



United Nations
Economic Commission for Africa

Poverty Maps

**A useful tool for policy
design to reduce poverty**

Working Paper

By

Adrian Gauci and Vanessa Steinmayer

Poverty and Social Policy Team

Economic and Social Policy Division

The picture of poverty is becoming more and more complex. On the continent, in particular in Sub-Saharan Africa (SSA) poverty levels have remained the same over the last decade. The magnitude of poverty in SSA as measured by the percentage of poor people living on less than \$ 1 a day was 45 per cent in 1990, and slightly increased to 46 per cent in 1999(Sachs 2005). But in absolute numbers, the poor population increased from 227 million to 313 million, a net addition of 86 million people to the rank of the poor, which by any account is a significant number. This is because poverty seems to have become entrenched and efforts to alleviate poverty have been rather unsuccessful. This shows that even though the rate of poverty more or less remained unchanged in Africa, the burden of poverty increased significantly. Even Africa's success stories such as Uganda, still have a high rate of poverty. For example the Ugandan economy grew 6.2% in 2001/02, slightly above the 5.9% growth a year before. The solid growth has been accompanied by substantial poverty reduction—lifting more than 4 million people from poverty (22% of the population) in a decade. Yet the national poverty numbers mask vast regional disparities (ECA 2003). The central and western areas of the country have grown more rapidly than the northern and the eastern regions.

The role of the State in alleviating poverty through efficient public expenditure is vital. For effective and efficient spending on poverty reduction, it is therefore necessary to use tools to support efficient targeting of expenditure to the poor.

In many countries, poverty is spatially defined. Extreme poverty often occurs in inaccessible areas with unfavourable terrain, while there is relative affluence in locations close to major cities and markets. Poverty mapping¹ is a useful tool in focusing on pockets of poverty spatially distributed within countries. Furthermore, considering poverty as a multifaceted human phenomenon, certain determinants of poverty can be mapped to provide wider policy options. For example the low status of infrastructure in SSA countries outside main cities significantly contributes to the lack of market access for the poor. This infrastructure can be mapped to determine areas of intervention, and optimization of public investment. Information on the special distribution of poverty is therefore of interest to policy makers for a number of reasons:

- Spatial distribution of poverty can be used to quantify suspected regional disparities in living standards and identify which areas are falling behind in the process of economic development;
- It facilitates the targeting of poverty alleviation programmes such as education, health, credit, and food aid; and,
- Geographic factors associated with poverty, such as landlockedness, mountainous terrain, prevalent farming systems, or distance from markets can partly explain persistent poverty trends

Spatial poverty maps

The production of poverty maps requires local levels of disaggregated data (Elbers 2004). Sub-regional levels of disaggregation within countries already exhibit some informative aspects not captured at the national level. For example West Africa has a relatively low national poverty

¹ Keith Forbes, a consultant in the Economic and social Policy Division (ESPD), produced the maps in this document. For some of the earlier maps thanks should go to the Geoinformation team of the Development Information Systems Division (DISD).

incidence of 39 per cent against 60 per cent for Southern Africa and 51 per cent for East Africa, yet it has the highest number of poor people. The rural areas in Southern Africa has a poverty incidence of 66 per cent, whilst West Africa has an incidence of 45 per cent (Forbes 2005).

However the most informative mapping is at a lower level of aggregation. National policies to accelerate growth and reduce poverty require intra- country comparisons. It is at the province, district or lower administrative level within countries that policy makers can have better information. (Demombynes 2002). Poverty incidence at the sub-regional level within countries exhibits a clear picture of the incidence across geographical space. However the poverty incidence at the local level does not address the multifaceted nature of poverty.

Poverty as a multifaceted phenomenon is more complex than intra-country poverty incidence. As a policy tool poverty mapping can assist in pinpointing various factors that determine that particular spatial distribution. Evidence available on spatial poverty in Africa shows that interregional or intra-country poverty difference is much more pronounced than inter-country poverty differences². Geographical differences are not only important for efficient targeting but also a contributory factor to lower economic performance at the national level. Remote and inaccessible areas have in the past served among other things as hotbeds for disruptive insurgency, rebel movements and civil strife making conflict a ghastly presence and a major source of Africa's tragedy.

A number of determinants of poverty considered in a selection of SSA countries show some structural aspects of spatial poverty. As a way of illustration, this document will show the geographical distribution of poverty incidence for a number of selected countries. In addition certain key factors that contribute to spatial poverty traps, such as, infrastructure, farming systems, management of water basins and their diaqastribution within countries will be shown.

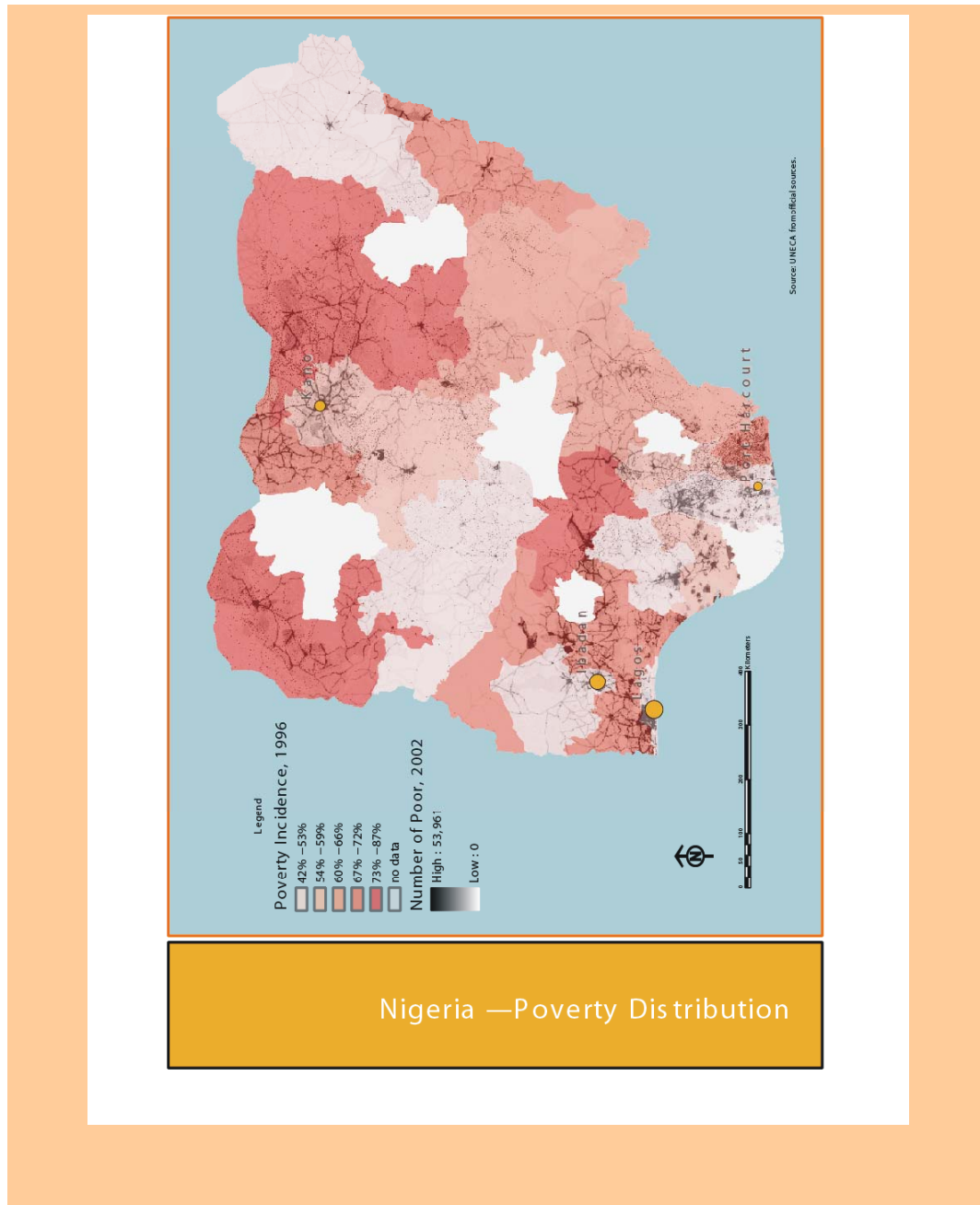
The methodology for the generation of poverty maps is based on estimates of consumption or income-based welfare outcomes at the local level. This approach involves imputing consumption or income at the unit-record level into the population census based on a set of regression models estimated from household data (Elbers 2004). These imputed estimates are then aggregated into welfare indices at different levels of geographic aggregation. Although largely used for income poverty maps other close correlates of poverty can be mapped. This allows a broader range of policy options in poverty reduction. Data requirements and technical capacity to generate such maps are high. The illustrative maps herein shown are based on data availability and are a 'snap shot' of poverty incidence and certain determinants, but could be used by policymakers in a more dynamic generation of poverty maps. This effectively assists in monitoring targeted expenditure and trends in alleviating poverty, nationally and sub-nationally.

² ECA (2004a)

West Africa

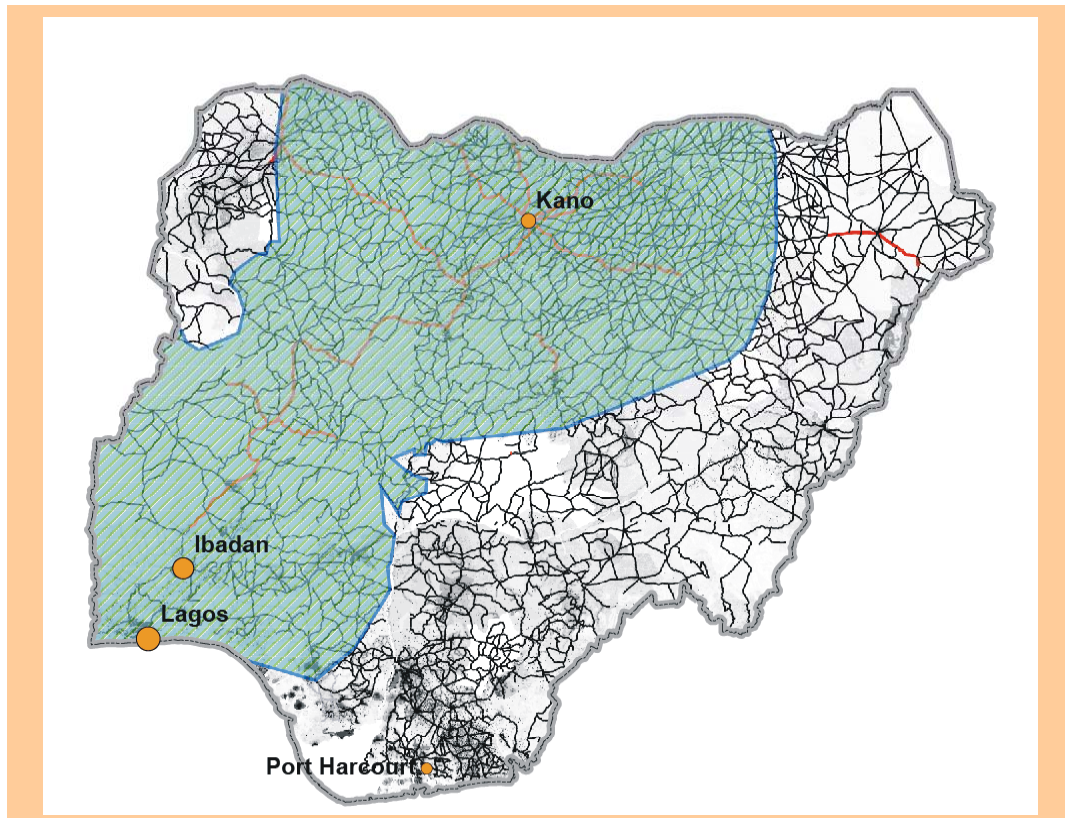
Nigeria

In Nigeria, the increase in poverty incidence with distance from larger centres is apparent. Different from many other countries, Nigeria has with the city of Kano in the north a second centre together with the large centre of the region Lagos-Ibadan in the South. Poverty incidence is therefore less than 50% in the districts of containing Ibadan, Lagos and Kano, while poverty rises to close to 90% in more remote districts.



Nigeria: Infrastructure

Improve infrastructure to market centres: The infrastructural map of Nigeria is concentrated around the big cities. Highways marked in red do not seem to penetrate more remote areas. The vicinity to urban centres is also vicinity to market places. The remoteness of the northwest shows an infrastructural deficiency that correlates with the higher poverty incidence in the same area. Improving infrastructure to connect remote districts to the market centres would therefore contribute to reducing poverty.

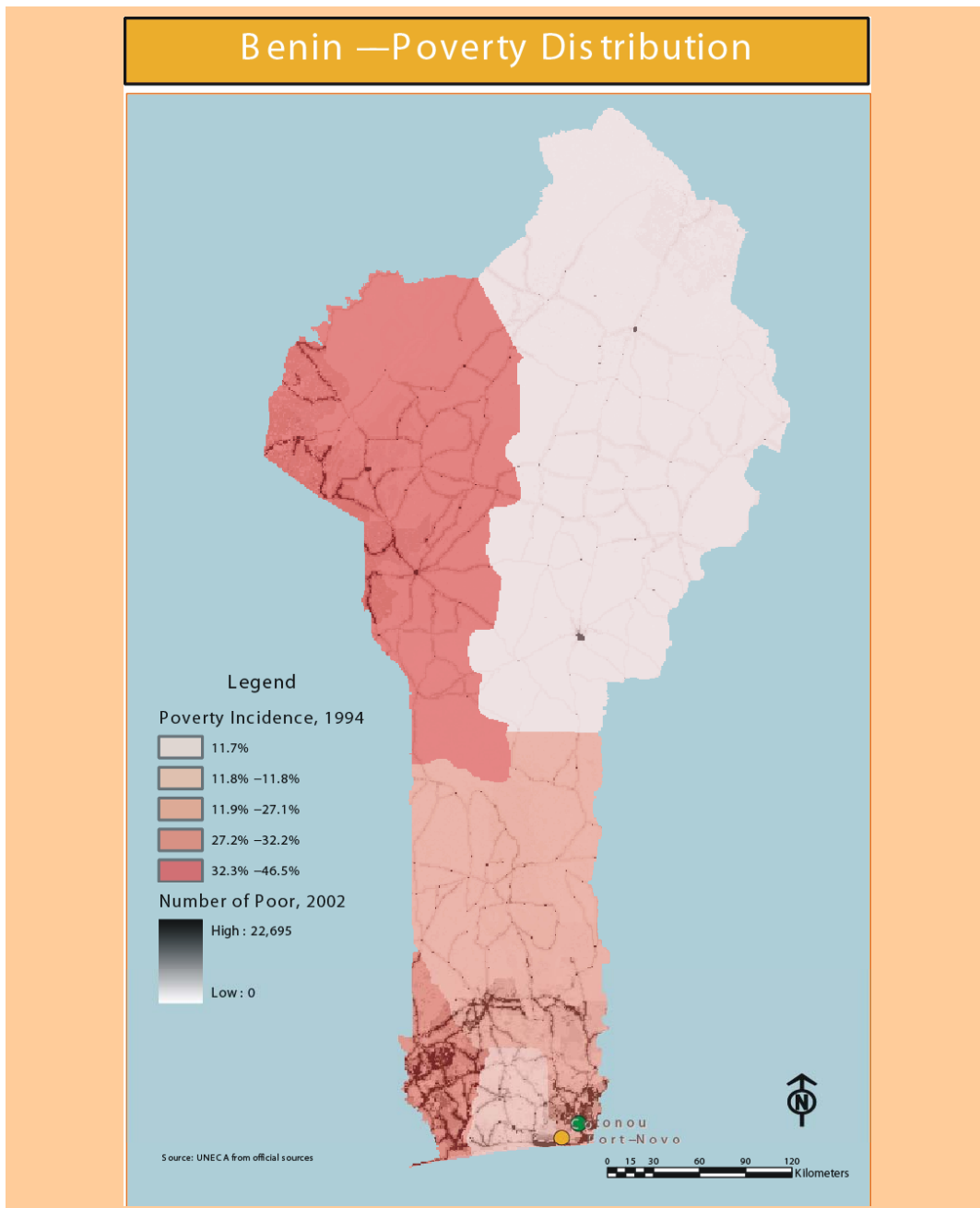


Source: Poverty incidence data provided by the Federal office of statistics (FOS) 1999

West Africa

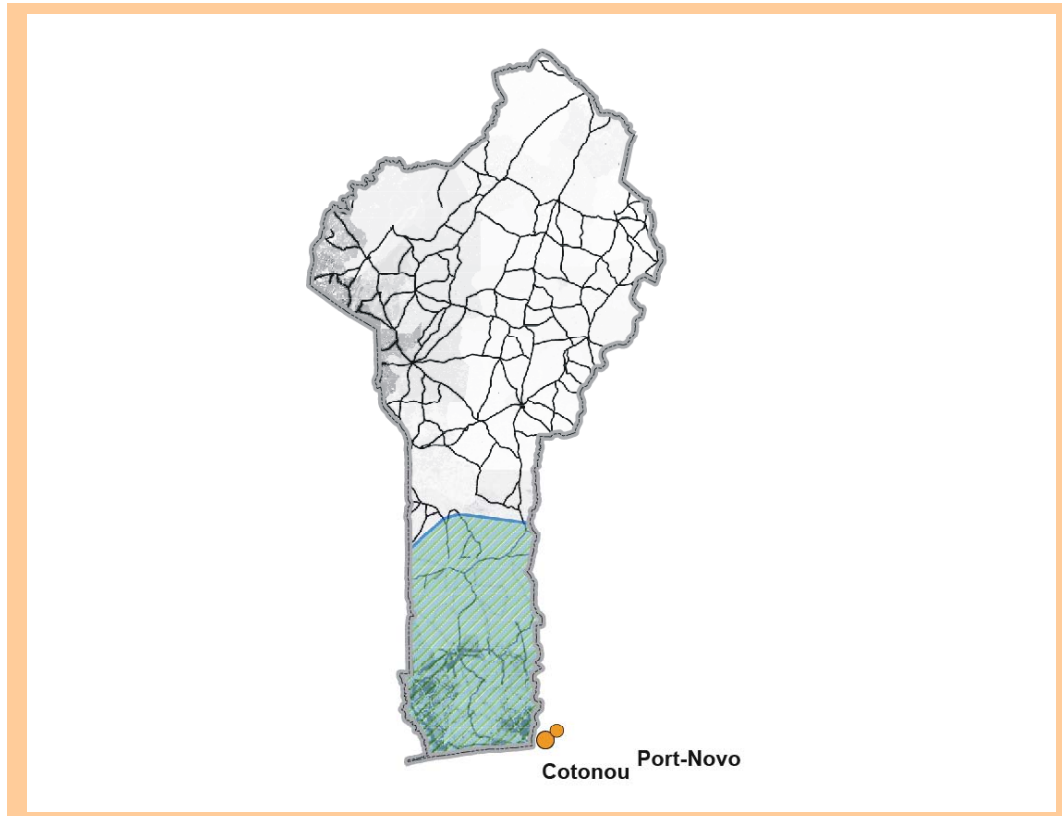
Benin

Benin has a higher poverty incidence in the northwest. It is no coincidence that infertile and severely eroded soils are found in this area. The agricultural production of the drier northwest area is largely cereal-root crops. 85 per cent of the poor live in the area of root production. The link between crops produced and poverty is particularly important in Benin. A concerted effort to increase cereal-root productivity through agricultural Research and development would greatly assist in poverty alleviation in Benin.



Benin: Infrastructure

The absence of a North-South highway axis in Benin results in a lack of market access to northern products. Only a small proportion of land area is within a 10-hour access to markets, but it is where 64 per cent of the poor live. Thus poverty reduction strategies should include the access to markets of all the population.

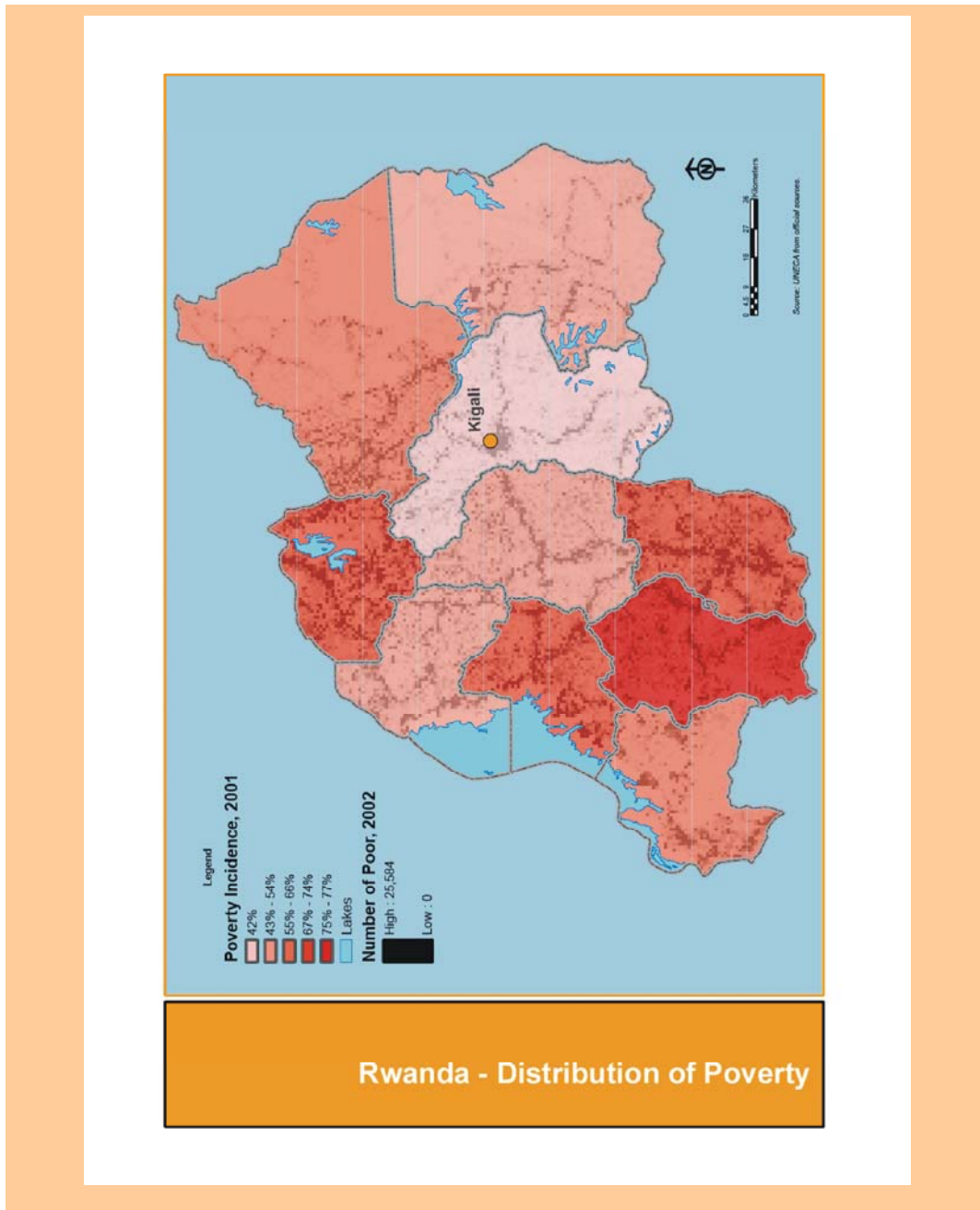


Source: poverty incidence estimates are provided by the Enquest Budget Consommatio. Government of Benin, 1994

East Africa

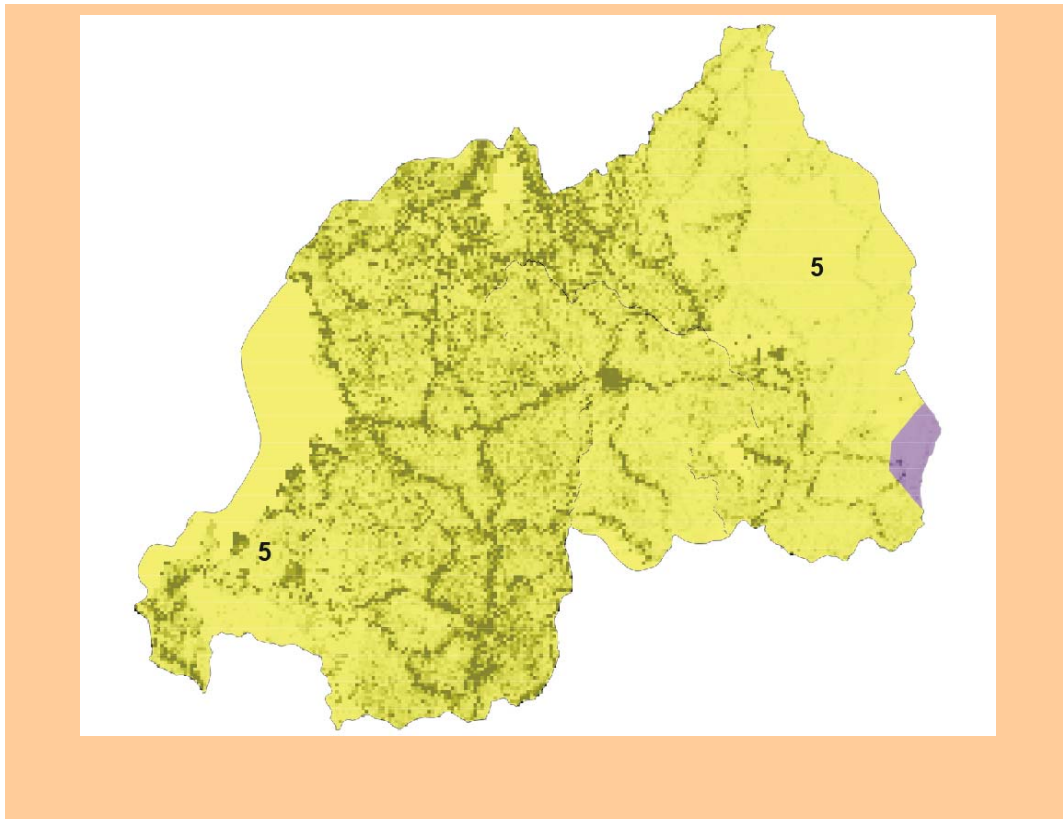
Rwanda

Rwanda has a high population density, with national figures at 250 people per km square. Land use is intensive and farm plots are small. Poverty incidence is high, particularly outside Kigali district and seems to increase with distance from the capital. However in the west, probably due to cross border trade with the Democratic Republic of Congo, poverty incidence drops.



Rwanda: Farming systems

Rwanda has highland perennial cash crop production (Zone 5), practically all over the country. The plot size for over 50 per cent of households is less than 0.5 ha. This is a major contributor to poverty levels. These small plots combined with population growth results in micronutrient overuse in soils and depleting productivity. A programme of increasing agricultural productivity through micronutrient replenishment is necessary to alleviate poverty.

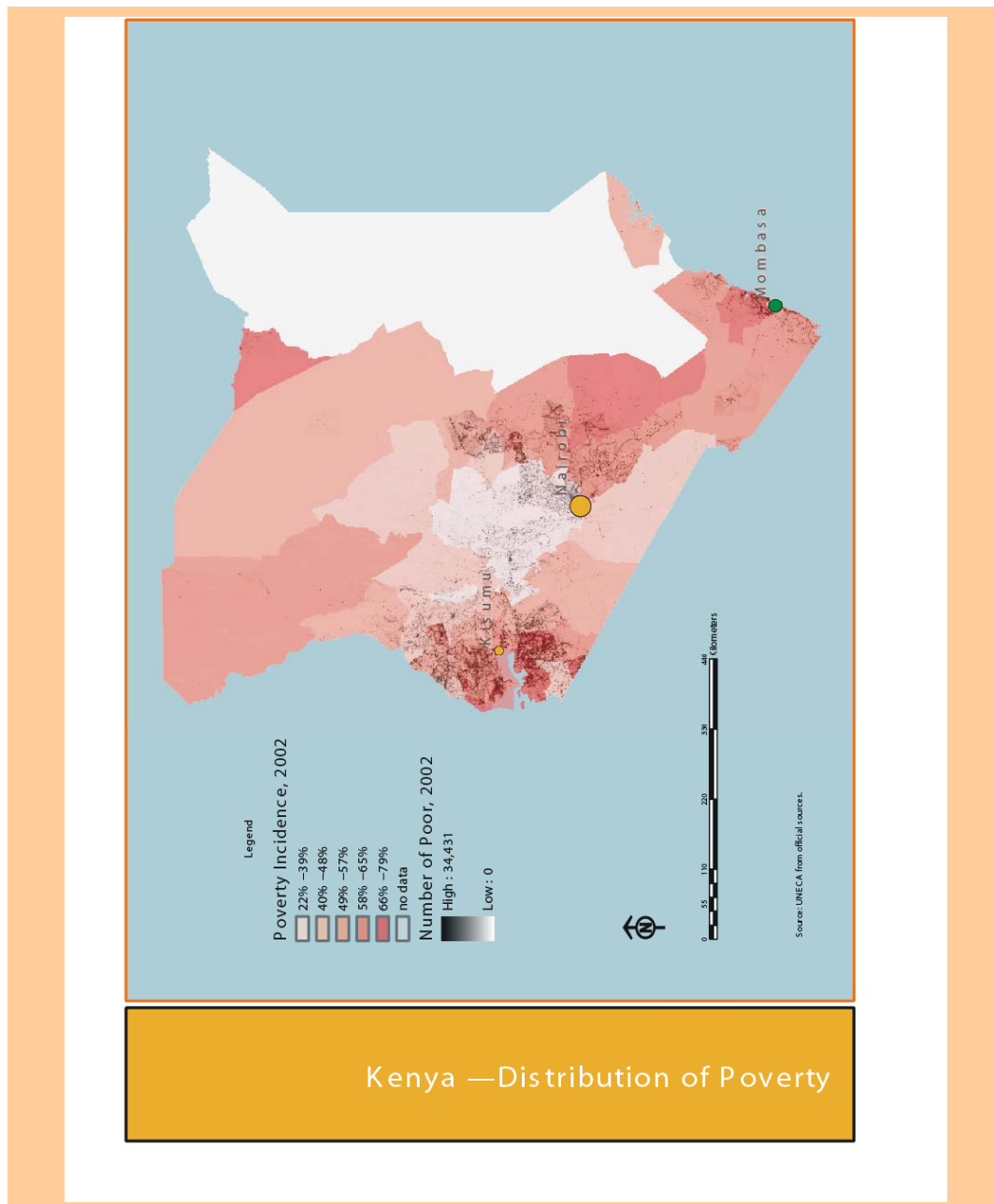


Source: household condition survey, 2001 cited in poverty Reduction strategy paper, Rwanda, July 2002.

East Africa

Kenya

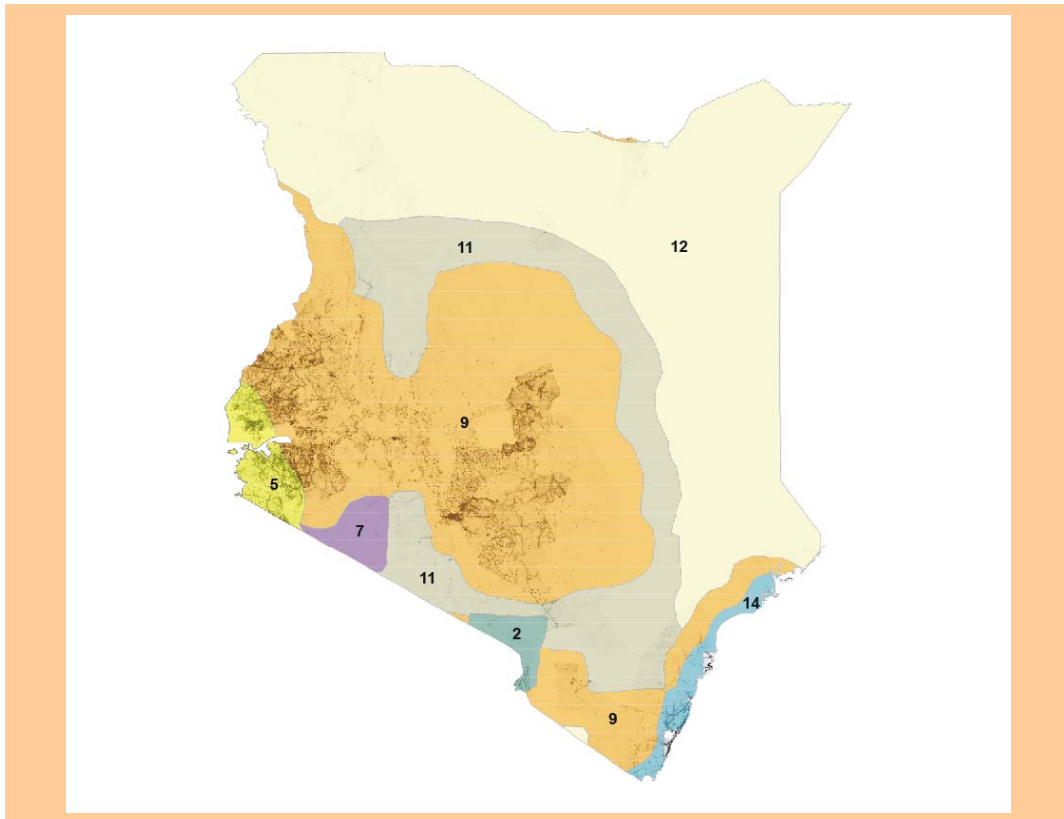
Kenya's geographic poverty trends exhibit a lower incidence around Nairobi and the Central region. An interesting observation is the unexpectedly high poverty incidence around Mombasa. The well developed tourism industry in that area has not positively impacted poverty levels. Poverty rates in the north, although sparsely populated, are also very high.



Source: Poverty data by International livestock Research Institute, Nairobi and Kenyan national statistics Office.

Kenya: Farming systems

Kenya's largest crop area (Zone 9) is mixed maize production. The vast majority of the poor live in this area. Further west highland perennial systems (Zone 5) are practiced. Drier climate surrounding this area (Zone 11 and 12) is where agro-pastoral systems are evidenced. Coastal artisanal fishing (Zone 14) and tree crops (Zone 2) and root crops (Zone 7) complete the picture. However what is of interest is that 77 per cent of poor people produce maize, with highland perennial systems contributing to 12 per cent of poor people live. Maize production can be greatly improved through improved inputs and this would have a positive impact on poverty incidence. Furthermore maize is the staple food for a number of countries in the area. Regional centres of research that can provide innovative techniques of production, and seed improvement is an area that can contribute to poverty reduction.

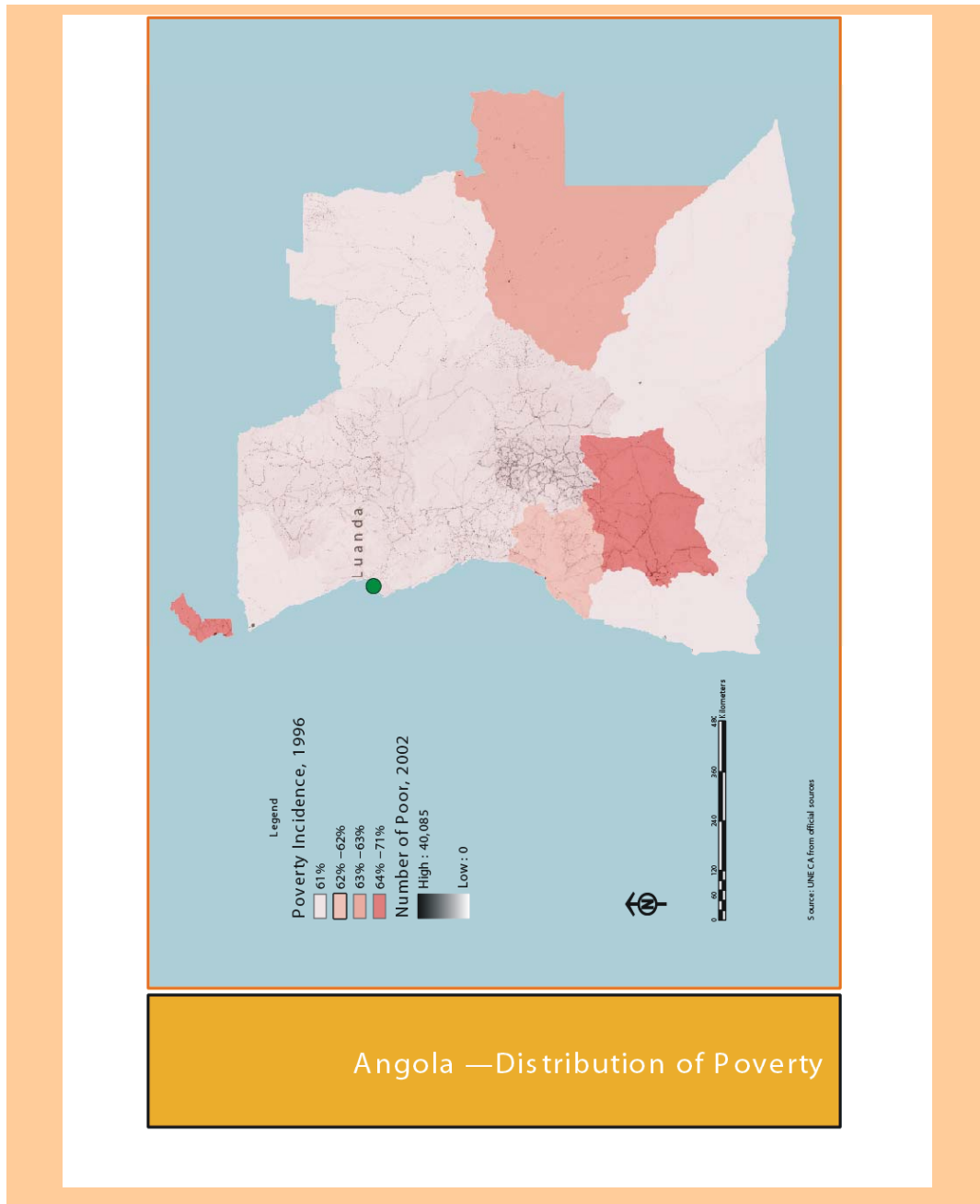


Source: Poverty data by International livestock Research Institute, Nairobi and Kenyan national statistics Office

Southern Africa

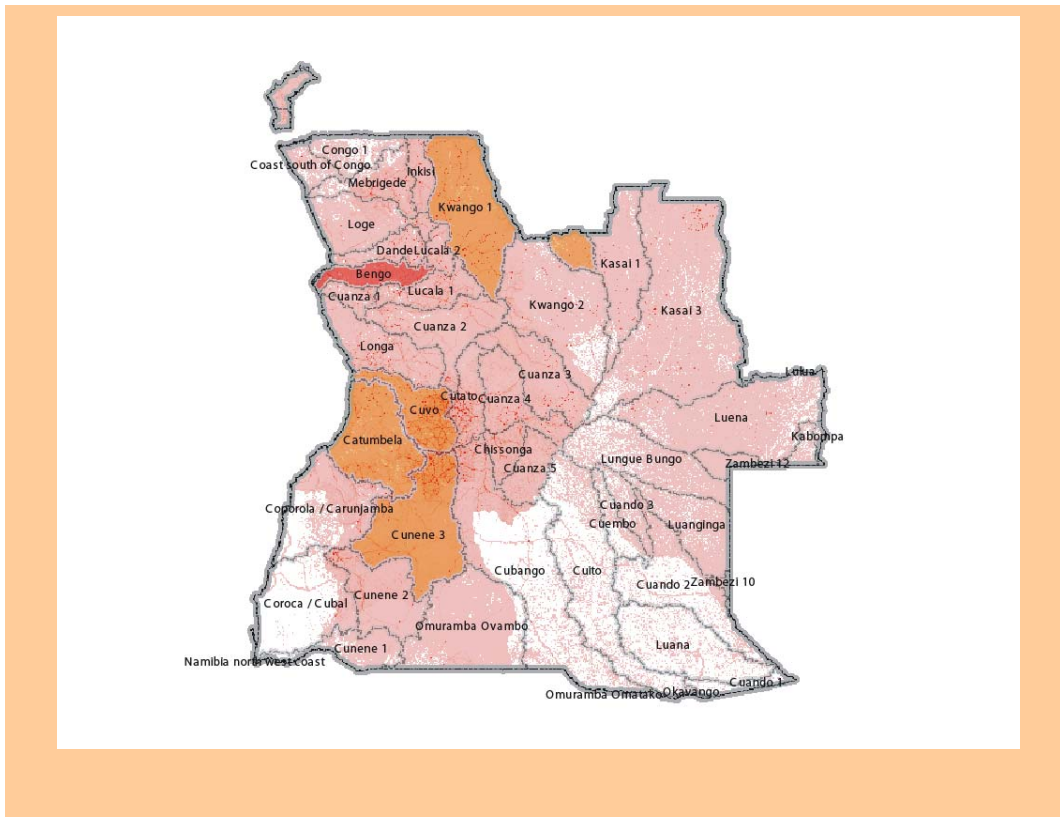
Angola

Poverty incidence in Angola seems to be uniformly spread over the national area. The highest number of poor are concentrated in the central highlands where agricultural production is the mainstay. A particular characteristic of Angola is that outside Luanda there are no major cities. Thus the poor living in the central highlands are more than 10 hours from markets, further exacerbating poverty.



Angola: Water Basin

Harnessing of water basins in Angola is at a very low level. Irrigation intensity and areas are 20 to 25 percent below Southern Africa average. For example the Bengo river basin feeding Luanda, only 0.03 per cent is irrigated. The farmers in the central highlands, the majority of the poor, depend on rainfall for agricultural production and thus are more vulnerable to shocks and hence poverty. Integrated water management, given the hydroelectric dams in Matala and Biopio, could decrease vulnerability and significantly contribute to poverty reduction.

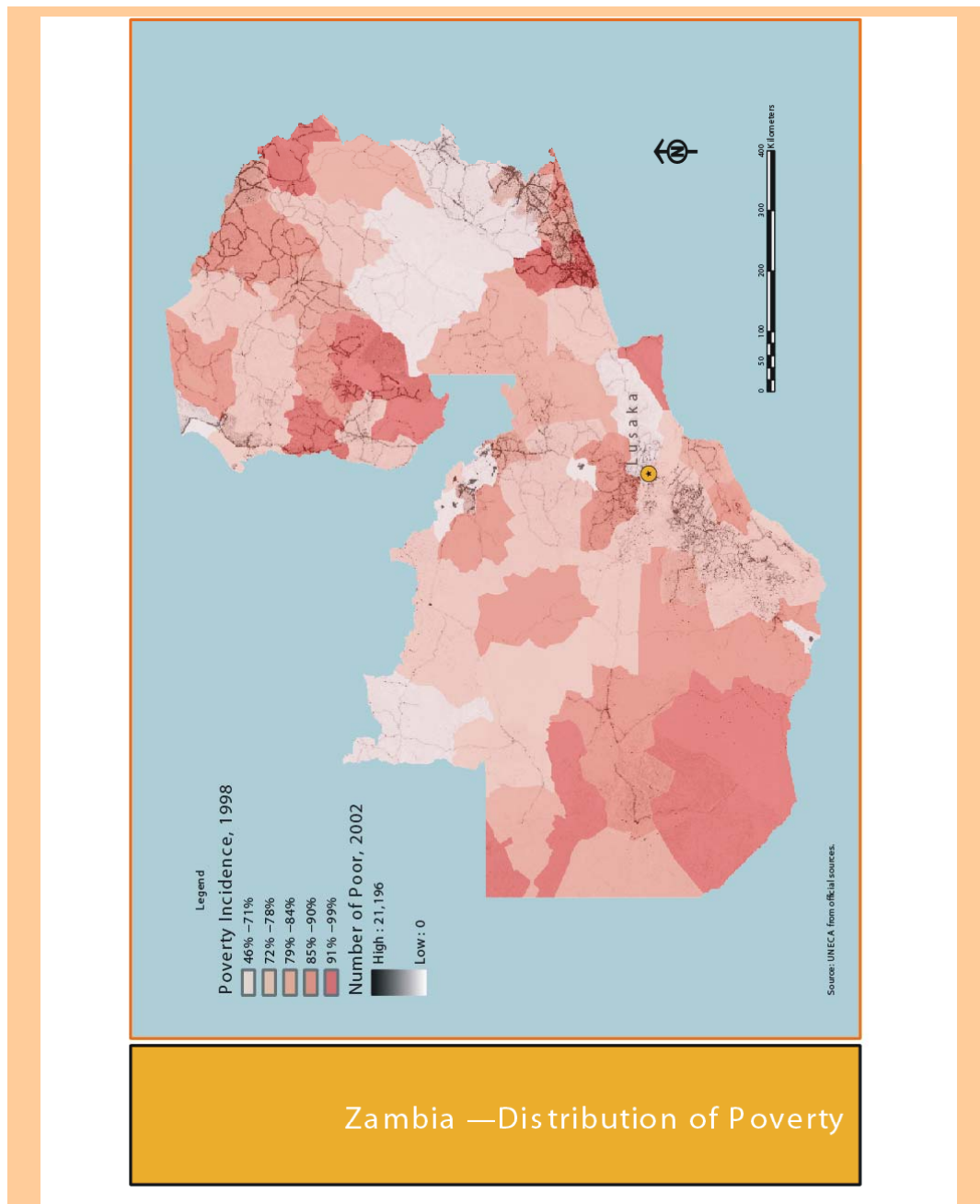


Source: Poverty incidence values are provided by the Instituto Nacional de Estatística., Gabinete de Mobilização das Condições de Vida de População Perfil da pobreza em Angola (1999)

South Africa

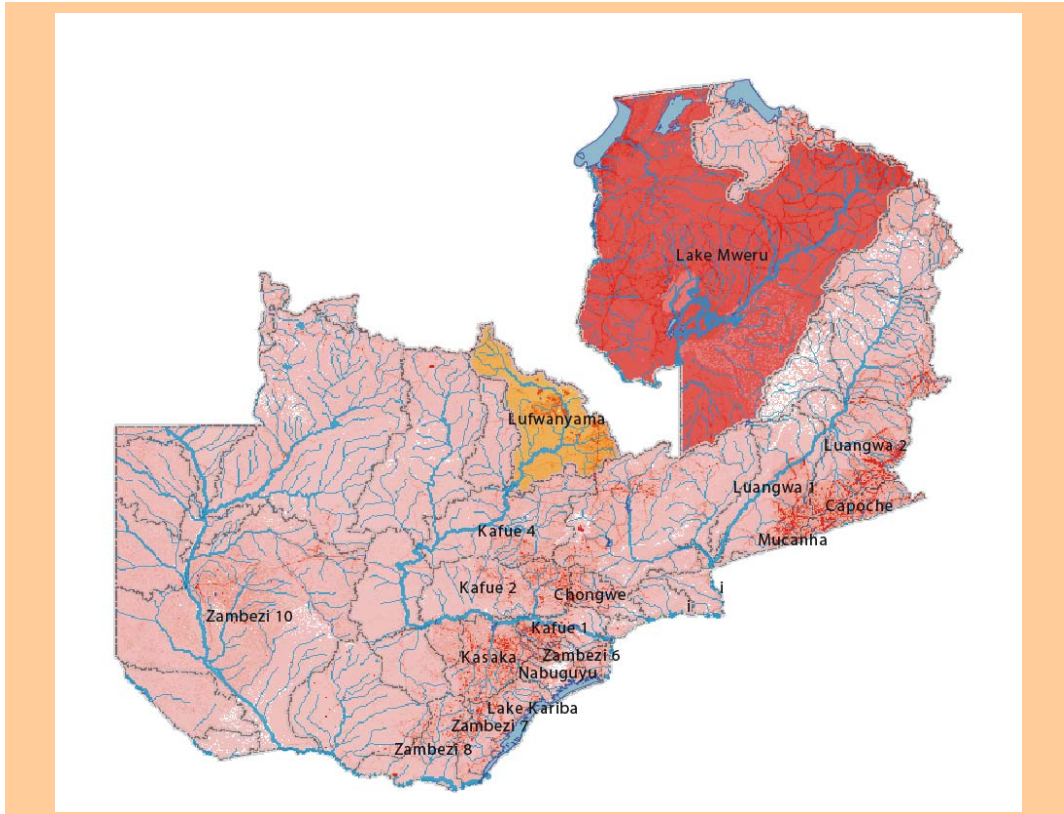
Zambia

Lusaka has the highest number of poor people. Zambia has a striking difference between urban and rural area poverty incidence, 56 per cent and 83 per cent respectively. The eastern part of Zambia has a high poverty incidence related to its isolation. An interesting observation is that open border policies with Malawi and Democratic Republic of Congo would reduce remoteness and dependency of the markets in the major cities-Lusaka and Ndola. Furthermore the number of poor access to market would increase from 43 per cent to 94 per cent.



Zambia: Water Basin

The Lake Mweru covers most of the north east and has the highest number of poor people at 20 per cent. It is not only the availability of water basins that could decrease poverty, but its harnessing for irrigation. In fact 0.4 per cent the Lufwanyama basin, slightly above the Southern Africa average, is under irrigation and contribute to the lower poverty levels are slightly lower. The second water basin Lufwanyama, north of Lusaka houses 14 per cent of the poor.

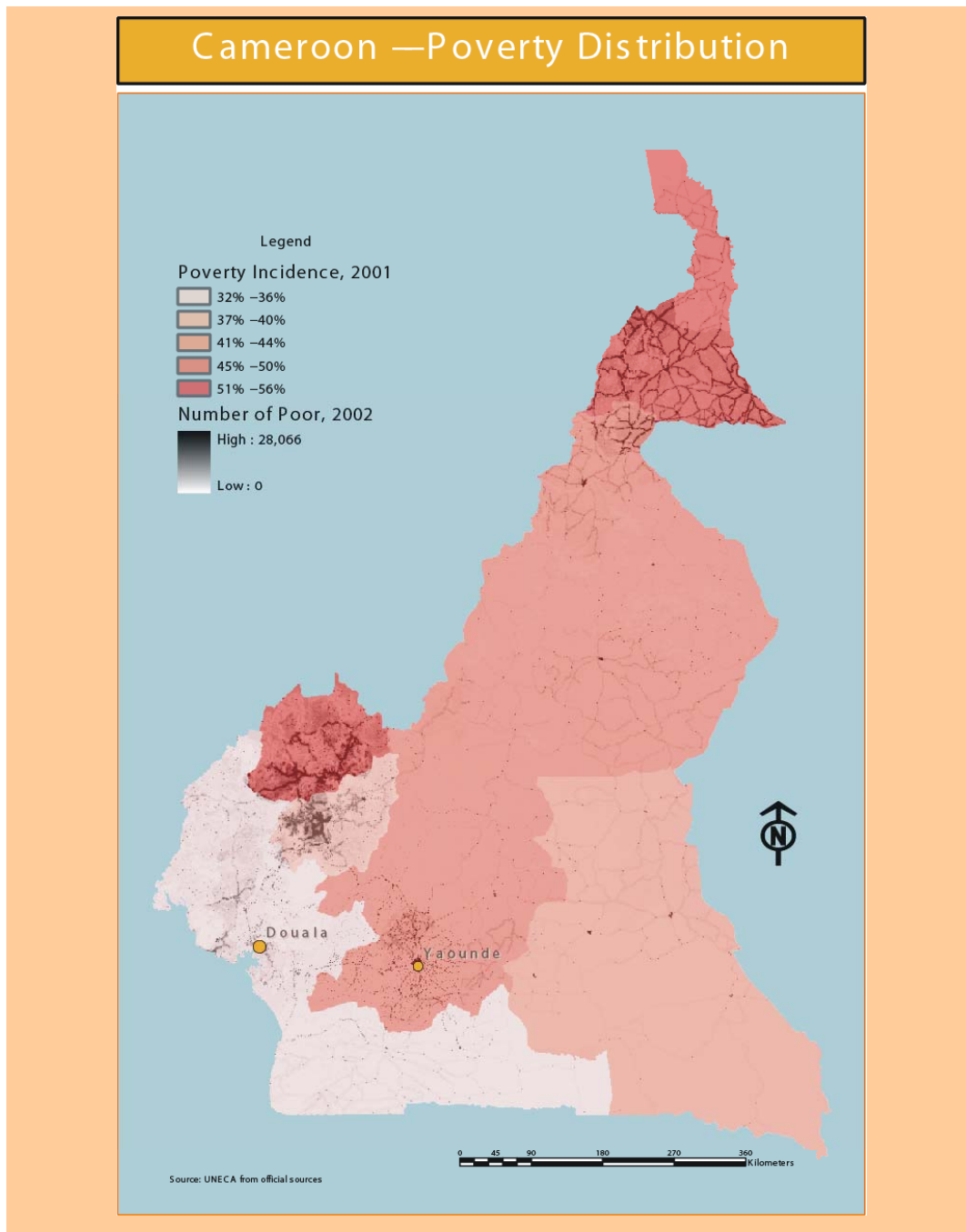


Source: National Statistical Office, Zambia

Central Africa

Cameroon

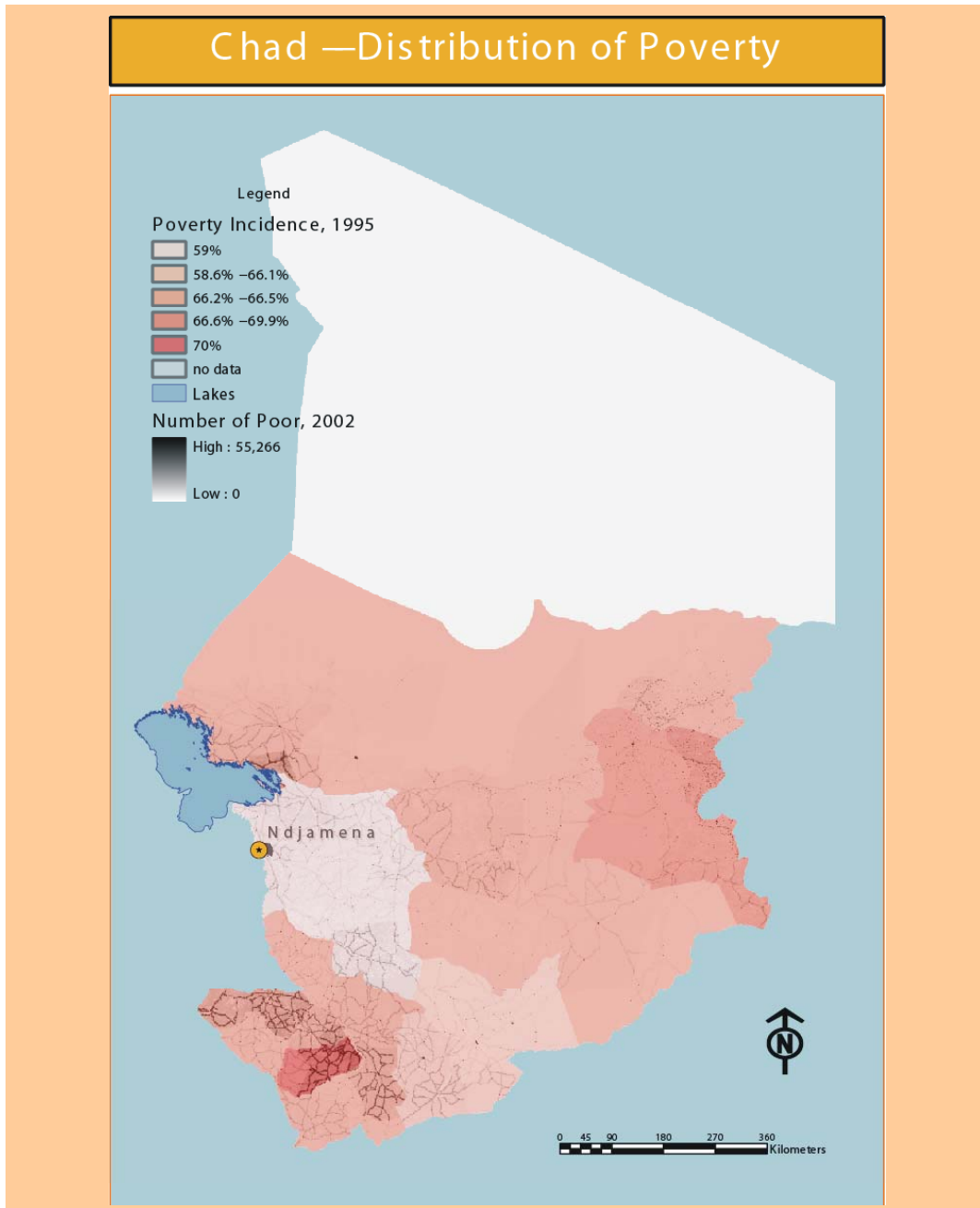
The remoteness of the north from the cities of Douala and Yaounde contributes to the higher poverty incidence. The north portrays agro climatic conditions of the dry Sahel region, further exacerbating poverty levels.



Central Africa

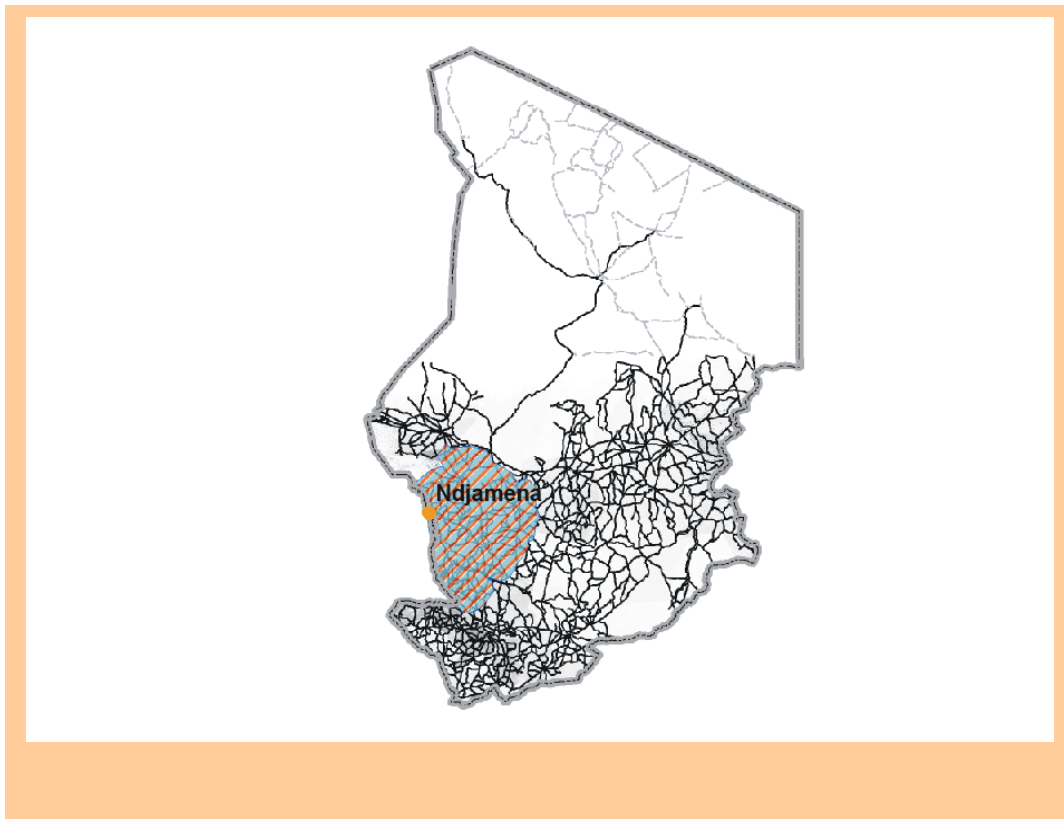
Chad

Chad is a land-locked country of vast size. The capital N'djamena has a lower poverty incidence, frequently found in most SSA countries' capitals. The Sahelian northern third of the country has little rainfall and probably would show a high poverty incidence, if data was available. The southern third is the principal agricultural zone. The population is markedly concentrated in the southern half of the country. In this region poverty incidence is highest in the east and a smaller area in the far south.



Chad: Infrastructure

In the far north there are few people and little economic activity. The road system in Chad largely isolates certain areas of the country. This contributes significantly to higher poverty. Furthermore the oil reserves currently a large economic activity in the country and other minerals in the north could be integrated with the more populous south through an adequate road network. This contributes not only to higher economic growth, but also to an investment that could serve both poor agricultural/pastoralists part of the population and extractive industries.



Source: National statistical office, Chad

Bibliography

- Demombynes, G., Elbers, C., Lanjouw, J., Lanjouw, P., Mistiaen, J. and Özler, B. (2002), “Producing an Improved Geographic Profile of Poverty,” *WIDER Discussion Paper No. 2002/39*
- Elbers, C., Fujii, T., Lanjouw, P., Özler, B. and W. Yin (2004), “Poverty Alleviation through Geographic Targeting: How much does disaggregation help?,” *World Bank Policy Research Working Paper 3419*, October 2004
- ECA (2003) ‘Accelerating the pace of development’, Economic report on Africa, Addis Ababa
- ECA (2004a): Assessing Regional Integration in Africa, ECA Policy Research Report, Addis Ababa.
- ECA (2004b) progress towards achieving the millennium development goals in Africa, mimeo
- Forbes, K (2005) The Africa poverty atlas, mimeo.
- Sachs, J (2005) “Investing in development a practical Plan to achieve the millennium Development Goals”, UN millennium Project, United Nations, New York.