deploying their limited resources in the most effective manner. According to the findings of numerous sector specific studies and manpower and financial analyses commissioned on Arusha Region in 1980:

There is probably greater development potential to be gained from making more effective and efficient use of resources already present in the Region than can be expected from the purchase and application of the limited additional resources that can be afforded.

The allocation of existing financial resources has also impeded development. A larger percent of the regional budget is allocated to development expenditures than to operation and maintenance costs. As a result, health facilities are constructed, and there are no funds for staff salaries or supplies; land rovers
are purchased and spare parts and fuel are in short supply; and, new water systems are built while existing systems deteriorate and become unusable. Table 26 shows the percent of recurrent expenditures in relation to total government expenditures. Normally recurrent expenditures are used to finance most operating and maintenance costs and, as can be seen, they have been falling and will probably continue to do so as a result of the economic crisis facing the nation. It is clear that whatever level of financial resources are available to the Region in the next several years development will occur faster if the share of the budget allocated to operation and maintenance expenditures is increased.[27]

Table 26: Trend in Recurrent Government Expenditures*

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Recurrent</td>
<td></td>
<td>80</td>
<td>80</td>
<td>80</td>
<td>75</td>
</tr>
<tr>
<td>Expenditures</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>as a Percent</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>of Total</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Expenditures</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Regional</td>
<td>61</td>
<td>66</td>
<td>54</td>
<td>54</td>
<td>53</td>
</tr>
<tr>
<td>Budget</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Total</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Government</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Budget</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* Elliott R. Morss, "Financial Resources Available for the Development of Arusha Region".

The last point to be made regarding a more effective utilization of existing financial resources is that there is no planning coordination between the central government, the Region, and the parastatals. The Region often does not have advanced information on investment plans or development projects funded by the central government or parastatals. Conversely, the central government is
not always aware what the critical development initiatives proposed by the Region really are. Increased communication among these parties concerning future development goals and strategies is essential if optimum use is to be made of the limited development resources.[28]

Government manpower is another primary resource for planning and implementing development initiatives. The regional manpower pool currently consists of about 10,000 individuals which are assigned by sector as outlined in Table 27.

Table 27: Government Manpower by Sector, Arusha Region*

<table>
<thead>
<tr>
<th>Sector</th>
<th>Total Number Staff</th>
<th>Total Number As % of All Staff</th>
</tr>
</thead>
<tbody>
<tr>
<td>Education</td>
<td>4451</td>
<td>48.0</td>
</tr>
<tr>
<td>Administration</td>
<td>1330</td>
<td>14.4</td>
</tr>
<tr>
<td>Health</td>
<td>1316</td>
<td>14.2</td>
</tr>
<tr>
<td>Works</td>
<td>538</td>
<td>5.8</td>
</tr>
<tr>
<td>Livestock</td>
<td>463</td>
<td>5.0</td>
</tr>
<tr>
<td>Water</td>
<td>446</td>
<td>4.8</td>
</tr>
<tr>
<td>Natural Resources</td>
<td>320</td>
<td>3.5</td>
</tr>
<tr>
<td>Agriculture</td>
<td>124</td>
<td>1.3</td>
</tr>
<tr>
<td>Lands</td>
<td>102</td>
<td>1.1</td>
</tr>
<tr>
<td>Ujamaa &amp; Ushirika</td>
<td>91</td>
<td>1.0</td>
</tr>
<tr>
<td>Culture</td>
<td>66</td>
<td>0.7</td>
</tr>
<tr>
<td>Trade</td>
<td>21</td>
<td>0.2</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>9268</strong></td>
<td><strong>100</strong></td>
</tr>
</tbody>
</table>

As seen in Table 28, the manpower of the Region is concentrated at the regional and district levels. This imbalance between headquarters and field staff has a negative effect on development since the best-trained staff are assigned to headquarters.

Table 29 shows the distribution of manpower by activity in the Region. With the exception of administration, the division of staff reflects the general pattern of the nation. Clearly, the emphasis is on social services where about 74 percent of the staff are assigned. The major productive sectors—agriculture, livestock, and natural resources—only have 10 percent of the staff complement which seriously constrains the planning and development of these activities.

Table 28: Distribution of Manpower by Level in Arusha Region*

(Excluding primary school teachers)

<table>
<thead>
<tr>
<th></th>
<th>Total Number of Staff</th>
<th>Total Number as % of all Staff</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regional</td>
<td>1649</td>
<td>33.0</td>
</tr>
<tr>
<td>District HQ</td>
<td>1386</td>
<td>28.0</td>
</tr>
<tr>
<td>Divisional</td>
<td>522</td>
<td>11.0</td>
</tr>
<tr>
<td>Ward</td>
<td>820</td>
<td>17.0</td>
</tr>
<tr>
<td>Village</td>
<td>546</td>
<td>11.0</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>4923</strong></td>
<td><strong>100%</strong></td>
</tr>
</tbody>
</table>

Table 29: Distribution of Manpower by Activity in Arusha Region*

<table>
<thead>
<tr>
<th>Services</th>
<th>% Production</th>
<th>% Development</th>
<th>% Administration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Health</td>
<td>14.2</td>
<td></td>
<td>5.0 Ujamaa 1.0</td>
</tr>
<tr>
<td>Education</td>
<td>48.8 Agric.</td>
<td>1.3 Culture</td>
<td>0.7 Administration 13.1</td>
</tr>
<tr>
<td>Works</td>
<td>5.8 Nat. Res.</td>
<td>3.5 Village Managers</td>
<td>1.3</td>
</tr>
<tr>
<td>Water</td>
<td>4.8 Trade</td>
<td>0.2</td>
<td></td>
</tr>
<tr>
<td>Lands</td>
<td>1.1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>TOTAL</td>
<td>73.9%</td>
<td>10%</td>
<td>3% 13.1%</td>
</tr>
</tbody>
</table>


Although about 23 percent of the posts are unfilled, it is unlikely that the Region will receive a larger manpower complement. However, much can be accomplished through better management, administration, deployment, and training of existing personnel.

AVAILABILITY OF ADDITIONAL RESOURCES

Before discussing the potential for mobilizing additional resources in the Region, it is useful to review recent financial trends. Regional development is funded by the central government, parastatals, regional government, and private investments. There are no data on the magnitude of each of these sources in Arusha Region, but national data provided in the Third Five-Year Development Plan indicate that 60 percent of public development expenditures are made by parastatals, 30 percent by central government ministries, and 10 percent by regional governments.
Ministries and parastatals account for 70 percent of public recurrent outlays and regional governments spend 30 percent. Private investment does not appear to be significant.

According to the public expenditure accounts for FY 1980/81, the proposed budget for Arusha Region came to a total of Tsh 52.9 million of which Tsh 21.8 million were in local currency and Tsh 31,140,300 were in foreign currencies. Almost 60 percent of the Region's development budget is provided by foreign assistance; the three main donors are the U.S., Sweden, and the ILO.[29]

Table 30 provides data on per capita development expenditures for all regions for the Third Five-Year Development Plan. It includes all public sources—central government, parastatals, and regional governments. Table 31 provides per capita income figures for each region. These tables show that per capita development expenditures in Arusha Region have dropped significantly. They also show that Arusha has dropped in per capita income growth so that it is ranked next to the last among all regions in the country. In other words, income is growing relatively slowly, yet development expenditures are being cut back.[30]

**FUTURE RESOURCES**

The Region has several options for mobilizing additional financial resources for development aside from those provided by the central government. They are: parastatals, revenue from regional- and lower-level government, borrowing, private investment, and foreign assistance.

While it is clear parastatals make an important contribution to the financial resources of the Region, there is no information on the magnitude or allocation of parastatal funds. To give some indication of how serious this lack of information is to sound
Table 30: Per Capita Development Expenditures According To Third Five-Year Development Plan (including Regions, Ministry, and Parastatals Budgets)*

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Arusha</td>
<td>507</td>
<td>4</td>
<td>521</td>
<td>8</td>
</tr>
<tr>
<td>Coast &amp; DAR</td>
<td>1893</td>
<td>1</td>
<td>2706</td>
<td>1</td>
</tr>
<tr>
<td>Dodoma</td>
<td>83</td>
<td>14</td>
<td>938</td>
<td>5</td>
</tr>
<tr>
<td>Iringa</td>
<td>384</td>
<td>6</td>
<td>983</td>
<td>4</td>
</tr>
<tr>
<td>Kigoma</td>
<td>156</td>
<td>10</td>
<td>452</td>
<td>10</td>
</tr>
<tr>
<td>Kilimanjaro</td>
<td>385</td>
<td>5</td>
<td>254</td>
<td>17</td>
</tr>
<tr>
<td>Lindi</td>
<td>54</td>
<td>17</td>
<td>455</td>
<td>9</td>
</tr>
<tr>
<td>Mara</td>
<td>125</td>
<td>12</td>
<td>404</td>
<td>12</td>
</tr>
<tr>
<td>Mbeya</td>
<td>509</td>
<td>3</td>
<td>1076</td>
<td>3</td>
</tr>
<tr>
<td>Morogoro</td>
<td>1507</td>
<td>2</td>
<td>2028</td>
<td>2</td>
</tr>
<tr>
<td>Mtwara</td>
<td>124</td>
<td>13</td>
<td>348</td>
<td>13</td>
</tr>
<tr>
<td>Mwanza</td>
<td>127</td>
<td>11</td>
<td>286</td>
<td>16</td>
</tr>
<tr>
<td>Rukwa</td>
<td>-</td>
<td>-</td>
<td>320</td>
<td>14</td>
</tr>
<tr>
<td>Ruvuma</td>
<td>79</td>
<td>15</td>
<td>287</td>
<td>15</td>
</tr>
<tr>
<td>Shinyanga</td>
<td>66</td>
<td>16</td>
<td>189</td>
<td>19</td>
</tr>
<tr>
<td>Singida</td>
<td>49</td>
<td>18</td>
<td>231</td>
<td>18</td>
</tr>
<tr>
<td>Tabora</td>
<td>168</td>
<td>9</td>
<td>408</td>
<td>11</td>
</tr>
<tr>
<td>Tanga</td>
<td>255</td>
<td>7</td>
<td>806</td>
<td>6</td>
</tr>
<tr>
<td>West Lake</td>
<td>182</td>
<td>8</td>
<td>632</td>
<td>7</td>
</tr>
</tbody>
</table>

* Third Five-Year Development Plan, Vol. I, Table 66, p. 126; Vol. II. Table V-1, p. 16.
Table 31: Per Capita Incomes and Rank on Per Capita Development Expenditure, by Region*

<table>
<thead>
<tr>
<th>Region</th>
<th>Per Capita Gross Domestic Product at Factor Cost</th>
<th>Rank On per Capita Development Expenditure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arusha</td>
<td>454 (5) 1132 (8) 150 (17)</td>
<td>4 8</td>
</tr>
<tr>
<td>Coast</td>
<td>226 (15) 793 (12) 251 (5)</td>
<td>- -</td>
</tr>
<tr>
<td>Dar</td>
<td>916 (1) 3111 (1) 239 (7)</td>
<td>1 1</td>
</tr>
<tr>
<td>Dodoma</td>
<td>240 (14) 651 (15) 171 (14)</td>
<td>14 5</td>
</tr>
<tr>
<td>Iringa</td>
<td>243 (13) 1115 (10) 359 (1)</td>
<td>6 4</td>
</tr>
<tr>
<td>Kigoma</td>
<td>160 (16) 568 (16) 255 (6)</td>
<td>10 9</td>
</tr>
<tr>
<td>Kilimanjaro</td>
<td>417 (6) 1237 (5) 197 (10)</td>
<td>5 15</td>
</tr>
<tr>
<td>Lindi</td>
<td>- - - - -</td>
<td>- -</td>
</tr>
<tr>
<td>Mara</td>
<td>261 (12) 745 (13) 186 (13)</td>
<td>12 11</td>
</tr>
<tr>
<td>Mbeya</td>
<td>356 (9) 1118 (9) 214 (9)</td>
<td>3 3</td>
</tr>
<tr>
<td>Morogoro</td>
<td>385 (7) 1148 (7) 198 (11)</td>
<td>2 2</td>
</tr>
<tr>
<td>Mtwara</td>
<td>295 (11) 680 (14) 130 (18)</td>
<td>13 12</td>
</tr>
<tr>
<td>Mwanza</td>
<td>498 (4) 1448 (3) 191 (12)</td>
<td>11 14</td>
</tr>
<tr>
<td>Rukwa</td>
<td>- - - - -</td>
<td>- -</td>
</tr>
<tr>
<td>Ruvuma</td>
<td>113 (18) 412 (18) 265 (4)</td>
<td>15 13</td>
</tr>
<tr>
<td>Shinyanga</td>
<td>577 (2) 1539 (2) 167 (15)</td>
<td>16 17</td>
</tr>
<tr>
<td>Singida</td>
<td>154 (17) 492 (17) 219 (8)</td>
<td>17 16</td>
</tr>
<tr>
<td>Tabora</td>
<td>381 (8) 1019 (11) 268 (3)</td>
<td>9 10</td>
</tr>
<tr>
<td>Tanga</td>
<td>531 (3) 1357 (4) 156 (16)</td>
<td>7 6</td>
</tr>
<tr>
<td>West Lake</td>
<td>308 (10) 1162 (6) 277 (2)</td>
<td>8 7</td>
</tr>
</tbody>
</table>

* Central Bureau of Statistics and Third Five-Year Development Plan
planning, the parastatal budget in FY 1979/80 for both development and recurrent expenditures was approximately double that of the central government's budget. The Region needs to know what the current and future parastatal activities in the Region are.

At the present time the Region and lower-level governments do not collect significant revenue from services or fees, although they may do so. This offers a potential for additional revenue, particularly if users of certain social services such as water systems contribute to operational and maintenance expenses.[31]

Another potential source of revenue is by borrowing from various national banks and credit agencies that hold undisbursed monies. A study by Arusha Region is currently underway to identify national financial institutions that provide funds, training, and technical assistance for development activities and to determine how the Region might take advantage of them.[32]

In theory, many new development activities could be financed from domestic and foreign private investments. Unfortunately, there are no estimates of private investments by outsiders into the Region. Currently there is little demand in the Tanzanian private sector for outside private investment, and the country has not attracted private investors because of the precarious economic situation, the regulation of economic activities, and the ambivalent policies in the past concerning foreign private investments. On the other hand, Tanzania and Arusha Region in particular have always been popular with foreign donors and, in all likelihood, foreign aid will increase.

In summary, since the central government is the main source of revenue for development initiatives in the Regions, future development is, to a large extent, a function of the level of these resources and how they are allocated. It would appear from recent trends that there will be no increases in the foreseeable
future in central government financing of recurrent expenditures, and increases in development expenditures will depend on the level of disbursements of foreign aid.
NOTES


8 T.L.M.C., a national parastatal, regulates all official livestock markets in the Region and monitors official prices of slaughtered meat. It is estimated that official slaughtered meat accounts for less of the offtake rate than meat sold on the black market. Ibid., pp. 14-15, 17.

9 Ibid., pp. 4-5.


25 At this time the one political party was TANU, but in February 1977 it merged with the Zanzibar Afro-Shirazi Party to form CCM.
26 Mudge et al., "Tanzanian Development Performance and Implications for Development Assistance," pp. 7-29, 30-35.


ANNEX A

HISTORICAL CHRONOLOGY OF ARUSHA REGION
### ANNEX A

**HISTORICAL CHRONOLOGY OF ARUSHA REGION**

<table>
<thead>
<tr>
<th>Date</th>
<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>2000 BC</td>
<td>Stone Bowl Culture, Neolithic Pastoralists flourished from Serengeti through Ngorongoro and Monduli to West Kilimanjaro.</td>
</tr>
<tr>
<td>500 - 200 BC</td>
<td>Engaruka flourishes as irrigation settlement.</td>
</tr>
<tr>
<td>Ca 1680 AD</td>
<td>Meru first established in present homeland.</td>
</tr>
<tr>
<td>Ca 1700 AD</td>
<td>First Iraqw arrived in Mama Isara area.</td>
</tr>
<tr>
<td>Ca 1840</td>
<td>Maasai replace Tatog in Ngorongoro and Kwavi in Kisongo, Sigirare, and Naberera areas.</td>
</tr>
<tr>
<td>1848</td>
<td>Existance of Kilimanjaro announced to outside world.</td>
</tr>
<tr>
<td>1850 - 1880</td>
<td>Swahili Caravan Trade (no Arabs and no slave trade) flourishes along Arusha-Engaruka-Ngorongoro-Serengeti-Lake Victoria Nyanza route.</td>
</tr>
<tr>
<td>Ca 1850</td>
<td>First Arusha migrated to Selian area from Arusha Chini.</td>
</tr>
<tr>
<td>1856</td>
<td>Mount Meru, Great Arusha, Kisongo, Engaruka, and Oldonyo Lengai first appear on map.</td>
</tr>
<tr>
<td>1870</td>
<td>Serengeti and Ngorongoro first appear on map.</td>
</tr>
<tr>
<td>1885 - 90</td>
<td>The Great Famine; smallpox decimates human population and rinderpest kills off cattle and wildlife.</td>
</tr>
<tr>
<td>1900</td>
<td>Establishment of German military garrisons at Arusha.</td>
</tr>
<tr>
<td>1902</td>
<td>First mission, Leipzig Mission Society, established on Meru.</td>
</tr>
<tr>
<td>1905</td>
<td>200 Afrikaner settlers arrive in Arusha.</td>
</tr>
<tr>
<td>1912</td>
<td>Railway reaches Moshi: extended to Arusha 1931.</td>
</tr>
</tbody>
</table>
1916
Germans evacuate Region, British Military Government established.

1920
Britain accepts Mandate for Tanganyika from League of Nations.

1926
German settlement commenced Oldeani, later subsidized by Nazi Government.

1929
Maasai established as separate district with headquarters at Monduli.

1930
Loliondo established as subsection of Maasai District.

1930 - 1939
World depression and threat of return of Tanganyika to Germany retards development.

1943
Sleeping sickness invades Region (Kiru-Magugu) October 1943.

1945 - 52
Karatu-Murera-Mbulumbulu cleared of tsetse fly.

1949
Construction of tarmac road, Namanga-Arusha-Moshi-Taveta commenced.

1959
Discovery of Australopithecus boisei skull made Olduvai world-famous.

1961
Tanganyika achieves independence 9th December.

1963
Arusha established as separate Region.

1966 - 68
Diplomatic relations with UX broken 1966, restored 1968.

1967
Arusha Declaration, 5th February 1967.

1969
Mbulu District divided into Mbulu and Hanang Districts.

1969

1972
Decentralization to Regions.

1974
Maasai District divided into Monduli and Kiteto Districts.

1975
Ngorongoro Conservation Area Authority established as parastatal.

1977
T.A.N.U. and A.S. Parties combine to form C.C.M.
1978
East African Community dissolved.

1979
ANNEX B

ARUSHA PLANNING AND VILLAGE DEVELOPMENT
PROJECT DOCUMENTATION
ANNEX B
ARUSHA PLANNING AND VILLAGE DEVELOPMENT PROJECT DOCUMENTATION

GENERAL OUTLINE

1. APVDP Annual Plans
2. Arusha Region Integrated Development Plan
3. APVDP Progress Reports
4. Issue Papers
   A) Agriculture
   B) Financial Resources
   C) Health
   D) Land Use and Conservation
   E) Livestock
   F) Manpower
   G) Natural Resources
   H) Population
   I) Small Industries
   J) Transportation/Works
   K) Water
   L) Wildlife and Tourism
5. Issue Paper Summaries
6. Regional Sector Papers
7. General Policy Papers
8. Evaluation Papers
9. District Strategy and Priority Papers
10. Seminars, Planning Workshops, Planning Committee Meetings
11. Regional and District Project Profiles
1. **APVDP ANNUAL PLANS**


   (Supplement to the Arusha Regional 1981/82 Annual Plan Submission.)

d) Fourth Annual Plan, 1982/83. (Also included in Regional Annual Development Plan 1982/83.)

2. **ARUSHA REGIONAL INTEGRATED DEVELOPMENT PLAN**

a) Summary Report: Arusha Region Integrated Development Plan


c) Volume Two: Arusha Region: Development Strategies and Priorities for the Next 20 Years.


e) Volume Four: Major Areas for Long-Term Investments.

f) Volume Five: Information Strategy and Documentation.

3. **APVDP PROGRESS REPORTS**

a) First and Second Quarter Progress Report, July-December 1979.


c) Fourth Quarter Progress Report, April-June 1980.


e) Sixth Quarter Progress Report, October-December 1980.

f) Seventh Quarter Progress Report, July-September 1981.

g) Eighth Quarter Progress Report, April-June 1981.

i) Tenth Quarter Progress Report, October-December 1981.


k) Twelfth Quarter Progress Report, April-June 1982.


m) Fourteenth Quarter Progress Report, October-December 1982.

4. ISSUE PAPERS

A. Agriculture


4) Back to Basics, Some Thoughts Concerning the Agricultural Sector in Arusha Region -- Robert Dodd, November 1981.


9) A Four Week In-Service Training Program in Agricultural Irrigation and Drainage, Arusha, Tanzania -- Bishay G. Bishay, August 1982.
B. Financial Resources


3) An Assessment of the Revenue Generation Capabilities of Villages, Districts and Arusha Region: Some Policy Options -- Larry Schroeder, Local Revenue Administration Project, Syracuse University, June 1981.


C. Health


2) APVDP Health Component -- Stan Yoder, September 1980.

3) Health Sector Assessment -- Stan Yoder, October 1980.

4) Education and Training for Health Planning in the Arusha Region, Tanzania (with abstract) -- Paul Chikira, August 1981 (Cornell University thesis).

D. Land Use and Conservation

1) Four Discussion Papers -- Henry Fosbrooke

   i. Land Tenure and Land Use
   ii. Farming Systems
   iii. Urban Development and the Growth of Communications
   iv. Resource Conservation


3) Information for Rural Land Planning in Arusha Region -- Dunford, Mouat, Slaymaker, June 1980.


7) Land Information Materials Available to Arusha Planning and Village Development Project -- Christine Dodson, December 1980.

8) Proposed Land Planning Units for Arusha Region, Tanzania -- Christopher Dunford, December 1980.

9) Recommendations for Soil Conservation in Karatu Division, Mbulu District, Tanzania -- Rorke Bryan, February 1981. (English and Swahili.)


E. Livestock


7) Livestock Leaflets, 20 subjects (Swahili) - Ofisi ya Maendeleo ya Mifugo (Livestock Development Office), June 1982.

F. Manpower


G. Natural Resources

1) Agro-Forestry and Its Relevance to the Arusha Region -- Henry Gabrielle, March 1980.


4) Beekeeping in Arusha Region -- Christopher Dunford, July 1980.


H. Population


3) Assessment of Inter- and Intra-Regional Migration in Arusha Region -- Wilfred Mlay, Department of Geography, University of Dar es Salaam, October 1981.

I. Small Industries (Community Development and Cooperatives Development)


5) Formal Industries in Arusha Town (Inventory.)

6) Formal and Informal in Rural Arusha Region (Inventory.)


J. Transportation/Works


2) Transportation in Arusha Region -- Edward Holland, January 1980.
3) Problems of Agricultural Transportation in Rural Areas (A Case Study of Seven Villages in Mbulu District) -- W. E. Maro, Economic Research Bureau, University of Dar es Salaam, June 1980.

4) Arusha Regional Transport Planning Project (Road Transport Infrastructure) Study -- Dr. Benno J. Ndulu, Department of Economics, University of Dar es Salaam, June 1980.


8) Rural Road Planning: A Training Program for District Engineers in Arusha Region, Tanzania -- Castor Tingirawanyuma, May 1982 (Cornell University thesis.)

K. Water


L. Wildlife and Tourism

1) Sector Assessment of Tourism in the Arusha Region of Tanzania -- Victoria Morss, May 1980.

5. ISSUE PAPER SUMMARIES (ENGLISH AND SWAHILI)

A. Agriculture  
B. Beekeeping  
C. Financial Resources  
D. Fisheries  
E. Forestry  
F. Health  
G. Implementation of Development Initiatives  
H. Land Use and Conservation  
I. Livestock  
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N. Water  
O. Wildlife and Tourism


A. Agriculture  
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C. Land Development  
D. Livestock  
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F. Small Industries  
G. Stores  
H. Ujamaa and Cooperatives  
I. Water  
J. Works

7. GENERAL POLICY PAPERS

a) APVDP Policy Paper


c) Information Activities of the APVDP: Present and Future Potentials -- Elliott Morss, March 1980.

e) Integrating Regional Development Objectives into the Regional Planning Process -- Elliott Morss.


g) Center and Periphery in Arusha Region: Institutional Capacities and Development Initiatives in the Context of Existing Governmental Structures and Village Organization -- Garry Thomas, November 1980.

h) The Village Profile Exercise: APVDP Background Information, Impressions and Perceptions -- David Peterson and Thad Peterson, June 1980.

i) The Village Profile Exercises: Codes for Information Held in Computer Files -- T. M. B. Chikoti, February 1982.


m) Summary Strategy Paper.


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q) APVDP Briefing Paper -- July 1981.


s) Integrated Rural Development Planning through the Decentralized System: Shortcomings and Prospects. The Tanzanian Experience with the Arusha Region as a Case Study -- Mbwiga Mwalende, May 1982 (Cornell University thesis.)


8. EVALUATION PAPERS


c) Report on the Evaluation Visit to the APVDP Graduate Training Program in Regional Planning at Cornell University, February 1981.


g) Evaluation of the APVDP Shallow Wells Program in Hanang District, October 1981.


9. DISTRICT STRATEGY AND PRIORITY PAPERS


e) Monduli District Development Issues, Strategies and Actions for the next 5 to 20 Years - Area Commissioner's Office, January 1981.

f) Ngorongoro District Long Term Development Strategies and Supporting Issues.

10. SEMINARS, PLANNING WORKSHOPS, PLANNING COMMITTEE MEETINGS


b) Workshop on RIDEP/Arusha, September 1979.

c) Manyara Workshop Papers, October 1979.


f) Minutes of Regional Planning Committee Meeting, 9-11 February 1981. (English and Swahili).


11. REGIONAL AND DISTRICT PROJECT PROFILES

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- **Arumeru**: Sambasha Gravity Water Supply Project

### 48
- **Arumeru**: Oldonyosapuk Hydraulic Ram Water Supply

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ANNEX C

LAND PLANNING UNITS FOR ARUSHA REGION, TANZANIA
ANNEX C

LAND PLANNING UNITS FOR ARUSHA REGION, TANZANIA

The Arusha Planning and Village Development Project identified two basic information needs in the area of resource assessment for land use planning in Arusha Region. First, a broad overview of the land resources available within the Region was needed by officials concerned with land management (agriculture, livestock, forestry). Second, villagers needed easily understood maps of their local areas showing the various land resources available to them for development.

To furnish this information, the Project decided on a two-step procedure. Step one was a rapid reconnaissance of the entire Region to provide the data needed to divide the Region into practical planning units. Once these units were defined, officials could determine which units should have priority for land development projects. Step two was to provide the detailed survey data needed for project design, implementation, and evaluation within the high priority planning units. As part of step two, APVDP prepared natural color aerial photo mosaics of the pilot wards. Additional survey data collection will be a long-term activity of the numerous officials involved in land use planning.

In planning for the land-based sectors (agriculture, livestock, forestry, fishing, fish-culture, beekeeping, wildlife) it is most efficient to first divide the region or district into areas that have distinctive resources, problems, and potentials. Once mapped and described, these delineated areas show general differences and similarities between various locations. Each area can be looked at as a separate planning problem.
In APVDP, these delineated areas are called Land Planning Units. They can be used to:

a) Organize information about the land and land users within Arusha Region;
b) Organize adaptive research aimed at developing technical solutions to specific land use problems;
c) Assign extension staff to areas where their individual skills are most needed;
d) Rank areas by their needs and potentials to establish priority for development investments;
e) Select for pilot projects a small number of villages or wards which represent the major land types and land use problems;
f) Apply lessons learned in certain villages to other villages sharing similar land-related problems.

Proposed Land Planning Units are delineated on the following district maps. These maps are made from a 1:500,000 overlay which can be placed over "Ramani ya Vijiji, Mkoa wa Arusha" -- the standard base map for Arusha Region -- and over the 1:500,000 scale satellite images purchased by the Project. The overlay and the satellite images may be borrowed from the Regional Resource Center.

The proposed Land Planning Units are based on the land units which were developed as described in Information for Rural Land Planning in Arusha Region, Tanzania (Dunford, Mouat, and Slaymaker, June 1980). The land units are fairly small areas of relatively uniform soil, vegetation, land use, and topography. They are agro-ecological units that can be combined in various ways to form planning units.

Land Planning Units are proposed here on a district-by-district basis, each district having its own set (with the exception of Mondulu and Ngorongoro, because the boundary between
these recently separated districts is yet to be established). This district focus recognizes the importance of planning at the district level. Each district is treated as an individual case. It is hoped that district planners will carefully examine the proposed planning units and modify them to suit their needs.

The Land Planning Units are not meant to replace current administrative units. They should be treated as flexible, informal planning aids -- a division of a district into manageable pieces to help planning for the land-based sectors. Implementation of activities developed through the planning process should still be carried out within the structure of administrative units -- villages, wards, and divisions. Most villages and almost all wards and divisions include more than one major land type, so it is inevitable that Land Planning Units and administrative units will not coincide. Furthermore, it is not necessary that they coincide.

The proposed planning units were designed primarily to organize land information about the districts. For each Land Planning Unit, a data sheet has been prepared. The information summarized in these data sheets was collected in January-February 1980 by visual counting and estimation from aircraft flying 300 feet above ground level. The technique and resulting data are described in the report *Livestock, Wildlife and Land Use Survey, Arusha Region, Tanzania* (EcoSystems, Ltd., September 1980). In that report, data are presented on a district-by-district basis. In the following data sheets, the survey data are further subdivided to give brief descriptions of the Land Planning Units proposed for each district.

The survey data sheets for Arumeru, Hanang, and Mbulu Districts are prepared differently from those for Kiteto, Monduli, and Ngorongoro districts. The difference reflect a greater concentration on crops in the first three districts and the fact that the analysis for the first three districts was based on
direct computer access to the original survey data, while the analysis for the Masai districts was based on the data summaries produced by EcoSystems, Ltd. in the form of computer-printed maps.

The descriptions of proposed Land Planning Units are sketchy and subject to considerable error because of the small percentage of each unit actually overflown by the survey crews. Therefore, the data presented should be used to compare Land Planning Units, not to make exact calculations.

EACH DATA SHEET SHOULD BE REGARDED AS A WORK SHEET -- TO BE CORRECTED AND ADDED TO ON THE BASIS OF OTHER DATA AND LOCAL KNOWLEDGE.
DISTRICT LAND PLANNING UNITS

AERIAL SURVEY DATA SHEETS

ARUMERU, HANANG, AND MBULU DISTRICTS

Each data sheet gives information on the following categories:

AREA: The area of the Land Planning Unit (LPU) in square kilometers, as measured from a map with a planimeter.
In parentheses, the number of minutes of flight time spent by the observer crew over the LPU (the minutes figure indicates the size of the sample taken from the LPU).

VEGETATION: The important vegetation types.
In parentheses, the percentage of the minutes of flight time over the LPU which were dominated by the particular vegetation types (for each minute of flight -- covering approximately 2.7 km -- the observer crew determined which vegetation type was dominant during that one minute).

SOILS: The important soil types (by color).
In parentheses, the percentage of the minutes of flight time over the LPU which were dominated by the particular soil type (see VEGETATION).

LIVESTOCK: Estimated livestock density given as the number of all livestock (cattle, sheep, goats, donkeys, pigs) per square kilometer.
In parentheses, the size of the density figure relative to the density figures for other LPU's (relative sizes can be very low, low, medium, high, very high, or extremely high).
The ratio indicates number of cattle to number of sheep and goats combined.

WILDLIFE: Estimated wildlife density given as the number of all large wildlife (mainly large mammals) per square kilometer.
In parentheses, the relative size of the density figure (see LIVESTOCK).
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District Land Planning Units
Aerial Survey Data Sheets
Arumeru, Hanang, and Mbulu Districts
Page 2

HOUSES: Estimated house density given as the number of all houses (thatched-roof huts, mabati-roof houses, and tembes) per square kilometer.

In parentheses, the relative size of the density figure (see LIVESTOCK).

The percentage of all houses which have "modern" mabati roofs.

The percentage of all houses which have been abandoned (given only if greater than 2%).

CROPS: Three cultivation methods listed in order of importance (in terms of the percentage of cultivated area which is dominated by the particular method, as revealed by the shape of fields and straightness of furrows).

Dominant crops, which are those most frequently seen from the air.

Diversity of crops, given as the total number of crop species seen in the LPU.

In parentheses, crop species seen in the LPU but not dominant.
ARUMERU DISTRICT
Land Planning Units
(Proposed)
ARUMERU DISTRICT

LAND PLANNING UNIT B

AREA: \(292 \text{ km}^2\) (8 minutes)

VEGETATION: Agriculture (50%)
Forest (25%)
Wooded Grassland (25%)

SOILS: Grey-brown (62%)
Brown (38%)

LIVESTOCK: Density - 101/km\(^2\) (medium)
Ratio - 1:1 (cattle to sheep/goats)

WILDLIFE: Density - 7.3/km\(^2\) (medium)

HOUSES: Density - 38/km\(^2\) (very high)
Mabati - 44%

CROPS: Cultivation Methods - ox-drawn (50%)
hand (25%)
mechanical (25%)
Dominants - primarily bananas and maize
Diversity - 11 species (other species: tobacco, eucalyptus, beans, wheat, wattle, grevillea, coffee, pine, pyrethrum)

NOTE: THIS UNIT IS THE BANANA-COFFEE BELT.
ARUMERU DISTRICT

LAND PLANNING UNIT C

AREA: 427 km$^2$ (15 minutes)

VEGETATION: Agriculture (100%)

SOILS: Brown (73%)

LIVESTOCK: Density - 176/km$^2$ (high)
Ratio - 1.5:1 (cattie to sheep/goats)

WILDLIFE: Effectively none

HOUSES: Density - 39/km$^2$ (very high)
Mabati - 51%

CROPS: Cultivation Methods - mechanical (57%)
ox-drawn (36%)
hand (7%)

Dominants - primarily maize and bananas
secondarily coffee and sisal

Diversity - 13 species (other species: marrows, pigeon peas,
eucalyptus, cassava, mango, grevillea,
potatoes, castor beans, wheat)

NOTE: THIS UNIT IS THE ARUSHA TOWN-KIKATITI AREA.
ARUMERU DISTRICT

LAND PLANNING UNIT D

AREA: 777 km\(^2\) (30 minutes)

VEGETATION:
- Agriculture (57%)
- Bushed Grassland (27%)

SOILS:
- Brown (63%)
- Red-brown (30%)

LIVESTOCK:
- Density - 371/km\(^2\) (extremely high)
- Ratio - 0.5:1 (cattle to sheep/goats)

WILDLIFE:
- Density - 0.1/km\(^2\) (very low)

HOUSES:
- Density - 20/km\(^2\) (high)
- Mabati - 35%

CROPS:
- Cultivation Methods - ox-drawn (67%)
  - mechanical (29%)
  - hand (4%)
- Dominants - primarily maize and bananas
  - secondarily sisal
- Diversity - 12 species (other species: marrows, pigeon peas, eucalyptus, cassava, mango, wattle, grevillea, coffee, pawpaw)

NOTE: THIS UNIT IS THE KIKWE-MBUGUNI-OLJORO AREA.
ARUMERU DISTRICT

LAND PLANNING UNIT H

AREA: 136 km² (5 minutes)

VEGETATION: Woodyed grassland (60%)
Bushed grassland (40%)
Agriculture (0%)

SOILS: Brown (100%)

LIVESTOCK: Density - 226/km² (very high)
Ratio - 0.5:1 (cattle to sheep/goats)

WILDLIFE: Effectively none

HOUSES: Density - 12/km² (medium)
Mabati - 83%
Abandoned - 8%

CROPS: Cultivation Methods - ox-drawn (100%)
Dominants - primarily maize
Diversity - 5 species (other species: bananas, pigeon peas, grevillea, potatoes)

NOTE: THIS UNIT IS THE NGARE NANYUKI HILLS AREA.
ARUMERU DISTRICT

LAND PLANNING UNIT I

AREA: \(102 \text{ km}^2\) (3 minutes)

VEGETATION: Grassland (100%)
Agriculture (0%)

SOILS: Brown (100%)

LIVESTOCK: Effectively none

WILDLIFE: Density - 5.6/\text{km}^2 (medium)

HOUSES: Effectively none

CROPS: Effectively none

NOTE: THIS UNIT IS AN OLD LAKE BED.
ARUMERU DISTRICT

LAND PLANNING UNIT J

AREA: 622 km$^2$ (22 minutes)

VEGETATION: Agriculture (50%)
Grassland (50%)

SOILS: Brown (77%)

LIVESTOCK: Density - 371/km$^2$ (extremely high)
Ratio - 0.5:1 (cattle to sheep/goats)

WILDLIFE: Density - 1.1/km$^2$ (very low)

HOUSES: Density - 21.5/km$^2$ (high)
Mabati - 38%

CROPS: Cultivation Methods - mechanical (60%)
ox-drawn (40%)
Dominants - primarily maize
secondarily wheat, bananas, beans, and coffee
Diversity - 14 species (other species: marrows, pigeon peas, castor beans, eucalyptus, cassava, mango, wattle, grevillea, potatoes)

NOTE: THIS UNIT IS THE MWANDET-OLDONYO SAMBU-OLKOKOLA AREA.
ARUMERU DISTRICT

OTHER LAND PLANNING UNITS

A - Meru Forest Reserve and Arusha National Park (400 km$^2$)

E - Sanya plains (65 km$^2$)

F - Ngare Nanyuki-Leguruki plains (78 km$^2$)

G - Ngare Nanyuki river valley (48 km$^2$)
HANANG DISTRICT
Land Planning Units (Proposed)
HANANG DISTRICT

LAND PLANNING UNIT A

AREA: 557 km² (20 minutes)

VEGETATION: Agriculture (30%)
Wooded grassland (30%)
Wooded bushland (20%)

SOILS: Grey (50%)
Grey-brown (28%)

LIVESTOCK: Density - 15/km² (very low)
Ratio - 2:1 (cattle to sheep/goats)

WILDLIFE: Density - effectively none

HOUSES: Density - 10.7/km² (medium)
Mabati - 14%

CROPS: Cultivation Methods - mechanical (50%)
ox-drawn (25%)
hand (25%)
Dominants: primarily bananas and maize
secondarily sugar cane
Diversity: 14 species (other species: castor beans, marrows,
pigeon peas, tobacco, eucalyptus,
beans, cassava, mango, coffee, sisal,
citrus)

NOTE: THIS UNIT IS THE KIRU-MAGARA-MAGUGU AREA.
HANANG DISTRICT

LAND PLANNING UNIT B

AREA: 1100 km² (39 minutes)

VEGETATION: Wooded grassland (26%)
Grassland (23%)
Agriculture (13%)
Bushed grassland (13%)
Wooded bushland (13%)

SOILS: Grey (37%)
Grey-brown (37%)

LIVESTOCK: Density - 47/km² (low)
Ratio - 2:1 (cattle to sheep/goats)

WILDLIFE: Density - 6.5/km² (medium)

HOUSES: Density - 6/km² (low)
Mabati - 8%

CROPS: Cultivation Methods - ox-drawn (50%)
mechanical (40%)
hand (10%)
Dominants - primarily maize
Diversity - 6 species (other species: bananas, marrows, pigeon peas, castor beans, cassava)

NOTE: THIS UNIT IS THE MWADA-NKAITI AREA. THERE IS A CLUSTERING OF LIVESTOCK AND CULTIVATION AROUND LAKE BURUNGI.
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HANANG DISTRICT

LAND PLANNING UNIT C

AREA: 727 km² (24 minutes)

VEGETATION: Agriculture (46%)
Bushed grassland (25%)

SOILS: Red-brown (48%)
Grey-brown (30%)

LIVESTOCK: Density - 104/km² (medium)
Ratio - 2:1 (cattle to sheep/goats)

WILDLIFE: Density - effectively none

HOUSES: Density - 12/km² (medium)
Mabati - 25%

CROPS: Cultivation Methods - mechanical (50%)
ox-drawn (25%)
hand (25%)
Dominants - primarily maize
secondarily bananas
Diversity - 14 species (other species - marrows, pigeon peas,
castor beans, tobacco, eucalyptus,
cassava, wheat, mango, sugar cane,
grevillea, coffee, citrus)

NOTE: THIS UNIT IS THE BABATI-GALLAPO-MAMIRE AREA.
HANANG DISTRICT
LAND PLANNING UNIT D

AREA: 877 km$^2$ (30 minutes)

VEGETATION: Wooded bushland (37%)
Agriculture (30%)
Bushed grassland (27%)

SOILS: Red-brown (64%)
Grey-brown (29%)

LIVESTOCK: Density - 140/km$^2$ (high)
Ratio - 2:1 (cattle to sheep/goats)

WILDLIFE: Density - effectively none

HOUSES: Density - 15/km$^2$ (high)
Mabati - 7%

CROPS: Cultivation Methods - ox-drawn (60%)
mechanical (20%)
hand (20%)

Dominants - primarily maize
secondarily bananas and tobacco
Diversity - 7 species (other species: pigeon peas, castor beans, potatoes, beans)

NOTE: THIS UNIT IS THE AREA AROUND MT. HANANG.
HANANG DISTRICT

LAND PLANNING UNIT E

AREA: 468 km² (16 minutes)

VEGETATION: Agriculture (31%)
           Bushed grassland (25%)
           Grassland (13%)
           Wooded bushland (13%)

SOILS: Red-brown (50%)
       Grey (25%)
       Grey-brown (25%)

LIVESTOCK: Density - 153/km² (high)
           Ratio - 2.5:1 (cattle to sheep/goats)

WILDLIFE: Density - 2/km² (low)

HOUSES: Density - 13/km² (medium)
        Mabati - 15%

CROPS: Cultivation Methods - hand (73%)
        mechanical (27%)
        Dominants - primarily maize
        secondarily marrows and tobacco
        Diversity - 12 species (other species: bananas, pigeon peas,
                   castor beans, eucalyptus, wheat, mango,
                   sugar cane, wattle, pine)

NOTE: THIS UNIT IS THE BASHANET AREA.
HANANG DISTRICT

LAND PLANNING UNIT F

AREA: 1361 km² (42 minutes)

VEGETATION: Woody bushland (33%)
Bushed grassland (31%)
Agriculture (29%)

SOILS: Red-brown (45%)
Grey-brown (36%)

LIVESTOCK: Density - 130/km² (high)
Ratio - 3:1 (cattle to sheep/goats)

WILDLIFE: Density - 6.5/km² (medium)

HOUSES: Density - 4.5/km² (low)
Mabati - effectively none
Abandoned - 12%

CROPS: Cultivation Methods - hand (53%)
mechanical (31%)
ox-drawn (16%)

Dominants - primarily maize
secondarily marrows

Diversity - 7 species (other species: wheat, castor beans, tobacco, eucalyptus, beans)

NOTE: THIS UNIT IS THE BASOTU AREA.
HANANG DISTRICT

LAND PLANNING UNIT G

AREA: 442 km² (15 minutes)

VEGETATION: Wooded bushland (73%)
Agriculture (20%)

SOILS: Red-brown (60%)
Grey-brown (40%)

LIVESTOCK: Density - 59/km² (low)
Ratio - 4:1 (cattle to sheep/goats)

WILDLIFE: Density - effectively none

HOUSES: Density - 16/km² (high)
Mabati - 19%

CROPS: Cultivation Methods - ox-drawn (66%)
mechanical (34%)
Dominants - primarily maize
secondarily bananas
Diversity - 9 species (other species: pigeon peas, castor beans, tobacco, cassava, mango, sugar cane, grevillea)

NOTE: THIS UNIT IS THE GIDA-SIROP HILLS AREA.
HANANG DISTRICT

LAND PLANNING UNIT H

AREA: 495 km² (17 minutes)

VEGETATION: Wooded bushland (82%)
Agriculture (0%)

SOILS: Red-brown (70%)
Grey (24%)

LIVESTOCK: Density - 92/km² (medium)
Ratio - 2:1 (cattle to sheep/goats)

WILDLIFE: Density - 4.5/km² (medium)

HOUSES: Density - 4.8/km² (low)
Mabati - effectively none
Abandoned - 6%

CROPS: Cultivation Methods - hand (83%)
ox-drawn (17%)
Dominants - maize only
Diversity - 1 species

NOTE: THIS UNIT IS THE BALANGDALALU-KATESH AREA.
HANANG DISTRICT

LAND PLANNING UNIT J

AREA: 915 km² (33 minutes)

VEGETATION: Wooded bushland (100%)
               Agriculture (0%)

SOILS: Grey (55%)
       Red-brown (30%)

LIVESTOCK: Density - 45/km² (low)
            Ratio - 1.5:1 (cattle to sheep/goats)

WILDLIFE: Density - 2.8/km² (low)

HOUSES: Density - 0.7/km² (very low)
         Mabati - effectively none
         Abandoned - 36%

CROPS: Cultivation Methods - hand (100%)
       Dominants - maize and tobacco only
       Diversity - 2 species

NOTE: THIS UNIT IS M10MBO-COVERED HILLS.
HANANG DISTRICT

LAND PLANNING UNIT K

AREA: 1350 km² (48 minutes)

VEGETATION: Wooded grassland (63%)
Grassland (19%)
Agriculture (0%)

SOILS: Grey-brown (48%)
Red-brown (35%)

LIVESTOCK: Effectively none

WILDLIFE: Density - 9.7/km² (high)

HOUSES: Effectively none

CROPS: Effectively none

NOTE: THIS UNIT IS THE TARANGIRE NATIONAL PARK.
OTHER LAND PLANNING UNITS

LAKES: $L_a$ - Manyara (390 km$^2$)

$L_b$ - Burungi (62 km$^2$)

$L_c$ - Babati (25 km$^2$)

$L_d$ - Balangida (38 km$^2$)

$L_e$ - Balangida Lelu (38 km$^2$)

$L_f$ - Basotu (28 km$^2$)

FOREST RESERVES: $M_a$ - Nou (Hanang part) (162 km$^2$)

$M_b$ - Ufiome (56 km$^2$)

$M_c$ - Bereku (Hanang part) (82 km$^2$)

$M_d$ - Hanang (57 km$^2$)

OTHER: $I$ - Rift Escarpment (138 km$^2$)
MBULU DISTRICT
Land Planning Units (Proposed)
1:500,000
MBULU DISTRICT

LAND PLANNING UNIT A

Sub-unit a

AREA: 535 km² (17 minutes)

VEGETATION: Agriculture (76%)
Bushed grassland (18%)

SOILS: Red-brown (76%)
Brown (23%)

LIVESTOCK: Density - 141/km² (high)
Ratio - 1:1 (cattle to sheep/goats)

WILDLIFE: Effectively none

HOUSES: Density - 18/km² (high)
Mabati - 27%

CROPS: Cultivation Methods - mechanical (59%)
ox-drawn (41%)

Dominant - primarily wheat
secondarily maize, bananas, and coffee

Diversity - 16 species (other species: pigeon peas, marrows, castor beans, tobacco, eucalyptus, beans, cassava, mango, wattle, grevillea, pine, pawpaw)

NOTE: THIS UNIT IS THE KARATU-MBULUMBULU-RHOTIA AREA.
MBULU DISTRICT

LAND PLANNING UNIT A
Sub-unit b

AREA: 365 km\(^2\) (11 minutes)

VEGETATION: Bushed grassland (45%)
Wooded Grassland (27%)
Agriculture (18%)

SOILS: Red-brown (82%)

LIVESTOCK: Density - 99/km\(^2\) (medium)
Ratio - 0.5:1 (cattle to sheep/goats)

WILDLIFE: Density - 2.4/km\(^2\) (low)

HOUSES: Density - 11.5/km\(^2\) (medium)
Mabati - 13%

CROPS: Cultivation Methods - mechanical (57%)
ox-drawn (43%)
Dominants - primarily maize and wheat
Diversity - 5 species (other species: pigeon peas, castor beans, beans)

NOTE: THIS UNIT IS THE OLDEANI AREA - LOWER SLOPES.
MBULU DISTRICT

LAND PLANNING UNIT A
Sub-unit c

AREA: 205 km$^2$ (7 minutes)

VEGETATION: Agriculture (71%)
Wooded grassland (29%)

SOILS: Red-brown (100%)

LIVESTOCK: Density - 89/km$^2$ (medium)
Ratio - 0.5:1 (cattle to sheep/goats)

WILDLIFE: Effectively none

HOUSES: Density - 16.5/km$^2$ (high)
Mabati - 42%
Abandoned - 5%

CROPS: Cultivation Methods - mechanical (57%)
hand (29%)
ox-drawn (14%)

Dominants - primarily coffee
secondarily maize and beans

Diversity - 12 species (other species: bananas, marrows, pigeon peas, castor beans, eucalyptus, cassava, wheat, grevillea, pine)

NOTE: This unit is the lower edge of the Crater Highlands forest.
MBULU DISTRICT

LAND PLANNING UNIT B

AREA: 715 km² (22 minutes)

VEGETATION: Agriculture (55%)
Wooded bushland (18%)
Grassland (14%)

SOILS: Red-brown (85%)

LIVESTOCK: Density - 173/km² (high)
Ratio - 1.5:1 (cattle to sheep/goats)

WILDLIFE: Density - 0.6/km² (very low)

HOUSES: Density - 10.2/km² (medium)
Mabati - 14%

CROPS: Cultivation Methods - hand (65%)
mechanical (20%)
ox-drawn (15%)
Dominants - primarily maize
secondarily bananas
Diversity - 14 species (other species: marrows, pigeon peas, castor beans, tobacco, eucalyptus, beans, cassava, wheat, mango, sugar cane, pine, citrus)

NOTE: THIS UNIT IS MBULU-DAUDI-ENDABASH AREA.
MBULU DISTRICT

LAND PLANNING UNIT D
Sub-unit a

AREA: 478 km² (14 minutes)

VEGETATION: Bushed grassland (43%)
Wooded bushland (29%)
Agriculture (7%)

SOILS: Red-brown (43%)
Grey-brown (43%)

LIVESTOCK: Density - 144/km² (high)
Ratio - 1:1 (cattle to sheep/goats)

WILDLIFE: Effectively none

HOUSES: Density - 12.4/km² (medium)
Mabati - 2%
Abandoned - 5%

CROPS: Cultivation Methods - hand (86%)
ox-drawn (14%)
Dominants - primarily maize
secondarily marrows, castor beans, and tobacco
Diversity - 9 species (other species: eucalyptus, wattle, potatoes, pine, pyrethrum)

NOTE: THIS UNIT IS THE DONGOBSH AREA.
MBULU DISTRICT

LAND PLANNING UNIT D
Sub-unit b

AREA:  700 km\(^2\) (24 minutes)

VEGETATION: Bushed grassland (75%)
Agriculture (17%)

SOILS: Red-brown (57%)
Grey-brown (39%)

LIVESTOCK: Density - 172/km\(^2\) (high)
Ratio - 1:1 (cattle to sheep/goats)

WILDLIFE: Density - 0.4/km\(^2\) (very low)

HOUSES: Density - 9.7/km\(^2\) (medium)
Mabati - 5%

CROPS: Cultivation Methods - hand (57%)
ox-drawn (39%)
mechanical (4%)

Dominants - primarily maize
secondarily tobacco and marrows

Diversity - 11 species (other species: bananas, castor beans, eucalyptus, beans, cassava, mango, wattle, sweet potatoes)

NOTE: THIS UNIT IS HAIDOM-MAGHANG AREA.
MBULU DISTRICT

LAND PLANNING UNIT E
Sub-unit a

AREA: 1422 km² (53 minutes)

VEGETATION: Wooded bushland (62%)
Bushed grassland (23%)
Agriculture (2%)

SOILS: Grey (38%)
Red-brown (34%)
Grey-brown (28%)

LIVESTOCK: Density - 60/km² (low)
Ratio - 1.5:1 (cattle to sheep/goats)

WILDLIFE: Density - 7.6/km² (medium)

HOUSES: Density - 2.0/km² (low)
Mabati - 5%
Abandoned - 13%

CROPS: Cultivation Methods - hand (56%)
        ox-drawn (44%)
Dominants - primarily maize
    secondarily tobacco
Diversity - 6 species (other species: bananas, marrows, eucalyptus, cassava)

NOTE: THIS UNIT IS THE HILLS AREA SURROUNDING YAIDA VALLEY.
MBULU DISTRICT

LAND PLANNING UNIT E
Sub-unit b

AREA: 308 km² (12 minutes)

VEGETATION: Wooded bushland (75%)
Agriculture (8%)

SOILS: Red-brown (67%)
Grey-brown (25%)

LIVESTOCK: Density - 109/km² (medium)
Ratio - 1:1 (cattle to sheep/goats)

WILDLIFE: Density - 0.2/km² (very low)

HOUSES: Density - 2.6/km² (low)
Mabati - effectively none
Abandoned - 19%

CROPS: Cultivation Methods - hand (70%)
ox-drawn (30%)
Dominants - primarily maize
Diversity - 6 species (other species: marrows, pigeon peas,
castor beans, tobacco, eucalyptus)

NOTE: THIS UNIT IS THE MASIEDA AREA.
MBULU DISTRICT

LAND PLANNING UNIT F
Sub-unit a

AREA: 722 km$^2$ (26 minutes)

VEGETATION: Bushed grassland (35%)
Wooded bushland (31%)
Wooded grassland (15%)
Agriculture (0%)

SOILS: Grey (44%)
Red-brown (42%)

LIVESTOCK: Density - 76/km$^2$ (low)
Ratio - 1.5:1 (cattle to sheep/goats)

WILDLIFE: Density - 6.5/km$^2$ (medium)

HOUSES: Density - 1.5/km$^2$ (low)
Mabati - effectively none
Abandoned - 6%

CROPS: Cultivation Methods - hand (50%)
ox-drawn (50%)
Dominants - primarily maize
secondarily bananas
Diversity - 4 species (other species: marrows, tobacco)

NOTE: THIS UNIT IS THE YAIDA VALLEY.
MBULU DISTRICT

LAND PLANNING UNIT F
Sub-unit b

AREA: 425 km\(^2\) (19 minutes)

VEGETATION:
- Wooded bushland (53%)
- Bushed grassland (26%)
- Agriculture (11%)

SOILS: grey (84%)

LIVESTOCK: Density - 30/km\(^2\) (low)
Ratio - 5:1 (cattle to sheep/goats)

WILDLIFE: Density - 11.9/km\(^2\) (high)

HOUSES: Density - 2.5/km\(^2\) (low)
- Mabati - 8%
- Abandoned - 17%

CROPS: Cultivation Methods - ox-drawn (100%)
- Dominants - primarily maize
- Diversity - 6 species (other species: bananas, marrows, sugar cane, coffee(?), sweet potatoes)

NOTE: THIS UNIT IS THE SHORE OF LAKE EYASI.
MBULU DISTRICT

OTHER LAND PLANNING UNITS

Ca - Kainam-Murray area (192 km²)
Cb - Tumati area (98 km²)
Fc - Mang'ola area (58 km²)
Fd - Endamaghang area (35 km²)
G - Lake Eyasi (1210 km²)
Ha - Marang Forest Reserve (354 km²)
Hb - Hassama Forest Reserve (49 km²)
Hc - Nou Forest Reserve (Mbulu part) (152 km²)
I - Lake Manyara National Park (Mbulu part) (83 km²)
Each data sheet gives information on the following categories:

AREA: The area of the Land Planning Unit (LPU) in square kilometers, as measured from a map with a planimeter.
In parentheses, the number of UTM grid squares (10 km x 10 km) within the LPU from which data are taken (indicates the size of the sample).

TOPOGRAPHY: The important types of topography.
In parentheses, the percentage of grid squares in which the type was dominant for at least one minute of flight time (for each minute of flight -- covering approximately 2.7 km -- the observer crew determined which type was dominant during that one minute). Because there are 3-4 minutes of flight within one grid square, up to four different types may be recorded as dominant in each grid square.

SOILS: The important types of soil (by color).
In parentheses, the percentage of grid squares in which the type was dominant for at least one minute of flight time (see TOPOGRAPHY).

VEGETATION: The important types of vegetation.
In parentheses, the percentage of grid squares in which the type was dominant for at least one minute of flight time (see TOPOGRAPHY).

LIVESTOCK: Estimated livestock density given as the number of all livestock (cattle, sheep, goats, donkeys, and pigs) per square kilometer.
In parentheses, the size of the density figure relative to the density figures for other LPU's (relative sizes can be low, medium, high, very high, or extremely high).
The ratio indicates number of cattle to number of sheep and goats combined ("shoats").
WILDLIFE: Estimated wildlife density given as the number of all large wildlife (mainly large mammals) per square kilometer.

In parentheses, the relative size of the density figure (see LIVESTOCK).

HOUSES: Estimated house densities given as the number of occupied agricultural houses (thatched-roof and mabati-roof) and the number of occupied pastoral houses (nkang) per square kilometer.

CROP COVERAGE: Relative amount of cultivated land (none, low, or moderate) within the LPU. Even where agriculture is not recorded as a dominant vegetation type, scattered cultivation may occupy a moderate percentage of the LPU.
KITETO DISTRICT

LAND PLANNING UNIT A

AREA: \(962 \text{ km}^2\) (6 grid squares)

TOPOGRAPHY: Undulating (83%)
Hills (50%)
Flat Land (17%)

SOILS: Red-brown (100%)
Grey-brown (50%)
Grey (17%)

VEGETATION: Bushed Grassland (83%)
Grassland (50%)
Wooded Grassland (50%)
Wooded Bushland (33%)
Agriculture (0%)

LIVESTOCK: Density - 45.4/km\(^2\) (medium)
Ratio - 7.9:1 (cattle to shoats)

WILDLIFE: Density - 4.1/km\(^2\) (medium)

HOUSES: Agricultural - 1.6/km\(^2\)
Occupied Nkang - 0.79/km\(^2\)

CROP COVERAGE: Moderate

NOTE: THIS UNIT IS THE SHAMBARAI-TERRAT AREA.
SUB-UNIT "Aa" IS AN AREA OF RELATIVELY EXTENSIVE AGRICULTURE.
KITETO DISTRICT

LAND PLANNING UNIT B

AREA: 5700 km\(^2\) (47 grid squares)

TOPOGRAPHY: Undulating (83%)
Hills (53%)
Inselbergs (13%)

SOILS: Red-brown (91%)
Grey-brown (72%)
Grey (23%)

VEGETATION: Wooded Grassland (60%)
Wooded Bushland (36%)
Bushed Grassland (28%)
Woodland (11%)
Grassland (9%)
Bushland (6%)
Thickets (6%)
Agriculture (0%)

LIVESTOCK: Density - 23/km\(^2\) (low)
Ratio - 3.1:1 (cattle to shoats)

WILDLIFE: Density - 15.6/km\(^2\) (medium)

HOUSES: Agricultural - 0.3/km\(^2\)
Occupied Nkang - 0.07/km\(^2\)

CROP COVERAGE: Low

NOTE: THIS UNIT IS THE NABERERA-SIMANJIRO AREA.
SUB-UNIT "Ba" IS THE SIMANJIRO MBUGA.
KITETO DISTRICT

LAND PLANNING UNIT C

AREA: 2065 km$^2$ (17 grid squares)

TOPOGRAPHY: Undulating (88%)
- Hills (41%)
- Inselbergs (35%)
- Flat Land (6%)
- Escarpments (6%)

SOILS: Red-brown (88%)
- Grey-brown (65%)
- Grey (12%)

VEGETATION: Wooded Bushland (59%)
- Bushed Grassland (53%)
- Bushland (29%)
- Wooded Grassland (24%)
- Thickets (18%)
- Agriculture (0%)

LIVESTOCK: Density - 3.7/km$^2$ (low)
Ratio - N/A (no sheep seen)

WILDLIFE: Density - 2.2/km$^2$ (low)

HOUSES: Agricultural - None
- Occupied Nkang - None

CROP COVERAGE: None

NOTE: THIS UNIT IS THE LOLBENE AREA.
KITETO DISTRICT

LAND PLANNING UNIT D

AREA: 2605 km² (13 grid squares)

TOPOGRAPHY: Hills (77%)
Undulating (69%)
Escarments (38%)
Inselbergs (8%)

SOILS: Red-brown (77%)
Grey-brown (77%)
Grey (23%)

VEGETATION: Wooded Bushland (69%)
Wooded Grassland (38%)
Bushed Grassland (38%)
Bushland (23%)
Thickets (15%)
Agriculture (0%)

LIVESTOCK: Density - 9.5/km² (low)
Ratio - N/A (no cattle seen)

WILDLIFE: Density - 1.8/km² (low)

HOUSES: Agricultural - 0.3/km²
Occupied Nkang - None

CROP COVERAGE: Low

NOTE: THIS UNIT IS THE LELATEMA MOUNTAINS AND MARTIN ESCARPMENT.
KITETO DISTRICT

LAND PLANNING UNIT E

AREA: 325 km$^2$

Insufficient data for analysis of this unit.

NOTE: THIS UNIT IS THE PANGANI-RUVU RIVER VALLEY.
KITETO DISTRICT

LAND PLANNING UNIT F

AREA: 4928 km$^2$ (37 grid squares)

TOPOGRAPHY: Undulating (92%)
Hills (43%)
Inselbergs (14%)
Escarments (3%)

SOILS: Grey-brown (76%)
Red-brown (70%)
Grey (14%)

VEGETATION: Bushland (70%)
Wooded Bushland (35%)
Woodland (19%)
Bushed Grassland (14%)
Wooded Grassland (11%)
Grassland (3%)
Agriculture (0%)

LIVESTOCK: Density - 14.4/km$^2$ (low)
Ratio - 1.8:1 (cattle to shoats)

WILDLIFE: Density - 5.1/km$^2$ (medium)

HOUSES: Agricultural - None
Occupied Nkang - 0.03/km$^2$

CROP COVERAGE: None

NOTE: THIS UNIT IS THE KITWAI AREA.
SUB-UNITS MARKED "Fa" ARE MBUGAS.
KITETO DISTRICT

LAND PLANNING UNIT G

AREA: 6665 km² (53 grid squares)

TOPOGRAPHY: Undulating (96%)
Hills (25%)
Inselbergs (9%)

SOILS: Red-brown (91%)
Grey-brown (75%)
Grey (19%)
Brown (2%)

VEGETATION: Wooded Bushland (98%)
Bushland (25%)
Bushed Grassland (11%)
Grassland (9%)
Wooded Grassland (8%)
Thickets (2%)
Agriculture (0%)

LIVESTOCK: Density - 8.1/km² (low)
Ratio - N/A (no shoats seen)

WILDLIFE: Density - 2.2/km² (low)

HOUSES: Agricultural - None
Occupied Nkang - 0.04/km²

CROP COVERAGE: None

NOTE: THIS UNIT IS THE MAKAMI AREA.
SUB-UNITS MARKED "Ga" ARE MBUGAS.
KITETO DISTRICT

LAND PLANNING UNIT H

AREA: 8720 km$^2$ (76 grid squares)

TOPOGRAPHY: Undulating (80%)
Hills (53%)
Inselbergs (33%)

SOILS: Grey-brown (83%)
Red-brown (71%)
Grey (11%)

VEGETATION: Wooded Bushland (100%)
Bushed Grassland (8%)
Thickets (7%)
Bushland (4%)
Wooded Grassland (4%)
Agriculture (4%)

LIVESTOCK: Density - 38/km$^2$ (medium)
Ratio - 2.1:1 (cattle to shoats)

WILDLIFE: Density - 1/km$^2$ (low)

HOUSES: Agricultural - 0.3/km$^2$
Occupied Nkang - 1/km$^2$

CROP COVERAGE: Moderate

NOTE: THIS UNIT IS THE KIBAYA-KIJUNGU AREA.
SUB-UNITS MARKED "Ha" ARE MBUGAS.
SUB-UNITS MARKED "Hb" ARE AREAS OF RELATIVELY EXTENSIVE AGRICULTURE.
NGORONGORO/MONDULI DISTRICTS

LAND PLANNING UNIT A

AREA: \(1012 \text{ km}^2\) (10 grid squares)

TOPOGRAPHY: Flat Land (90%)
Undulating (30%)
Escarpsments (20%)

SOILS: Grey (20%)
Brown (20%)
Grey-brown (10%)

VEGETATION: Lakes (90%)
Bushed Grassland (30%)
Grassland (10%)
Agriculture (0%)

LIVESTOCK: Density - 39.6/km² (medium)
Ratio - 0.13:1 (cattle to shoats)

WILDLIFE: Density - 0.5/km² (low)

HOUSES: Agricultural - 0.2/km²
Occupied Nkang - 0.2/km²

CROP COVERAGE: None

NOTE: THIS UNIT IS LAKE NATRON AND THE SURROUNDING SHORE.
NGORONGORO/MONDULI DISTRICTS

LAND PLANNING UNIT B

AREA: \(222 \text{ km}^2\) (2 grid squares)

TOPOGRAPHY: Undulating (50%)
Hills (50%)

SOILS: Grey (100%)
Grey-brown (50%)

VEGETATION: Grassland (100%)
Agriculture (0%)

LIVESTOCK: Density - 112/km\(^2\) (high)
Ratio - 3.5:1 (cattle to sheep)

WILDLIFE: Density - 5.9/km\(^2\) (medium)

HOUSES: Agricultural - 0.7/km\(^2\)
Occupied Nkang - None

CROP COVERAGE: None

NOTE: THIS UNIT IS OLDONYO LENGAI AND SURROUNDING AREA.
NGORONGORO/MONDULI DISTRICTS

LAND PLANNING UNIT C

AREA: \(508 \text{ km}^2\) (3 grid squares)

TOPOGRAPHY: Hills (66%)  
Escarps (66%)

SOILS: Grey (100%)  
Grey-brown (33%)

VEGETATION: Grassland (66%)  
Wooded Bushland (66%)  
Agriculture (0%)

LIVESTOCK: Density - 3.9/km\(^2\) (low)  
Ratio - N/A (no sheep seen)

WILDLIFE: Density - None

HOUSES: Agricultural - None  
Occupied Nkang - 0.3/km\(^2\)

CROP COVERAGE: None

NOTE: THIS UNIT IS THE RIFT ESCARPMENT.
NGORONGORO/MONDULI DISTRICTS

LAND PLANNING UNIT D

AREA: 852 km² (5 grid squares)

TOPOGRAPHY: Hills (80%)
              Undulating (40%)
              Escarpments (20%)

SOILS: Brown (60%)
        Grey-brown (40%)
        Red-brown (20%)

VEGETATION: Wooded Bushland (80%)
             Grassland (40%)
             Forests (40%)
             Agriculture (20%)

LIVESTOCK: Density - 36.7/km² (medium)
            Ratio - 4.5:1 (cattle to shoats)

WILDLIFE: Density - 6/km² (medium)

HOUSES: Agricultural - None
        Occupied Nkang - None

CROP COVERAGE: Moderate

NOTE: THIS UNIT IS THE NORTHERN HIGHLANDS FOREST RESERVE.
NGORONGORO/MONDULI DISTRICTS

LAND PLANNING UNIT E

AREA: 1942 km² (11 grid squares)

TOPOGRAPHY: Hills (100%)

SOILS:
- Brown (91%)
- Grey-brown (27%)
- Red-brown (18%)

VEGETATION:
- Grassland (91%)
- Bushed Grassland (45%)
- Woodland (27%)
- Wooded Grassland (18%)
- Forests (18%)
- Wooded Bushland (9%)
- Agriculture (0%)

LIVESTOCK: Density - 225.3/km² (very high)
Ratio - 0.34:1 (cattle to shoats)

WILDLIFE: Density - 5.3/km² (medium)

HOUSES:
- Agricultural - 3.5/km²
- Occupied Nkang - 2/km²

CROP COVERAGE: None

NOTE: THIS UNIT IS THE CRATER HIGHLANDS, EXCLUDING NGORONGORO CRATER AND THE NORTHERN HIGHLANDS FOREST RESERVE. THERE ARE TWO SUB-UNITS MARKED "Ea" WHICH ARE RESTRICTED AREAS - OLMOTI AND EMBAGAI CRATERS.
NGORONGORO/MONDULI DISTRICTS

LAND PLANNING UNIT F

AREA: 318 km² (1 grid square)

TOPOGRAPHY: Flat Land (100%)
Undulating (100%)

SOILS: Grey-brown (100%)

VEGETATION: Grassland (100%)
Agriculture (0%)

LIVESTOCK: Density - None
Ratio - N/A (no livestock seen)

WILDLIFE: Density - 33.6/km² (high)

HOUSES: Agricultural - None
Occupied Nkang - None

CROP COVERAGE: None

NOTE: THIS UNIT IS NGORONGORO CRATER.
NGORONGORO/MONDULI DISTRICTS

LAND PLANNING UNIT H

AREA: 792 km\(^2\) (5 grid squares)

TOPOGRAPHY: Undulating (40%)

Inselbergs (40%)

Escarments (40%)

SOILS: Grey (100%)

VEGETATION: Wooded Grassland (80%)

Grassland (40%)

Wooded Bushland (20%)

Agriculture (0%)

LIVESTOCK: Density - 172.2/km\(^2\) (high)

Ratio - 0.71:1 (cattle to shoats)

WILDLIFE: Density - 646.5/km\(^2\) (extremely high)

HOUSES: Agricultural - None

Occupied Nkang - None

CROP COVERAGE: None

NOTE: THIS UNIT IS THE ENDULEN-KAKESIO AREA.
NGORONGORO/MONDULI DISTRICTS

LAND PLANNING UNIT I

AREA: $3672 \text{ km}^2$ (27 grid squares)

TOPOGRAPHY: Undulating (93%)
- Hills (33%)
- Flat Land (4%)
- Inselbergs (4%)

SOILS: Grey (96%)
- Grey-brown (7%)
- Brown (4%)

VEGETATION: Grassland (89%)
- Wooded Bushland (26%)
- Wooded Grassland (7%)
- Woodland (4%)
- Lakes (4%)
- Agriculture (0%)

LIVESTOCK: Density - 10.9/km² (low)
- Ratio - 0.67:1 (cattle to shoats)

WILDLIFE: Density - 310.1/km² (very high)

HOUSES: Agricultural - 0.2/km²
- Occupied Nkang - 0.3/km²

CROP COVERAGE: None

NOTE: THIS UNIT IS OPEN PLAINS OF THE SERENGETI-OL BALBAL AREA.
THERE IS ONE SUB-UNIT MARKED "Ia" -- IT IS A RESTRICTED AREA: OLDUVAI GORGE.
NGORONGORO/MONDULI DISTRICTS

QUEIEN PLANNING UNIT: K

AREA: 1825 km\(^2\) (13 grid squares)

TOPOGRAPHY: Undulating (100%)
Hills (62%)
Inselbergs (23%)

SOILS: Grey (100%)
Grey-brown (8%)
Brown (8%)

VEGETATION: Wooded Grassland (62%)
Grassland (46%)
Wooded Bushland (38%)
Agriculture (0%)

LIVESTOCK: Density - 13.7/km\(^2\) (low)
Ratio - 0.61:1 (cattle to shoats)

WILDLIFE: Density - 38.5/km\(^2\) (high)

HOUSES: Agricultural - None
Occupied Nkang - 0.3/km\(^2\)

CROP COVERAGE: Low

NOTE: THIS UNIT IS THE SERENGETI PLAINS EAST OF GRUMECHEM HILL.
NGORONGORO/MONDULI DISTRICTS

LAND PLANNING UNIT L

AREA: 800 km² (2 grid squares)

TOPOGRAPHY: Hills (100%)

SOILS: Grey (100%)

VEGETATION: Wooded Grassland (100%)
            Forests (50%)
            Agriculture (0%)

LIVESTOCK: Density - 26.8/km² (low)
            Ratio - N/A (no shoats seen)

WILDLIFE: Density - None

HOUSES: Agricultural - None
        Occupied Nkang - None

CROP COVERAGE: Moderate

NOTE: THIS UNIT IS THE ARASH HILLS.
NGORONGORO/MONDULI DISTRICTS

LAND PLANNING UNIT M

AREA: \( 1320 \text{ km}^2 \) (8 grid squares)

TOPOGRAPHY: Undulating (75%)
Hills (13%)

SOILS: Grey (100%)
Grey-brown (25%)

VEGETATION: Grassland (63%)
Wooded Bushland (50%)
Agriculture (0%)

LIVESTOCK: Density - None
Ratio - N/A (no livestock seen)

WILDLIFE: Density - 0.9/km\(^2\) (low)

HOUSES: Agricultural - None
Occupied Nkang - 0.4/km\(^2\)

CROP COVERAGE: None

NOTE: THIS UNIT IS THE SALEI PLAINS.
NGORONGORO/MONDULI DISTRICTS

LAND PLANNING UNIT N

AREA: \(810 \text{ km}^2\) (5 grid squares)

TOPOGRAPHY: Hills (80%)
Escarpments (40%)
Undulating (20%)

SOILS: Grey-brown (100%)
Grey (80%)
Red-brown (20%)

VEGETATION: Wooden Grassland (80%)
Wooded Bushland (80%)
Forests (20%)
Agriculture (0%)

LIVESTOCK: Density - 43.8/km² (medium)
Ratio - 4.3:1 (cattle to shoats)

WILDLIFE: Density - 0.7/km² (low)

HOUSES: Agricultural - 0.1/km²
Occupied Nkang - None

CROP COVERAGE: None

NOTE: THIS UNIT IS THE LOLIONDO HILLS.
SUB-UNIT "Na" IS THE LOLIONDO FOREST RESERVE.
NGORONGORO/MONDULI DISTRICTS

LAND PLANNING UNIT O

AREA: \(1022 \text{ km}^2\) (6 grid squares)

TOPOGRAPHY: Hills (100%)
Inselbergs (17%)

SOILS: Grey (100%)
Grey-brown (83%)

VEGETATION: Wooded Grassland (83%)
Grassland (33%)
Wooded Bushland (33%)
Thickets (33%)
Forests (17%)
Agriculture (0%)

LIVESTOCK: Density - 51.1/km\(^2\) (medium)
Ratio - 0.72:1 (cattle to shoats)

WILDLIFE: Density - 18.1/km\(^2\) (medium)

HOUSES: Agricultural - None
Occupied Nkang - 0.2/km\(^2\)

CROP COVERAGE: Low

NOTE: THIS UNIT IS THE MUNDOROSI HILLS.
NGORONGORO/MONDULI DISTRICTS

LAND PLANNING UNIT P

AREA: \(4218 \text{ km}^2\) (29 grid squares)

TOPOGRAPHY: Undulating (97%)
Hills (34%)
Escariments (14%)
Flat Land (7%)

SOILS: Brown (52%)
Grey-brown (48%)
Red-brown (10%)
Grey (10%)

VEGETATION: Bushed Grassland (72%)
Grassland (69%)
Wooded Grassland (17%)
Wooded Bushland (10%)
Bushland (3%)
Woodland (3%)
Agriculture (0%)

LIVESTOCK: Density - 69.2/km² (medium)
Ratio - 0.89:1 (cattle to shoats)

WILDLIFE: Density - 12/km² (medium)

HOUSES: Agricultural - 0.2/km²
Occupied Nkang - 0.4/km²

CROP COVERAGE: Low

NOTE: THIS UNIT IS THE RIFT VALLEY PLAINS.
NGORONGORO/MONDULI DISTRICTS

LAND PLANNING UNIT Q

AREA: 2095 km² (12 grid squares)

TOPOGRAPHY: Hills (100%)
Escarpments (17%)
Undulating (8%)

SOILS: Brown (67%)
Grey-brown (50%)
Red-brown (42%)

VEGETATION: Bushed Grassland (67%)
Grassland (58%)
Wooded Grassland (33%)
Wooded Bushland (17%)
Bushland (8%)
Forests (8%)
Agriculture (0%)

LIVESTOCK: Density - 75.4/km² (medium)
Ratio - 0.65:1 (cattle to shoats)

WILDLIFE: Density - 2.9/km² (low)

HOUSES: Agricultural - 2.3/km²
Occupied Nkang - 0.03/km²

CROP COVERAGE: Low

NOTE: THIS UNIT IS THE GELAI, KITUMBEINE, LEPURKO, LOSIMINGURI, AND MONDULI MOUNTAINS. SUB-UNITS MARKED "Qa" ARE FOREST RESERVES.
NGORONGORO/MONDULI DISTRICTS

LAND PLANNING UNIT R

AREA: $1120\text{ km}^2$ (6 grid squares)

TOPOGRAPHY: Hills (100%)
Undulating (33%)
Inselbergs (17%)

SOILS: Grey-brown (50%)
Red-brown (33%)
Brown (33%)

VEGETATION: Wooded Bushland (83%)
Wooded Grassland (50%)
Bushed Grassland (17%)
Agriculture (0%)

LIVESTOCK: Density - 46.1/km$^2$ (medium)
Ratio - 0.32:1 (cattle to shoats)

WILDLIFE: Density - 1/km$^2$ (low)

HOUSES: Agricultural - 2.1/km$^2$
Occupied Nkang - 2.2/km$^2$

CROP COVERAGE: Low

NOTE: THIS UNIT IS THE ENGARENAIBOR HILLS.
NGORONGORO/MONDULI DISTRICTS

LAND PLANNING UNIT S

AREA: 2130 km² (15 grid squares)

TOPOGRAPHY: Undulating (93%)
Hills (27%)
Escariments (13%)

SOILS: Grey-brown (67%)
Red-brown (47%)
Brown (7%)

VEGETATION: Wooded Grassland (67%)
Grassland (47%)
Bushed Grassland (40%)
Wooded Bushland (20%)
Agriculture (0%)

LIVESTOCK: Density - 59.9/km² (medium)
Ratio - 0.53:1 (cattle to shoats)

WILDLIFE: Density - 4.5/km² (medium)

HOUSES: Agricultural - 0.4/km²
Occupied Nkang - 0.2/km²

CROP COVERAGE: Low

NOTE: THIS UNIT IS THE LONGIDO PLAINS.
NGORONGORO/MONDULI DISTRICTS

LAND PLANNING UNIT U

AREA: \(630 \text{ km}^2\) (3 grid squares)

TOPOGRAPHY: Undulating (100%)

SOILS: Grey-brown (100%)
Red-brown (66%)

VEGETATION: Grassland (66%)
Bushland (66%)
Bushed Grassland (66%)
Wooded Grassland (66%)
Agriculture (0%)

LIVESTOCK: Density - 30.7/km\(^2\) (medium)
Ratio - 0.29:1 (cattle to shoats)

WILDLIFE: Density - 1.7/km\(^2\) (low)

HOUSES: Agricultural - None
Occupied Nkang - 0.4/km\(^2\)

CROP COVERAGE: None

NOTE: THIS UNIT IS THE TINGATINGA AREA.
NGORONGORO/MONDULI DISTRICTS

LAND PLANNING UNIT V

AREA: \( 635 \text{ km}^2 \) (3 grid squares)

TOPOGRAPHY: Undulating (100%)
Hills (33%)

SOILS: Brown (100%)
Red-brown (33%)

VEGETATION: Grassland (66%)
Bushland (33%)
Bushed Grassland (33%)
Wooded Grassland (33%)
Agriculture (0%)

LIVESTOCK: Density - 64.2/km\(^2\) (medium)
Ratio - 0.27:1 (cattle to shoats)

WILDLIFE: Density - 0.2/km\(^2\) (low)

HOUSES: Agricultural - None
Occupied Nkang - 0.4/km\(^2\)

CROP COVERAGE: Moderate

NOTE: THIS UNIT IS THE OLMOLOG AREA.
NGORONGORO/MONDULI DISTRICTS

LAND PLANNING UNIT W

AREA: \(580 \text{ km}^2\) (3 grid squares)

TOPOGRAPHY: Undulating (100%)

SOILS: Brown (100%)

VEGETATION: Grassland (100%)

Agriculture (0%)

LIVESTOCK: Density - 75/km\(^2\) (medium)

Ratio - 1.1:1 (cattle to shoats)

WILDLIFE: Density - 4.2/km\(^2\) (medium)

HOUSES: Agricultural - 0.2/km\(^2\)

Occupied Nkang - None

CROP COVERAGE: Moderate

NOTE: THIS UNIT IS THE ARDAI PLAIN.
NGORONGORO/MONDULI DISTRICTS

LAND PLANNING UNIT X

AREA: $575 \text{ km}^2$ (1 grid square)

TOPOGRAPHY: Undulating (100%)

SOILS: Brown (100%)

VEGETATION: Bushed Grassland (100%)
Agriculture (100%)

LIVESTOCK: Density - 455/km$^2$ (extremely high)
Ratio - 0.24:1 (cattle to shoats)

WILDLIFE: Density - None

HOUSES: Agricultural - 11.2/km$^2$
Occupied Nkang - 0.3/km$^2$

CROP COVERAGE: Moderate

NOTE: THIS UNIT IS THE MAKUYUNI AREA.
NGORONGORO/MONDULI DISTRICTS

LAND PLANNING UNIT Y

AREA: $2500 \text{ km}^2$ (18 grid squares)

TOPOGRAPHY: Hills (67%)
- Undulating (56%)
- Inselbergs (17%)

SOILS: Grey-brown (72%)
- Red-brown (61%)
- Brown (33%)
- Grey (11%)

VEGETATION: Wooded Grassland (83%)
- Bushed Grassland (44%)
- Agriculture (17%)
- Grassland (11%)

LIVESTOCK: Density - 5.8/km$^2$ (low)
- Ratio - 0.23:1 (cattle to shoats)

WILDLIFE: Density - 17/km$^2$ (medium)

HOUSES: Agricultural - 0.4/km$^2$
- Occupied Nkang - None

CROP COVERAGE: Moderate

NOTE: THIS UNIT IS THE LOKISALE AREA.
SUB-UNIT "Ya" IS THE TARANGIRE NATIONAL PARK.
NGORONGORO/MONDULI DISTRICTS

OTHER LAND PLANNING UNITS

G - Lake Eyasi Escarpment (285 km²)

J - Gol Mountains (260 km²)

T - Longido Mountain (70 km²)
  (Ta - Longido Forest Reserve)

Z - Mto wa Mbu-Engaruka Area (62 km²)