



United Nations  
Economic Commission for Africa

# Spatial maps

## Targeting & mapping poverty

Working Paper  
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## Introduction

A major challenge facing Sub-Saharan Africa (SSA) is to eradicate poverty. Africa houses 313 million poor people. (Sachs 2005). Economic growth although positive since the late 90s has not resulted in significant poverty reduction. Strengthening the link between economic growth and poverty reduction is vital in Africa, particularly in Sub-Saharan Africa (SSA). During the period 1996-2002 average economic growth in Africa was about 3.6 percent, compared to the world average of 2.7 percent (World bank 2004). However it is estimated that the growth rate has to exceed the threshold of 7 per cent to have a positive impact on poverty (ECA 1999). Inadequate economic growth has been further compounded by conflict situations, droughts, external debt and the negative impact of HIV/AIDS and this in turn has exacerbated poverty levels.

A classic definition of poverty is ‘the inability to attain a minimal standard of living’ measured in terms of basic *consumption* needs or the *income* required for satisfying them . Poverty is thus characterized by the failure of individuals, households or entire communities to command sufficient resources to satisfy their basic necessities. Consumption based poverty lines are primarily concerned with *physical* measures of well being. The inability to attain minimal standards of consumption to meet basic physiological criteria is often termed *absolute* poverty or deprivation. It is most directly expressed as not having enough to eat or as hunger or malnutrition (May 2003). This has been linked to income/consumption measures of poverty.

More recently poverty has been seen to encompass deprivation of basic capabilities, which in turn entails dispossession of health, education, participation in development, and the environment (Sen 2001, UNDP 1997). This has been recognized in the Millennium Development Goals (MDGs), wherein human development is central to economic growth and well being. In fact the manifestations of poverty are multifaceted. These include child malnutrition, infant and child mortality, illiteracy, inadequate sanitary conditions, and voicelessness of the poor. Thus poverty is not simply insufficient income, but a interdependent web of a lack of basic capabilities (Arimah 2001).

At the most basic level, per capita income is a robust predictor of demand for education and health services. Access to basic health and education services explain only part of the high mortality and low primary enrolment rates in Africa. A significant proportion is also explained by abject poverty. High drop out rates from schools due to bouts of famine and epidemics of diseases related with malnutrition contribute significantly to low primary completion and high child mortality rates.<sup>1</sup>

## Poverty and its distribution

The multifaceted nature of poverty is further compounded by its spatial distribution. The distribution of poor people in diverse agro-climatic conditions, the geographic distribution of schools and clinics, water and electricity supply, contribute to lower economic growth in that

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<sup>1</sup> For example see Bourguignon, Bussolo, Lofgren, van der Mensbrugge (2004) for the illustration of MDG synergy for Ethiopia.

region but are also the result of this low growth. 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 out of 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, with civil strife partly causing the inadequate growth in the north. This allowed direct poverty reduction, albeit not homogenous poverty reduction over geographical areas. Another example is the diverse Human Development Index (HDI) in different regions of Ethiopia. In fact the Afar region has a human development index<sup>2</sup> of 0.182, whilst Addis Ababa region has an index of 0.487, this points towards a non-homogenous poverty reduction strategy and economic performance nationally (Ethiopia HDR 1998).

Evidence available on spatial poverty in Africa shows that interregional or intra-country poverty difference is much more pronounced than inter-country poverty differences.<sup>3</sup> It is also plausible that income inequality arising out of regional differences could contribute an important part to overall inequality. In addition, the spatial difference is much more severe with respect to other forms of deprivation such as health and education, which makes geographic poverty traps important factors in determining progress towards the MDGs. 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 (Fosu 2005). Thus, addressing geographic poverty traps play an important role in dealing with growth, income distribution and human development issues.

It is through understanding of the determinants of spatial distribution of poverty that more effective poverty reduction policies can be implemented in SSA.

Closely linked to the above is the concept of inclusive development. The need to ensure that all the population, including the poor participate actively in development effectively means that policies should aim at a homogenous level playing field for all. Equity is complementary to long term prosperity. Institutions and policies that promote this level playing field contribute to sustainable growth and development. Thus the role of the State in ensuring equitable distribution is vital. The institutions that address the spatial distribution of inequality should combine both the mitigation of possible distributional conflicts arising from vested interests, and ensuring that all manifestations of inequality spread over geographical areas and groups are addressed.

The lack of human endowments and income poverty at the local level is intimately linked to the need of a State that delivers goods and services efficiently and effectively to all areas and groups in SSA. The need to target interventions that reach the poor in the most remote areas within a country is vital. For example East Africa has an estimated 87.8 million of poor people set at and the vast majority, 70.9 million live in the rural areas (ECA 2005). This disaggregated figure, although useful for directing resources for rural development, is not at a sufficient level of information for more targeted policy direction. In fact although widely accepted that poverty incidence in rural areas is higher than urban areas in SSA, the rural areas exhibit other spatial characteristics; for example distance from schools and clinics, road networks, and market

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<sup>2</sup> The Human Development Index is a composite of literacy, education, gender, income that assesses development outcomes (UNDP)

<sup>3</sup> ECA (2004)

distance. There is a need for more focused targeting by tackling spatial poverty through its underlying determinants which hinder economic growth.

## Targeting

Targeting, concentrating limited public resources on well defined “target” groups within society, is important in the SSA context (van de Walle 1998). In practice there are two distinct approaches to alleviating poverty through public expenditure allocation, namely broad and narrow targeting.

### (i) Broad targeting

Broad targeting is to reach the poor, not as individuals but through targeting types of spending. Welfare gains by the poor are achieved through types of spending considered important for their active participation in economic development. Primary education and primary health care are typical examples of broad targeting. For example in Cote d’Ivoire the subsidy for primary education of the poorest quintile was nearly CFAF 7,000 which dropped to nearly CFAF 4,000 for the richest quintile (Demery, Dayton and Mehra 1997). The rationale for this is that basic services tend to be underprovided by the private sector in the absence of government intervention. However, ensuring access to such services by the poor is not that clear cut. The non-identification of the poor as a group sometimes leads to a certain amount of “leakage” and possibly inequitable distribution.

The beneficiaries or end-users of targeted public expenditure aimed at reducing poverty have limited access and utilization of the ‘public good’ itself. For example only 22 per cent in Uganda and 49 per cent in Ghana of funding of books and other instructional material, key to improving educational quality, reached end users in 1996 (Reinikka and Smith 2004). Leakage estimate of drug provision in Uganda was estimated to be 40 to 94 per cent of the total (Ablo and Reinikka 2000).

Broad targeting is also linked to the cost of delivery. Universal primary education or primary health care also reaches many who can afford to pay and this makes broad targeting rather costly for poverty reduction. For example children immunization rates in Benin are as high as 80 per cent for the richest 20 percent income group and drop to 40 per cent in the lowest 20 percent income group. Similarly in Burkina Faso immunization rates are 60 per cent for the richest 20 per cent and less than 20 per cent for the poorer quintile. In Cameroon in three distinct regions, in the richest region 1 access and utilization of health facilities is 100 per cent, whilst in the poorest region 3 this drops to 30 percent for both access and utilization (WBI 2001).

Furthermore, broad targeting does not address specific objectives; for example safety nets to mitigate exogenous shocks. In a drought or natural disaster, generic provision of basic social services, a key aspect of broad targeting, is unlikely to provide adequate protection for the poor and hence poverty reduction. For example a recent study on Ethiopia<sup>4</sup> showed that the contribution of transitory poverty due to variability of income to total poverty is as much as 20%-35% so that addressing income shocks alone can lead to substantial reductions in poverty.

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<sup>4</sup> Shimeles (2004)

## Narrow targeting

Narrow targeting is defined as a deliberate attempt to concentrate benefits to the poor-whatever the type of spending. Narrow targeting is based on one or two principles-or a combination of both.

Categorical targeting or indicator targeting is the first type. A characteristic of poor people (indicator) is chosen that can be observed easily. An example is geographical targeting on status of infrastructure. The lack of feeder roads to market or access to water basins is a case in point. Through the spatial distribution of such categories that keep poor people below adequate income levels can be identified and pro-poor expenditure to address these factors can be made. For example in Bangladesh Grameen Bank micro credit targeting focuses rural landless women (van de Walle 1998).

The second type is self-targeting. Through the introduction of incentives the poor and only the poor participate in a certain scheme. A typical example is public employment schemes that tend to screen out the employed and skilled workers and thus the non-poor. Another example is the subsidy programmes based on items that the poor consume (see box 1).

### Box 1 Tunisia's narrow targeting

Tunisia had a fiscally unsustainable universal food subsidy limited by the absence of any real difference of food baskets across income groups.

The Tunisian government differentiated goods not by their intrinsic value but by packaging. For example, milk was packaged in plastic containers rather than cartoons. Subsidies were transferred to these and at the same time the creation of better packaging without subsidies, alongside import liberalization gave rise to “superior’ goods for the non-poor.

This policy succeeded in significant lower programme costs through focused spending and achieved some form of political consensus.

**Source:** Tuck & Lindert 1996.

Narrow targeting, based on spatial poverty maps or self targeting schemes, also present costs. These are administrative costs, costs arising from incentive effects and costs that result from the effects on the political economy. Whilst the first can be measured, the other two are more difficult but nevertheless require adequate scrutiny.

The administrative cost of producing spatial maps is quite high. This method requires national/local statistical offices to generate estimates of welfare measures at a much lower administrative level. Small area estimation combines household surveys with population surveys to produce these estimates. These factors raise the cost of producing these estimates, and though combining a few indicators often does improve targeting, it may raise administrative costs.

Furthermore, estimation at the local administrative level assumes relatively high technical and financial capacity and efficient decentralization. In SSA this is not always the case, but the policy pertinence of spatial maps to better target poverty reduction can outweigh the increased cost of programmes.

Behavioural responses to narrow targeting can also raise costs. For example, a study in South Africa exhibited that each rand of public pension support provided decreased remittances from migrant workers to pensioned parents by 0.2 to 0.4 rand (Jensen 1998). Food stamps in Sri Lanka reduced the number of hours worked by recipients, effectively reducing net household income by 29 per cent (van de Walle 1998). The obligation cost of the poor is often omitted. For example, in mapping and implementing water basin development in a poor area might cause internal migration to the area targeted and an inadequate infrastructure for the enlarged population.

Spending that is narrowly targeting the poor results in a contraction of benefits for the middle class. Since the middle class is generally the most vocal and important politically, then political support for targeting might not be forthcoming. Therefore, there is need to promote participation and support by diverse groups to effectively implement targeted programmes. For example in Tunisia a successful awareness campaign to gain political consensus of the middle class was based on the differential costs of universal food subsidies and the more targeted version. The high cost of the universal food subsidy meant, according to Tunisian authorities, that investments on roads, hospital beds, and manufacturing jobs could not be met were not addressed, but would be if the more focused cheaper programme would be implemented (Tuck & Lindert 1996).

## Mapping for poverty reduction

Poverty maps are an extremely useful tool for poverty reduction. This is particularly so, if a specific poor area exhibits a lack of public endowments that stifle higher economic growth. Spatial maps pinpoint investment areas that need attention to accelerate economic growth and focus poverty reduction spending.

Besides, private expenditure can be heightened in targeted areas for poverty reduction. Better roads for the poor to have access to markets do not reduce non poor use of such facilities. It may be plausible to maintain that private expenditure and community-specific public facilities are at least weakly complementary (Dasgupta & Kanbur 2005). Targeting through mapping of endowments has a possible impact of spurring higher economic activity of the area identified.

In addition, mapping poverty and its correlates could provide a better analytical tool in discerning why there continues to be persistent poverty in certain areas. The agro climatic conditions across SSA countries may result in risk averse household policy choices of subsistence farming rather than tradables, with the resultant low income stream for poorer farmers and their further marginilaztion (see box 2).

## Box 2 Ethiopia's cash crops

A study in Ethiopia on crop types and poverty alleviation based on a staple food that is not much traded (*enset*), a staple food that is significantly traded in the domestic market (*teff*), a traditional export crop (coffee) and a 'new' export crop (*chat*) evidenced their link to agro climatic conditions and poverty reduction. *Teff* is one of the main domestically marketed crops in Ethiopia. Generally, rural households produce *teff* for the market and it is an important source of cash income. Coffee and *chat* are also important export crops, the first being the most important export item of the country and the importance of the second increased during the recent past. While the cultivation of these crops by households has a tendency to decrease the probability of poverty (all four coefficients are negative), the significant levels and the marginal effects tell an interesting story. If we move from *enset*, to *teff*, to coffee and then *chat* the variables become more and more statistically significant. While the coefficient for *enset* is not significant at all, that for *teff* becomes significant around 10%, for coffee around 6% and for *chat* at 1%. Similarly, the marginal effects successively increase in absolute terms: -5.0%, -6.1%, -9.1% and -31.4% respectively. Households cultivating *chat* have a 31.4% lower probability of being poor as compared to households that do not. The importance of the domestic demand for these goods notwithstanding, encouraging the expansion of exportable crops, particularly non-traditional crops, has a large impact on poverty reduction. This tallies with the overall reform goal of encouraging the production of tradables. The provision of infrastructure and giving the right incentives that encourage the production of exportable agricultural outputs will have the win-win result of enhancing growth as well as reducing poverty.

**Source:** Geda, Shimeles, Weeks, 2002.

Poverty maps have the advantage of providing a more revealing picture of poverty and some of its determinants within prescribed areas. New estimates can be used to generate updated maps that provide a more dynamic trend of poverty levels and more importantly provides the possible monitoring of targeting.

The determinants investigated are not exhaustive, but are the main factors of the entrenchment of poverty at the local level. These are water basins, infrastructure, agriculture and food security. These determinants have also been listed as some of the structural reasons that have made Africa the most vulnerable area and the cause of persistent poverty traps (Sachs 2005). Their intracountry distribution can assist in pinpointing the distribution of these variables and provide wider policy options to tackle poverty.

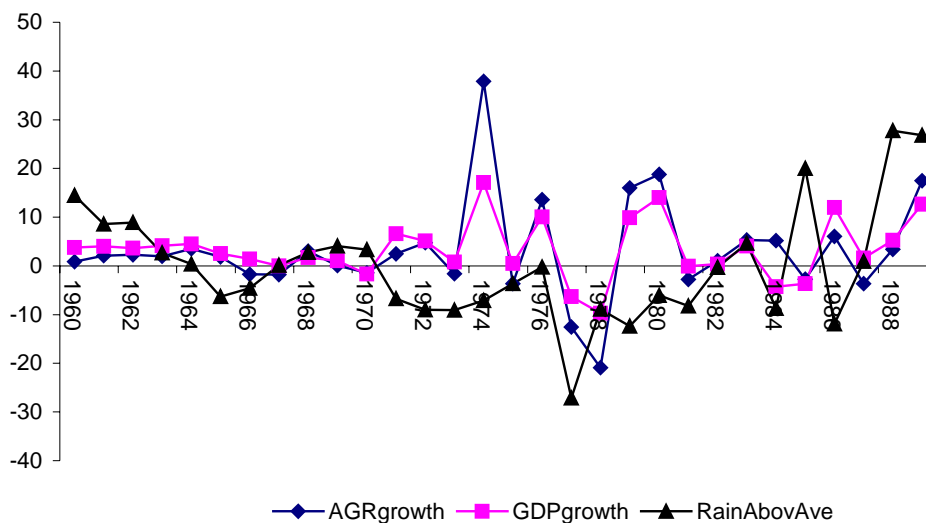
## Determinants at the aggregate level

Africa exhibits a low infrastructure status in SSA that has contributed to more costly trade to high-income trading partners outside the continent (Sachs 2005). The low level of intra-African trade further exacerbates this (ECA 2004). Physical transportation links are woefully inadequate in Africa. Road density, accounting for 90 per cent of interurban transport, is 6.8 km per 100 square kilometers in Africa, well below Latin America at 12 km per 100 square kilometers and Asia at 18 km per 100 square kilometers (ECA 2004). The non-availability of sea outlets causes a number of constraining supply side aspects, particularly severe in the African context. The ratio of transport and insurance costs as a percentage of exports is 9 per cent greater in landlocked

countries (ECA 2004). Besides, the dependency on transit infrastructure, the incidence of war and instability in transit countries makes landlocked SSA countries particularly vulnerable and marginalized in the world economy. For example, estimated delays at major SADC border posts cost US\$48 million yearly (Faye, Sachs and Snow 2004).

In addition, most Africans live in the interior, with few rivers to provide irrigation and a lack of alluvial plains. In fact Africa has the lowest share of food crops produced on irrigated lands in the world. For example in Ethiopia the close links of rainfall and GDP( see Figure 1) point towards a vulnerability to high seasonal and interannual fluctuations with resulting poverty. This is also one of the causes of food insecurity in SSA. The low agricultural productivity combined with high population growth results in a chronic food insecurity problem in most parts of SSA.

Figure 1: Rainfall, Agriculture & GDP (1967/68-1997/98)



**Source:** CSA and MEDaC (Various years)in Geda 2002

The negative effect of these determinants on national economies' growth and poverty reduction is not a homogenous phenomenon. Spatial maps assist in localizing these determinants at a much lower level of administration and provide areas of intervention.

Poverty maps are produced using dimensions of poverty itself and the profiles of the poor section of the population. A range of maps for a number of SSA countries will illustrate a number of beneficial aspects for poverty reduction:

- Better targeting possibilities for national governments
- A wider range of policy options to tackle poverty for national governments
- Analytical tools, key to understanding contributory aspects of persistent poverty levels

# Spatial Poverty ODI

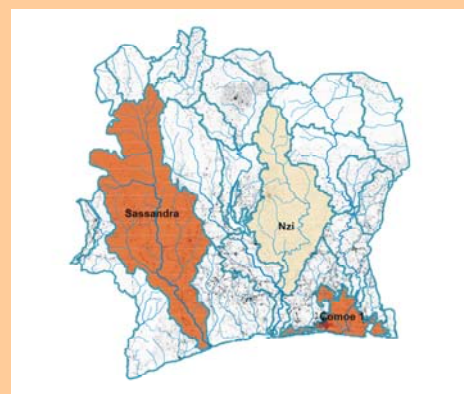
## West Africa

### Cote d'Ivoire

The poverty incidence for rural areas in Cote d'Ivoire was 42 per cent in 1998. The population is widely dispersed outside Abidjan and there is an evenly distributed population density through the country. In fact the poverty incidence map does not exhibit significant diverse rates of poverty. Abidjan houses 45 per cent of total urban population, and is the major market. Nearly 62 per cent of the poor live more than 10 hours way from this urban centre and this is likely to further exacerbate poverty. However, recent civil strife has most likely changed these local poverty incidences.



**Water basins and poverty reduction**  
The river basins Comoe, Sassandra and Nzi represent 22 per cent, 17 per cent and 11 per cent of the 65 per cent of the poor that inhabit the 5 most populated river basins. Cote d'Ivoire uses river basins both for energy supply and irrigation. However, given the large number of poor people in these areas, better integrated water management is needed to alleviate poverty.

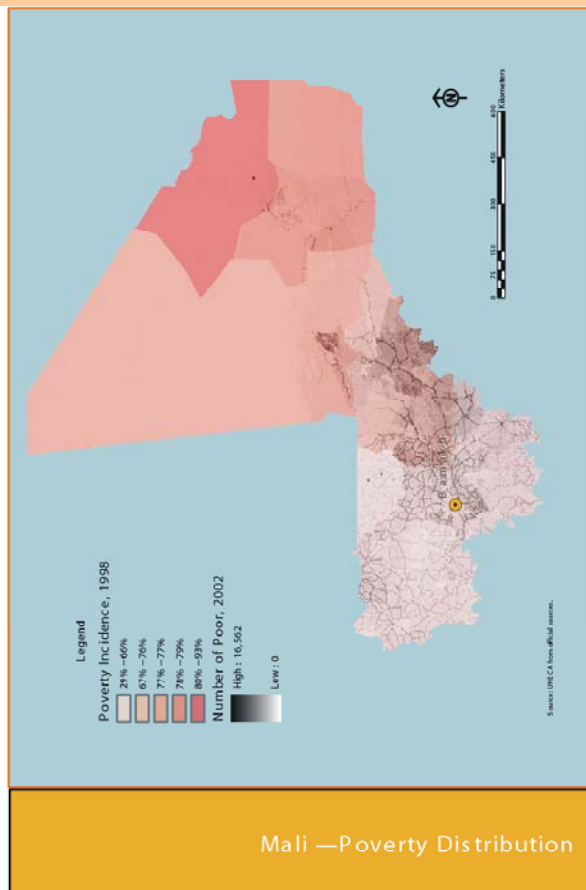


### Water Basin

# West Africa

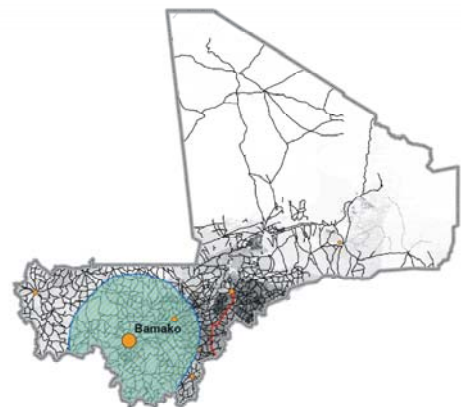
## Mali

Mali, like many African states, exhibits an urban centric development. Mali's population is largely found in the south of the country around Bamako. Poverty incidence as depicted in the map below evidences growing poverty with growing distance from the capital city. In the eastern part of the country, poverty levels are as high as 80 per cent living below the poverty line, whilst in Bamako and its vicinity, poverty incidence drops to 20 per cent. Targeting for poverty reduction needs to disproportionately benefit the populations of the eastern areas if poverty reduction is to be achieved.



### Infrastructure and inequality

A divided highway (marked in red) has been constructed to connect the market area to Cote d'ivoire. This has been off set by the recent civil strife in that transient country. More importantly, the eastern part of the country, where the majority of the poor live is isolated and this reduces access to markets for poor farmers and further exacerbates their marginalization, and vulnerability. Infrastructure that leads to a more inclusive type of development and therefore connecting poor areas to the rest of the country is necessary to alleviate poverty.

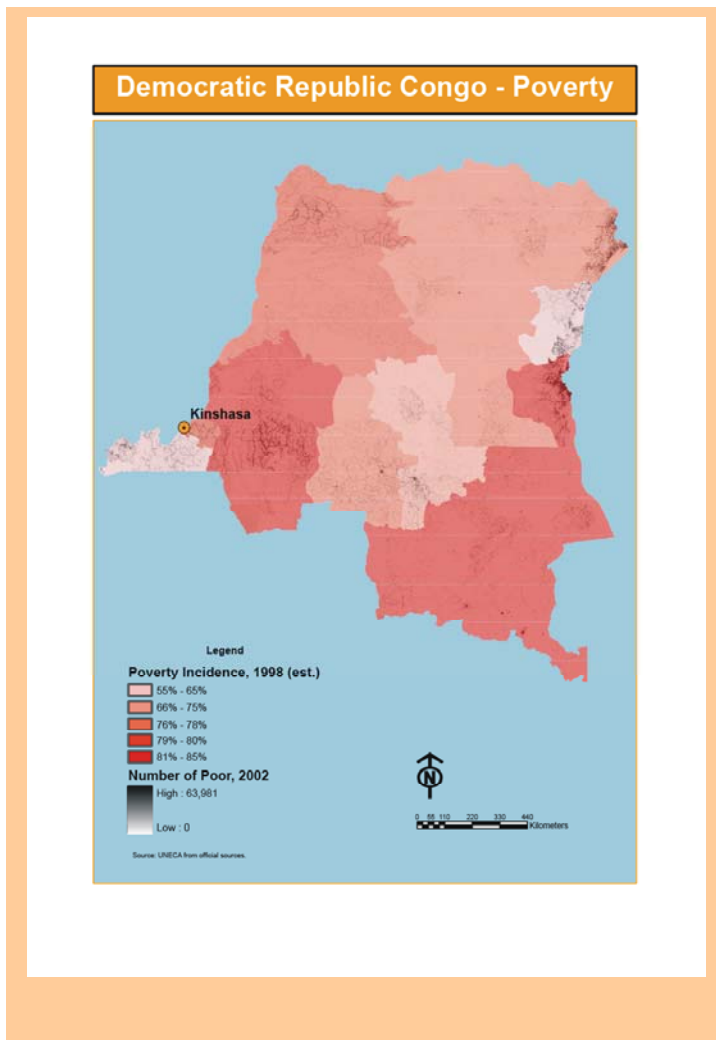


### Infrastructure

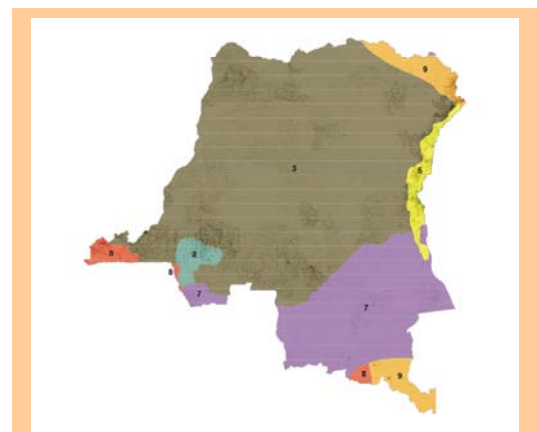
# East Africa

## Democratic Republic Congo

The Democratic Republic of Congo (DRC) is a large country with most of the population living in the southwest and along the northeast border. Similar to Mali, poverty incidence rises with distance from the capital Kinshasa. The recent conflict in DRC has led to displacement of people and increased poverty in war torn areas. For example, in the east of Kinshasa the poverty incidence is as high as 80 per cent. Peace and stability has to go hand in hand with an efficient decentralization process to service remote areas and reduce poverty.



Forest based agricultural production (Zone 3) represents the largest area and also has the greatest number of poor people at 64 per cent. Root crop production (Zone 7) is found in the southeast and 12 per cent of the poor live in this area. Mixed cereal production (Zone 9) is found in the northern and southern extremes. Zone 5 (highland perennial type of production) houses 11 per cent of the poor. Mixed cereal root crop (Zone 8) and commercial tree crop production represent only 3 and 2 per cent of the poor respectively. The link between type of crop and poverty level is a relatively unexplored area in designing national and local poverty strategies and it is necessary to diversify agricultural production to less vulnerable crop types as part of a poverty reduction strategy.

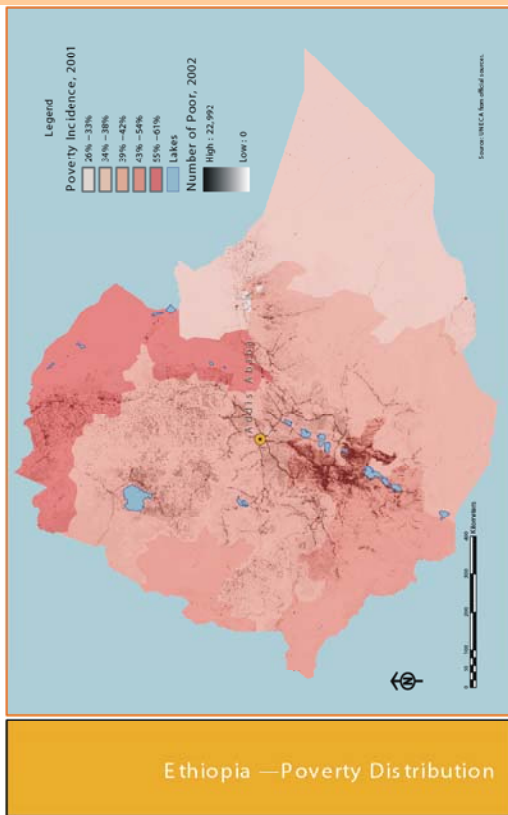


## Agriculture

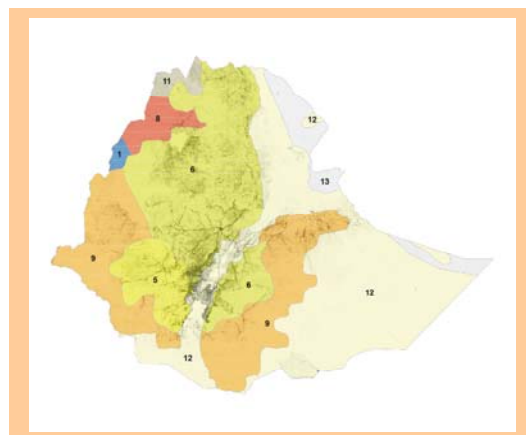
## East Africa

### Ethiopia

Ethiopia is a large landlocked country with a large population (approx 70 million) and more importantly a high demographic growth rate. Although Ethiopia is a poor country, diverse poverty incidences are spatially distributed. The northeast and the southwest have the highest poverty incidence, which reaches 55 to 60 per cent. The lowest poverty levels are found in the city districts of Addis ababa, Harare, and Dire Dawa at 26 to 33 per cent. The Sustainable Development Poverty Reduction Strategy (SDPRS), up for review currently should factor in the diverse poverty strategies at the local level and strengthen local authorities capacity.



The mixed temperate highland farming system houses 52.5 per cent of the poor. The pastoral system (Zone 12) houses 12 per cent of the poor. Mixed maize (Zone 9) contributes to 14 per cent of total poor people. High perennial (Zone 5) houses 10 per cent of the poor. The remaining systems have low percentage of poverty, but also represent a small fraction of total population. Water basins have competing users—a growing urban population, industry and agriculture. Better management of existing water supplies and harnessing the great potential of more river basins should be a top priority. Food security is an enormous problem, due to droughts but also due to soil degradation, and that only 0.2 per cent of the poor live on irrigated systems. There is a need for a rural integrated package that focuses on specific agro climatic conditions spatially distributed, which enforce local agricultural capacity.



### Food Security

## Mapping as a policy tool

These maps do provide a number of interesting aspects for a more effective poverty reduction. The determinants of poverty are not only income based, but a wider range of factors. Mapping poverty may also assist in understanding why poverty persists in certain areas. Furthermore the close correlates of poverty (factors) provide a larger range of policy options. For example, in Mali upgrading the infrastructure in the northeast would have the effect of better market access to a vast number of the poor in that area. In Ethiopia harnessing river basins would allow at the local and national level irrigation for poor farmers, decreasing their vulnerability and improving economic performance.

Despite the country specificity of poverty mapping, certain common characteristics of SSA countries can be observed. Infrastructure is key to poverty reduction. Besides the need to upgrade infrastructure at the national level, its internal development is equally important. Ensuring a road network that allows the poor from remote under-serviced areas to be mobile, so they are able to market their products and labour, is necessary in order to achieve a more inclusive development path.

Water basin management is an extremely important aspect for Africa. Africa has a very high urban growth. Agricultural production is still largely rain-fed. Demand on water is growing, but this can be harnessed for poverty reduction. Spatial maps are extremely useful instruments to identify river basins in a particular locality and super impose poverty incidence in that area. This assists in designing water harnessing and poverty reduction strategies. Furthermore, efficient water management has a spill over effect on health outcomes. The availability of clean water and sanitation in rural areas does decrease the likelihood of water borne vectors and thus disease burdens.

The link between crop type and poverty is a vital aspect of poverty reduction. This can be mapped and local policies on agricultural extension inputs designed for reducing poverty. For example, if maize production in Kenya is where there is a high incidence of poverty then increasing agricultural productivity, and diversifying into more profitable crops has to be part of a poverty reduction strategy for that area.

In addition, spatial maps offer two important aspects in designing poverty reduction strategies. First of all, the factors determining poverty in an given area can include any aspect considered pertinent by the authorities. For example spatial maps can be produced on the distribution of health clinics and schools within national territories. This provides national policy makers to plan regional and local investments in this area. Second, the level of the spatial maps can be as specific and accurate as required (Elbers 2004).

However spatial maps do have certain underlying assumptions that should be analysed in the context of SSA. The production of spatial maps is rather data intensive and technically taxing. The collection of data at the local level and its organisation into map generation requires the identification of the poverty incidence and a selection of a determinant/s of that poverty level. The mapping of this provides information for policy interventions. The generation of the maps themselves requires significant technical and financial resources.

Besides, there is a trend towards the disbursement of Official Development Assistance (ODA) to local levels rather than national governments. Thus, tracking is increasingly becoming a local activity and spatial maps will be valuable in this respect.

Equally important is the system of governance. The spatial maps are definitely a useful tool, but resources allocated and relevant expenditure based on spatial maps should be used efficiently. Narrow targeting for the efficient use of public resources through maps is a way to ensure more efficiency. However the involvement of end users is crucial. Mechanisms to ensure end users participate in monitoring of budgetary transfers are imperative. The Public Expenditure tracking Systems (PETS) introduced in Uganda, Zambia and Tanzania have substantially improved efficient allocation. This was done through involving end users as monitors of transfers made<sup>5</sup>. The use of spatial maps should follow the same pattern and provide governance institutions for end user that ensures transparency and accountability.

## Conclusions and recommendations

Local and national authorities should identify a number of determinants and poverty incidence at low levels of administration and map them. Then local level data can be compared against national averages, and according to available resources, interventions designed.

The need to select certain interventions can be guided by the most divergent characteristic from national averages. For example, if in Afar region in Ethiopia there are 15 doctors for 1.2 million people (a ratio of 1: 82,800) and this is significantly below the national average of 1: 33, 000 (UNDP 2004), then policy interventions in that region should prioritize health facilities in poverty alleviation.

In addition the generation of maps is valuable in monitoring the dynamic nature of poverty trends. The maps are practical tools in pinpointing policy areas and valuable in monitoring the outcome of policy decisions and actions.

Furthermore poverty reduction through the use of maps has the advantage of observing contributory determinants of such poverty. Besides this observation can be done at the lowest level of administration. This provides a wider option of policy and at the same time illustrating qualitative aspects of poverty.

Hence the policy recommendations in the generation and use of spatial maps are:

- Technical and financial capacity at both national and local level. This in turn requires upgrading statistical capacity at all levels in SSA countries.
- A careful cost benefit analysis of different methods of narrow targeting including map generation should be made.
- The various determinants are interrelated and thus coordination of policy interventions must be made.
- Public expenditure efficiency and efficacy is assisted using maps, but administrative capacity has to be developed.

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<sup>5</sup> The literature on Public Expenditure Tracking Systems (PETS) is thoroughly reviewed in Reinikka & Smith (2004), Ablo & Reinikka (2000)

- Enhanced governance structures are a necessity. End-users must be involved in the designing, implementation and monitoring of public goods delivered. This will enhance transparency and accountability as well as give a voice to the poor.

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