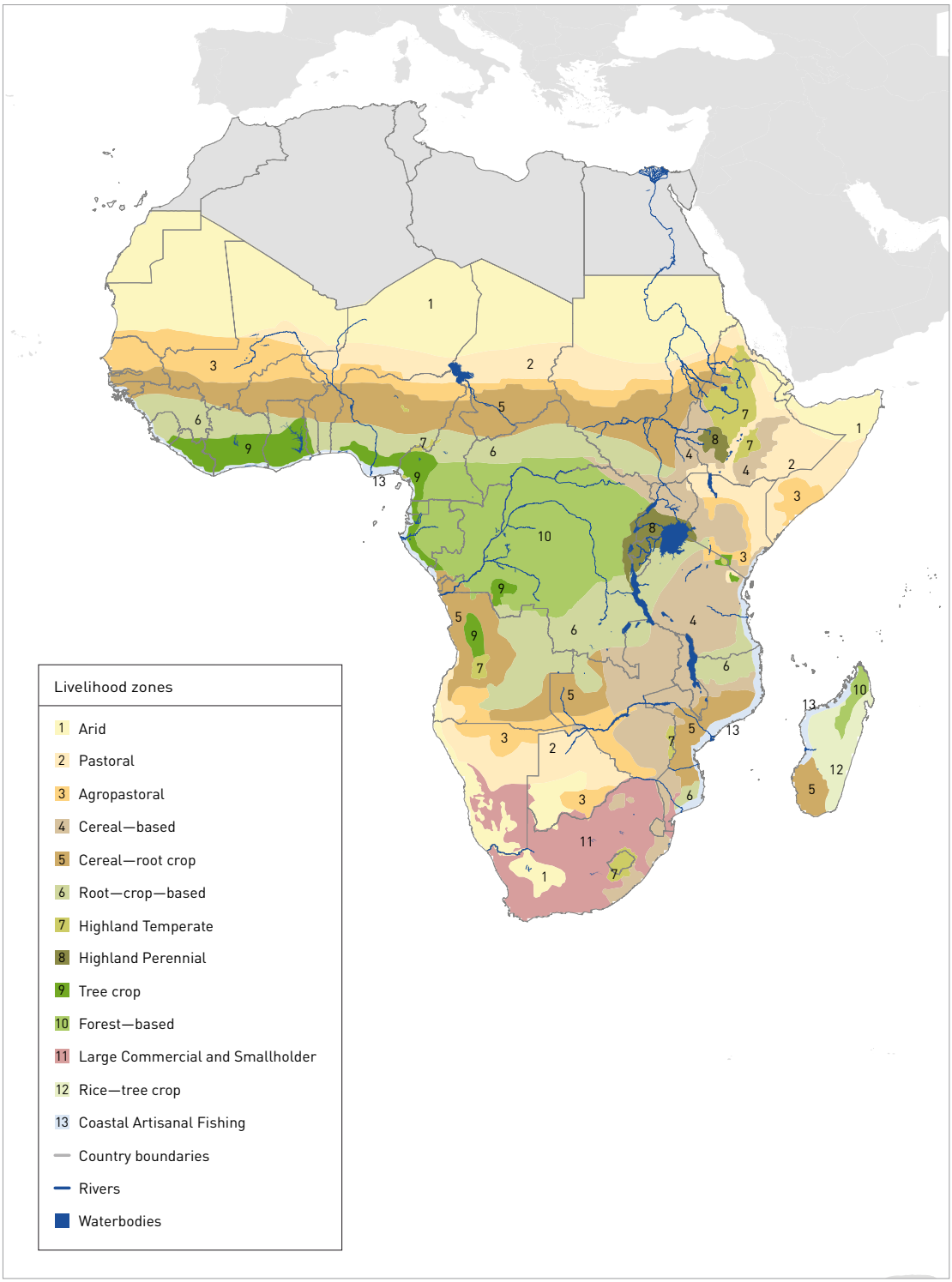
Figure 7 **Main livelihood zones in sub-Saharan Africa**



of food and cash crop production, e.g. vegetables, cotton, rice, and sugar cane;
  - wetland conditions: wetland rice-based livelihood zones, dependent on monsoon rains supplemented by irrigation.
- Zones characterized by farm size and management:
  - dualistic (mixed large commercial and smallholder) livelihood zones, across a variety of ecologies and with diverse production patterns.
- Other zones:
  - coastal artisanal fishing zones;
  - peri-urban zones.

## Analysing poverty, water and agriculture across livelihood zones

For the purposes of this study, issues relating to water and rural poverty have been analysed and mapped out in each livelihood zone in order to define linkages and identify the potential of each zone in terms of water development and poverty reduction through water interventions.

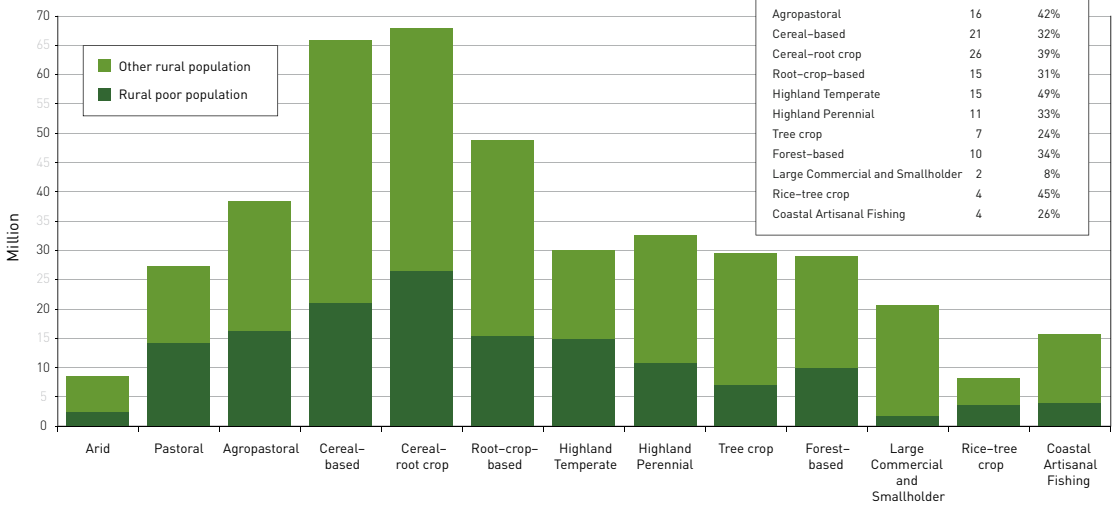
### Rural poverty

As shown in Figure 5, the rural poor are spread out across the region with a higher concentration in East Africa, the Lake Victoria basin, Madagascar and the Gulf of Guinea.

Figure 8 shows that, in absolute terms, the cereal–root crop zone and the cereal–based zone host the largest number of rural poor, with 26 and 21 million, respectively. This is principally because of the large area and rural population of these zones. Although droughts can occur, poverty is not mainly driven by climate variability in these zones. It is also related to socio-economic factors, such as very small farm size or landlessness, lack of oxen, low off-farm income, and deteriorating terms of trade for maize producers (FAO and World Bank, 2001).

In relative terms, the pastoral zone is the one with the highest share of rural poor (more than 50 percent of rural population is poor). As in the agropastoral zone (42 percent are poor), the main sources of poverty appear to be climate variability and a high vulnerability to droughts. These zones

Figure 8
**Poor as part of rural population in livelihood zone of SSA**




| Livelihood zone | Rural poor Million | Rural poor % of rural population |
|---|---|---|
| Arid | 2 | 28% |
| Pastoral | - | 52% |
| Agropastoral | 16 | 42% |
| Cereal–based | 21 | 32% |
| Cereal–root crop | 26 | 39% |
| Root–crop–based | 15 | 31% |
| Highland Temperate | 15 | 49% |
| Highland Perennial | 11 | 33% |
| Tree crop | 7 | 24% |
| Forest–based | 10 | 34% |
| Large Commercial and Smallholder | 2 | 8% |
| Rice–tree crop | 4 | 45% |
| Coastal Artisanal Fishing | 4 | 26% |

present similar features – climate represents the main driver for rural poverty resulting in crop failure (in agropastoral areas), famines and food shortages, and livestock weakness, which leads to deaths and price falls. Besides droughts, rural poverty is aggravated by low levels of assets. Better-off households are food secure even in most bad years because their abundant livestock can compensate the lack or loss of grain. Households in the lower stratum are chronically food insecure in both good and bad years because they cannot grow enough grain to feed themselves, and they do not have enough livestock or other assets to exchange for grain. Poverty is also exacerbated by physical isolation and, consequently, the lack of infrastructure, access to markets and health facilities. However, insufficient access to water is a crucial element determining rural poverty.

The highland temperate zone presents severe poverty both in relative and absolute terms. Political instability, migrations and civil conflicts have had a strong impact on the rural poor population of this area. In addition, interannual variability in rainfall has caused several droughts in the last 20 years and, as a result, wide fluctuations in agricultural production have been observed. This has contributed to famines that have been responsible for increases in poverty and a considerable narrowing of the horizons of the country's rural households.The zone is also characterized by ineffective and inefficient agricultural marketing, inadequate production technologies, a lack of developed transport and communication networks, and limited access of rural households to support services. These factors, combined with a lack of participation by the rural poor in decisions that affect their livelihoods, contribute to maintaining high levels of rural poverty.

The rice–tree crop zone also contains a significant percentage of rural poor although the absolute number is limited. Farmers in this zone eke out a living under subsistence agriculture, whose products are hardly enough to feed their families. The average size of a family plot is small (1–1.5 ha). With the population growth in Madagascar, this situation has been aggravated further, and malnutrition has increased. The isolation of the rural population and the lack of adequate infrastructure and markets also contribute to make living conditions hard.

### Agriculture and water

In the last 40 years, the cultivated area has expanded at an annual rate of nearly 0.75 percent. This has mostly happened through conversion of forest and grasslands and shortening of fallows. Up until 2030, cultivated land is projected to expand more slowly, but the actual rate of expansion will depend upon the future evolution of livelihood zones (FAO and World Bank, 2001).

The Global Agro-Ecological Zones (GAEZs) dataset developed by the International Institute for Applied Systems Analysis (IIASA) and FAO (IIASA and FAO, 2000) provides spatially distributed information on "cropland", defined as a land cover type. This study has adopted cropland as defined in the GAEZ assessment as the best geo-referenced approximation for cultivated land. However, at the level of the region, there is a discrepancy between the GAEZ cropland area (234 000 ha) and official data on cultivated land (arable and permanent crops, 210 million ha in 2005) as provided by FAOSTAT-2008.

As shown in Figures 9 and 10, cultivated land is mainly concentrated in the agropastoral, cereal–root crop, and cereal–based zones. They account for almost 60 percent (130 million ha) of the total cultivated land in the region, and cover nearly 30 percent of the total land. The cereal–based zone serves as the food basket of the East and Southern Africa region. Both local and hybrid maize is grown (the former often being preferred for home consumption because of its better taste in spite of lower yields) (FAO and World Bank, 2001).

Table 4 Poverty, water and agriculture in livelihood zones of sub-Saharan Africa

| Livelihood zone | Area (1 000 Km²) | Rural population (1 000) | Rural poor (1 000) | Area cultivated (1 000 ha) | Pasture (1 000 ha) | Livestock (1 000 ruminants) | Irrigated areas (1 000 ha) | Irrigation potential (1 000 ha) | Anthropogenic pressure on water resources* | Irrigated areas/ Irrigation potential |
|---|---|---|---|---|---|---|---|---|---|---|
| Arid | 5 144 | 8 342 | 2 332 | 1 545 | 33 607 | 8 368 | 780 | 2 088 | 78.4% | 37.3% |
| Pastoral | 2 692 | 27 245 | 14 129 | 10 150 | 190 594 | 24 224 | 1 202 | 2 042 | 40.8% | 58.9% |
| Agropastoral | 2 132 | 38 432 | 16 208 | 42 464 | 148 440 | 35 174 | 917 | 2 300 | 8.1% | 39.9% |
| Cereal-based | 2 452 | 65 901 | 20 912 | 36 038 | 137 440 | 24 497 | 624 | 5 182 | 2% | 12% |
| Cereal-root crop | 3 174 | 67 942 | 26 434 | 51 624 | 194 555 | 38 576 | 448 | 7 759 | 1% | 5.8% |
| Root-crop-based | 2 810 | 48 712 | 15 227 | 28 806 | 128 651 | 16 240 | 187 | 8 640 | 0.2% | 2.2% |
| Highland Temperate | 439 | 30 034 | 14 816 | 10 275 | 27 509 | 12 378 | 174 | 1 768 | 2% | 9.8% |
| Highland Perennial | 320 | 32 755 | 10 795 | 7 080 | 9 883 | 6 255 | 54 | 833 | 0.8% | 6.5% |
| Tree crop | 732 | 29 625 | 7 035 | 13 683 | 23 944 | 4 186 | 116 | 2 512 | 0.4% | 4.6% |
| Forest-based | 2 624 | 29 170 | 9 991 | 11 007 | 58 514 | 3 328 | 92 | 6 722 | 0.1% | 1.4% |
| Large Commercial and Smallholder | 1 228 | 20 439 | 1 585 | 15 268 | 78 494 | 12 833 | 1 418 | 1 390 | 24.5% | 100% |
| Rice-tree crop | 309 | 8 052 | 3 654 | 2 701 | 20 803 | 1 153 | 694 | 780 | 4.7% | 88.9% |
| Coastal Artisanal Fishing | 387 | 15 558 | 4 035 | 3 631 | 13 921 | 1 967 | 374 | 1 113 | 1.7% | 33.6% |

*Agricultural water withdrawal / Total available runoff

Figure 9 **Cultivated land (rainfed and irrigated) of sub-Saharan Africa**