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Indicator Shocks to Vulnerability and Social Welfare in District Level, South Ethiopia

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Abstract: ***The term vulnerability generally refers to exposure to incidents and stress, and difficulty in coping with them. Analyzing vulnerability involves identifying not only the threat but also the resilience or responsiveness in exploiting the opportunities and resisting or recovering from the negative effects of the changing environment (Moser, 1998). The most common methods employed in measuring vulnerability are econometric and indicator methods. In this study indicator method was employed. The indicator method of quantifying vulnerability is based on selecting some indicators from the whole set of potential indicators and then systematically combining the selected shocks to indicate the levels of vulnerability. Furthermore, the prevalence of shocks at district level in the region is not studied yet. As a result, it remains very difficult to give relevant information, which could be used to design appropriate intervention, to policy makers and development partners. The survey result shows that 22.8 percent of the total households are vulnerable to different shocks with 4.8 standard deviation. Among the major shocks, family member illness takes the lead. It affects about 43.3 percent of the households with 2.83 standard score. Thus families need to spend their time and money to take care of the patient. The situation is more exacerbated especially if it is the household head that gets sick. The other shock, Price rise of food items affects 27.1 percent of the households with 1.45 standard score. Food shortage is also the other shock that affects 15 percent of the households in the region with 0.4 standard score. Reduced income of household member is identified as a significant indicator of vulnerability in some zones. Food shortage/drought is also identified as a serious indicator of vulnerability in some zones namely, Gamo Gofa (with standard score, 3.18), Halaba Special woreda (1.79), Wolayita (1.53), and South Omo (1.08).***

Keywords: Social services, Social welfare, Vulnerability

1. Introduction

1.1 Vulnerability Indicators

The term vulnerability generally refers to exposure to incidents and stress, and difficulty in coping with them. Chambers and Ellis (1989) disaggregated the concept vulnerability into internal and external distinctions, to clarify its two sides. While the external side of vulnerability includes risks and shocks to which an individual is subject to, the internal side refers to being defenselessness or lack of defense without damaging loss. Loss can take many forms – becoming or being physically weak, economically impoverished, socially dependent or humiliated, and psychologically harmed. Therefore, analyzing vulnerability involves identifying not only the threat but also the resilience or responsiveness in exploiting the opportunities and resisting or recovering from the negative effects of the changing environment (Moser, 1998).

The most common methods employed in measuring vulnerability are econometric and indicator methods. In this study indicator method was employed. The indicator method of quantifying vulnerability is based on selecting some indicators from the whole set of potential indicators and then systematically combining the selected shocks to indicate the levels of vulnerability. Two options are available for calculating the level of vulnerability using this method at any scale. The first is assuming that all indicators of vulnerability have equal importance and thus giving them equal weights (Cutter, Mitchel, and Scott, 2000 from Temesgen Deressa et.al (2008)). The second method is assigning different weights to avoid the uncertainty of equal weighting given for the diversity of shocks used. Sixteen indicators of vulnerability are incorporated in this study such as illness of household member, unexpected loss of job, flood, land slide; heavy rain, price hike etc were measured using frequency, percentage, standard deviation and standard score.

1.2 Social Welfare Indicators

According to the definition of United Nations (1967),"Social welfare as an organized function is regarded as a body of activities designed to enable individuals, families, groups and communities to cope with the social problems of changing conditions." Social welfare is thus conceived in a broader sense, as a "social service" and which includes, among others, education, health care, road, water, housing etc. To analyze the status of welfare in the region, distance and time, extent of utilization and reasons for no/low utilization of physical and social services of welfare were measured. These are credit and saving services, whole season road, market, potable water, various levels of education and health services. Descriptive statistics were used to measure access and extent of utilization of different social and physical infrastructures.

To measure economic welfare, among the most commonly used approaches household consumption expenditure approach is employed; besides that to measure non-monetary aspects of individual welfare access and degree of utilization of road , market , water, primary school, secondary school, preparatory school, technical-vocational school, maternal health care service, distance from woreda and zonal centers were analyzed.

1.3 Study Motivations and Objectives

The measurement and analysis of poverty and inequality is crucial to understand peoples' well-being. Macro level poverty studies conducted so far in Ethiopia show the status

of poverty at national and regional level only. For example, the study conducted by MOFED (2011) indicates that the SNNPRS's total, rural and urban poverty is estimated to be 29.6, 30 and 25.8 percent respectively. This result, however, does not show the real picture of well-being status at district level. Moreover, poverty situation of a particular place is a dynamic phenomenon; it changes from time to time. Furthermore, the prevalence of shocks at district level in the region is not studied yet. As a result, it remains very difficult to give relevant information, which could be used to design appropriate intervention, to policy makers and development partners. Therefore, this study is conducted to fill the gap in the above areas by studying the status of well-being and prevalence of shocks at district level in the SNNPRS. Access and extent of utilization of different social and physical infrastructures also composes part of this paper to explain the qualitative aspect of poverty.

Thus, the objective of this study is to depict the socio-economic welfare status and the indicator shocks to vulnerability in the South Nations, Nationalities, and Peoples Regional State.

The Southern Nations, Nationalities and Peoples' Regional State (SNNPRS) is located in the South and South-Western part of Ethiopia. Astronomically, it roughly lies between $4^0.43$ - $8^0.58$ North latitude, and $34^0.88$- $39^0.14$ East longitudes. It is bordered with Kenya in South, South Sudan in South- West, Gambella region in North- West and surrounded by Oromiya region in the North, West and East. The total area of the region is estimated to be 110,931.9 Sq. Km which accounts 10% of the country's land mass and inhabited by 15,760,743 population (CSA, 2007) covering nearly 20% of the total population of the country. The population of the region is estimated to grow (same with the country) at an average rate of 2.9 percent in 1994 and reduced to 2.6 in 2007(Defaru Debebe, 2014). The population density of the region is 142 persons per Square kilometer, which makes the region one of the most populous parts of the country. In addition to this 91.3 % of the population resides in rural areas and only 8.7 % in urban. There are 3,249,102 households in the region with an average of 4.7 persons per household. Agriculture is the predominant economic activity of the region. The region is home for 56 ethnic groups with their own distinct geographical location, language, cultures, and social identities living together. These varied ethnic groups are classified into the Omotic, Cushetic, Nilo-Saharan and Semitic language families. Based on ethnic and linguistic identities, the region is at present divided into 14 districts (sub-divided in to 135 Woredas) and 4 Special Woredas. With regards to rainfall condition, the past three decades rainfall data show that the mean annual rainfall of the region ranges from the lowest 400 mm in the extreme South of South Omo zone to over 2200 mm in the west in Sheka and Kaffa zones. The mean annual temperature of the region ranges less than 10^oC in the extreme highlands of the eastern part of Sidama to over 27^oC in the lowland areas of the South mainly in the Omo-rate plain /South Omo zone/.

2. Materials and Methods

2.1 Study Design

People's well-being change over time and hence there is a tendency of moving in and out of poverty situation. Accordingly, determinants also change over time. Because of such very nature of the subject, poverty and well-being are best studied by having a panel of observations in a longitudinal study design. However, longitudinal study design often requires taking repeated measurements, which has cost and time implications. Because of the time and cost involved, it is a relatively little used design in social research (David, 1995). Hence, in the present study a cross sectional study design was employed. The study was carried out over a short period of time and it is relatively inexpensive compared to longitudinal study design.

2.2 Sampling Design

The survey covered rural and urban areas of the regional state. Therefore, each category in the region was considered to be a survey domain for which the major findings of the survey are reported. A total of 304 rural and 57 urban kebeles were selected randomly and the respondents from each kebeles were selected from the fresh list of households prepared at the beginning of the survey using systematic sampling techniques.

2.3 Data and Its Sources

In the present study both primary and secondary data were used. The study mainly focused on primary data. It was collected from the selected households using survey questionnaire. The questionnaire was adapted from Central Statistics Agency since it is comprehensive and frequently used to collect data on qualitative and quantitative indicators of poverty and well-being. The secondary data were collected from relevant reports, journals and other published and unpublished sources.

2.4 Methods of Data Analysis

Statistical analysis was performed using statistical package such as EXCEL, and STATA. Before the analysis, the data were checked for missing values, entry errors and outliers. Simple descriptive statistical techniques such as frequency, percentage, mean and standard deviation, were used to describe the responses. Regression analysis was used to show how poverty determines vulnerability status among sample districts in the study area. Indicator shocks to vulnerability are analyzed to measure exposure to incidents and stress, and difficulty in coping with them. In this study shocks that expose households to vulnerability and their coping mechanisms/ opportunities were identified. Table 1 summarizes the various shocks that can cause vulnerability to poverty and the number of households affected by these shocks. It is also important to note that in the analysis process all factors were scaled so that positive values of standard scores indicate higher probability of vulnerability and negative values explains reduced overall vulnerability.

3. Result and Discussion

The survey result shows that 22.8 percent of the total households were vulnerable to different shocks with 4.8 standard deviation. Among the major shocks, family member illness takes the lead. It affects about 43.3 percent of the households with 2.83 standard score. Thus families needed to spend their time and money to take care of the patient. The situation is more exacerbated especially if it was the household head that gets sick. The other shock, Price rise of food items affects 27.1 percent of the households with 1.45 standard score.

Households attempt to mitigate the problem by shifting their consumption to cheaply available foods in the region such as enset, sweet potato, Irish potato and others. Reducing quantity and frequency of consumption were also some of the most practiced coping mechanisms used by the households.

Table 1: Major indicator of shocks to vulnerability of households in SNNPRS,Ethiopia

Types of major shocks	Number of responses	Total respondent	Simple &weighted Percentage		Standard score of ( ) percentage	
			Simple	Weighted	Simple	Weighted
Death of HH member (bread earner)	735	16291	4.5	6.5	-0.49	-18.3
Illness of HH member	6791	15676	43.3	59.6	2.83	20.5
Unexpected loss of jobs of HH	232	15322	1.5	2	-0.74	-21.3
Shortage of food/drought	2303	15472	14.9	20.2	0.4	-7.9
Flood, land slid/avalanches	813	15302	5.3	7.1	-0.42	-17.5
Pests break out/big crop damage	796	15303	5.2	7	-0.43	-17.6
Great loss/death of livestock	804	15308	5.3	7.1	-0.42	-17.5
Price fall	618	15265	4	5.4	-0.53	-18.8
Price rise of food items	4171	15371	27.1	36.6	1.45	4.3
Unexpected Fire rise	154	15291	1	1.4	-0.79	-21.8
Theft/robbery	420	15297	2.7	3.7	-0.64	-20.1
Reduce income of HH member	2058	15371	13.4	18.1	0.27	-9.4
Conflict/ instability/insecurity	560	15269	3.7	4.9	-0.56	-19.1
Heavy rains preventing work	1007	15279	6.6	8.8	-0.31	-16.2
Reduced drinking water quality/ quantity	3460	15602	22.2	30.4	1.02	-0.6
Involuntary loss of house/land	283	15172	1.9	2.5	-0.71	-20.9
Total HH size (at least with one major shock)	11385	16291	69.9			
Mean			10.2	22.8	0	0
Standard deviation			11.7	4.8	1	1

Source: Calculated from Survey, 2015

Shortage of potable water is one of the causes for household vulnerability in the region affecting 22.2 percent of the households with 1.02 standard score. In addition to its effect on the households' health, this problem particularly affects women and children as they were required to spend their sizeable time and energy walking significant distances to collect water from different sources which leads households to economic difficulty. To cope up this problem households reported that they used pond water, and water from other sources by boiling it, and reducing their water consumption.

Food shortage is the other shock that affects 15 percent of the households in the region with 0.4 standard score. The study reveals that households' coping mechanisms with the problem varies across a range of choices including: working as daily laborers, engagement in petty trade, borrowing money, selling household property, and buying food from market.

Household head income loss affects 13.4 percent of the households and households endeavor to overcome the problem by shifting from one job to another, income diversification, consumption reduction, selling of property etc. Death of household head affects 4.5 percent of the households. In this case households with adult and grown successors overtake the role of the deceased, migrate to relatives and urban areas in search of protection and job, selling household property etc.

This study reveals that only 3 percent or less of the households are affected by factors like fire accident, involuntary loss of house/land, unexpected loss of jobs. Factors like theft/robbed, security problem, heavy rainfall or wind affect only less than 5-7 percent of the population on the average. Accidental land loss may arise if the land was possessed by contractual agreement or natural disaster as landslide.

4. Prevalence of Shocks at District Level

The district shock distribution is described in Table 2. The mean response of exposure to at least one shock is 65 percent with standard deviation 15.8. As indicated in the table, zones with positive standard score are vulnerable to those shocks on average. Basketo Special worda, Halaba Special woreda, Dawro and Silte zones are highly exposed to shocks with their respective standard score of 2.3, 1.9, 1.5 and 1.3. The other five districts such as Sheka, Konta Special Woreda, Hadiya, Gurage, Segen Area Peoples and Yem Special woreda show moderate exposure. In the remaining ten zones with negative standard score, less exposure to shocks is observed. Whereas, in terms of rural and urban exposure in the region, the result indicates that the rural exposure is higher than that of the urban.

Table 2: Prevalence of shocks at zonal level and its standard score

Zone /spatial woreda	*Number of responses for Shock*	*Total respondents*	*Percentage*	*Standard score*
Gurage	1117	1566	71	0.4
Hadiya	722	1001	72	0.5
Kembata Tembaro	565	1030	55	-0.6
Sidama	963	1883	51	-0.9
Gedeo	376	740	51	-0.9
Wolayita	978	1769	55	-0.6
South Omo	513	859	60	-0.3
Sheka	217	279	78	0.8
Kafa	753	1462	52	-0.9
Gamo Gofa	893	1747	51	-0.9
Bench Maji	868	1463	59	-0.4
Segen Area	595	860	69	0.3
Dawro	923	1073	86	1.3
Silte	743	840	88	1.5
Yem	293	442	66	0.1
Konta	349	463	75	0.7
Halaba	389	411	95	1.9
Hawassa	125	369	34	-2.0
Basketo	206	273	74	2.3
Rural	8236	12867	64	1.2
Urban	1295	2252	58	-0.8
Semi-Urban	1796	3058	59	-0.4

Source: Computed from Survey, 2015

On the other hand prevalence and standard scores of vulnerability indicators are calculated and presented in Annex(in full document). Illness of household member is the leading shock to vulnerability in the region except Gedeo Zone and Basiketo Special woreda. The rise of food price is the second leading shock to vulnerability in most zones, except some zones namely Wolayita, Gamo Gofa, Dawro, Bench Maji, Kafa, Yem Special woreda, and Halaba Special woreda. Reduced income of household member is identified as a significant indicator of vulnerability in some zones such as Hadiya, Gedeo and Basketo Special woreda with positive standard scores. Food shortage/drought is also identified as a serious indicator of vulnerability in some zones namely, Gamo Gofa (with standard score, Z= 3.18), Halaba Special woreda (Z= 1.79), Wolayita (Z= 1.53), and South Omo (with Z= 1.08).

Lack of potable water is the other serious indicator of vulnerability in Dawro, Bench Maji, Gamo Gofa, Wolayita, South Omo and Basketo Special woreda. The remaining shocks are reported as moderate and low level indication of vulnerability in the region (Annex).

4.1 Social Welfare

To measure welfare of the group of societies, we have many different socioeconomic services under consideration. However, twelve major socioeconomic services incorporated in the study such as credit and saving habit, market access, road access, schooling, health and administrative centers. Statistical measures such as average distance of services from the residences, average time consumed to access the services and its distribution patterns were computed.

From Table 3 it can be observed that the average distance of credit and saving service, market access, technical and vocational school, preparatory school, secondary and primary school, and health care institutions is relatively highest in Bench Maji and South Omo zones. In case of Kafa Zone, the average distance of credit and saving, market access, primary school, prenatal service, and health center is still higher. Three zones such as Halaba , South Omo and Wolayita are identified for lack of drinking water access, where households are required to travel on average more than 3km. The highest average distance to access all season road is recorded for South Omo Zone (34.04 km) . Following it, other zones namely Dawro, Basketo, Gedeo, Gamo Gofa and Kafa have such a whole season road inaccessibility problem.
The administrative challenge associated with far distance is reflected extremely in Dawro, Gamo Gofa and Segen People zones. Thus the average distance from woreda center to residence of sample respondent in Dawro zone is 56.56km. While the average distance of zone center in Gamo Gofa and Segen Area People zones is 145.85 and 150.49 kilometers respectively.

On the other hand, Table 4 shows the average time households require to go to these service centers. The average time to access socio-economic services is associated with the average distance and availability of modern mode of transport to these service centers. There is a strong positive correlation of time and distance to access these social and physical infrastructures. This correlation can be affected by the use of the service and/or mode of transportation. That means, even though the distance to a service or infrastructure is high, the time to access the service will be low with the use of modern transportation or vis versa. Accordingly, from Table 4, four services: credit and saving, technical and vocational school, preparatory school, and prenatal and postnatal services have strong positive correlation. The implication is that those zones which are far away from these services need special intervention to shorten the time to access the services.

In Table 3, it is also indicated that the average distance of socio-economic service centers from household residence is highest in Bench Maji and South Omo zones. However, when distance of these services is measured by time, Dawro and South Omo are found to be the two zones where these services are most distant from household residence. This mismatch of ranking by time and distanc for Bench Maji and Dawro zones can be explained by more mountainous topography in Dawuro zone that takes too much time to access infrastructures.

5. Conclusion

5.1 Vulnerability

Shocks to vulnerability result shows that 22.8 percent of the total households in the region were vulnerable. Mainly two indicators (illness of household member and food price rise) indicated significant impact on socioeconomic wellbeing of the region. Next to these indicators, drinking water quality/quantity, food shortage/drought and income reduction reveal sensible implication in the region. On the

other hand, three districts (Halaba Special Woreda, Silte Zone and Dawuro Zone) have reported higher magnitude of shocks relative to other zones. All zones, except Gedeo, experienced the impact of illness of household member on their socioeconomic wellbeing. Therefore, health issue needs great attention in the region followed by food price, food supply and drinking water availability and quality. Furthermore we know that health status is highly influenced by food and water supply/quality.

To reduce the incidence and magnitude of these shocks; the concerned bodies should be work to enhance awareness of the people to take care of their health and optimal utilization of health services. The government and NGOs train and support farmers to maximize food crop production to have sufficient supply of food items which may reduce or keep the food price as it is. Sufficient food production give guarantee to reduced food shortage.

5.2 Social Welfare

This study also aimed to examine the welfare status of the region to unveil the interplay between elements of welfare and poverty. As a result the status of welfare in the region was measured by taking twelve different socioeconomic services. From Table 3 it was observed that the average distance to access hospital, preparatory school and technical and vocational training centers is large. We observed that health status education level, and access of infrastructure are important elements to determine poverty reduction. While in South Omo and Bench Maji, ten socioeconomic services have presented on average far distance from households' residence (Table 3). When we measure the access of socioeconomic services in terms of time taken to have the service, households in South Omo and Dawure zones spent much time. This is manifested by limited road and modern transportation availability in two zones and difficult topography of Dawuro.

Far distance was mentioned as a prime barrier for not using Hospital services. As far as health center service utilization is concerned it is only in few zones such as Sheka (22.22 percent), Kafa (14.32 percent), Segen Area People (10.35 percent), and Bench Maji (9.12 percent) relatively higher number of non-users were reported, that is associated with distance.

It is highly recommended that while designing policies like health and introducing modern medical systems, it is better to consider some of the socio cultural elements of the society. Though there is no way to unveil community members' denial to modern medication system, there were some members of the society who still relied on traditional medication system. As a result it is better to design a new way of integrating the traditional and modern systems of medication together.

Among the observed socio economic services especially road, technical and vocational education, preparatory school, hospital and zonal center community members in South Omo Zone, while compared to others, are expected to go far to get the services. Thus an immediate intervention should be done to address the extreme variances of socio economic services among the region.

The reasons of most of the respondents for not using the socio economic welfare services was not clear and their simply gave undisclosed reasons. Hence identifying the undisclosed reasons are beyond the scope of the study different arguments were not covered. Thus, working on identifying the important factors for the undisclosed reasons needs further research, unless it is very difficult to address the root reasons for not using the services.

Table 3: Average distance of socio-economic services (km)

Special Woereda / Zone	Credit & saving service	Road access	Market access	Water access	Technical-vocational education & training	Preparatory school	Secondary school	Primary school	Maternal service	Hospital	Health center	Health post/ clinic	Woreda center	Zone center
Bench Maji	14.56	8.03	8.00	1.52	68.60	27.21	19.53	4.51	7.94	69.02	10.26	10.19	21.13	91.72
Basketo	8.59	11.34	9.24	10.22	49.34	8.79	6.33	1.52	4.51	53.5	6.81	11.21	7.77	6.89
Dawro	10.02	13.32	6.82	2.06	42.95	12.27	6.78	3.61	6.25	40.97	7.23	4.63	56.56	50.91
Gedeo	13.47	10.06	5.30	1.29	42.16	11.69	6.76	2.03	3.00	37.56	5.48	2.5	14.19	43.74
Gamo Gofa	9.14	9.58	3.47	1.27	28.55	17.76	3.97	1.59	5.45	54.06	4.67	2.40	18.96	145.85
Gurage	9.67	3.86	4.62	0.911	24.43	11.15	4.14	1.47	2.83	26.30	3.52	1.97	12.86	63.92
Hadiya	10.97	8.12	5.66	1.512	36.15	11.33	7.09	3.04	8.83	36.11	8.83	4.52	13.15	40.49
Halaba	12.3	3.36	5.7	3.77	18.04	17.12	7.84	1.87	5.97	11.7	5.51	2.08	21.07	28.25
Hawassa	3.82	3.55	2.18	0.37	6.95	3.25	2.41	2.57	2.51	6.28	2.78	2.19	4.21	7.94
Kafa	15.8	9.09	10.62	1.27	58.72	16.92	7.43	4.17	7.73	50.59	10.25	3.51	20.73	66.07
Kembata T.	5.74	3.09	3.58	1.49	20.19	5.62	3.26	1.79	3.25	19.89	3.92	2.72	6.43	23.48
Konta	9.07	3.29	4.64	1.40	106.5	18.75	5.73	2.51	5.63	17.9	7.66	2.70	19.67	38.56
Segen	7.51	8.00	4.75	1.17	17.20	14.16	6.15	1.37	2.82	16.3	6.27	2.22	19.311	150.49
Sheka	5.17	3.1	4.26	1.43	23.86	8.31	4.45	1.82	4.59	25.25	4.56	2.44	9.12	89.15
Sidama	8.2	4.9	3.84	1.27	18.65	9.13	3.87	1.4	3.88	19.75	3.18	2.04	9.99	74.65
Silte	9.73	4.58	5.97	1.83	37.15	6.92	6.14	1.85	5.73	38.2	5.21	2.96	10.34	40.76
South Omo	14.2	34.04	9.02	2.72	107.24	82.34	12.88	2.16	7.04	94.87	10.18	4.56	17.41	73.65
Wolayita	8.71	6.76	5.5	2.72	22.68	9.00	6.66	2.14	6.16	21.75	4.89	2.99	10.62	26.24
Yem	7.7	5.33	4.16	1.59	25.23	18.66	8.38	2.51	5.58	36.42	5.45	3.03	26.14	20.5

Special Woereda / Zone	Table 4: Average time to access socio-economic services (in hour)											
	Credit & saving service	Road access	Market access	Water access	Technical & vocational education & training	Preparatory school	Secondary school	Primary school	Maternal service	Hospital	Health center	Health post
Bench Maji	1.6	1.4	1.0	0.5	4.6	3.1	1.3	0.7	0.7	3.8	0.9	0.8
Basketo	1.1	1.1	0.7	0.4	6.0	1.1	0.9	0.3	0.7	6.2	1.0	0.4
Dawro	2.2	2.6	1.1	0.5	6.3	2.0	1.4	0.6	0.9	5.6	1.5	0.7
Gedeo	2.1	1.4	0.9	0.4	4.0	1.7	1.1	0.4	0.8	3.3	1.0	0.6
Gamo Gofa	1.8	1.3	0.7	0.3	3.0	2.8	1.3	0.7	0.6	3.3	0.8	0.7
Gurage	1.6	0.6	0.6	0.2	2.7	1.8	0.9	0.3	0.4	3.3	0.8	0.4
Hadiya	1.2	1.1	0.6	0.3	4.2	1.4	0.8	0.5	0.7	2.8	0.7	0.5
Halaba	2.2	0.5	0.7	0.7	2.7	2.8	1.5	0.4	1.0	1.6	0.9	0.4
Hawassa	0.6	0.2	0.2	0.1	0.7	0.5	0.4	0.3	0.3	0.7	0.4	0.3
Kafa	2.6	1.4	1.3	0.3	6.7	2.5	1.2	0.7	0.7	4.5	1.3	0.5
Kembata T.	0.8	0.6	0.5	0.2	2.9	1.2	0.6	0.4	0.4	1.9	0.5	0.4
Konta	2.4	0.7	0.6	0.3	10.5	3.0	1.3	0.5	1.0	3.1	1.7	0.7
Segen area	1.9	1.6	0.9	0.4	2.5	1.9	0.9	0.5	0.6	3.2	1.6	0.5
Sheka	0.9	0.7	0.7	0.3	1.9	1.7	0.8	0.4	0.8	2.0	0.8	0.6
Sidama	1.4	0.9	0.7	0.3	2.3	1.5	0.9	0.4	0.8	2.8	0.7	0.4
Silte	1.5	1.0	0.8	0.3	5.2	1.3	1.2	0.4	0.9	5.5	1.0	0.4
South Omo	2.1	1.5	1.5	0.7	7.5	5.0	2.3	0.6	1.1	5.5	1.7	0.6
Wolayita	1.5	0.7	0.6	0.5	3.1	1.5	1.1	0.3	0.8	2.9	0.8	0.4
Yem	1.0	0.8	0.5	0.4	4.1	2.8	1.4	0.4	0.6	4.0	0.9	0.5
Corr(km,mi)	0.66	0.32	0.48	0.38	0.64	0.69	0.36	0.21	0.63	0.50	0.47	0.31

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