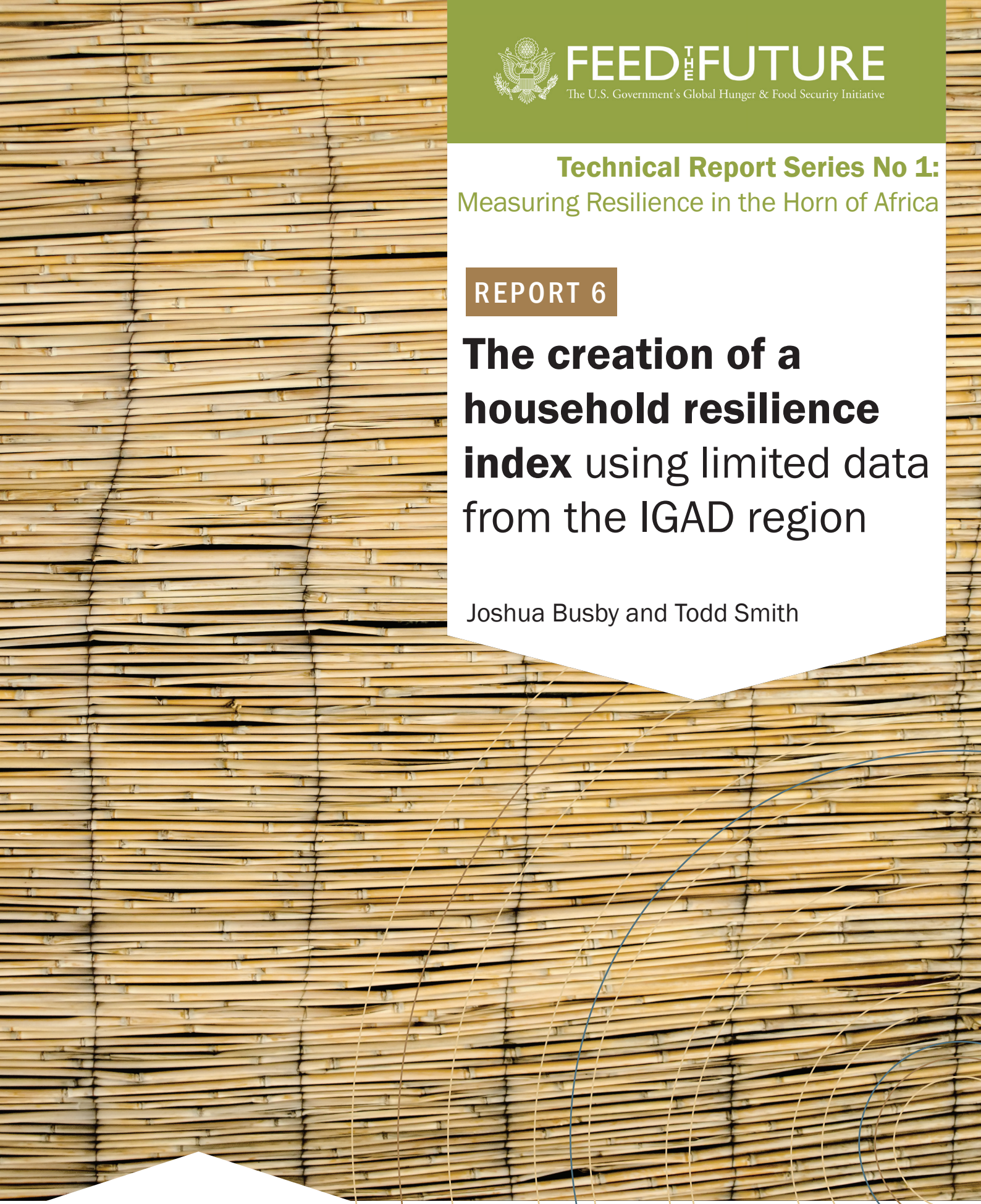

FEED THE FUTURE
The U.S. Government's Global Hunger & Food Security Initiative

Technical Report Series No 1:
Measuring Resilience in the Horn of Africa

REPORT 6

The creation of a household resilience index using limited data from the IGAD region

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1 Introduction

The Technical Consortium for Building Resilience in the Horn of Africa (TC) is a project of the CGIAR, which was formed in 2011 following the effects of the 2011-2012 drought. The main aim of the Technical Consortium initially was to provide financial and technical support to the Intergovernmental Authority on Development (IGAD) and its member states (Djibouti, Ethiopia, Kenya, Somalia, South Sudan, Sudan and Uganda) to formulate regional and national investment programmes for the long-term development of ASALS and to follow this with technical support, with particular focus on monitoring and evaluation and the targeting of investments within these plans. These investment plans became the Country Programme Papers (CPPs) for drylands projects for the Member States and the Regional Programming Framework (now the IGAD Drought Disaster Resilience Sustainability Initiative (IDDRSI)), which focused on investment plans to address regional issues for IGAD. The focus of the TC's work at present is to collaborate with different partners, specifically including the governments in the region as their plans develop, to provide tools for measuring the impact of investments on enhanced resilience and to develop decision support tools for better targeting and prioritization of investments or projects. These tools will not only be useful for monitoring the impact of interventions within the national drylands investment plans and provide evidence for rational decision-making and prioritization, but will be applicable for donors, developments, NGOs and civil society when measuring or targeting their projects.

It has been noted that there is a gap between the strategies that decision makers use to allocate policy-related investments for ASALs and the analytical techniques that researchers use to model the conditions of ASALs and assess the impact of related interventions. To help bridge this gap, the TC has been working to develop and apply approaches to support evidence-based decision-making and investment prioritization to enhance resilient development trajectories in Horn of Africa (HoA). The result will be a toolbox of methodologies and application processes that facilitate the capacities of the IGAD member states to identify the investments with greatest potential for the highest impact to build resilience to shocks and stressors, in particular to drought, in the HoA. The toolbox will be tailored to elucidate the implications of more focused interventions, for a more specific sub-population of interest, as those details are specified by IGAD or the member states. It will also be able to test how well investments perform under different conditions (climatic and otherwise) and over varied time horizons. The toolbox will be of use to multiple audiences, but the primary focus for application will be to provide tools for the Government of Kenya (GoK) National Drought Management Authority (NDMA), to assist with decision analysis and prioritization for investment proposed in the Kenya Ending Drought Emergencies Common Programme Framework (EDE CPF) drylands investment plan. It is also assumed, however, that the conceptual analysis and knowledge gained in the provision of tools to the GoK NDMA will also be of use to other clients such as NGOs, donors and development partners to assist with their decision making processes and that these tools will also have potential for replication in the remaining IGAD member states.

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Background to pilot development

Given that data in the Horn of Africa is limited, one is more likely to obtain relatively complete data when using a model comprised of a more limited set of targeted indicators. In this way, a model of resilience should be as parsimonious as possible in providing the most value, given its purpose, with the least amount of inputs. Furthermore, if the goal is to periodically update the model's index to evaluate changes over time, one needs to have access to data that are collected regularly (or that could conceivably be collected regularly).

With these considerations in mind, the construction of a narrower and focused Household Resilience Index that captures a measure of human well-being is recommended as an alternative to a more complex, composite index for use in resilience M&E. This report shows how such an index can be readily created for most of East Africa using available data, that is robust to alternative specifications. It also details how multiples waves of data for Uganda, Kenya, and Ethiopia allow one to create a time-series measure of change at the sub-national level in those three countries.

For those requiring a more complex measure of resilience, a review of FEWSNET's acute food insecurity methodology and their newly released chronic food insecurity scale is provided.

3 Proposed **Household Resilience** Index

In previous work on climate security vulnerability, the University of Texas developed a sub-index of Household and Community Resilience using indicators from the DHS and MICS surveys. These are surveys that are supported financially by USAID and UNICEF respectively, but the work is typically carried out by national government statistical agencies. The survey work is also supported by technical consultancies such as ICF International. These surveys are carried out periodically in different countries with largely consistent questions for temporal and geographic comparability. For some countries, there are multiple survey waves that allow for inter-temporal comparisons. The survey waves are not all carried out at the same time in different countries.

For many countries, the original data is available from the Measure DHS website (www.measuredhs.com). In countries such as Eritrea, the original data has never been released but one can glean important data from the public reports. Notionally, other countries such as Sudan have surveys, but the reports reveal that the data is not available with any geographic resolution.

Despite data limitations, it is possible to construct a baseline Household Resilience Index for almost the entire region, using the latest survey year from the DHS and MICS surveys. Southern Somalia and Sudan do not have data for the DHS and MICS surveys, and data for Djibouti was sourced from an alternative but comparable survey conducted by the UNDP and the Ministère de l'Economie, des Finances, et de la Planification, chargé de la Privatisation [1]. As will be discussed, we demonstrate that it is sometimes possible, though perhaps not necessary, to impute certain indicators for purposes of index construction.

The proposed index captures human development at the sub-national level using indicators of educational attainment, access to basic necessities, access to health care, and health status. It has the potential to provide a baseline measure of human development that would allow the user to identify the relative distribution of better and worse human development within the region. It is also consistent with approaches to resilience and vulnerability that focus largely on social sources, separating them from biophysical contributors to climate vulnerability [2,3,4].

Defining the scale of data capture

When constructing a composite index it is first necessary to carefully define what one wishes to capture with an index that cannot be measured directly or captured with a single proxy indicator. In this case, we wish to capture household resilience to climatic shocks. The UNISDR defines resilience as "the ability of a system,

[1] Djibouti Ministère de l'économie, des finances et de la planification, chargé de la privatisation, and United Nations Development Programme. Profil de la pauvreté à Djibouti. Le ministère, 2002 (available at http://www.ministere-finances.dj/statistiques/AS/Statis/Edam/PROFIL.pdf).

[2] Brenkert, A.L. & Malone, E.L. (2005). Modeling Vulnerability and Resilience to Climate Change: A case sudy of India and Indian states. Climatic Change, 72, pp. 57-102.

[3] Adger, W.N., Brooks, N., Bentham, G., Agnew, M., & Eriksen, S. (2004). New Indicators of vulnerability and adaptive capacity. Norwich, UK: Tyndall Centre for Climate Change Research.

[4] Vincent, K. (2004). Creating an Index of Social Vulnerability to Climate Change for Africa. University of East Anglia: Tyndall Centre.

community or society exposed to hazards to resist, absorb, accommodate to and recover from the effects of a hazard in a timely and efficient manner, including through the preservation and restoration of its essential basic structures and functions" [5]. When applied to the household level, it is reasonable to expect that households are more resilient to unexpected shocks when they are healthier, better educated and have more robust access to basic household necessities, shelter, food, water and healthcare. In other words, higher levels of what has come to be called human development make households more resilient [6].There is also a well-established correlation between "human development" and transportation, communication and economic infrastructure. The causal connections between these factors are the subject of a large body of on-going research in the development field. From a practical prospective, reliable and comparable data on infrastructure is simply not available for most of the region. Consequently, the conception of "resilience" is largely interchangeable with "human development."

For the purposes of this project, six indicators were identified for which there was relatively complete subnational coverage across all countries in the region (save for Sudan and southern Somalia). In some cases, data were available for four indicators and values for the other two could be imputed. The indicators include:

- delivery in a health care facility
- infant mortality
- female literacy
- primary school net attendance rate
- access to improved water
- and the percentage of underweight children

(See Appendix A for maps of individual indicators). These indicators largely map on to indicators identified as important to vulnerability in the previous literature on climate change [7,8,9].

Indicators were included in this index only if they were not very highly correlated with another indicator in the index for which there was ample information. For example, delivery in a health facility is nearly perfectly correlated with another indicator that is readily available: whether a woman's birth was attended by a trained health care professional. Therefore, only one of these indicators was included.

Weighting of indicators

Method 1: Equally weighted average of available data

The simplest aggregation of the indicators is an equally weighted average of the available indicators in a particular region. Because the raw indicators are not measured in the same way or not on same scale, it is first necessary to normalize them to comparable measures. The simplest method to potentially do this is the minmax transformation, which captures the position of an individual score relative to the spread of the entire range of scores for that indicator. Mathematically, this transformation can be represented by the equation:

$$I_X = \frac{\textit{actual value of } X - \textit{minimum value of } X}{\textit{maximum value of } X - \textit{minimum value of } X}$$

[5] UNISDR. (undated). *Terminology.*

[6] UNDP. (2011). *Human Development Report 2011.* New York: United Nations Development Programme.

[7] Adger, W.N., Brooks, N., Bentham, G., Agnew, M., & Eriksen, S. (2004). *New Indicators of vulnerability and adaptive capacity.* Norwich, UK: Tyndall Centre for Climate Change Research.

[8] Brooks, N., Adger, W.N., & Kelly, P.M. (2005). The determinants of vulnerability and adaptive capacity at the national level and the implications for adaptation. *Global Environmental Change*, 15, pp. 151-163.

This transformation allows one to observe where in the range of scores a particular score lies. This transformation has the benefit of being easily conducted and easily understood because the resulting scores range from zero to one. Another possible transformation is to the z-score transformation in which the difference between each individual score and the mean for that indicator is divided by the standard deviation of the indicator. This transformation has the benefit of better preserving the distribution of the original data but it is not as easily understood because while all of the transformed variables are comparable because they each have a mean of zero and a standard deviation of one they do not have a common minimum or maximum.

The important thing to note is that once these transformations are made into a common scale, the result is relative scores rather than absolute ones. Thus, while the raw data might indicate that X percentage of children are underweight, the transformed score will inform on a zero to one scale where a particular sub-national unit falls, given the distribution of other scores in the region. The region as a whole may generally have very bad human development indicators, but in terms of the distribution of the scores, some areas may be better off than others - even if none of them are particularly well-off. Nonetheless, to aggregate indicators into a composite, one needs to have them on a comparable scale, which ultimately involves data transformations like this one.

Once converted into a comparable scale, a simple average across all six indicators can be created. For some geographic units, only four or five indicators of the six are available, and the composite is the average of the available data.

Table 1 shows the data sources and years for each indicator. In the case of Djibouti, data for female literacy was missing, so adult literacy was used instead. This may overstate the value for women but is a decent substitute, given the circumstances.

Table 1: Data Availability and Sources

	DELIVERY IN A HEALTHCARE FACILITY	INFANT MORTALITY RATE	WOMEN'S LITERACY RATE	PRIMARY NET ATTENDANCE RATE	ACCESS TO IMPROVED WATER	UNDERWEIGHT CHILDREN
DJIBOUTI			UNDP, 2002*****	UNDP, 2002	UNDP, 2002	UNDP, 2002
ERITREA	DHS, 2002	DHS, 2002		DHS, 2002		DHS, 2002
ETHIOPIA	DHS, 2011	DHS, 2011	DHS, 2011	DHS, 2011	DHS, 2011	DHS, 2011
KENYA	DHS, 2009	DHS, 2009	DHS, 2009	DHS, 2009	DHS, 2009	DHS, 2009
SOMALIA						
Puntland*	MICS4, 2011	***	MICS4, 2011****	MICS4, 2011	MICS4, 2011	
Somaliland**	MICS4, 2011	MICS4, 2011	MICS4, 2011****	MICS4, 2011	MICS4, 2011	
SUDAN						
SOUTH SUDAN	MICS4, 2010	MICS4, 2010	MICS4, 2011****	MICS4, 2010	MICS4, 2010	MICS4, 2010
UGANDA	DHS, 2011	DHS, 2011	DHS, 2011	DHS, 2011	DHS, 2011	DHS, 2011

* Bari, Nugal & Mudug

** Maroodijeex/Saaxil, Awdal, Togdheer, Sool, Sanaag

*** "A data quality review of the aforementioned indicators, namely mortality rates, adolescent birth rate, fertility rates and early child bearing shows lack of plausibility of the estimates for these four indicators which are therefore not included in this preliminary report." MICS4 Preliminary Report, p. 2

**** Young (15-24) women's literacy.

***** Adult literacy rather than female literacy.

Method 2: Principle Components Analysis

An alternative approach to using an equally weighted average of the available data is to use Principal Components Analysis (PCA) to determine weights based variation in data. This method was pioneered and applied to human development indices in 2002 [9], and has the benefit of allowing the data to establish the weights rather than imposing artificial weights on the data. It is not, however, transparent to non-statisticians because it does not result in individual weights for each indicator but for weights for theorized components - each constructed from differently weighted combinations of the raw untransformed indicators.

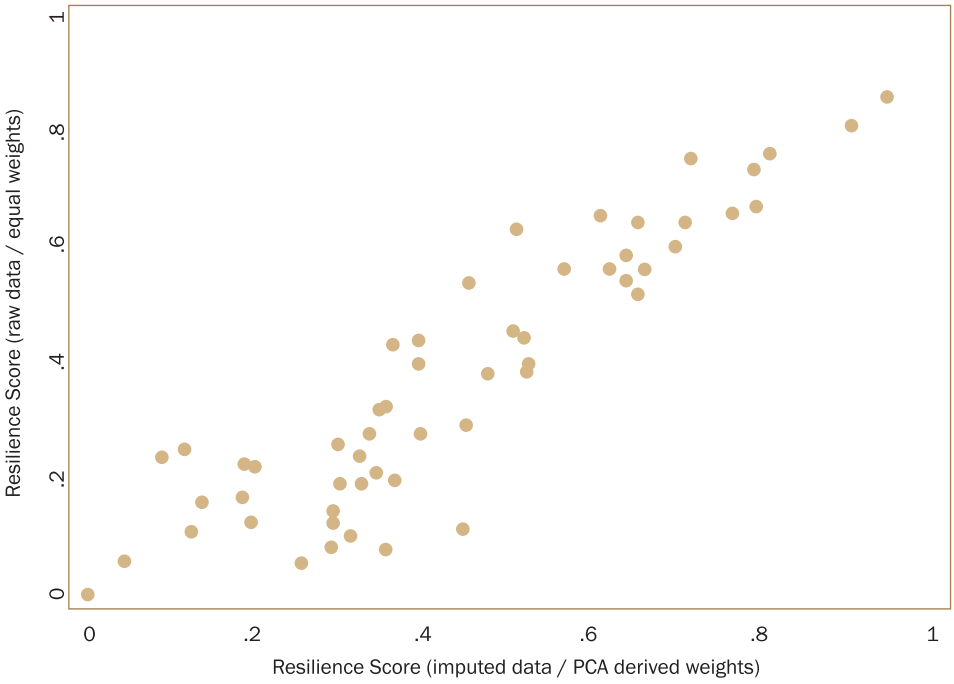
In order to apply this PCA, it is first necessary to impute values for missing indicators because it cannot establish weights for incomplete data. This is achieved by using multiple imputation, which uses linear regression of each indicator on all the others to calculate values for missing observations. This is an iterative process with the potential to result in different values depending on the randomly established starting points. For this reason, an iterative process was conducted that first calculated imputed values of missing data, and then used that unique complete set to calculate the PCA derived weights and to calculate composite scores for each subnational unit using these indicator and component weights and the z-score transformed indicator values. This final composite score is then minmax transformed in order to make it more easily understood by a non-technical policy audience. This entire process is repeated 500 times and the final mean of the 500 calculated composite scores for each unit is then used as the final reported value. Using this method, one can also observe the standard errors of the final scores. Assuming that the method is valid, one can say with 95% confidence that the true composite score, without missing data, is within roughly two standard errors of the reported score.

[9] Nagar, A.L. & Basu, S.R. (2002). *Weighting Socioeconomic Indicators of Human Development: A Latent Variable Approach.* In A. Ullah, A.T.K. Wan, & A. Chaturvedi (Eds.), Handbook of Applied Econometrics and Statistical Inference (pp. 609-41). New York: Marcel Dekker.

4

Resilience score of both weighting methods

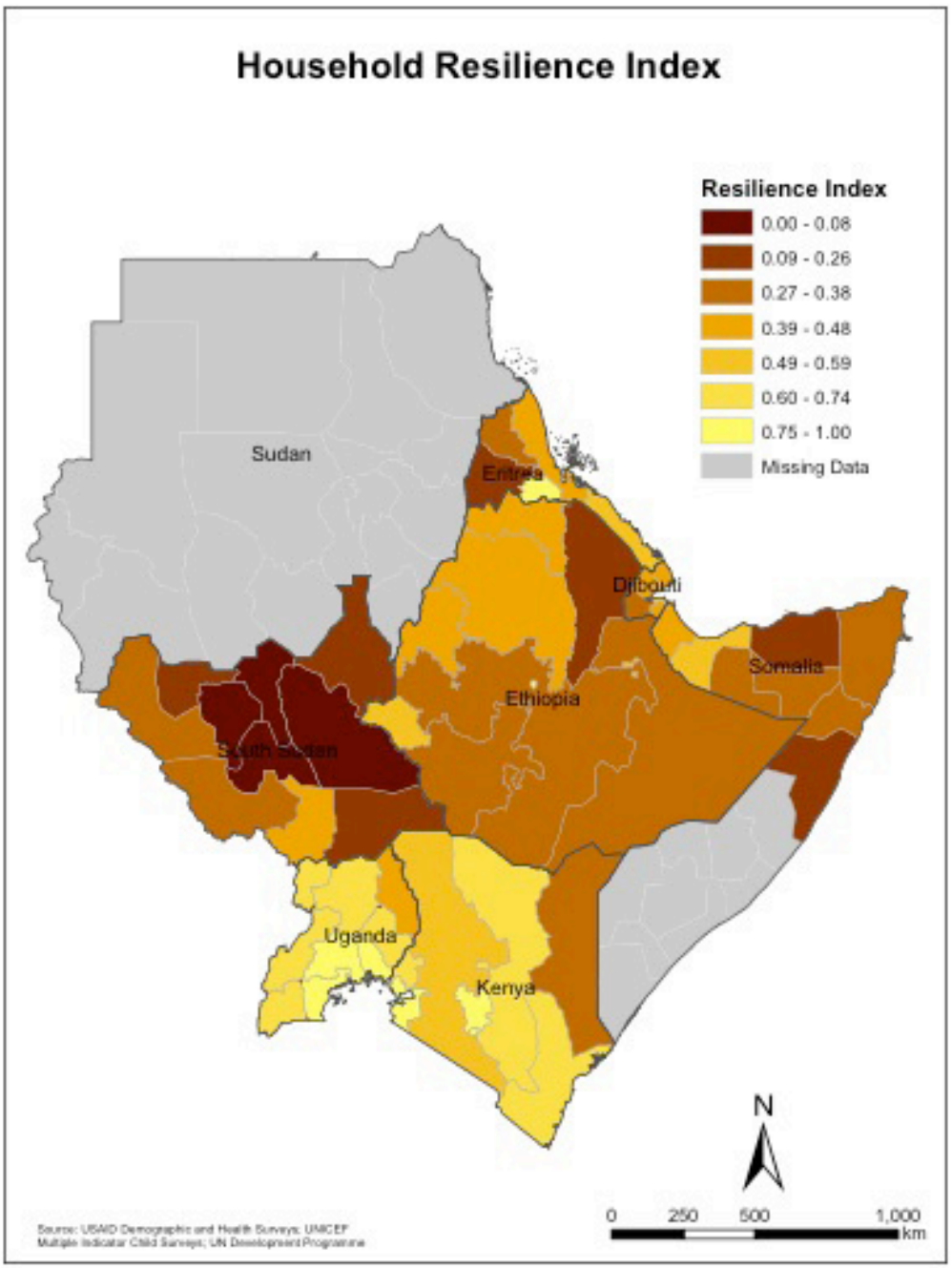
The raw data and the resilience score using both of these methods are delivered in an Excel appendix. Ultimately, the resilience score using the simple equally-weighted average method (resil_simple) and the resilience score using imputed values and PCA derived weights (resil_zscore) are highly correlated with a Pearson correlation coefficient of 0.9311. The figure below is a linear graph of this correlation. From this, it can be concluded that a more simple construction, using these data, provides a reasonable method of index construction and this can be done with by someone with less statistical training.



The map of the IGAD region in Figure 1 shows the composite scores using imputed data and the PCA derived weights. It reveals that South Sudan and the North Eastern province of Kenya have the least resilience across the region with the Kampala area in Uganda and Nairobi among the most resilient, based on our index. We have to be cautious with interpreting such maps as the cut-points between different color schemes can be manipulated to show what mapmakers want to show. Here, we used a quantile categorization to show a roughly similar number of observations in each of seven categories of data.

This map was generated using the latest survey year for all the countries in the region. As mentioned, several countries have experienced multiple survey waves of DHS and MICS surveys. Notably, Kenya, Ethiopia, and Uganda have all had three survey waves, allowing one to chart changes over time.

Figure 1: A map of the IGAD region showing the composite scores using imputed data and the PCA derived weights



One has to be especially careful in trying to create an inter-temporal index that one can use to compare values over time. If the data is converted to be based on the minimum and maximum in the current wave of the survey, all that is measured is the placement of a particular geographic unit for that indicator relative to the scores of that unit in that particular time period. Thus, an area might be a low performer in time period one but a relatively high performer relative to other areas in the next time period. That measure would not indicate how a geographic unit compared to its former self in the previous time period.

In order to avoid this problem, the scores for each indicator were converted relative to the lowest and highest scores from all time periods. This allows us to chart how the scores change in relation to the distribution across the entire time frame. As

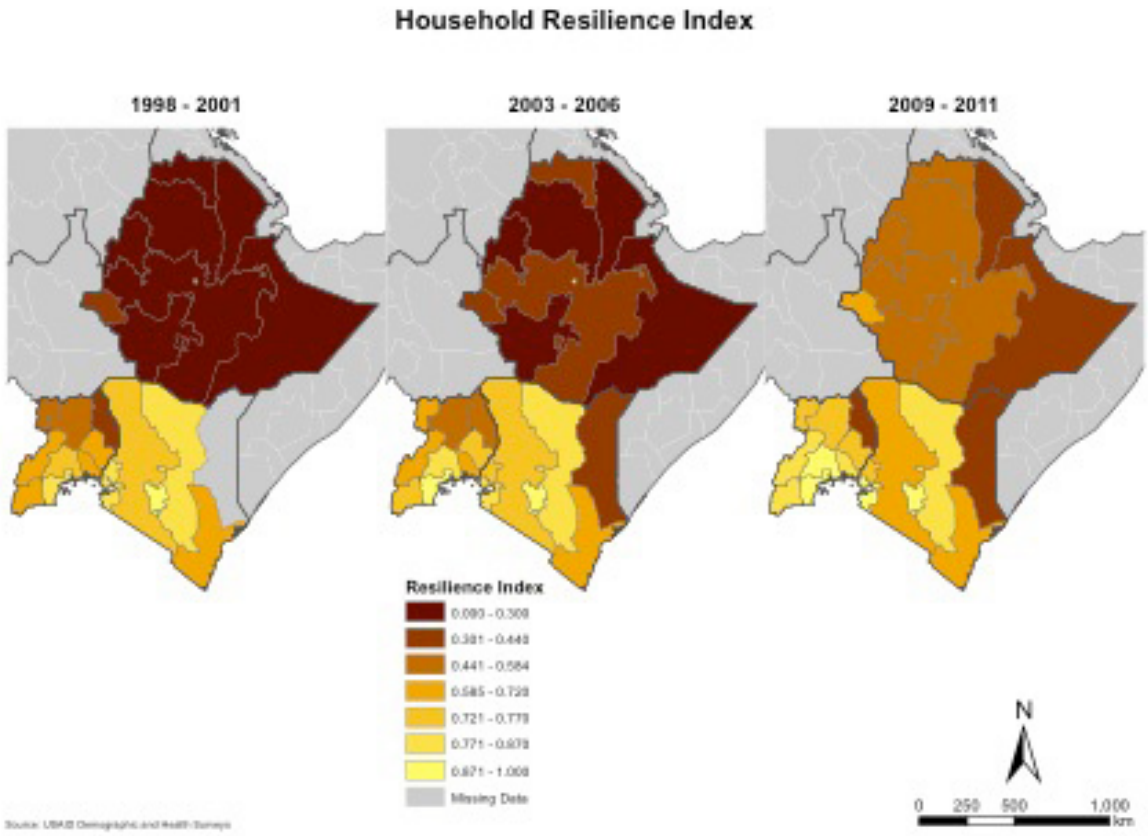
depicted in the figure below, some changes are observed in the three countries across three waves of the surveys.[10] A number of regions in Ethiopia (such as Oromia and Tigray) appear to improve across the waves of the surveys, while the Rift Valley in Kenya appears to have lower resilience by the final wave. The Karamoja region of northeastern Uganda experienced some changes over time but it is unclear if this represents real movement over time in living conditions, or is merely a slight change in Uganda's placement along the cut-off between different color gradations.

It is somewhat misleading to look at this map at the regional level because highly populated areas like Nairobi, Addis Ababa, and Kampala (which tend to have higher scores) show up as small blips on the map and are harder to distinguish from other areas despite representing a large proportion of the total population. In addition, the first phase for Kenya is missing data for the North Eastern province, and data for the Eastern province and the Rift Valley were only collected for the southern portion of those provinces but the data is applied to the entire geographic unit.

Countries also experience reorganizations of administrative units periodically, and it is not clear if the survey was administered in exactly the same way across waves. We thus present the inter-temporal portrait of resilience with some reservations.

[10] Ethiopia was surveyed in 02/2000 - 05/2000, 04/2005 - 08/2005, and 12/2010 - 05/2011. Kenya was surveyed from 02/1998 - 07/1998, 04/2003 - 09/2003, and 11/2008 - 02/2009. Uganda was surveyed in 09/2000 - 03/2001, 05/2006 - 10/2006, and 06/2011 - 12/2011.

Figure 2: Changes are observed in the three countries across three waves of the surveys



It is also unclear how to interpret why these changes occurred. One can make plausible stories that fit one's preconceived notions (for example, that Ethiopia is richer and therefore living standards have improved, that Ethiopia's policies of disaster risk reduction and preparedness paid off to contribute to rising living standards, that increased diversification of income away from pastoralism contributed to changes in living standards), or one could argue the converse: that projects to shore up pastoralists' livelihoods account for changes in improved living standards. Similarly, one could suggest that the deterioration in the Rift Valley is a consequence of political violence. The point of these contradictory observations is that the maps cannot indicate why these changes have occurred. One can decompose the maps and look at the baseline indicators for each geographic area and how they change over time, but even these changes cannot account for the causal processes that contributed to those changes.

5

The use of **FEWSNET data** to construct a more complex alternative index

The index described in the previous section provides a rather limited measure of resilience largely due to the scarcity of appropriate data in the region and the associated difficulties in maintaining datasets for larger groups of indicators. Should a more complex measure of resilience be required, incorporating physical exposure, demographic influences, market factors, and household indicators, it is recommended that existing methodologies and approaches are used, such as the USAID-funded Famine Early Warning Systems Network (FEWSNET)'s acute food insecurity methodology and their newly released chronic food insecurity scale. This chronic food insecurity scale might be particularly relevant to interests in tracking and contributing to long-term development rather than food security emergencies.

FEWSNET has begun collecting all of its acute maps of food insecurity into a single data package, allowing one to track what they call "persistent acute" food insecurity. From this data for most of East Africa from April 2008 to April 2014, we have created an animated map for the region.

Since 1985, FEWSNET has carried out efforts to assess the likelihood of famine events in at-risk countries around the world. Their coverage includes all IGAD countries, save Eritrea. They perform integrated seasonal assessments of food security, mapped at the subnational level as a means of identifying areas at risk of acute food insecurity across East Africa. These have the advantage of being more comprehensive than the Household Resilience Index presented above and include indicators representing four areas, food consumption, livelihoods change, under-nutrition, and mortality. Their methods include metrics of physical exposure, markets and food access and human well-being.

Since the 2.0 version was launched in 2012, the Integrated Food Security Phase Classification (IPC) system that FEWSNET uses has become something of an industry standard, embraced by CARE, FAO, Oxfam, the World Food Programme, and a host of other governmental and non-governmental partners (see the graphic from the 2012 technical manual below).

Areas are classified into five categories for possible famine, including (1) minimal, (2) stressed (3) crisis (4) emergency and (5) catastrophe/famine. Each of these scores has a specific technical meaning, and a host of indicators are used to rate the famine potential in a given area. These assessments are produced roughly four times a year.

At first blush, FEWSNET's orientation to short-term emergency disaster situations seems in contrast to the much avowed emphasis on long-term development and subsequent resilience. However, they have recently begun to prepare maps of what they call "persistent acute" food insecurity by collecting the seasonal scores for the period 2008-2014. Data for East and West Africa has been shared with the authors. They have also, as of July 2014, launched a chronic scale to identify more long-term drivers of food insecurity. While the IPC chronic scale will evaluate similar aspects of food security as the acute scale (nutrition, mortality, changes in livelihood status, and food consumption), they will build these chronic food security assessments using a slightly different methodology and reference scale of indicators. Both of these approaches will be discussed in turn and some preliminary findings will be provided.

Persistent Acute Food Insecurity

Maps of persistent acute food insecurity can be used to identify the areas over the last seven years that have persistently experienced high levels of food insecurity.

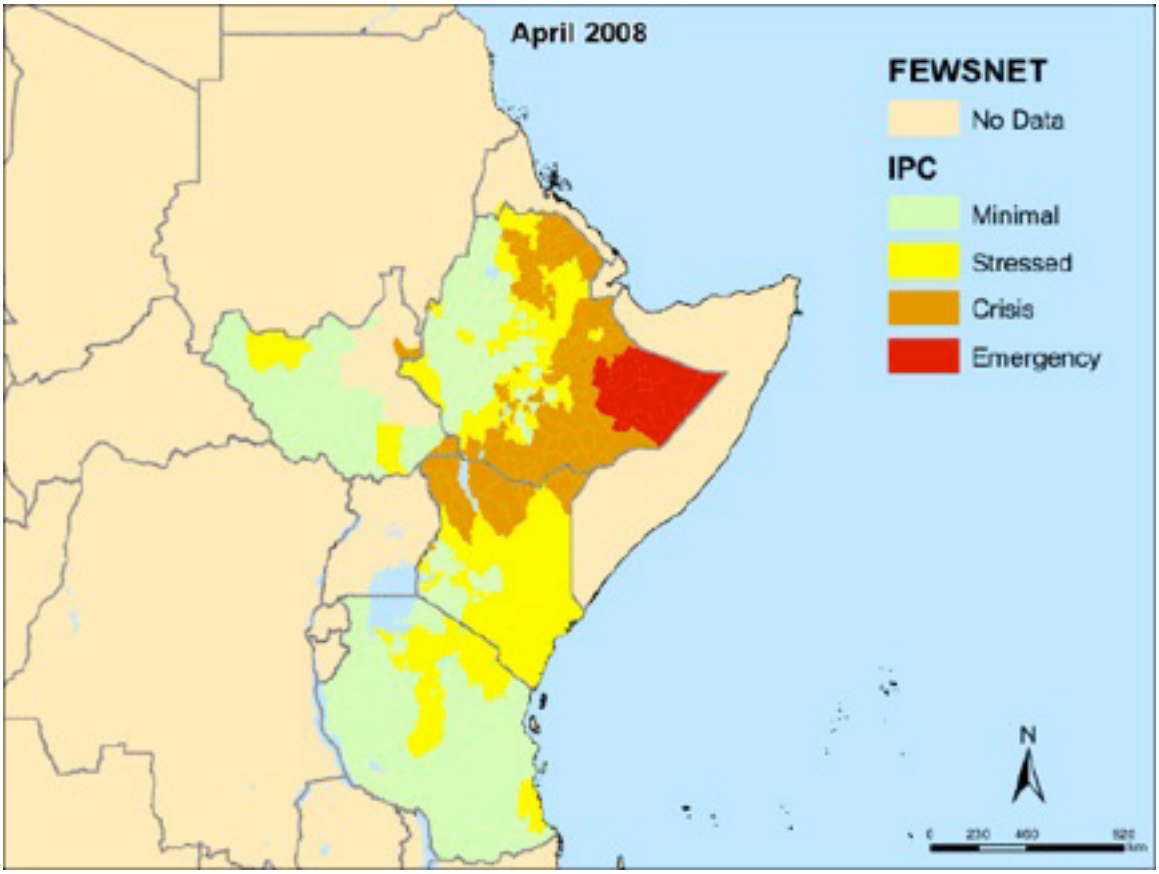
The data shared with the authors by FEWSNET include Ethiopia, Kenya, Sudan, South Sudan, and Tanzania. As FEWSNET reported to the authors, Somalia used a different mapping method in the earlier years to synchronize with the Food Security and Nutrition Analysis Unit (FSNAU), so they do not have Somalia data in the same format and it may ultimately be difficult to retrieve [11].

The animated video below provides the changing portrait of food insecurity over the last seven years in much of the region. Even though the original data is on the same 1 to 5 scale, one cannot simply take the average for this period as IPC methods changed during this period.[12]

[11] Because Somalia has experienced famine during this period, this data is particularly valuable as no other sub-national unit in the region has experienced famine or 5 on the IPC scale. The authors have requested additional information on the status of Somalia data and why Uganda, which is a FEWSNET country, is not included in that data.

[12] The caveats about the data are as follows:
1. Prior to April 2011, FEWS NET used its own classification system to classify food insecurity. This system has been in use in various forms since around January 1990 (developed during the FEWS II workshop in Tunis, Tunisia). While the IPC scale is described as being started by FSNAU in Somalia. It was in fact inspired by the FEWS Scale as the two projects collaborated closely since FEWS started in Somalia around 1993. Starting in April 2011, FEWS NET switch to piloting and using the IPC scale. Both the now discontinued FEWS Scale and the IPC scale are 5-level scales. As they are related, they are also similar. However there are important differences:
a. The FEWS Scale (and IPC 1.1) classified a region by the highest food insecurity level of any household in the region, even if only ONE household.
b. The IPC version 2 scale, which FEWS NET started using in April 2011, uses a 20% rule where a region is classified based on the highest level of food insecurity of at least 20% of the households (1 in 5). Therefore the FEWS Scale would tend to classify areas more severely than the IPC scale. This makes the whole historical series not comparable. However, the relative geographic pattern of food insecurity within the same period should remain similar using either scale.
2. FEWS NET has been refining its basic administrative unit of analysis with incorporation of livelihood zones. This means that during this historical period, the underlying analytic units for some countries may have changed. This data series is expressed in the current analytic units. Historical data from periods using different units have been geographically assigned to the new units.

Figure 3



While the methodology changed over time for classifying geographic areas to different levels on the scale, the scale itself roughly captures the same dynamics so that a score of 1 represents a minimal level of food insecurity while a score of 4 represents emergency conditions (there were no famines or phase 5 food insecurity observations in the data shared with the authors). That said, the methodological changes make it hard to compare the significance over the entire arc of the period as the same scores do not have a consistent meaning over time (see the notes above on how the original FEWS scale classified areas as being food insecure based on a lower threshold than the IPC 2 scale).

These concerns notwithstanding, as a rough first cut at areas of persistent acute food insecurity over this relatively short time period, the number of periods that a geographic unit scored a 4 were examined, followed by the proportion of the periods a country was in the 4 category as a share of all observations. The maximum number of observations was 25. The data are available for some countries like Ethiopia down to the admin3 (woreda- or district-) level whereas for other countries like South Sudan, data is only available at the admin2 (county-) level.

For the period April 2008¬–April 2014, 18 districts in Ethiopia, all located in the Somali region of eastern Ethiopia, each received a score of 4 for emergency food security conditions for 10 of the 25 observations (40% of the time). This is roughly ¼ of the districts in this vast, sparsely populated region, where pastoralists constitute a relatively large proportion of the populace. All of the other administrative units with either 8 or 9 periods with a food insecurity classification

of 4 were also located in the Somali region. Other areas with a relatively high proportion of 4 classification included Akobo county in Jonglei State, South Sudan, and parts of Southern Kordofan in Sudan, and several areas in north central Kenya including parts of Marsabit and Isiolo counties.

One can also look at the areas that were always in the minimal category for food insecurity including most areas of Amhara and Oromia provinces of Ethiopia; some parts of Benechangul Gumu and SNNPR provinces of Ethiopia; many areas of Nyanza, Rift Valley, and Western provinces of Kenya; parts of Central Equatoria and Western Equatoria in South Sudan; Dar es Salaam, and parts of Iringa, Kegera, Kigoma, Mbeya, Mtwara, Pwani, Rukwa, Ruvuma, and Tabora regions of Tanzania; and Jazirah, Khartoum, Northern, Qadarif, River Nile, Sinnar, and White Nile provinces of Sudan, among others.

These maps provide something of a comparative perspective with the proposed Household Resilience Index. Areas that appeared comparatively worse on the index's snapshot of contemporary resilience such as Afar do not appear as persistent problem areas in FEWSNET food security assessments. That said, other areas such as parts of Jonglei state in South Sudan appear to have a high frequency of food insecurity and low household resilience.

Since the FEWSNET maps encompass a host of other factors than the resilience maps, one should treat these comparisons with caution and approach them as complementary data sources from which one could draw different conclusions about resilience and food insecurity. The FEWSNET scale is an absolute scale of food insecurity whereas our household resilience index is a relative scale based on an area's aggregate score relative to other areas in the wider region. The FEWSNET acute maps were never created with an eye towards long-term developmental outcomes and thus our calculation of persistently acute food insecurity is rough and ready. New efforts by FEWSNET to craft a measure of chronic food insecurity promise to be more directly relevant to interests in long-term development and resilience.

IPC Chronic Scale

In July 2014, FEWSNET launched a new chronic scale for food insecurity that is intended to allow the IPC to focus on both crises and medium to long-term development outcomes. The chronic scale is meant to get at the structural causes of food insecurity and look at outcomes over a longer 3 to 5 year time period. The brief accompanying the launch described the relevance of the chronic scale as follows: "To inform actions that focus on improving quality and quantity of food consumption through strengthening and rebuilding livelihoods and resilience through complimentary programs" [13].

Information about the precise methodology underpinning the new chronic scale is limited. The launch event in July focused mostly on the motivation and intended outcomes and how the product will be differentiated from the acute maps. However, these discussions were carried out at a very general level.

The origins of the chronic scale date back to 2011 when the idea was included in the IPC 2.0 technical manual. Between 2011 and the July 2014 launch, an IPC

[13] IPC. (2014). Version 1.0: IPC Chronic Food Insecurity Classification.

technical working group has been developing the methodology, having hosted several synthesis meetings and pilot projects around the world, including in Uganda and Kenya.[14]

The website reports that there will be a variety of rollout events in 8 target countries this year, including Kenya and Uganda. Between 2015 and 2018, the plan is to roll-out the approach to 36 to 40 countries.[15] These are not named but presumably, a number of countries in East Africa would be among them.

The technical working group that is developing the chronic scale includes experts from FAO, WFP, FEWSNET, Save the Children, the European Commission and others. While much work has gone into the emergent standard, there are still opportunities for the Technical Consortium to participate CGIAR as an interested stakeholder, particularly if there were some concern that certain populations such as pastoralists might not be given sufficient attention or be captured adequately by the measure.

The chronic scale's primary emphasis will be on the base level of food insecurity during what are periods of two to three "non-exceptional" years. In looking at the previous ten years, the idea is to identify periods without "unusual shocks." Among the indicators that were being reviewed were several nutritional indicators which might reflect on chronic food insecurity including severe stunting, iron deficiency and indicators of overweight populations [16].

Unlike the acute scale, the chronic scale will only have four levels, (1) Minimal/No, (2) Mild, (3) Moderate, and (4) Severe. The map in Figure 4, from the 2012 technical manual, is a depiction of what the chronic scale maps might look like [17].

The 2012 technical manual also included an early version of the reference table that analysts would use to make their assessments. The reference table included the range of possible indicators that might be included in the assessments including calorie consumption as well as several other measures of food consumption and dietary diversity, stunting, body mass index, anemia, vitamin A deficiency, erosion in livelihood assets, the frequency of hazard exposure, access to water, among other indicators [17]. The IPC acute assessment draws on DHS and MICS data for nutritional assessments and mortality. Other data sources inform the assessments as well including FEWSNET's satellite data on rainfall and vegetation, FAO data on food access, among other sources [18].

The IPC methodology is also intended to identify causal factors that contribute to food insecurity through a Limiting Factor Matrix to see which combination of factors availability, access, utilization, and stability conjoin to drive food insecurity in a given area [17]. The chronic scale is intended to get at structural causes of persistent food insecurity [19].

Given that the chronic scale is in its early stages of rollout and deployment, there is potential for interested parties to play an active roll in its implementation. This is an area for further research.

[14] http://www.ipcinfo.org/ipcinfo-technical-development/ipc-chronic-scale/en/

[15] http://www.ipcinfo.org/ipcinfo-technical-development/ipc-chronic-scale/chronic-implementation/en/

[16] IPC. (2013). IPC Chronic Food Insecurity Analysis Development Process - Second Round of Piloting.

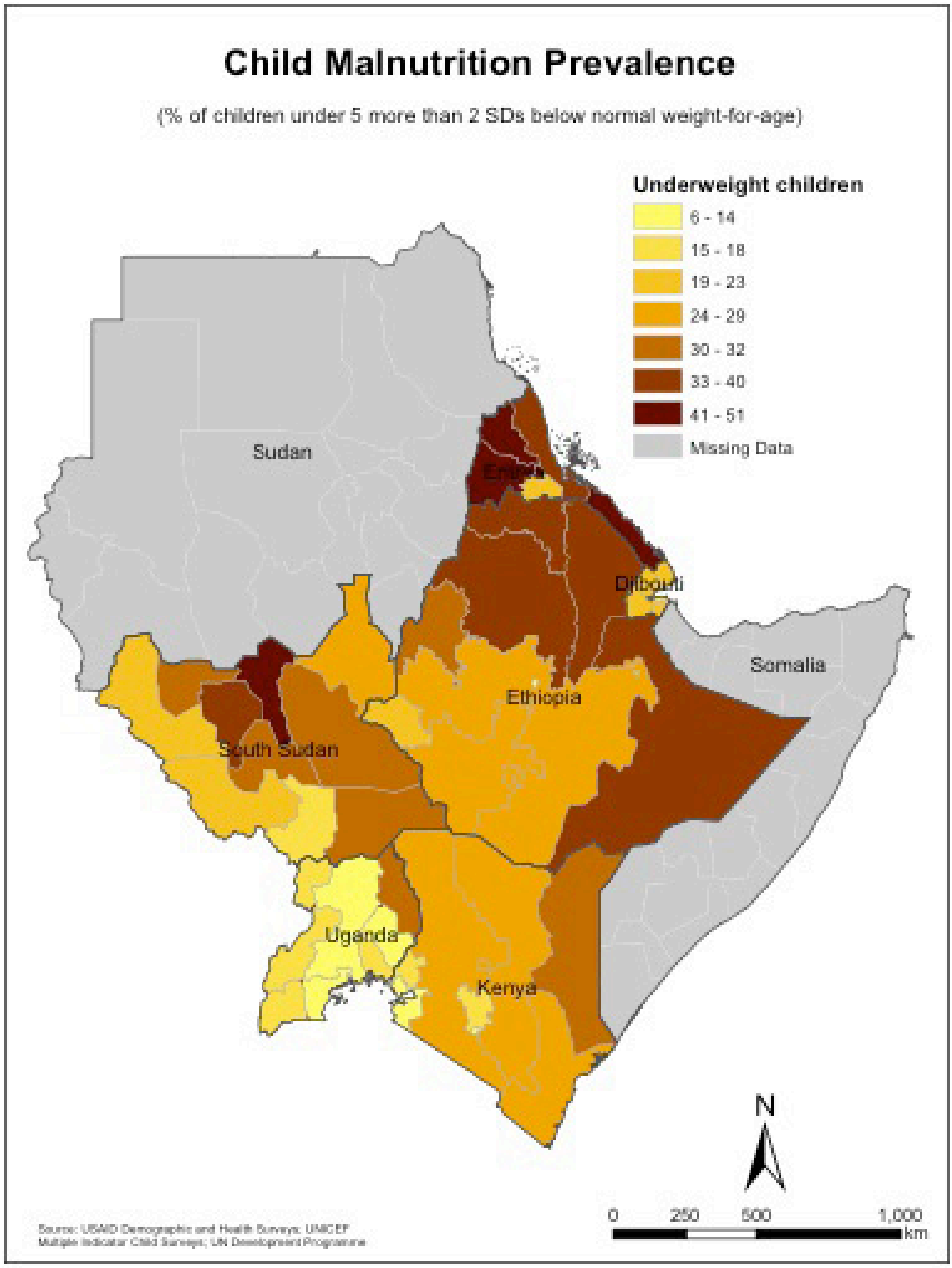
[17] FAO. (2012). Integrated Food Security Phase Classification: Technical Manual Version 2.0. Rome: Food and Agriculture Organization.

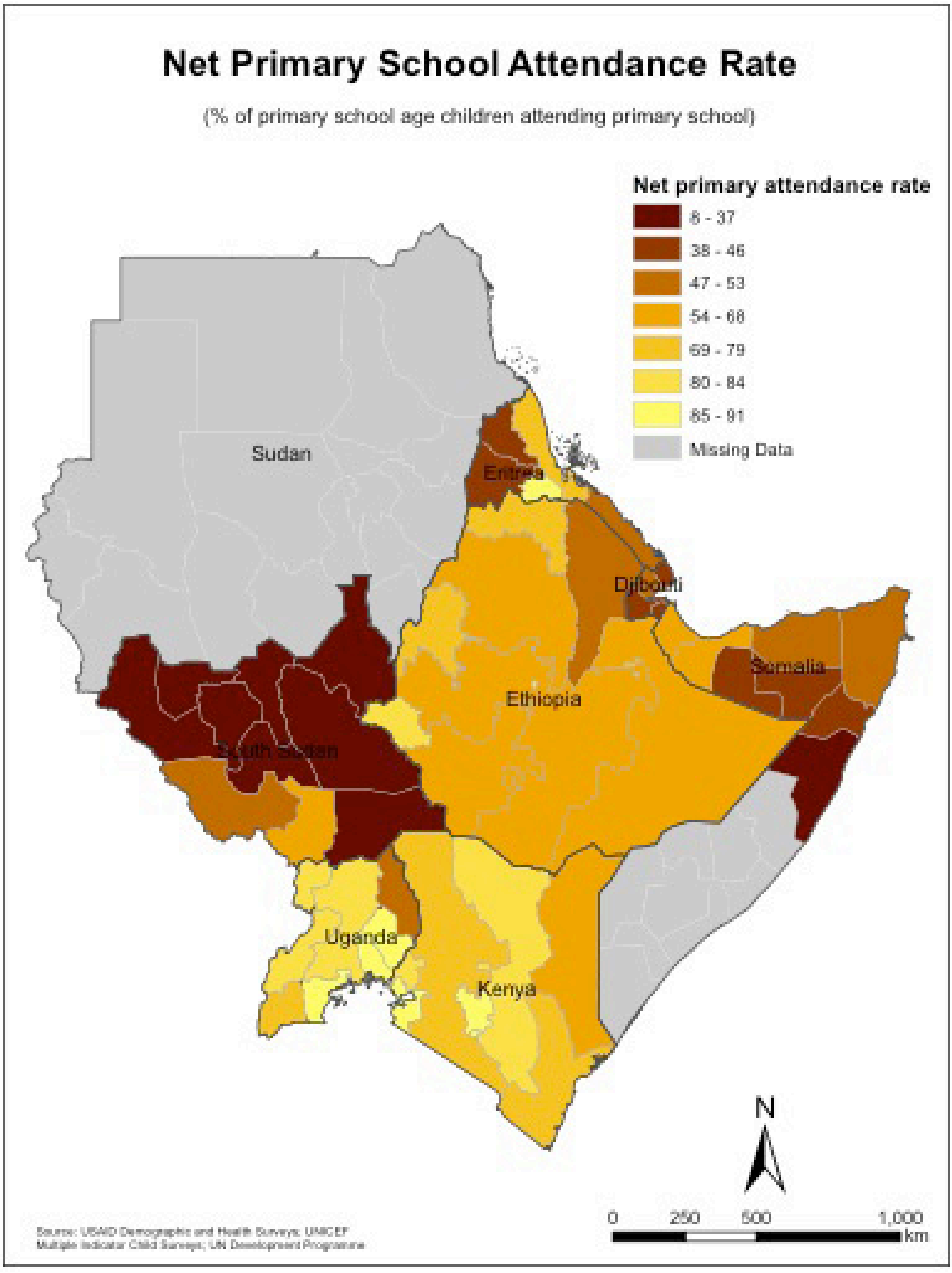
[18] Ntela, M. (2013). An Integrated Analysis of Food Security and Nutrition to Support Agriculture Planning: The Example of IPC in Southern Africa. Paper presented at the CAADP Nutrition Capacity Development Workshop, Gaborone, Botswana.

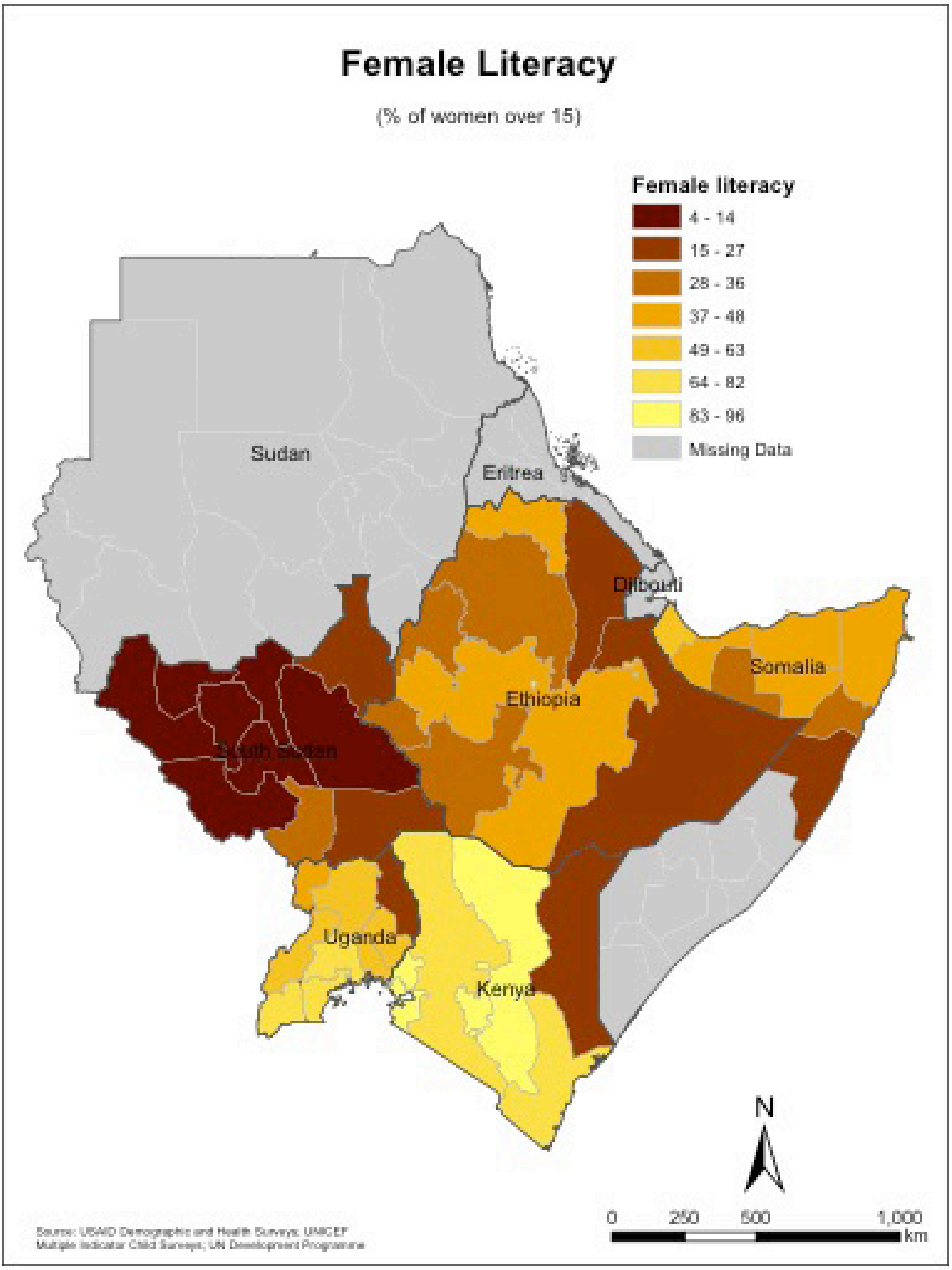
[19] IPC. (2014). Version 1.0: IPC Chronic Food Insecurity Classification.

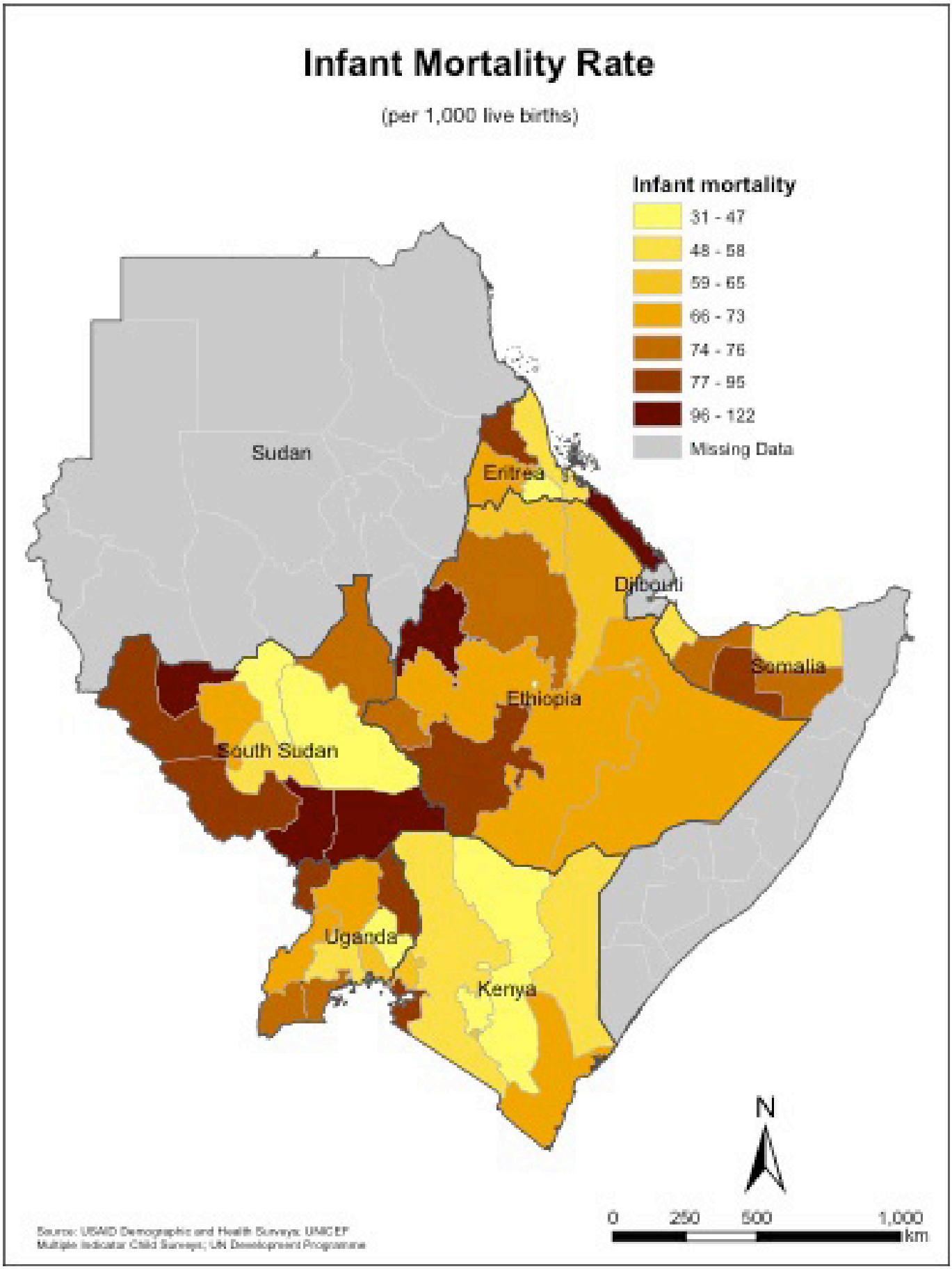
Appendix A:
Indicator Maps of Household Resilience Index

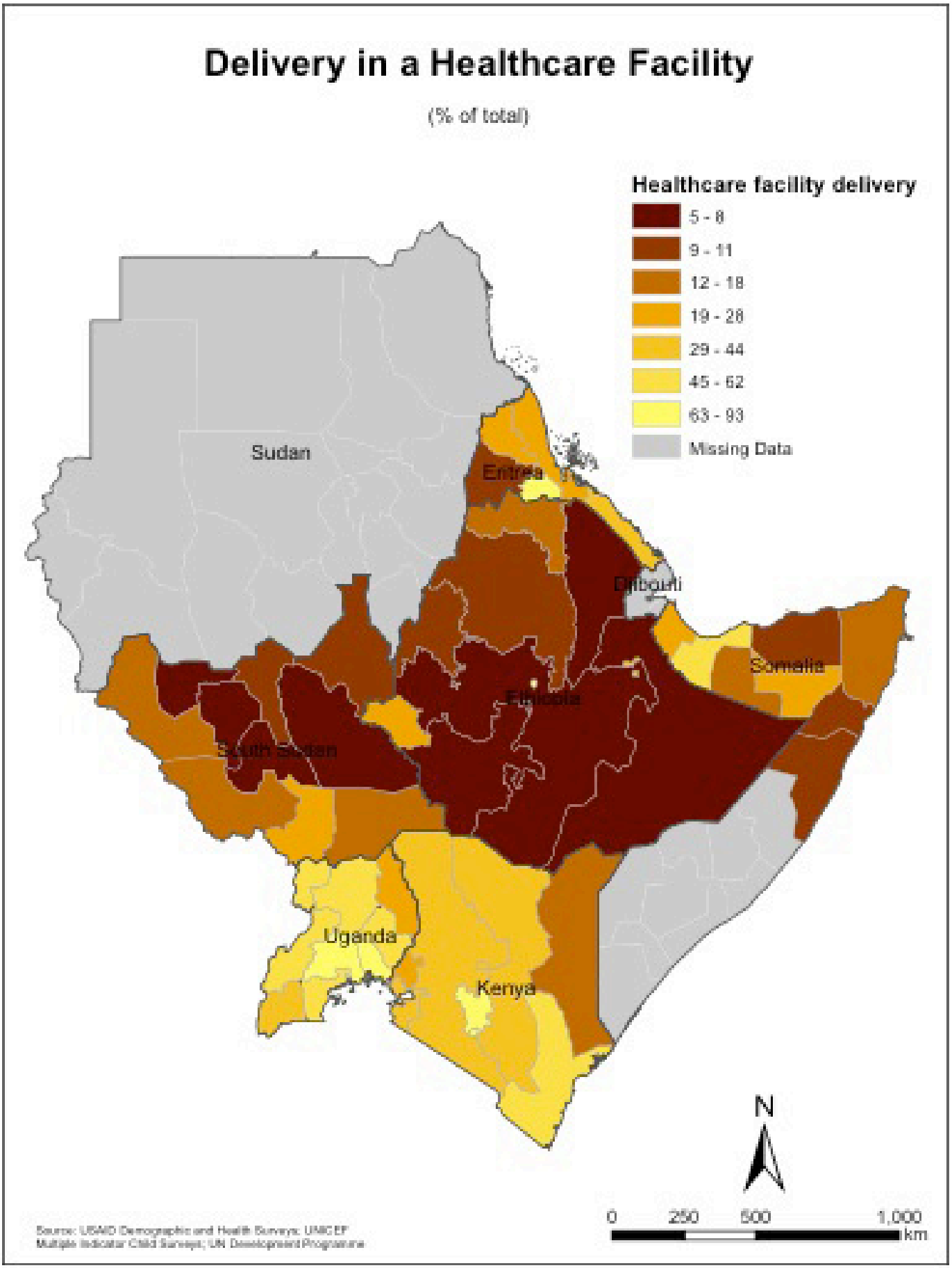
6




Net Primary School Attendance Rate
(% of primary school age children attending primary school)
Net primary attendance rate
8 - 37
38 - 46
47 - 53
54 - 68
69 - 79
80 - 84
85 - 91
Missing Data
Sudan
Eritrea
Djibouti
Somalia
Ethiopia
South Sudan
Uganda
Kenya
N
0
250
500
1,000
km
Source: USAID Demographic and Health Surveys; UNICEF
Multiple Indicator Child Surveys; UN Development Programme


Female Literacy
(% of women over 15)
Female literacy
4 - 14
15 - 27
28 - 36
37 - 48
49 - 63
64 - 82
83 - 96
Missing Data
Sudan
Eritrea
Djibouti
Somalia
Ethiopia
South Sudan
Uganda
Kenya
N
0
250
500
1,000
km
Source: USAID Demographic and Health Surveys; UNICEF
Multiple Indicator Child Surveys; UN Development Programme


Infant Mortality Rate
(per 1,000 live births)
Infant mortality
31 - 47
48 - 58
59 - 65
66 - 73
74 - 76
77 - 95
96 - 122
Missing Data
Sudan
Eritrea
Djibouti
Somalia
Ethiopia
South Sudan
Uganda
Kenya
N
0
250
500
1,000
km
Source: USAID Demographic and Health Surveys; UNICEF
Multiple Indicator Child Surveys; UN Development Programme


Delivery in a Healthcare Facility
(% of total)
Healthcare facility delivery
5 - 8
9 - 11
12 - 18
19 - 28
29 - 44
45 - 62
63 - 93
Missing Data
Sudan
Eritrea
Djibouti
Somalia
Ethiopia
South Sudan
Uganda
Kenya
N
0
250
500
1,000
km
Source: USAID Demographic and Health Surveys; UNICEF
Multiple Indicator Child Surveys; UN Development Programme

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