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Localizing Multidimensional Poverty Assessments for Inclusive Public Policies:

The Case for a Communal Poverty Profile in Mali

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As in many developing countries, in Mali, generating reliable and up-to-date data beyond national averages to uncover geographic and other inequalities is one of the major challenges for rigorous monitoring of progress towards achieving the SDGs. Mali's National Observatory for Human Development has set up a mechanism to generate socio-economic and poverty metrics for 703 municipalities based on the small area estimation procedure. The generated metrics shed light on poverty inequalities among municipalities while providing information on SDG acceleration integrated policies. This experience of data processing shows that existing data at the supra-communal level can be used to infer useful indicators that uncover the most deprived people, inform local development policies and offer reliable inputs for predictive modelling for anticipatory governance.

In Mali, as in many developing countries, rigorous and regular monitoring of progress towards the SDGs requires disaggregated data that inform on subnational dynamics and multifaceted inequalities. Poverty measurement is integral to countries' commitments to developing systems to measure progress towards the 2030 Sustainable Development Goals (SDGs). SDG1, which calls for eradicating poverty in all its forms worldwide, is broken down into two targets and three indicators,[2] whose thematic and geographic nature and scope recommend considering poverty in a disaggregated manner. Such disaggregated data and analyses would provide insights on who the poor are, where they are and by how much they are deprived on different dimensions.

Mali is a vast territory of 1,241,238 million km2, characterized by diverse socio-economic realities across regions. As a result, the implementation of an effective, decentralized SDG-sensitive public policy favouring local development to leave no one behind requires disaggregated data, which helps central decision-makers target priority areas and local authorities define their specific priorities.

Mali has a system for measuring monetary poverty every year. For more than a decade, this system has been based on the implementation of a modular and permanent household survey (EMOP) that collects data on consumption expenditures to generate various measures of poverty as well as other indicators to monitor progress towards SDGs. Specifically, the topics covered by the EMOP include the socio-demographic characteristics of the population, education, health, employment, housing, food security and household consumption expenditures.

However, the EMOP is generally representative at the regional level (first level of disaggregation/decentralization) and by place of residence (urban/rural). The perspective of conducting integrated and inclusive policies to leave no one behind requires lower-level disaggregation to improve the targeting of public policies and programmes such as social safety nets. To this end, the Observatoire du Développement

Humain et de Lutte contre la Pauvreté (ODHD/LP), with joint support from UNDP and UNICEF, has undertaken to use EMOP data as well as other data sources, such as communal surveys, to develop socio-economic and poverty profiles of municipalities.

This note presents the Malian experience of mapping poverty at the commune level, based on the 2022 communal poverty report.[3] The communal poverty profiling approach was initiated in line with the goal of generating a reference system for the country's geographic statistics at the most deconcentrated level. This geographic system aims to provide spatial representation of monetary and non-monetary poverty, human capital development, malnutrition, access to and quality of basic services (education and health service infrastructure), rainfall indices and indicators of the early warning system (EWS), as well as soil quality and other indicators.
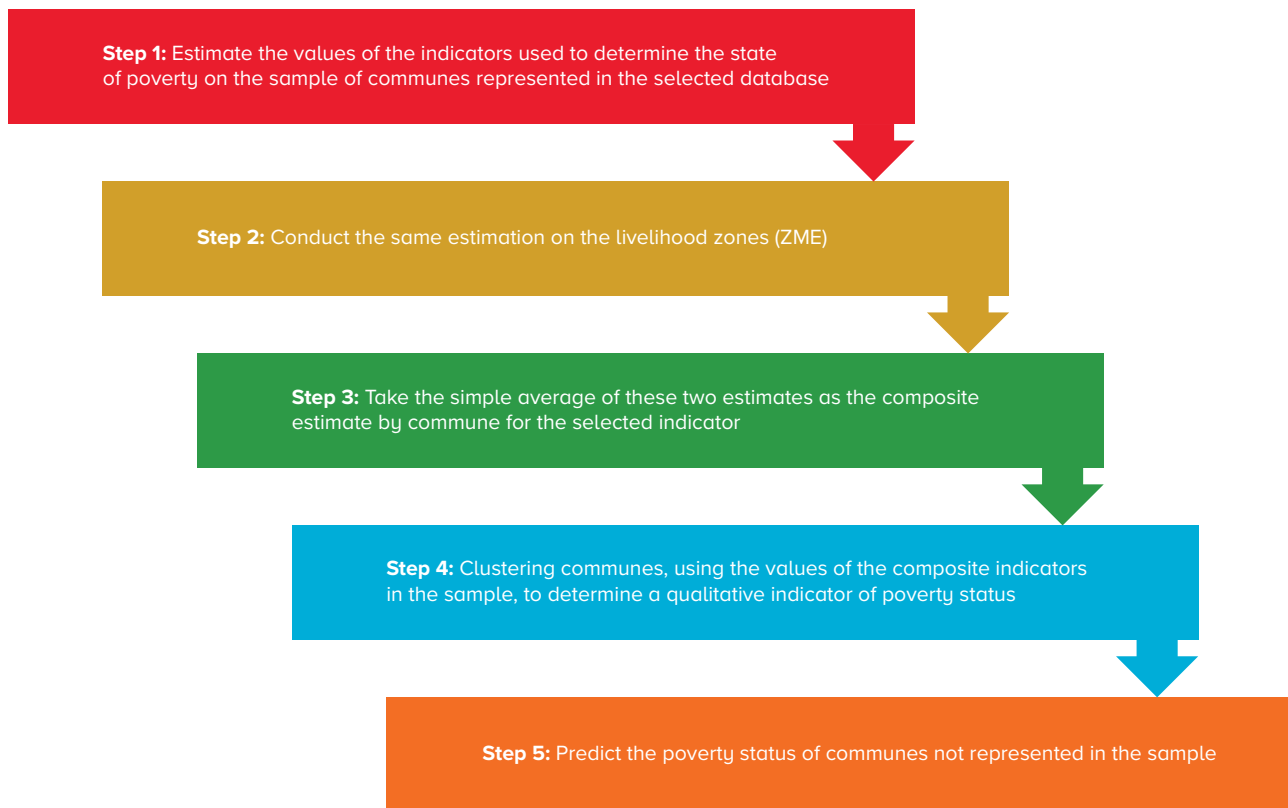
Methodological approach

Statistical procedure for estimating the communal poverty profile

According to the literature, there is no global model for qualifying a geographical entity according to multidimensional poverty criteria. However, it is possible to identify clusters of communities with similar aspects of poverty through superimposition procedures. This pragmatic approach was used to generate the municipal poverty profile in Mali. Monetary poverty for a given geographical entity (the commune) was evaluated in terms of the percentage of people in the entity (commune) with a consumption value below a given threshold. The same principle of evaluation for the entities was adopted for the other poverty dimensions the study considered. The assessment of living conditions poverty was, however, specific to the commune.

A small area estimation procedure[4] was used to develop the poverty profile for 703 communes in Mali by exploiting various data sources. Small area estimation (SAE) offers a means of estimating indicators when critical data are not available at lower levels of geography (i.e., district or municipality levels). It consists of applying auxiliary information from exhaustive sources such as the census or from very large sample surveys and modelling the considered indicators according to variables with good explanatory power.

In Mali, the statistical procedure was carried out in five steps (Figure 1).

Figure 1: Statistical procedure for estimating municipal poverty

Step 1: Estimate the values of the indicators used to determine the state of poverty on the sample of communes represented in the selected database

Step 2: Conduct the same estimation on the livelihood zones (ZME)

Step 3: Take the simple average of these two estimates as the composite estimate by commune for the selected indicator

Step 4: Clustering communes, using the values of the composite indicators in the sample, to determine a qualitative indicator of poverty status

Step 5: Predict the poverty status of communes not represented in the sample

The small area estimation combined several indicators to summarize multidimensional poverty. The poverty status in terms of living conditions was estimated by first calculating, for each municipality, the proportions of localities at a given distance from a given infrastructure. A principal component analysis of these statistics was then used to categorize municipalities in four groups of living conditions: Very Poor, Poor, Almost Poor and Least Poor. The measurement of this poverty status was based on data from a census that covered all communes.

The specific approach used to characterize a municipality in terms of monetary poverty consisted, first, of using data from the sample of the annual poverty survey (EMOP) to estimate the monetary poverty of municipalities within the sample. Then, a synthetic indicator of monetary poverty using economic variables was calculated for these municipalities in the EMOP sample.[5] This synthetic indicator was further replicated with the other municipalities using the TwoStep Cluster classification procedure and discriminant analysis.

Food poverty was determined by using variables relating to the socio-demography of households, the monetary aspects of household food and parameters of household food status. The estimates were first made on the samples of the National Survey on Food and Nutritional Security (ENSAN) and replicated with other municipalities using discriminant analysis.

Following these estimates, a summary indicator was created by cross-referencing the statuses of the various poverty dimensions and interpreting the results to define the multidimensional poverty status. By multidimensional poverty status, we mean here a pooling of the various poverty statuses considering contextual factors. In other words, we seek to create groups of municipalities within which characteristics are as similar as possible in terms of poverty of living conditions, monetary poverty and food and nutritional poverty. The determined multidimensional poverty status is analysed according to thematic indicators, including environment, education and health, as well as indicators related to economic facilities and infrastructure and those related to economic activities.

Data Source

In the case of Mali, the estimation of the communal poverty profile was based primarily on four sources. The first was the EMOP survey database in SPSS format, as well as the published EMOP report. This database contains data for 2020 for 1,109 households in 371 communes. It was used to determine each commune's monetary poverty status.

Two databases from the second source, the National Food Security and Nutrition Survey (ENSAN 2020) in SPSS format, were used. One relates to household food consumption data and the other to nutritional data for children under five. The first database contains 578 communes, including the six communes of the District of Bamako, with the remaining communes distributed among the 49 cercles of the country. households, It was used to determine the communes' food poverty

status. The second database contains 15,971 records on indicators related to child nutrition.

The database on the socio-economic profile of Mali's 703 communes, 2021 edition, was also used. These data are organized into three subsets: the database of indicators by commune, the database of indicators by locality (approximately 12,230 localities) and the database of indicators for localities aggregated to the commune level.

Finally, the commune poverty profile was cross-referenced with contextual factors based on indicators from the database of the Global Alliance for Resilience in Mali (MLI-AGIR). This database provides indicators for each commune on agricultural soil resources, the frequency of floods, the frequency of droughts and the frequency of attacks by pests.

Main results

This procedure estimates multidimensional poverty based on the dimensions and the available data for those dimensions for each of the 703 communes. By pooling these four poverty statuses while

considering contextual indicators, we generated a typology of communes according to their multidimensional poverty status.

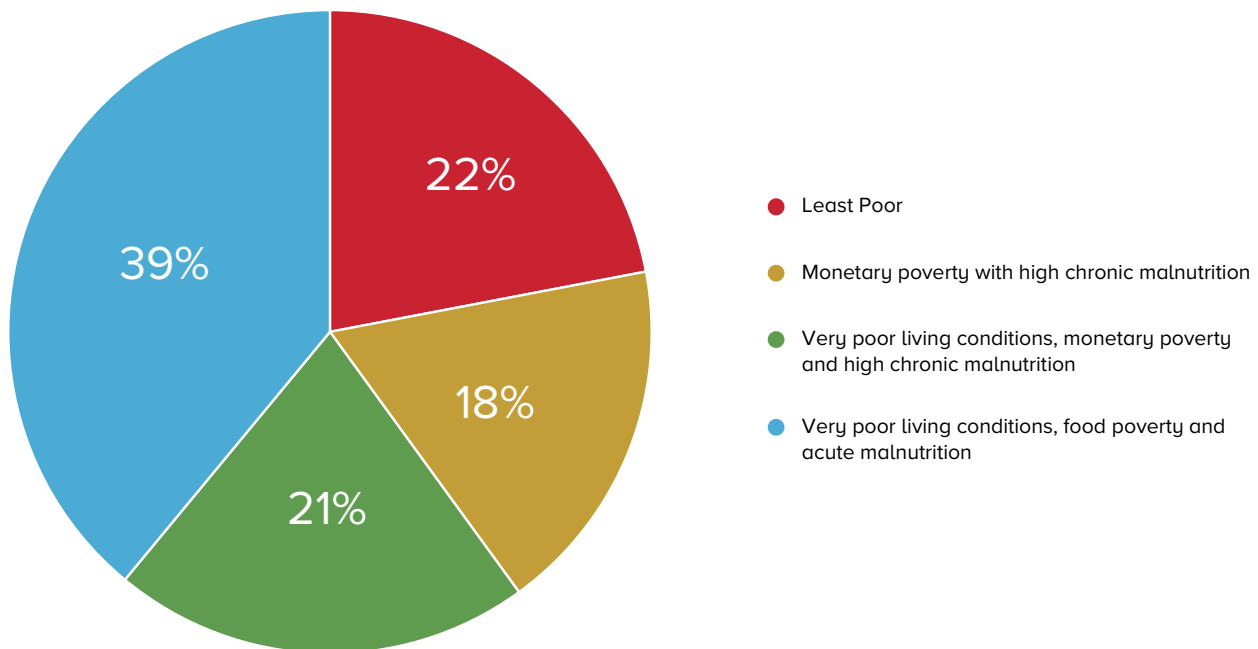**Figure 2: Mapping of multidimensional poverty in the 703 municipalities**
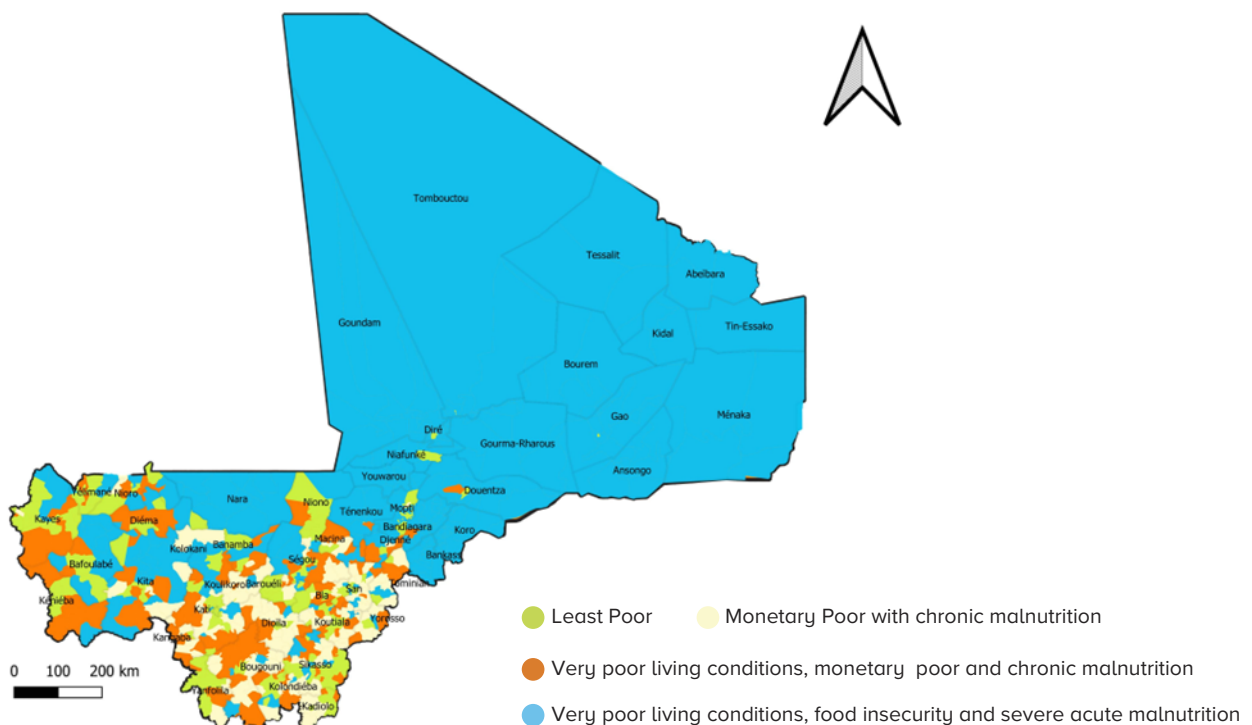
Source: Report on "Pauvreté Multidimensionnelle de la Pauvreté", Mali, 2022

The results indicate that nearly half of the 703 communes (49.5 percent) are poor in monetary terms, and 26 percent face food poverty.[6] Food poverty in the communes increases with the decline in the land's agricultural potential. In terms of nutrition, 450 of the 703 communes, or 64.1 percent, combine a high level of chronic global malnutrition with a moderate level of acute global malnutrition, while 253 of the 703 communes, or 35.9 percent, combine a high level of acute global malnutrition with a moderate level of chronic global malnutrition. The first group is more associated with agro-pastoral areas, while the second is associated with transhumance and nomadic livestock areas.

Child malnutrition is chronic in zones with soil with agricultural potential (69 percent of communes) and rather acute in zones with soil unsuitable for agriculture (59 percent of communes). In the zone with medium soil potential, most communes (65 percent) are almost or not poor in terms of living conditions, while in the zone with low soil potential, the number of communes is not very differentiated in terms of poverty in living conditions. The zone with soil unsuitable for agriculture presents the same unequal aspect in terms of poverty of living conditions but with a greater frequency of poor to very poor communes (65 percent of communes).

Figure 3: Distribution of municipalities according to poverty characteristics

- 22% — Least Poor
- 18% — Monetary poverty with high chronic malnutrition
- 21% — Very poor living conditions, monetary poverty and high chronic malnutrition
- 39% — Very poor living conditions, food poverty and acute malnutrition

Source: Author, based on data from the Multidimensional Poverty Report 2022

The multidimensional poverty status reveals a typology of communes. The first group of 157, or 22.3 percent of the communes, is the least poor. A second group of 128, or 18.2 percent of communes, suffers from monetary poverty with high chronic malnutrition. A third group of 143 communes, or 20.3 percent of communes, is characterized by very poor to poor living conditions coupled with monetary poverty and high overall chronic malnutrition. The fourth group of 275 communes, or 39.2 percent of communes, is made up of communes with very poor to poor living conditions, food poverty and high overall acute malnutrition. Furthermore, the estimates show that the higher the level of isolation, the higher the level of multidimensional poverty. Income-generating activities such as market gardening and cattle fattening are more common in communes with lower levels of multidimensional poverty. Income diversification activities, such as improved family poultry farming, beekeeping and fish farming, are more important in communes with lower levels of multidimensional poverty.

Policy Implications and Outlook

Estimating the communal poverty profiles provides better identification and improved geographic targeting of policies and poverty reduction programmes that seek to improve inclusion. First, the approach indicates the most impactful common policies across geographic areas. For instance, the analyses show how poverty inequalities between communes in Mali can be significantly reduced by policies that improve child nutrition and feeding.

Second, the generated data indicate specific policies to be prioritized by geographic cluster. For instance, data reveal how public policies should prioritize investments in reducing the isolation of the poorest communes to increase inclusion.

Third, the disaggregated data generates insights for deepening the understanding of interactions with other factors not specifically considered by the estimated indicators. For instance, the generated data reveal that most of the communes of the North and the Centre, subject to ongoing security crises, are characterized by precarious living conditions coupled with food insecurity and high malnutrition. In addition, these municipalities are less characterized by monetary poverty. This finding confirms the need to strengthen connectivity between these communes and the communes with high agricultural production while strengthening public service delivery.

Fourth, the diversity of the data generated and the typology of communes that emerges based on various indicators highlight factors that should be prioritized in formulating integrated solutions and programmatic action at the communal level. For example, the impact of a nutritional programme on poverty can be boosted with productive inclusion interventions aimed at alleviating monetary poverty in the commune.

As an illustration for policy use, the Agence Nationale d'Investissement des Collectivités Territoriales (ANICT)[7] in Mali, in carrying out its mission of allocating drawing rights and other subsidies to the local authorities, relies on the communal poverty profile. ANICT's criteria consider the level of poverty of the communes, which are categorized into four poverty classes: "very poor", "poor", "almost poor" and "not poor". UNDP used the metrics to mirror its interventions with the most deprived communes, while ANICT allocates drawing rights and other subsidies to the local authorities using the communal poverty profile.

In replicating these assessments, the use of non-traditional data to generate reliable real-time information to inform inclusive public policies at a lower cost may be considered. This would help in capitalizing and institutionalizing the capacities developed to replicate with other data sources, such as telephony data. Technological innovation to automate the calculation of the various indices would also be beneficial. Future works may also include predictive tools based on georeferenced data to integrate future scenarios and thus strengthen anticipatory governance.

While the generation of disaggregated data (at the municipal and sub-municipal level) is often limited by relatively high costs for a vast territory like Mali, this experience with Mali shows that existing data at the supra-communal level can be used to infer useful indicators that locate the most deprived people and inform local development policies.

Endnotes

1   Ademonkoun Rodolphe Missinhoun is Economics Advisor, UNDP Mali & Mauritania, email: ademonkoun.missinhoun@undp.org. The author would like to thank Usman Iftikhar, Frederick Mugisha, Nathalie Bouche, Edvard Orlic and Tanya Pedersen, for their review and helpful comments on this brief.

2   Target: 1.1: By 2030, completely eliminate extreme poverty (living on less than $1.25 a day) worldwide.

Indicator: Proportion of the population living below the international poverty level, disaggregated by sex, age group, employment status and place of residence (urban/rural).

Target: 1.2: By 2030, at least half the proportion of men, women and children of all ages suffering from some form of poverty as defined by each country.

Indicator 1: Proportion of population living below the national poverty line, disaggregated by sex and age groups.

Indicator 2: Proportion of men, women and children of all ages suffering from some form of poverty as defined by each country.

3   ODHD (2022). Profil de pauvreté multidimensionnelle des 703 communes au Mali. a24eb9082a74ac82ea55dfa1963164130df77baf.pdf (odhd-mali.org)

4   Rao, J.N.K. (2003). Small Area Estimation, Wiley. 19-310_SAE_Brochure_A4-SINGLE-PROOF6.pdf (unfpa.org)

5   The municipality being a very small universe compared to the sampling universe that is the region, it is expected that the post-stratified estimators obtained will be imprecise. To overcome this disadvantage, Livelihood Zones (ZMEs) were used. The Livelihood Zone is defined as a geographical area in which households obtain their basic survival needs, notably food and income, in a relatively similar manner. Economic variables were estimated, by ZME, in terms of household averages. The value of this estimate was assigned to each of the municipalities in the same ZME. The simple average of the values estimated at the level of the EMOP and ZME was used for each variable to characterize the municipality.

6   It might be important to note that even in the non-poor communes there are likely people in poverty in multidimensions. But here the disaggregation at the commune level ensures that communes being left behind are identified and acted on.

7   The amount of the drawing rights and subsidies was 18,578,288,970 FCFA for 2020.