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The KENYA INSTITUTE for PUBLIC POLICY RESEARCH and ANALYSIS

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Social Sector Division

Kenya Institute for Public Policy
Research and Analysis

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Abstract

Social cohesion is important for sustained development and peaceful coexistence. Broadly, like glue, it binds individuals together based on trust, shared loyalties, positive relationships, solidarity and constructive interdependence. Despite the importance of social cohesion in sustainable development, there is limited empirical work on its measurement in Kenya. This study documents the methodology for measuring social cohesion in the Kenyan context. The study uses both perceptions and objective data as obtained from a 2013 national representative household survey, county level attribute data obtained from Human Development Report (2009) and various government documents. The Principal Components Analysis (PCA) technique was used in identifying the critical indicators for social cohesion. The social cohesion index measure consists of six components: identity, diversity, equity, prosperity, peace and trust. The unweighted SCI was estimated at 56.6 per cent in 2013, while the weighted index was 58.1 per cent. The national trust index stood at 43.7 per cent; the peace index 40.1 per cent; the identity index 72.7 per cent; the diversity index 88.6 per cent; the prosperity index 60.5 per cent; and the equity index was 34.6 per cent. Correlation analysis of relationship between social cohesion and selected development indicators shows that counties with low human development index, low literacy, low access to improved water, low life expectancy and high poverty head count have relatively low levels of social cohesion. To ensure social cohesion, there is need to address horizontal and vertical inequalities, including access to services and opportunities; promote social values of trust, peace and positive management of ethnic diversities in the country; investing in deepening human capabilities and education; and mitigate the risks associated with the harsh environmental conditions in arid and semi-arid lands. Finally, it is critical for the government to institutionalize annual collection of social cohesion data and information.

Abbreviations and Acronyms

ASALs	Arid and Semi-Arid Lands
ECLAC	Economic Commission for Latin America and the Caribbean
EU	European Union
GDP	Gross Domestic Product
GoK	Government of Kenya
HDI	Human Development Index
KIPPRA	Kenya Institute for Public Policy Research and Analysis
KNBS	Kenya National Bureau of Statistics
MTP	Medium Term Plan
NASSEP	National Survey Sampling and Evaluation Plan
NCIC	National Cohesion and Integration Commission
NSGVP	National Survey on Giving, Volunteering and Participating
OECD	Organization for Economic Cooperation and Development
PCA	Principal Component Analysis
PEV	Post-Election Violence
SCI	Social Cohesion Index
UNDP	United Nations Development Programme
GoK	Government of Kenya
SSA	Sub-Saharan Africa
UN	United Nations
WHO	World Health Organization

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1.   Introduction

Over the last 50 years, Kenya's national development agenda has largely focused on strong economic growth as a basis for prosperity and better living standards for Kenyans. Indeed, at independence, the government's Sessional Paper No. 10 of 1965 aimed at eradicating poverty, ignorance and illiteracy. Thus, over time, the economy's growth has been measured through the level of economic performance. The current national development blueprint, Kenya Vision 2030, aims at enabling the country to attain middle income status by 2030. Whereas the Vision emphasizes the social pillar as one of the foundations for sustainable development, challenges to economic and social transformation have perpetuated rising inequalities and feelings of exclusion. Citizens' expectations of equal access to socio-economic and political opportunities and overall improved standard of living have not been met. Thus, as the country strives for middle income status and as it implements the Medium Term Plan (MTP) II, it is imperative to assess the critical foundations for sustainable development, notably social cohesion.

While several countries have developed robust frameworks for measuring social cohesion (Economic Commission for Latin America and the Caribbean-ECLAC, 2007; and Organization for Economic Cooperation and Development-OECD, 2011), Kenya is at the early stages of grappling with the phenomenon. Perhaps, it is because social cohesion is an elusive concept, meaning that its measurement should be grounded in a given social, economic and political context (Ferroni et al., 2008). For instance, Markus (2010) bases social cohesion on the issue of migration into Australia, while Mwabu et al. (2013) bases it on peace (in the aftermath of Kenya's post-2007 election violence). Ferroni *et al.* (2008) focus on its relationship with various aspects of development. Such grounding is important in identifying the data required to discuss the concept and estimating its index. Additionally, the purpose for developing a cohesion index is to inform the choice between competing dimensions and elements. Furthermore, social cohesion is fundamental to sustained development; it can be used to explain the country's level of socio-economic development. An index is also useful for the management of integration of individuals and communities, as well as for the government's integration of the different cohesion aspects into a unified political and socio-economic nation.

The importance of measuring social cohesion for Kenya can also be gleaned from other countries' experiences. In a review of the European Union (EU) cohesion policy (Farole et al., 2011), it is noted that social cohesion is fundamental for sustainable growth, and promotes performance of the status of human and social capital, entrepreneurship, innovation and its assimilation, exploitation of scale economies, access to markets, and on institutions. Farole *et al.* (2011)

argue that differences in these aspects across EU countries undermine the scope for lagging EU economies to attain their respective production frontiers. Consequently, this regional unevenness perpetuates under-development of the less cohesive countries. This phenomenon can be observed in Kenya, which is characterized by wide internal disparities in development.

Related to the foregoing, a national measure of social cohesion could undermine the true picture of disparities in sub-national cohesion. Therefore, sub-national cohesion indices are also critical especially in the context of the vast inequalities estimated using distinctive sub-national indicators.

Further, social cohesion is not a free good. It is produced, and has a price (money and other inputs). It is also a societal public good whose inputs include: (a) generalized trust extending outside one's ethnic group or immediate social network; (b) governance structures; and (c) institutions. Social cohesion and local public goods such as roads, security, schools health facilities, etc, complement each other in development. Additionally, social cohesion can be viewed as a factor of production and a consumer good which is valued for its own sake and enters the social welfare function directly.

The motivation behind measurement of social cohesion is three fold. First, it helps to monitor the status of the country in promoting social cohesion and integration. Second, is to assess if social cohesion interventions have been effective; the government, through agencies responsible for ensuring the country remains cohesive and integrated must have accurate and regular data on social cohesion indices over time. Third, the novelty of this study is to document the methodology that is relevant from both theoretical and policy perspectives. The availability of county-based social cohesion index enables analysis of its correlates and effects or relationships between the index and selected development indicators. The analysis is also important for monitoring, evaluation and assessment of social cohesion interventions in the country.

The aim of this study is therefore to present the methodology for measuring social cohesion index for Kenya. A social cohesion index for Kenya is created based on the definition of Chan et al., 2006, and Rajulton et al., 2007. The index consists of six components categorized under economic, political and social domains. After presenting the methodology, a cross-county comparative analysis of the computed the social cohesion index (SCI) using 2013 data is presented. The index is then correlated with selected development indicators.

The rest of the paper is organized as follows. Section 2 focuses on a survey of related literature. Section 3 dwells on the conceptual and analytical frameworks of the study and other methodological approaches, including the Principal

Component Analysis (PCA) technique used to isolate the most significant elements for inclusion in the components of the SCI. Section 4 presents the results on applying the methodology in estimating Kenya's social cohesion index using 2013 data, while section 5 covers analysis on relationship between social cohesion and selected development indicators. Section 6 concludes and provides the policy implications.

2. Related Literature

2.1 Defining Social Cohesion

The concept of social cohesion was first advanced by Eleim Durkheim in 1893 (Rajulton *et al.*, 2007). There was neither a clear definition of the concept nor a possibility of its direct measurement. Social cohesion is an ordering feature of a society and defines the interdependence between its members, and their shared loyalties and solidarity (Berger-Schmitt, 2000). However, a couple of centuries since Durkheim, there is still no single accepted definition of social cohesion. A century of advances in empirical observations and analytical techniques has not overcome this problem.

Common definitions that have been applied in the literature include, but are not limited to, the following: a broad concept covering several dimensions such as sense of belonging and active participation; trust among societal members; as well as the extent of inequality and disparities, exclusion and mobility (OECD, 2011). The notion of social cohesion is also associated with the narrower concept of "social capital", which Ferroni *et al.* (2008) see as a multidimensional, context-specific and which instantiates informal values and norms within a permitting group. For them, social capital is an element of social cohesion.

Social cohesion is understood to be (an) ideational (or) relational construct that glues individuals together (Rajulton *et al.*, 2007). It is multidimensional and multilevel (Botterman et al., 2012) in nature; and can be seen as both a means to an end and an end in itself, as well as a measure of the level and nature of satisfaction of individuals relational needs together with their sense of belonging and solidarity generated by a system designed to provide welfare for all (Ferroni *et al.*, 2008). Ferroni et al. (2008) also cite the Council of Europe's conceptualization of social cohesion as 'the capacity to ensure the welfare of all member states, minimizing disparities and averting polarization.' From a positional perspective, Markus (2010) defines Australia's social cohesion concerns as "trapped in the social impact of sustained (in-) migration."

According to OECD (2011), a cohesive society is one that works towards the well-being of all its members, creates a sense of belonging and promotes social mobility. It minimizes disparities, avoids marginalization, and fosters social cohesion by building networks of relationships, trust and identity between different groups, fighting discrimination, exclusion and excessive inequalities, and enabling upward social mobility. For ECLAC (2007), social cohesion consists of a society's ability to ensure the well-being of all its members, minimizing disparities and avoiding polarization. For Kenya too, social cohesion is "a sense as well as a feeling that (people) are members of the same community engaged in a common

enterprise, facing shared challenges and opportunities" (Government of Kenya, 2012).

Social cohesion can also be viewed through people's perceptions of their real life experiences. Perceptions are the similar to subjective probability, which makes it possible to incorporate people's feelings about their own well-being into traditional objective measures. Subjective measures are important because of their intrinsic value and can be instrumental in creating better developmental outcomes. Subjective measures are also useful in analyzing aspects of social cohesion that are difficult to measure objectively, or those with no objective.

Berger-Schmitt (2000) points out that social cohesion involves two analytical distinct societal goal dimensions: reduction of disparities, inequalities, and social exclusion; and strengthening of social relations, interrelations and ties. A sense of belonging is fundamental to the existence of the group.

Although peace is a necessary condition for social cohesion, a society can be in a state of internal conflict and still be cohesive; kept together by bonding institutions and governance structures. It is the existence of functional institutions and governance structures that brings back communities to a stable state after some disturbance. Such institutions include a broadly accepted constitution, a reasonable system of laws plus property rights, and an ethical code of behaviour and speech. Examples of governance structures include: arrangements for sharing power and resources, mechanisms for conflict resolution, social safety nets, and accountability systems.

2.2   Theoretical Underpinnings of Social Cohesion

Available literature identifies two main theoretical orientations of social cohesion. First, sociological and psychological approach underscores the importance of integration and social stability (Berger, 1998). Second, the policy approach considers social cohesion as a precondition for economic development and prosperity, and has been adopted by most developed economies such as Canada, European countries and international institutions (Acket et al, 2011). Further, Rajulton et at. (2007) elaborates measurement of social cohesion using six components which are classified into three domains, namely: economic, socio-cultural and political.

The relations under the economic domain include insertion or exclusion, which involves a shared market capacity regarding the labour market, where all individuals feel that they have equality to participate in the economy. Political dimensions include legitimacy to maintain institutions, both public and private,

and extent to which institutions adequately represent the citizenry and their interests. Also, it includes involvement in management of public affairs. Socio-cultural domain comprises acceptance or tolerance in differences and pluralism. It involves shared common values and feeling of belonging. Absence of these preconditions results to lack of social cohesion which undermines sustained prosperity. In this framework, the social cohesion components comprise of: insertion/exclusion, legitimacy/illegitimacy, recognition/rejection, equality/ inequality, participation/passivity, and affiliation/isolation (Acket *et al.*, 2011).

This study adopts Rajulton's et al. (2007) theoretical framework which includes the socio-cultural, political and economic perspectives of social cohesion. The study also adopts the Government of Kenya (2012) definition of social cohesion "as a process and an outcome of instilling and enabling all citizens to have a sense as well as a feeling that they are members of the same community engaged in a common enterprise, facing shared challenges and opportunities." In this context, social cohesion encompasses vertical and horizontal equality, freedom, trust, democracy, absence of war, tolerance of diversities, just peace, social justice, the rule of law, equal and shared opportunities, and sustained prosperity.

2.3   Empirical Literature

Various studies have attempted to measure social cohesion, especially for developed economies, with the components, indicators and methods applied varying across countries depending on the context and data availability. Rajulton et al. (2007) estimate SCI for Canada and Northern America using three dimensions of social cohesion: political (voting and volunteering), economic (occupation, income and labour force participation) and social participation (social interactions and informal volunteering). Specific indicators were based on sub-country or Census Metropolitan Areas (CMA) data. The information was gathered through a National Survey on Giving, Volunteering and Participating (NSGVP). The study used factor analysis and standardization to create an overall index of social cohesion for each CMA. The indices were ranked at sub-country level.

Duhaime et al. (2002) estimated SCI for Arctic Canada using six indices: presence of social capital, demographic stability, social inclusion, economic inclusion, community quality of life, and individual quality of life. The SCI indicators included voting in most recent elections, level of satisfaction with government, attending a local community meeting, time in community of residence, reasons for wanting to leave community in last five years, degree of participation in subsistence economy, access to cognitive support, access to material support, and employment activity in the previous one year. However,

the pair only identified the indices/components and indicators, and no particular score was given.

Dragolov et al. (n.d.) estimated SCI for 34 North America and OECD countries using 2 domains with 3 dimensions each. The domains were social relations and connectedness, the focus being the common good of the society. The dimensions were: (i) social networks, trust in people, acceptance of diversity; (ii) identification, trust in institutions, perception of fairness; and (iii) solidarity and helpfulness, respect for social rules, and civic participation. The basic steps included: (i) indicator selection; (ii) indicator aggregations; (iii) indicator reduction through factor analysis; and (iv) standardization. Secondary data analysis (from internationally representative surveys) as well as expert assessments and information from international institutions were utilized. The datasets used included: the World Values Survey, European Values Study and the International Crime Victims Survey. The study covered the period 1989 to 2012, and countries were ranked in five tiers (top tier to bottom tier).

Ferroni et al. (2008) on their part measured SCI for 18 countries in Latin America. The study used two dimensions (social capital and distribution of opportunities) and 8 indicators (compliance with the law, interpersonal trust, trust in public institutions, poverty incidence, income Gini coefficient, size of middle class, education gini coefficient, and inter-generational mobility). Indicator selection was based on definition of social cohesion. The indicators were aggregated and standardization based on a scale of 0-1, while applying equal weights to each component. The measures of SCI varied between 0.31-0.51, with Nicaragua recording the lowest index and Uruguay the highest.

Markus (2010 and 2013) in his recent studies attempted to measure SCI for Oceania - Australia with a view to addressing the region's socio-economic issues of service delivery, population growth given net immigration, economic performance and discrimination. The studies used various indicators to construct five SCI components of social justice and equity, belonging, worth, participation, and acceptance/rejection and legitimacy. The studies used a dual-framework of national survey of randomly generated sample using landline and mobile phone contacts. Additional locality-based survey of 2,500 respondents was used in 2013 and online survey of 2,300 recent migrants. Using a base year of 2007 (SCI= 100%), the studies established that the SCI had declined from 96.62 per cent in 2010 to 88.48 per cent in 2013.

Further, existing literature has identified a variety of methods of approaching social cohesion index analysis, meaning each instance is invariably an empirical undertaking of choosing what is best for specific region's or country's context. Mwabu et al. (2013) and Langer and Stewart (2012) attempted to measure SCI for

Kenya using 2010 managing ethnic diversities dataset and afro-barometer survey data for Kenya. Mwabu *et al.* (2013) conceptualized SCI using one component of trust and one indicator of trusting people from other ethnic groups. The index was estimated at 0.71. Langer and Stewart (2012) used three indices: trust, horizontal inequalities, and identity to develop an inequality-adjusted national social cohesion index. However, the study did not take into consideration the vast array of both objective and subjective indicators of social cohesion. This study adopts a comprehensive approach and Principal Component Analyses to isolate variables that loaded significantly on the selected dimensions, while presenting a detailed methodology for measuring social cohesion for Kenya.

3. Methodological Approach

3.1 Analytical Framework

A review of the social cohesion literature indicates that its conceptual management is complicated by its intangibility. Writing about social cohesion in Australia for example, Markus (2010) underscores the lack of an agreed definition of the term due to its focus on intangibles, such as the extents of belonging, group attachment and willingness to participate and share outcomes. While often associated with social capital, Green et al. (2003) emphasize the possible distinction between the two phenomena, pointing out that the trust and reciprocity that enable collective action and bonds within communities – social capital – do not always exist at higher levels of aggregation of society. This distinction between the community and society (national) levels is also underscored by Botterman *et al.* (2012) who distinguish the characteristics of a rural from an urban aspect of cohesion. Based on a wide literature review, Acket *et al.* (2011) distinguish analyses of social cohesion based on sociological and psychological concerns with integration and social stability, from those which are policy oriented, seeing the phenomenon as a precondition for economic prosperity. Social cohesion is seen to have multiple facets that influence different spheres of human life, and different types of social relations.

In this study, social cohesion is conceptualized as a social phenomenon whose elements include: equity, prosperity, diversity, peace, national identity and trust, including legitimacy of institutions. This is important for creating an environment of peaceful co-existence. It is also instrumental in generating the growth of assets and opportunities whose wise management can fuel harmony and improve human welfare.

Social cohesion and social conflict are two sides of the same phenomenon. Social cohesion has two key aspects: (i) An equilibrium probability of peaceful co-existence; and (ii) A stable equilibrium of the probability of peaceful co-existence (Mwabu et al., 2013). When a society is at a stable equilibrium, expectations of individuals and communities are generally being met. The term 'stable equilibrium' denotes the ability of communities to return to a non-conflict state within a short duration after a disturbance. Frequent conflicts of a deliberate nature are incompatible with a cohesive society.

Langer *et al.* (2012) conceptualize social cohesion (good social relations) to be composed of three components (a triangle): the extent of equity (fairness), the level of trust among people, and people's propensity to prefer national to their group (or ethnic) identity. When people have a common identity, they tend to

trust and remain fair to one another. The critical outcome of the relations is peace, an instrument for economic prosperity.

This methodological note extends this triangular conceptualization, first, to a 'diamond' of four components of social cohesion (good social relations): peace (absence of social conflict), generalized trust (complete confidence or faith in people with whom one co-exists irrespective of background or circumstance, and institutions); equity (just distribution of resources and power across individuals and groups in a society); and cultural diversity[1] (varieties in ethnic backgrounds and heritages, religious beliefs, marriages, political ideologies and associations, and identity preferences, e.g. whether one wants to be identified as a Kenyan or as a member of a particular ethnic group). Social cohesion, according to this diamond, is peace with equity, cultural diversity and communities that trust each other. Peace is a necessary but not a sufficient component for social cohesion (peaceful and meaningful coexistence of different communities). Peace is meaningless if it exists but is inaccessible to communities which consequently hurt needlessly, or to a majority of people steeped in abject poverty. In addition to peace, social cohesion exists if there is equity, social trust, and appreciation of cultural diversity; the latter being a sign of tolerance and appreciation of differences in identity or other characteristic.

Thus, it seems reasonable to move from a diamond to a pentagon, where social cohesion has five components: peace, trust, equity, diversity and prosperity. However, good social relations can also be analyzed from the perspective of a hexagon of six components; peace, trust, equity, diversity, prosperity and national identity. The ultimate outcome is sustainable development which is a function of peace. We note that sustainable development goes beyond mere economic growth to include, inclusive development which focuses on the resulting quality of life. The hexagon illustrates how we envisage the assessment and analysis of social cohesion in formulating a social cohesion index. The factors explaining the variation of the index over space and time are not included in the computation of the respective indices.

This study's analytical framework for social cohesion is adapted from Rajulton *et al.* (2007), focusing on the conceptual issues in the relationships between socio-economic well-being, inequalities and social cohesion. In keeping with the perception that social relations revolve around economic, political and/or socio-cultural concerns, Rajulton *et al.* (2007) developed a framework within which to conceptualize and analyze social cohesion, suggesting various characteristics of

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[1] In many studies, this is usually referred to as 'national identity' which individuals are expected to prefer. However, in multi-ethnic states, individuals may have multiple preferred identities of which the nation is just one.

the phenomenon (Figure 3.1). They also suggest the application of a two-stage factor analysis process to select the most suitable observed variables that load most heavily on the unobserved factor, social cohesion. The framework has six dimensions measuring economic, political and socio-cultural factors whose elements are subjected to PCA, distinguishing the significant ones to be combined to produce an overall index of social cohesion.

It is important to gauge the direction and extent of social cohesion, especially against the backdrop of realities that divide–as well as unite–society. Yet, as in the case of social capital, there is no universally agreed measure of social cohesion. Thus, it is its tangible, measurable underlying facets that the analyst must consider, rather than the concept itself. On the facets, Markus (2010) argues that the measure must be based on perceptions of reality – generated from surveys, rather than some objective measure of belonging, pride in or satisfaction with life, mistrust, discrimination and service delivery (infrastructure). The implication of its multidimensionality is that its measure focuses on various indicators rather than a single one (as conceptualized by Mwabu et al., 2013). Such a set of indicators must lend themselves to effective inter-temporal/longitudinal monitoring (Markus, 2010) based on survey and other panel data. However, a combination of both perceptions and attribute data has been used in other socialcohesion studies
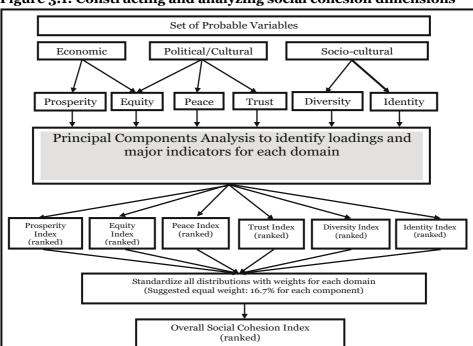
Figure 3.1: Constructing and analyzing social cohesion dimensions

Source: Adapted with modifications from Rajulton et al. (2007)

such as Rajulton *et al.* (2007). Such a framework can also enable the comparison of cohesion across regions and counties.

Nonetheless, the literature reflects choice in the methods for constructing cohesion indices. The social cohesion index may be based on perceptions, objective data, or both. The perceptions will typically be collected through a survey, key informant interviews and FGDs. There exists plenty of sources for the objective data, most notably the national statistics office and databases of international sources. In terms of data processing, the survey outputs and objective data provide descriptive statistics. Beyond this, the literature shows that this data can be processed through regression analysis, factor analysis and PCA, depending on the focus of interest. The current study used PCA to isolate variables that loaded significantly on the selected dimensions. Rajulton *et al.* (2007) distinguish between exploratory and confirmatory factor analysis. Under the PCA, variables with Eigen values of greater that one are considered significant, hence their respective Eigen vectors constitute the loading weights.

3.2   Data Sources

The study used both secondary and primary data sources. The SCI survey data was collected in April to June 2013 using two instruments: the household questionnaire and Focus Group Discussion (FGD) or key informant interview guides. The household based survey covered a national representative sample of 4,860 rural and urban households in 324 clusters across the country. The survey was based on the Kenya National Bureau of Statistics' National Sample Survey and Evaluation Programme (NASSEP) V frame, which was yet to include the north-eastern Kenya counties of Garissa, Mandera and Wajir. During the survey, however, data was also collected from the three counties, enabling the eventual computation of a separate unweighted index from the weighted one based on the NASSEP V frame. The target population of the survey was persons aged 18 years and above. The survey captured data on relevant socio-economic indicators on trust, peace, identity and diversity. Secondary data was collected from the 2009 Kenya Population and Housing Census, UNDP's 2009 Human Development Report, and attribute data on distribution of selected public services across the country, among other sources.

3.3   The Principal Components Analysis Technique

Given that social cohesion is multidimensional in nature and complex to measure, it takes various dimensions; notably, social, economic, political and cultural (Green et al., 2003). To capture the underlying attributes of social cohesion, the PCA

technique used Stata software to generate an aggregate measure of social cohesion. The PCA technique assists in determining whether it is feasible to use a smaller number of elements to represent information contained in the k dimensions. This is the first step in identifying latent variables and ultimately transforming the original correlated variables into a smaller number of uncorrelated variables. Among the advantages of the PCA technique is that it generates scores for multiple dimensions. It examines the variance-covariance matrix of the factors underlying a phenomenon, such as social cohesion, and assumes that all variability in the individual measures should be used in the computation of the aggregate measure. For instance, all factors that influence social cohesion must initially be included, such as trust of individuals and government, crime, socio-economic factors, poverty and literacy, among others. Finally, the weighted data for each of the variables that explain the components was aggregated to determine the sub-indices for each component. The composite SCI is a sum of the standardized sub-indices, assuming equal weights. The hypothetical value of SCI and that of each of its six sub-index components ranges between 0 and 1.

On transforming variables in the multi-dimensional context, Barcena *et al.* (2010) note that the function should satisfy two minimum requirements. First, since the attributes are measured in different units, they must be translated into a common scale for aggregation. Second, the functions should avoid assigning high relative importance to extreme values that might exist in the original distribution. The most important and commonly used transformation methods include: standardization based on the range, normal distribution function (or p-score), distance from the attribute's mean, distance from the attribute's optimal value, and undertaking logarithmic transformation. There is no normative guideline on the most appropriate method, and the diverse methods can produce different results. This report transforms variables at two levels: first, it redefines the responses for each latent variable and collapses them into a binary variable of 0 (worst) and 1 (best); second, it standardizes the variables based on the range, as has been done by UNDP's Human Development Index (HDI) method. The sub-indices for each component are standardized on a scale of 0 to 1 based on the minimum and maximum theoretical values of each component (X–min/max-min). An index ranging from 0 to 1 enables accurate interpretation and facilitates temporal and spatial comparison.

Finally, the structure of the weighting factors of the different attributes that make up a multidimensional index is critical. According to Barcena *et al.* (2010), any weighting scheme involves a trade-off among the dimensions considered, and therefore represents an implicit value judgement regarding the elements that determine (and to what extent) the numerical value of the indicator being analyzed. Various weighting strategies have been discussed in the literature, including equal

weighting for all attributes based on data, market prices or normative approach. Equal weighting for all attributes is adopted in computing the final composite index, whereas for data, PCA determines the relative weights for each of the individual latent variables used in computing the sub-indices. The rationale for using PCA is that it circumvents the problem of double counting, since it takes the correlation between different attributes into account when determining the weights. The PCA does this by considering uncorrelated dimensions, or giving them less weight than those that are correlated. The weighting factors considered in PCA were the Eigen vector associated with the maximum Eigen value (principal component). The choice of weighting structure relied on common sense and previous literature on the subject matter.

3.4   Steps in Computing SCI

Before presenting the results of SCI measure for Kenya, it is helpful to review the stages that were involved in computing the index. These steps are largely similar to those highlighted in Figure 3.1.

Step 1: Defining the concept, its theoretical and analytical frameworks

This entails specifying the scope and multiplicity of indicators and components to be considered. The study used a combination of both objective and subjective data sources. Six components of social cohesion were identified and defined. This stage also involved preliminary consultations with stakeholders and related literature review.

Step 2: Preparing conceptual and analytical framework

The next step involved preparation of conceptual and analytical framework. For each component, the study identified specific indicators tied to a specific component. Thus, the indicators were clustered into the six components of peace, identity, diversity, trust, equity, and prosperity. This stage is important in scoping the indicators for each social cohesion dimension/component.

Step 3: Weighting of indicators

A sub-index was computed for each of the six components using the retained (or significant) indicators. The Eigen vectors of the first principal component were used as the respective weights for each of the indicators.[2] The sub-index for a component was a linear combination computed as:

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[2] The first principal component yields values that assign larger weight to components that vary the most across the units of analyses (a component that does not vary across the unit of analysis would have a weight of zero).

Sub-Index of Component I $= \sum_{k=1}^{n} p_k(x_k) \Big/ \sum_{k=1}^{n} p_k$

where p_k represents the weight assigned to each indicator x_k by the PCA method and x_k represents the kth indicator of the sub-index (e.g. for trust sub-index, there were two indicators: complete trust of people of another ethnic group, and trust in the judiciary).

To allow for a more objective interpretation, each of the sub-indices was standardized based on the range, as has been applied by UNDP's Human Development Index (HDI) method. The sub-indices for each component are standardized on a scale of 0 to 100 per cent based on the minimum and maximum theoretical values of each component using the transformation formula:

(X–min/max-min)

where X is the computed value of a component (e.g. trust) for unit of analysis (e.g. county). Min and max represent the minimum and maximum values of a component across units of analysis. This transformation allowed for a more accurate interpretation, and facilitates temporal and spatial comparison. The sub-indices of the components of cohesion and their respective PCA weights are summarized in Appendix Table 1.

A series of iterations were undertaken to explore the sensitivity of various indicators, while assessing the range of variability of the component indices. For all social cohesion indices, indicators recording PCA results with Eigen value (principal component) of more than one were used in the computations, with their respective Eigen vectors constituting the weights, while all computed component indices were standardized to lie between the range of 0 and 1 before conversion into percentage.

Step 4: Standardization and computation of composite SCI

The computed component indices were then used to compute the composite SCI using equal weights. The overall SCI for each county was a simple arithmetic mean of the six sub-indices. Thus, the county SCIs assumed an equal weight for the components. The national values of the components were means of the county SCIs. This enabled the computation of an overall index at national level. It is important to note that as indicated in the sample design, the units of analysis were unweighted.

The measured SCI was ranked by county and subsequently discussed with stakeholders to build consensus.

3.5 Measurement of Social Cohesion Indices

3.5.1 *Trust*

The trust dimension included eight indicators that were likely to influence the degree to which good relations will last. These include complete trust in people of another ethnic group (generalized trust); government; legal institutions (human rights, media); judiciary; and people of other religions, financial institutions, religious and educational institutions (Appendix Table 1).

Each of the measures of trust was constructed based on the responses from the household survey. Interpersonal trust was measured based on responses to the question: How much do you trust people of another ethnic group? Those who 'trust completely' and 'trust somewhat' are combined, against those who 'do not trust at all'. Trust in government is measured based on the question: How often do you think the Government of Kenya (national and county governments; Parliament (Senate and National Assembly)) can be trusted to do the right thing for the Kenyan people? Trust in institutions is an average of the responses to the question: How often do you think institutions (media, human rights, police, banks, executive, legislature, religious institutions, judiciary and education institutions) can be trusted to do the right thing for the Kenyan people?

3.5.2 *Equity*

Perceptions on equity dimension were obtained from survey questions: (i) Please specify how strongly you agree or disagree with the statement that public goods are distributed fairly across Kenya's regions: Strongly agree; Agree; Disagree; or Strongly disagree; (ii) In your community today, the gap between those with high income and those with low income is too large: Strongly agree, Agree, Disagree or Strongly disagree; (iii) Indicate how important the sharing of government positions is in your life? Very important; Important; Not important. These perception data was complemented with attribute data from secondary sources, including Kenya Roads Board (KRB) data on the status of county road networks, and census 2009 data on access to electricity, water and sanitation. The PCA results presented in Appendix Table 1 show that access to good road network, water and electricity were good predictors of the equity dimension.

3.5.3 *Diversity*

Diversity was measured using the following survey questions: (i) How proud are you of your ethnic community (customs)? Extremely proud; Proud; Moderately proud; or Not proud at all? (ii) How often do you spend your free time with people of other ethnicities? Always; Most of the time; Only some time; or Never: (iii) With respect to friendship, are there among them friends from other ethnic

groups? Yes; No? (iv) How often do you communicate with people of other ethnicity? Always; Most of the time; Only some time; or Never: (v) In your view, does intermarriage promote ethnic complementarities in the country? Strongly agree; Agree; Disagree; or Strongly disagree.

Perceptions on social protection programmes were captured using responses for the question: Please indicate the extent to which you agree with the statement that social government programmes have contributed to peaceful co-existence in your community? Strongly agree; Agree; Disagree; Strongly disagree. PCA isolated the returns on spending free time with people of other ethnicities, communicating with people of other ethnicities, and intermarriage as strong predictors of diversity in Kenya.

3.5.4   Peace

Peace was measured using the survey questions: (i) How would you rate people of different ethnic groups and socio-economic class are getting along these days? Very well; Well; Poorly; Very poorly; Don't know: (ii) With respect to 2007/8 post-election violence or any election-related violence in your area, how do you relate with people from other ethnic groups? Very well; No relations; Very cautiously; Conflict over: (iii) Please specify the kind of relations that best describe your relationship with your immediate neighbours; You have constant conflicts: True; Somewhat true; Not at all: (iv) Have you ever been a victim of crime in the last one year? Yes; No: and (v) How would you describe the following socio-economic issues facing the society you live in today? Crime, law and order; social issues including family, child care, drug use, family breakdown, lack of personal direction; insecurity (national security and terrorism); ethnic tensions or hostilities; people of different ethnic groups getting along well; poverty and food insecurity; youth unemployment- major problem? Somewhat a problem, Not a problem. PCA isolated national security, law and order, and social issues as being significant for the construction of the peace index (Appendix Table 1).

3.5.5   National identity

This study considers the pre-eminence of national identity by asking: (i) How proud are you of your way of life/culture; your ethnic community (customs); to be Kenyan? Extremely proud, Proud; Moderately proud; Not proud at all: (ii) To what extent do you agree with the view that your community has a strong sense of identity? Always; Most of the time; Sometimes; Never. It also required respondents to: Rate the importance you attach to the following: ethnicity in defining your identity; belonging to an ethnic group; voting in national elections: Very important; Important; Not important. The PCA results show that importance

of ethnicity in defining identity, and importance of belonging to an ethnic group were significant for the construction of the identity index.

3.5.6 Prosperity

Prosperity is assessed using the following survey questions: (i) How often can your household afford three meals a day? Always; Most of the time; Only some of the time; Never?: (ii) Would you describe your current economic situation as: You can afford to buy anything we need? Always; Most of the time; Rarely; Never: (iii) How would you rate access to clean and safe drinking water? Easily accessible; Accessible but with difficulties; Not accessible at all. The SCI survey data was complemented with attribute data on major development indicators such as the KNBS share of non-poor population, and UNDP's GDP, life expectancy and education indices.

The incidence of the non-poor is the percentage of the population above the national poverty line. The larger the share of the non-poor in the population, the greater the extent of well-being and inclusion in the society. PCA results show that GDP, share of non-poor population, and education are significant for the prosperity index.

4. Social Cohesion Index Estimates

4.1 Social Cohesion Indices

This section discusses the six components of social cohesion. Appendix Table 2 and Figures 4.1 to 4.7 list the counties, and respective selected indicators and SCI indices.

4.1.1 Trust index

Trust is important at both institutional and society levels. When individuals trust one another, transaction costs are likely to be low, and long lasting relations are likely to be enhanced (Mwabu et al., 2013). When people place trust in established public institutions, they are inclined to articulate their demands and grievances through formal institutions, thereby allowing such institutions to uphold the rule of law, even over conflict management. They also trust public institutions to adopt policy solutions to pressing social problems. Conversely, when individuals lack trust for one another, as well as for public institutions, there is likely to be conflict given the greater risk of not reaching amicable agreements on issues. Weakness in or the lack of interpersonal trust and trust for public institutions is likely to increase transaction costs and reduce spontaneous cooperation. In this study, these effects are captured with elements of trust.

Based on PCA results presented in Appendix Table 1, only generalized (complete) trust on people of other ethnic groups, and in the courts (judiciary) were significant, meaning they had Eigen values greater than one. Consequently, these two of the original eight elements were used in the construction of the trust index. The national trust index stood at 43.7 per cent (Figure 4.1).

The composite trust index was 47.3 per cent and 38.3 per cent for rural and urban areas, respectively. The index ranged between a high of 65.6 per cent in Nandi County and a low of 2.6 per cent in Wajir County. Generally, trust levels were low (less than 25%) in counties along the Eastern and Coastal regions, and moderate (26-50%) in counties along the Western and Southern parts of Kenya such as Turkana, West Pokot and Kajiado. Trust levels were relatively high (51-75%) among counties in the Rift Valley and Western regions.
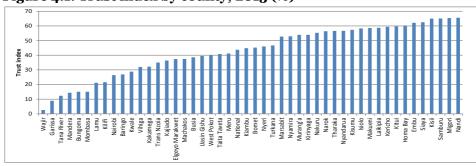
Figure 4.1: Trust index by county, 2013 (%)

4.1.2   *Equity index*

Under the equity dimension, the distribution of public opportunities (investments and offices) was included, which affects the ability of the people to enjoy them in the economic, social and political spheres. As a good attribute of social relations, equity makes people feel included. This dimension of the social cohesion index considers the fair distribution of public goods across regions, and perceptions on the gap between the high and low income groups. County level equity indices are presented in Figure 4.2.
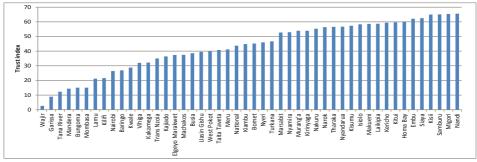
Figure 4.2: Equity index by county, 2013 (%)

The equity index was 34.6 per cent (45.5% rural and 27.2% urban), and had the lowest average score among the six dimensions. Nairobi County scored highest on all the three objective indicators, and its equity index was standardized to 100 per cent. West Pokot recorded the lowest equity index of 1.9 per cent. Major regional variations across counties were observed with counties in the Northern and Southern regions recording the lowest equity indices.

4.1.3   *Diversity index*

This dimension focuses on the positive diversity embedded in the national constitution, including ethnic, religious, cultural or political diversity. The strength of diversity is related to perceived complementarities that bring people together. Diversity is also a sign of tolerance for the differences among people.
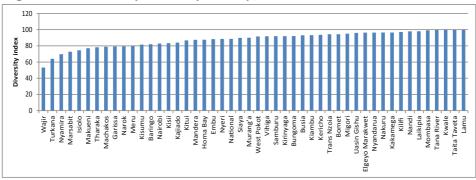
Figure 4.3: Diversity index by county, 2013

We identified the following aspects of tolerance for diversity: spending time with people of other ethnic communities, communicating with people of other ethnicities, friendship with people of other ethnicities, and intermarriages that promote ethnic complementarity.

The diversity index ranged from a high of 100 per cent (in Kwale, Lamu and Taita Taveta counties) to a low of 53.2 per cent in Wajir County. The diversity index was also higher in rural (90.3%) than urban (87.4%) areas. The national diversity index was 88.6 per cent (Figure 4.3).
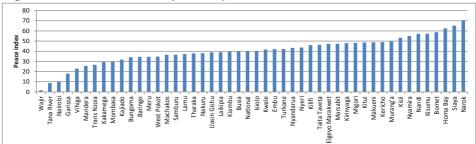
4.1.4   Peace index

Figure 4.4: Peace index by county, 2013 (%)

Social relations can be good in the sense that the critical outcome is peace, which is an instrument of economic prosperity. The peace dimension focuses on the absence of conflict. Thus, peace index was measured using three indicators: national security, law and order, and existence of tensions. The peace index was 40.1 per cent (33.8% rural and 44.5% urban). The highest level of peace was recorded in Siaya County with an index of 77.5 per cent and the lowest in Wajir (1.6%). Peace was among the lowest indices across Kenya's counties.

4.1.5   *National identity index*

Common identity plays a critical role in how people or groups relate. The identity was 72.7 per cent (70.0% rural and 74.5% urban). Nakuru County recorded the lowest national identity index of 41.4 per cent, while Turkana and Mombasa counties recorded the highest identity index of 90.9 per cent and 95 per cent, respectively.
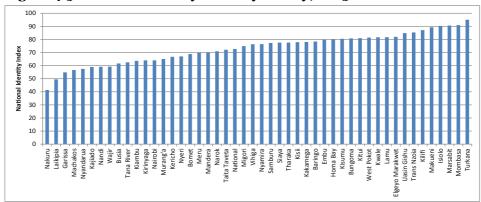
Figure 4.5: National identity index by county, 2013

4.1.6   *Prosperity index*

Prosperity is a potential outcome of social cohesion, but the relationship is not imminent. According to Langer and Stewart (2012), peace and prosperity are an outcome of social cohesion. An eventual outcome of social cohesion is sustainable development, whose implicit peace can lead to economic growth. According to the study results, the prosperity index was 60.5 per cent (65.1% rural and 57.4% urban).
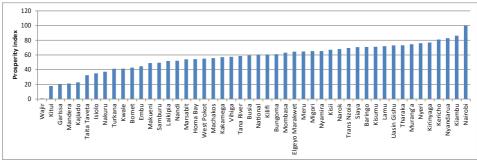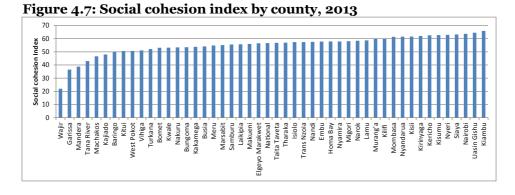
Figure 4.6: Prosperity index by county, 2013

Nairobi County recorded the highest scores for all the three indicators, and its prosperity index score was standardized to 100 per cent. Wajir had the lowest score of zero, which should be interpreted as suggesting that the county, besides having the lowest GDP and education indices, had the largest proportion of poor persons.

4.2   Social Cohesion Index Measure

The SCI index comprised of six components: trust, peace, equity, diversity, prosperity and identity. The un-weighted national SCI, which included North Eastern region was estimated at 56.6%, while the weighted one was 58.1 per cent (Figure 4.7 and Appendix Table 2). Generally, the highest index at the national level is in the diversity dimension (88.6%) whose significant elements included spending time with people of other ethnic groups, friendship with people of other ethnic groups, acceptance of intermarriages, and pride over ethnic customs. The lowest index was in the equity dimension (34.6%), whose significant elements included fair regional distribution of public goods, the rate of household access to arable land, and roads in fair or good condition. The SCI, however, varies across regions and counties. The rural SCI (56.4%) was only marginally lower than that of urban areas (57.0%), and urban poverty which was 7 percentage points higher.

The highest cohesion index was that of Kiambu County (65.9%), which compared to Wajir's score (22.0%), the lowest among the 47 counties. The national mean is close to the median with 23 counties below it and 24 above it. However, the skewed distribution of county SCI scores around the national mean – with a range of 9.3 per cent for the 24 above the mean, compared to 34.6 per cent for the 23 counties below the mean – underscores the severity of marginalization of some Kenyan counties.

Figure 4.7: Social cohesion index by county, 2013

5. Relationships between Social Cohesion Index and Development Indicators

This section focuses on the relationship between selected development indicators and social cohesion. The selected indicators include: Human Development Index, poverty, access to improved water, life expectancy and literacy levels. For each selected development indicator, the analysis is presented at county level (see Appendix Table 2 and Figures 5.1 to 5.5).

5.1 Social Cohesion and Human Development Index

There seems to be a positive association between the social cohesion index and the Human Development Index (HDI) across counties (Figure 5.1). Counties with high levels of HDI such as Kiambu, Nairobi, and Uasin Gishu have the highest SCI scores. On the other hand, those that lag behind in HDI tend to have relatively low SCI. This is expected given that the overall SCI includes the equity index and the prosperity index, both of which are good proxies for the overall level of development across regions.

This finding is consistent with Acket *et al.* (2011) who found a positive and significant relationship between social cohesion and development-related measures of GDP per capita for 39 European countries. Indeed, counties which are more cohesive are likely to exhibit higher levels of human development, hence better prosperity prospects. Wajir, Mandera, Kajiado and Garissa counties have low levels of human development and low SCI.
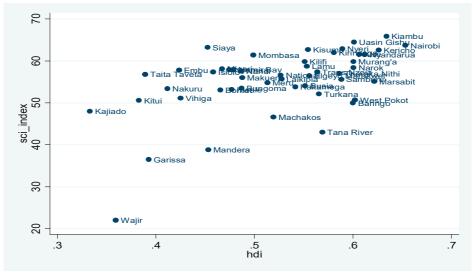
Figure 5.1: Social cohesion and Human Development Index (HDI)

5.2   Social Cohesion and Poverty

Poverty as well as inequality are known to trigger conflict through a number of channels. Poverty can harm social cohesion through generation of grievance (Collier and Hoeffler, 2002). Figure 5.2 suggests that regions with higher levels of poverty are likely to have lower SCI scores. For example, SCI is relatively high in Kiambu and Nairobi counties, which have relatively low levels of poverty headcount. On the other hand, Wajir, Mandera and Tana River counties have relatively high poverty scores and lower levels of SCI.
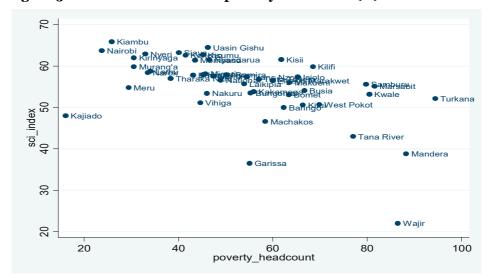
Figure 5.2: Social cohesion and poverty headcount (%)

5.3   Social Cohesion and Access to Water

At a general level, it would be expected that poor access to improved water could compromise social cohesion. This is because water scarcity is associated with conflict, especially if it is closely tied to livelihood activities such as pastoralism. However, there is no direct relationship between access to improved water and social cohesion in the country. There are some counties which have low access to improved water and high social cohesion, while others have high access to improved water and low social cohesion measure. The preposition could, however, be supported by the low SCI score for Mandera, Wajir and Tana River counties but not by the relatively high SCI score for Narok or Murang'a counties. The correlation between social cohesion index and access to improved water, therefore, leans towards a positive direction, but is not clear cut due to a number of counties with low access to water but relatively high social cohesion measure
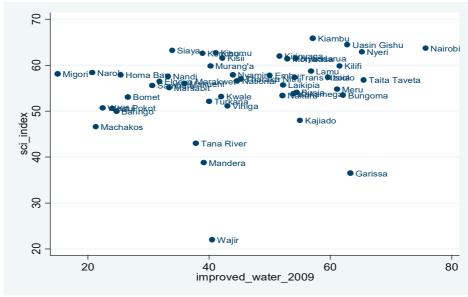
Figure 5.3: Social cohesion and access to improved water (%)

(Figure 5.3).

5.4   Social Cohesion and Life Expectancy

There is high and strong correlation between social cohesion index and life expectancy, which is a proxy for demographic characteristics. These correlations suggest that there is substantial relationship between socio-cultural indicators and life expectancy. According to the analysis, more cohesive counties are also characterized by higher quality of life and better well-being.

5.5   Social Cohesion and Literacy Levels

It would be expected that literacy rates, just like the overall HDI, would be a good proxy for overall development. It is also documented that education may have a positive effect on cohesion, since it enhances interactions across diverse communities. The analysis confirms this assumption and indicates that there is a positive and strong relationship between literacy levels and social cohesion across counties (Figure 5.5). More cohesive counties also reported higher literacy levels. This finding suggests that more cohesive counties are able to invest in human capital, while improving the literacy outcomes.
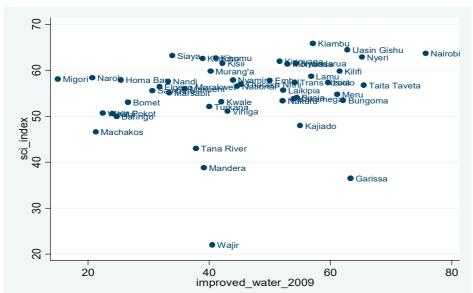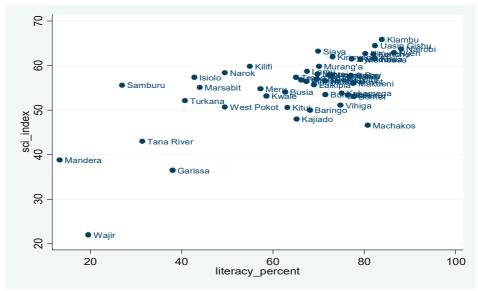
Figure 5.4: Social cohesion and life expectancy index

Figure 5.5: Social cohesion and literacy rate (%)

6.   Conclusion and Policy Implications

The objective of this study was to document methodological approaches for measuring social cohesion within the Kenyan context. Using social cohesion data (2013), it was possible to build a reliable index starting from individual level variables. The novelty of this approach was that it was based on micro-level individual data, which is easy to collect albeit expensive. The availability of reliable micro-based SCI data also enabled in-depth analysis of its dimensions and relationships between selected development indicators and social cohesion. The study documents the methodology of measuring social cohesion using a Kenyan example, and provides a measurable approach for monitoring social cohesion across counties. This methodology was applied in the NCIC-KIPPRA study on Status of Social Cohesion in Kenya (2013).

Overall, low cohesion index was determined for Wajir County, while the highest was Kiambu County. The leading counties were: Kiambu, Uasin Gishu, Kirinyaga, Murang'a and Nairobi. Wajir's best performance across the six domains was in national identity. Wajir's scores in at least three dimensions are notably low; prosperity (1%); peace (1.6%); and trust (2.6%). It is notable that other counties in the ASALs (Garissa, Mandera, Tana River and Kajiado) scored low. The other notable indices score was 100 per cent for coastal counties (Lamu, Kwale and Taita Taveta) on the diversity dimension. Nairobi recorded the highest equity and prosperity index of 100 per cent. Modest equity scores were for Bomet, Kitui, Migori, Homa Bay and Narok counties. These scores are based on the context of the elements that PCA found to be significant for their respective dimensions.

From the study, there is need to address the following issues:

(i) Horizontal and vertical inequalities, including access to public services and opportunities;

(ii) Poverty through a growth, redistribution and productivity-oriented strategy. This is critical for improved livelihoods and prosperity since social cohesion is imperative for sustainable development of the country;

(iii) Promote social values, including trust, peace and positive management of ethnic diversities in the country. Investing in systems for early warning, conflict management and peace building is critical;

(iv) Sustained human capital development by investing in health and education, and targeting counties with low human capital outcomes;

(v) Human and infrastructure capital development should be strengthened, notwithstanding devolution and assuming effectiveness in service delivery; and

(vi) Mitigating the harsh environments among pastoralists.

Indeed, high level of social cohesion requires a balance between the six dimensions and, in any society, sustained development is undermined where any one of the elements of social cohesion is ignored.

Finally, establishing and institutionalizing a social cohesion data and information system and ensuring the collection of up to date data and information is critical for regular monitoring of social cohesion in the country. This would ensure effective trend analysis of social cohesion in the country over time and across regions.

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Appendices

Appendix Table 1: Components of social cohesion and their PCA weights

Component	Indicators	Eigen Value	PCA Weight	Eigen Vector
Trust	Complete trust in people of another ethnic group	3.1267	Significant	0.2840
	Courts (Judiciary)	1.37897	Significant	0.4026
	Kenya government (National and County Governments; Parliament)	0.819276	Low weight	
	Religious institutions	0.766125	Low weight	
	Financial institutions	0.557786	Low weight	
	Educational institutions	0.540931	Low weight	
	Human rights institutions and media	0.43536	Low weight	
	People of another religion	0.37485	Low weight	
Peace	National security	2.42429	Significant	0.4506
	Law and order	1.45306	Significant	0.4211
	No tensions	1.22147	Significant	0.4351
	No social issues (family breakdown; drug use; lack of social direction)	1.05889	Significant	0.3564
	People of different socio-economic class	0.952202	Low weight	
	No ethnic violence	0.910421	Low weight	
	Relations with people from another ethnic group after PEV	0.847184	Low weight	
	No constant conflict with neighbours	0.775804	Low weight	
	Never a victim of crime	0.738417	Low weight	
	People of different ethnic groups getting along well	0.565594	Low weight	
	Poverty and food insecurity not a problem	0.561603	Low weight	
	Youth unemployment not a problem	0.491067	Low weight	

Equity	Good road infrastructure	2.24035	Significant	0.1997
	Share of households with access to water	1.02879	Significant	0.5572
	Share of households with access to electricity	1.01772	Significant	0.5435
	Share of households with access to sanitation	0.956069	Low weight	
	Fair distribution of good roads across regions	0.923064	Low weight	
	Important-sharing of government jobs	0.457481	Low weight	
	Gap between the rich and poor is too low	0.376524	Low weight	
Diversity	Spend time with people of other ethnicity	1.9059	Significant	0.6523
	Communicate with people of other ethnicity	1.08357	Significant	0.6461
	Intermarriages promote ethnic diversity	1.00434	Significant	0.1463
	Social protection for all	0.951399	Low weight	
	Proud of ethnic community customs	0.81018	Low weight	
	Friendship with people of other ethnic identity	0.244609	Low weight	
Prosperity	GDP index	1.89515	Significant	0.6327
	Share of non-poor population	1.18086	Significant	0.4384
	Education index	1.00121	Significant	0.6009
	Life expectancy index	0.860752	Low weight	
	Access to clean and safe drinking water	0.751494	Low weight	
	Can afford to buy all things	0.310546	Low weight	
National Identity	Importance of ethnicity in defining identity	1.77799	significant	0.5855
	Importance of belonging to an ethnic group	1.0314	significant	0.5714
	Community has strong sense of identity	0.914933	Low weight	
	Proud to be Kenyan	0.780738	Low weight	
	Importance of voting in national elections	0.494938	Low weight	

Source: PCA Output using SCI Survey, 2013. Also in NCIC-KIPPRA, 2013

Appendix Table 2: Social cohesion index and selected indicators

	County	Life Expectancy (Years)	Literacy Rate (%)	Life Expectancy Index	HDI	Poverty Headcount, 2013 (Estimates)	Overall Conflict Index	Improved Water, 2009	Trust Index	Peace Index	Identity Index	Diversity Index	Prosperity Index	Equity Indec	SCI Index
1.	Baringo	63.8	68.1	0.560	0.600	62.3	11.5	24.7	26.9	34.5	78.4	82.0	70.9	11.2	50.0
2.	Bomet	66.1	77.7	0.555	0.466	63.4	15.5	26.6	45.2	58.7	68.8	94.4	42.8	7.4	53.1
3.	Bungoma	59.5	71.5	0.394	0.487	55.3	16.0	62.1	15.1	34.1	80.8	92.1	61.0	38.3	53.5
4.	Busia	47.1	62.7	0.515	0.552	66.7	12.0	54.4	38.6	39.8	61.6	93.0	59.5	31.4	54.1
5.	Elgeyo Marakwet	65.6	67.3	0.510	0.556	60.0	11.5	31.8	37.4	47.3	82.0	96.3	64.5	14.9	56.5
6.	Embu	64.7	77.1	0.522	0.424	43.1	9.5	50.0	62.1	42.0	79.8	88.3	44.6	32.6	57.8
7.	Garissa	59.4	38	0.613	0.393	55.1	17.0	63.3	8.9	18.0	54.8	79.3	20.5	39.0	36.5
8.	Homa Bay	39.8	73	0.456	0.479	45.2	14.0	25.4	60.2	62.6	80.1	87.6	54.3	5.3	57.9
9.	Isiolo	57.6	42.8	0.543	0.458	65.3	16.0	59.6	58.3	40.2	90.3	74.6	35.0	43.4	57.4
10.	Kajiado	63.7	65.2	0.532	0.333	16.1	12.0	55.0	36.4	31.8	58.9	84.0	22.8	56.9	48.0
11.	Kakamega	54.2	75.1	0.599	0.542	55.9	13.0	53.9	32.2	29.4	78.0	96.5	57.0	29.9	53.8
12.	Kericho	59.6	82	0.593	0.626	41.5	13.0	38.9	59.4	49.0	66.7	93.6	80.9	25.2	62.6
13.	Kiambu	56	83.9	0.648	0.634	25.9	16.0	57.1	44.8	39.6	63.6	93.1	86.2	68.7	65.9
14.	Kilifi	54	55	0.517	0.551	68.5	15.0	61.5	21.6	46.0	87.1	97.2	60.6	45.2	59.8
15.	Kirinyaga	62.8	73.1	0.645	0.581	30.5	16.0	51.6	53.9	48.0	64.0	92.0	76.9	36.9	62.0
16.	Kisii	59.2	82.4	0.637	0.606	61.8	12.5	42.2	65.0	53.3	77.9	83.3	67.1	23.9	61.6
17.	Kisumu	40.4	80.3	0.504	0.554	45.2	15.5	41.1	57.3	57.3	80.5	81.5	71.1	29.6	62.7
18.	Kitui	58.9	63.2	0.595	0.383	66.4	14.0	24.0	59.7	48.7	81.0	86.7	17.8	6.0	50.6
19.	Kwale	53	58.6	0.467	0.477	80.5	16.5	42.0	28.8	41.7	81.7	100.0	41.4	25.3	53.2
20.	Laikipia	64.9	69	0.642	0.528	54.0	16.0	52.2	58.7	39.0	49.5	98.0	51.8	37.9	55.7
21.	Lamu	56	67.5	0.548	0.553	34.0	13.0	56.8	21.2	37.2	81.7	100.0	72.0	41.6	58.7
22.	Machakos	59	80.8	0.598	0.519	58.4	10.0	21.3	37.5	36.6	56.6	78.9	55.7	13.3	46.6
23.	Makueni	57.2	77.6	0.463	0.488	63.5	12.5	35.9	58.6	48.8	89.3	77.0	48.9	16.5	56.0

24.	Mandera	61	13.3	0.573	0.453	88.3	15.5	39.1	14.4	25.6	70.1	87.5	21.1	13.9	38.8
25.	Marsabit	58.1	44	0.688	0.622	81.5	16.0	33.4	52.7	47.4	90.6	72.8	54.0	14.8	55.1
26.	Meru	62.8	57.3	0.535	0.513	29.4	11.0	61.1	41.2	34.5	69.9	80.0	64.7	40.9	54.8
27.	Migori	46.5	69.8	0.255	0.467	45.7	15.0	15.0	65.4	48.2	74.9	95.1	65.2	0.0	58.1
28.	Mombasa	53.3	79.2	0.488	0.499	43.5	16.5	52.9	15.1	29.7	90.9	99.2	63.1	71.3	61.4
29.	Murang'a	63.4	70.1	0.645	0.601	30.6	13.5	40.2	53.9	49.7	65.1	90.1	74.6	25.7	59.8
30	Nairobi	57	88.1	0.533	0.653	23.7	17.0	75.7	26.4	10.2	64.0	82.8	100.0	100.0	63.7
31.	Nakuru	55.6	76.4	0.595	0.412	46.1	17.0	52.1	55.3	38.1	41.4	96.5	37.2	49.3	53.4
32.	Nandi	60.2	76.8	0.565	0.487	47.3	12.5	33.2	65.6	57.1	59.1	97.9	52.1	13.8	57.6
33.	Narok	61.2	49.5	0.681	0.601	33.5	15.5	20.7	56.4	70.5	70.9	79.5	68.0	5.0	58.4
34.	National	56.6	71.4	0.527	0.527	49.0	14.1	44.6	43.7	40.1	72.7	88.6	60.5	34.6	56.6
35.	Nyamira	56.8	72.3	0.268	0.475	50.2	16.5	43.9	52.9	55.0	76.4	69.7	65.3	24.0	57.9
36	Nyandarua	63.7	77.3	0.522	0.612	46.6	11.5	54.3	56.7	43.3	57.5	96.3	82.9	33.0	61.5
37..	Nyeri	63.9	86.5	0.630	0.589	33.0	14.0	65.2	46.0	43.7	67.0	88.5	76.0	55.3	62.9
38.	Samburu	60.7	27	0.687	0.588	79.8	13.0	30.6	65.1	36.6	77.3	92.0	49.4	13.4	55.6
39.	Siaya	40.6	69.9	0.222	0.453	40.1	9.5	33.9	62.5	65.2	77.5	89.8	70.6	14.7	63.2
40.	Taita Taveta	57.9	66.2	0.480	0.389	57.0	13.5	65.5	40.8	46.4	72.1	100.0	32.5	48.0	56.8
41.	Tana River	53.8	31.4	0.472	0.569	77.0	15.5	37.8	12.3	8.8	62.5	99.8	58.5	14.4	43.0
42	Tharaka Nithi	58.7	69.7	0.567	0.586	38.3	11.0	45.2	56.6	37.9	77.6	78.2	73.1	18.8	57.0
43.	Trans Nzoia	60.2	65.1	0.645	0.564	54.4	15.5	54.1	35.0	26.7	85.3	94.3	69.5	32.7	57.4
44.	Turkana	61.6	40.8	0.610	0.566	94.5	16.5	40.0	46.7	42.2	95.0	64.0	41.3	17.9	52.1
45	Uasin Gishu	60.6	82.4	0.665	0.601	46.2	15.5	62.8	39.5	38.9	84.8	96.0	73.0	55.2	64.5
46.	Vihiga	55.9	74.8	0.313	0.425	44.7	10.0	43.0	32.0	22.9	76.3	91.8	57.5	26.2	51.1
47.	Wajir	61.8	19.6	0.600	0.359	86.5	16.0	40.5	2.6	1.6	59.2	53.2	0.0	15.1	22.0
48.	West Pokot	58.3	49.5	0.7	0.6	69.9	16.0	22.4	39.9	34.8	81.4	91.6	55.0	1.9	50.7

Source: UNDP (2010) and author's computations