

**POVERTY IN TANZANIA: COMPARISONS
ACROSS ADMINISTRATIVE REGIONS**

AN INTERIM REPORT

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1 Introduction

This is an interim report on a research project that has three broad objectives. The first objective is to undertake a re-appraisal of the ranking of administrative regions in Tanzania in terms of the level of poverty. The re-appraisal involves a sensitivity analysis of poverty ranking using different adult equivalent scales. The second objective is to check the consistence of the ranking of the regions by poverty using stochastic dominance tests. The stochastic dominance test checks whether altering poverty line within a reasonable range would change the ranking of the region in terms of poverty. The last objective of this research report is to undertake a multidimensional poverty analysis by region in Tanzania to see how the welfarist approach compares to a variant of capability to functioning approach in ranking poverty across regions in Tanzania. This interim report is about the findings with regards to the first two objectives.

Initially this project had intended to also compare poverty by regions in Tanzania for the years 2000 and 1991. However, the available household budget survey data for 1991 did not involve sampling at the regional level. This makes comparability of the poverty measures by regions between 1991 and 2000 impossible to undertake.

This report is organized as follows. Section two discusses the motivation for the study. Section three dwells on methodology. Empirical results are discussed in section four. Section five concludes the report.

2 Motivation of the Study

One of the main concern of Tanzania since independence has been the issue of equity. Tanzania went as far as introducing a homegrown philosophy/ideology of socialism known as *Ujamaa* whose main aim was to redress inequality in the country. One of the ways that inequality may be manifested is in the disparity in the levels of welfare across geographical regions in the country. Disparity of welfare across geographical regions may be due to historical, geological or climatical factors. Such disparity may also be due to political factors, such as where the long serving head of state hails from and so on.

Huge disparity in the welfare across regions was anathema to Tanzania's philosophy of *Ujamaa* and several measures were taken to arrest the disparity (Ndulu 1982).

Apart from ideology, measures to reduce inequality across regions may be motivated by the need to avoid political instability and consolidate national cohesion. In most African countries issues of distribution of the national cake between different ethnic groups and even religious groups are at the core of political instability and civil wars. Ethnic groups tend to occupy different geographical areas and movement from one geographical area to the other is minimized because of, among other reasons, the difficulty of integrating into a different ethnic group. Thus bitterness, rather than migration, tends to be the main response to economic disparity across regions. In Tanzania, boundaries of administrative regions somehow follow the ethnic division of the country. For example, the regions of Mwanza and Shinyanga are predominantly populated by the Sukuma while the Gogos and Rangis dominate Dodoma region. Even more, administrative regions also tend to reflect the religious faith that people subscribe to: Moslems predominantly populate the coastal regions in Tanzania while regions in the highlands are predominantly Christian. A huge disparity in the well being of people across regions can potentially create ethnic and religious tensions in the country that may undermine national cohesion and political stability.

An affirmative program to redress regional inequality in welfare is therefore an important step in building a stable and peaceful nation in Africa. This fact was long recognized by the government of Tanzania and significant effort was directed into affirmative action of this nature in the first two decades of independence (see for example Ndulu 1982). Currently the main policy effort in Tanzania is poverty reduction. This means that allocation of national resources is not only to be informed by the need to stimulate high economic growth, but must respond to the need of different areas and groups as manifested by the level of poverty. Increasingly, parliamentary debates on resource allocation revolve around the need to give priority to the poorer regions. There is even an emerging political alignment of some regions, which seems to be motivated by the need to attract national resources to address perceived relative poverty of the regions.

It is therefore pertinent that analysis of the relative welfare of Tanzania is done to inform policy and the debate on the regional distribution of welfare. Such analysis is particularly important at this time when poverty reduction has taken the center stage of policy initiatives in the country.

The latest national-wide household budget survey data offers useful data for comparing poverty between the regions of Tanzania. To be sure, the National Bureau of Statistics of Tanzania has compiled a report based on this household data. The report ranks administrative regions by the level of poverty and other indicators of welfare¹. However, more needs to be done in ranking regions by poverty for three reasons:

- a) The National Bureau of Statistics uses per capita household expenditure and household expenditure adjusted for adult equivalence scales for calculating head count ratios for each region. However, in spite of the well-known weaknesses of the head count ratios, no effort is made to calculate poverty gap and distribution-sensitive poverty indices for each region. Moreover no effort is made to test sensitivity of the ranking of regions by poverty to changes in the adult equivalence scales used.
- b) The National Bureau of Statistics used three poverty lines (for Dar es Salaam, other urban centers and for the rural areas) for calculating poverty in each region. However, it is quite likely that each region may have a different poverty line. Furthermore, no sensitivity analysis is made to check whether the ranking of regions by the extent of poverty would remain intact even as poverty lines are altered within a reasonable range. Such a sensitivity analysis is important given the fact that a range of poverty lines may be admissible as reasonable for calculating poverty indices.
- c) Lastly, even though the National Bureau of Statistics reported some other indicators of welfare by regions, such as distance to important facilities, no attempt is made to construct an index of a collection of these welfare indicators

¹ The Research and Analysis Working Group in Tanzania released a report on *Poverty and Human Development Report* in 2002. The report ranks regions in terms of Human Development Index and other indicators (see United Republic of Tanzania, 2002). This report is a testimony to the importance attached by the government in ranking regions by the level of poverty.

for ranking regions. To be sure construction of such an index is a daunting task that may not necessarily attract consensus. Yet attempt to undertake a multidimensional comparison of poverty using stochastic dominance can go a long way in determining how decisively or otherwise, regions differ in the levels of welfare.

There is an obvious need to undertake empirical analysis that compares poverty across the regions of Tanzania to fill the gaps discussed above. This research project attempts to achieve such a feat. The analysis that is reported in this report responds to the first two gaps discussed above. The final report of this project will tackle all of the three gaps.

3 Methodology

3.1 The Coverage

The United Republic of Tanzania came into being following the union of two sovereign states of the then Republics of Zanzibar and Tanganyika in 1964. The United Republic of Tanzania is a semi-federal state where the union government discharges all the core functions of a state but Zanzibar retains semi-autonomy in running its economic and some political affairs. Zanzibar is subdivided into five administrative regions while Tanzania mainland was divided into 20 administrative regions up to the year 2003.² Zanzibar maintains its own data collection agency and had the last household budget survey data collected in 1991. The union government maintains a bureau of statistics that is in charge of all statistical data in the country. However, traditionally, the National Bureau of Statistics confines itself to Tanzania mainland with respect to household budget survey data. The latest household budget survey data by the National Bureau of Statistics was collected in the year 2000/2001. There is no counterpart household budget survey data for Zanzibar in 2000/2001. We will therefore confine our analysis to the Household Budget Survey Data of 2000/2001 that only covers Tanzania Mainland, which means that Zanzibar would not be included. Henceforth, Tanzania in this report will only mean Tanzania Mainland. The population of Tanzania Mainland constitutes more than the 95% of the population of the United Republic of Tanzania.

² Currently, Tanzania Mainland is divided into 21 regions. This followed the partition of Arusha into two regions of Arusha and Manyara in 2003.

The twenty regions covered in this report are; Dodoma, Arusha, Kilimanjaro, Tanga, Morogoro, Pwani, Dar es Salaam, Lindi, Mtwara and Ruvuma. Others are; Iringa, Mbeya, Singida, Tabora, Rukwa, Kigoma, Shinyanga, Kagera, Mwanza and Mara.

3.2 *The Data*

Data used in this report is from the 2000/01 Tanzania Household Budget Survey that was conducted by the National Bureau of Statistics. The survey draws from the National Master Sample, a generalized sample design set up by the National Bureau of Statistics to fit any type of survey a researcher intends to implement. Specifically the 2000/01 HBS was implemented to examine welfare trends over the 1990s and to offer a baseline assessment of future efforts. The National Bureau of Statistics had also conducted a national-wide household budget survey in 1990/1991 that also draws from the National Master Sample.

Though the two surveys differ in scope and coverage, they are both nationally representative samples and are comparable at the national level. Both surveys gathered the following information on individual and household characteristics:

- Household members' sex, age, marital status, education attainment and economic activities. The 2000/01 HBS added information on their health status.
- Household expenditure, consumption and income
- Household housing conditions
- Household ownership of consumer durables and assets
- Household access to economic and social facilities

The 2000/01 HBS looked also at the household food security.

In both surveys the information was gathered using the main household expenditure, consumption and income over a period of one month. In addition for the 2000/01 survey diaries were distributed to record individuals consumptions done outside homes.

The sampling of the 1991/92 HBS was done on Dar es Salaam, other urban areas and the rural areas. That means that no sampling was done at the level of administrative region. The sample size of the survey is 4,466 households. The 2000/01 household budget

survey, on the other hand, involved sampling for each of the 20 administrative regions and final sample was 22,584. Even though the two surveys are comparable in many regards, comparison at the regional level is not statistically advisable because of the fact that the 1991/92 data was not sampled at the regional level. Moreover, the 2000/01 data is likely to be more reliable not only because of the larger sample size, but also because of the use of diaries in the collection of data to avoid under-reporting.

3.3 Poverty Indices

The principal indicator of welfare, and therefore of poverty, is the household expenditure. Using this indicator Head Count Ratios, Poverty Gap and an FGT indicator that is sensitive to income distribution and transfers of income are used (see Foster, Greer and Thorbecke 1984). The rationale for using household expenditure as an indicator of welfare derives from the theory of consumer behavior (see for example Deaton and Muellbauer 1980 and Glewwe 1991). This approach, dubbed welfarism, has been a subject of sustained criticism (Sen 1984, 1985a, 1985b, 1987 and 1992). Still, welfarism remains the welfare indicator that is well derived from theory and summarizes welfare in a single index and thus making it easier to interpret. We will use this index in this report, but we intend to add a multidimensional analysis of poverty in the final stage of this study as a way of addressing some of the contentious aspects of welfarism approach. Another indicator used in this report is the proportion of household expenditure devoted to food. A poor household spends a higher proportion of its income on food than a rich household.

3.4 Adult Equivalent Scales

One of the challenging aspects of using household expenditure data as an indicator of welfare relates to the creation of mechanism for translating household welfare to individual welfare. Such a mechanism involves developing adult equivalence scales that translate children into adults and also compare women to men. The basis for such translation has mostly been the nutritional requirement of an individual by age and gender. Table 1 gives the adult equivalence scales that have been used by virtually every empirical study in Tanzania. These scales are based on the work of Latham (1965) and were probably first used for poverty analysis in Tanzania by Collier, Radwan and

Wangwe (1986). Based on Table 1 therefore a male child aged between 0 to 2 years is considered equivalent to a 0.4 of an adult.

Table 1: Adult Equivalence Scales: Index of Calorific Requirements by Age and Gender for East Africa

AGE GROUPS (YEARS)	MALE	FEMALE
0-2	0.4	0.4
3-4	0.48	0.48
5-6	0.56	0.56
7-8	0.64	0.64
9-10	0.76	0.76
11-12	0.8	0.88
13-14	1	1
15-18	1.2	1
19-59	1	0.88
Over 60	0.88	0.72

Source: Collier et al (1990).

Questions can be asked about why is it that a woman aged between 19 to 59 is considered to be only 0.88 equivalent to a male of similar age even though within this range of age a woman may be lactating or, as is the case in most rural areas, the woman may be working more to support the family than does a man. This suggests that it is worth a while to explore other possible adult equivalence scales. As pointed out by Lanjouw and Ravallion (1995) “the choice of welfare measure, including an equivalence scale, is ultimately based on value judgments about which difference of opinion must be expected (pp. 1416). One other possible set of adult equivalence scales is based on the estimation of the Food and Nutrition Commission of Zambia; the scales are presented in Table 2. Zambia is a country that borders Tanzania and one expect a lot of similarity between Zambians and Tanzanian, a similarity that is likely to extend in the nutritional needs.

Table 2: Adult Equivalent Scales Based on Nutrition Requirement by Age in Zambia

AGE	ADULT EQUIVALENT SCALE
Child 0 years	0
Child 1-3 years	0.36
Child 4-6 years	0.62
Child 7-9 years	0.78
Child 10-12 years	0.95
Adult (13 years and above)	1.00

Source: Central Statistical Office (1996) page 126.

In Table 2 male and female members of household are treated as equal in terms of their nutritional needs for each age group. Still, it may be questioned why a child of less than one year is considered to have zero needs in terms of nutrition. Surely the need of such a child is above zero and may be reflected in terms of increased nutrition need of the lactating mother.

We wish to see however whether changing the adult equivalence scales would alter the ranking of regions in terms of the levels of poverty. Several studies have tried to assess the sensitivity of poverty or inequality ranking to the adult equivalence scales. In one such study Burkhauser *et al* (1996) found that measured aggregate poverty and inequality between the USA and Germany consistently show higher poverty and inequality in the USA than in German irrespective of the scales used. However, more detailed analysis indicated that altering the scales upset the ranking of some vulnerable groups. In this report we look at the implications of altering adult equivalence scales from the one commonly used in Tanzania to those used in Zambia in the ranking of regions in terms of poverty.

3.5 Poverty Lines

In this study we develop poverty line for each of the 20 administrative regions of Tanzania.

We use the method developed by Greer and Thorbecke (1986a) consisting of relating food expenditure to calorie consumption. The approach has been applied to Kenya by Greer and Thorbecke (1986a and 1986b), in Ghana by Kyereme and Thorbecke (1987), and in Tanzania by Naho (2003).

Data required for calculating this food poverty line is calorie consumption C_j and food expenditure variable X_j for each household j in the given population sample of the study. The focus is on calorie consumption rather than on other nutrients, because a diet which is nutritionally adequate in terms of required calorie content supposedly contains adequately enough of other nutrients for a healthy lifestyle.

Given the two data sets, a functional relationship between expenditure of acquiring a certain number of calories to the quantity of calories consumed can be specified. The cost of calorie function in log linear form is expressed as;

$$\log X = a + bC \dots\dots\dots(1)$$

Where a and b are parameters to be estimated and X and C are as defined above. Using the estimate of equation (1) a poverty line Z is deduced. Such a poverty line reflects the cost of acquiring the minimum amount of calories, R , necessary to lead a healthy life for an individual. We substitute R for C in the estimated equation (1):

$$Z = e^{(\hat{a} + \hat{b}R)} \dots\dots\dots(2)$$

Where $\hat{}$ indicates that the parameter has been estimated. For the case of Tanzania, we selected R equal to 2,000 calories, a middle value of the three values used by Tinios *et al.* (1993) in a study assessing poverty in Tanzania. This is the approach used in generating poverty line for each of the 20 regions.

4 Empirical Results

The poverty indices have been calculated using three types of expenditure: per capita expenditure, adult equivalent expenditure based on Tanzania's adult equivalent scales, adult equivalent expenditure based on the Zambia's adult equivalent scales. The three different alternatives yield different results. While computation using per capita expenditure yields the highest regional indices, computation using adult equivalent expenditure based on the Tanzania's adult equivalent scale yields the lowest poverty indices.

4.1 Head Count Ratios

Generally, the head count ratios derived from the three types of expenditure seem to suggest that Tabora has the smallest proportion of people whose expenditure are below the food poverty line. As Table 3 below shows, regional head count ratios derived from adult equivalent expenditure based on the Tanzania's adult equivalent scales and from adult equivalent expenditure based on the Zambia's adult equivalent scales are smallest for Tabora. Dar es Salaam, which has the lowest head count ratio (25.3 percent), when the ratios are derived from per capita expenditure, has the third smallest head count ratio, when the ratios are derived from the adult equivalent scales based on the Tanzania's and Zambia's adult equivalent scales.

Table 3: Head Count Ratios

SN	Region	P ₀ :(Tanzania adult eq. scales)	P ₀ :(Zambia adult eq. scales)	P ₀ :M (based on per capita expd).	NBS
1	Dodoma	35.3	37.6	51.4	13
2	Arusha	32.5	34.8	45.4	25
3	Kilimanjaro	26.5	30.1	39.5	11
4	Tanga	17.6	22.4	30.4	11
5	Morogoro	23.3	26.8	34.5	14
6	Pwani	20.8	21.8	30.3	27
7	Dar es Salaam	17.5	20	25.3	7
8	Lindi	27.1	32.7	42.1	33
9	Mtwara	19.6	22.5	30.6	17
10	Ruvuma	30.2	36.6	43.6	27
11	Iringa	31.7	34.1	40.6	10
12	Mbeya	16.4	18.5	27.4	8
13	Singida	33.8	38.1	45.3	28
14	Tabora	12.1	15.4	26.9	9
15	Rukwa	22.1	26.4	39.7	12
16	Kigoma	24.7	26.2	40.6	21
17	Shinyanga	30	32.9	42.1	22
18	Kagera	24.6	27.9	35.2	18
19	Mwanza	22.5	25.4	34.8	30
20	Mara	26.7	27.7	31.2	36

NBS = National Bureau of Statistics results

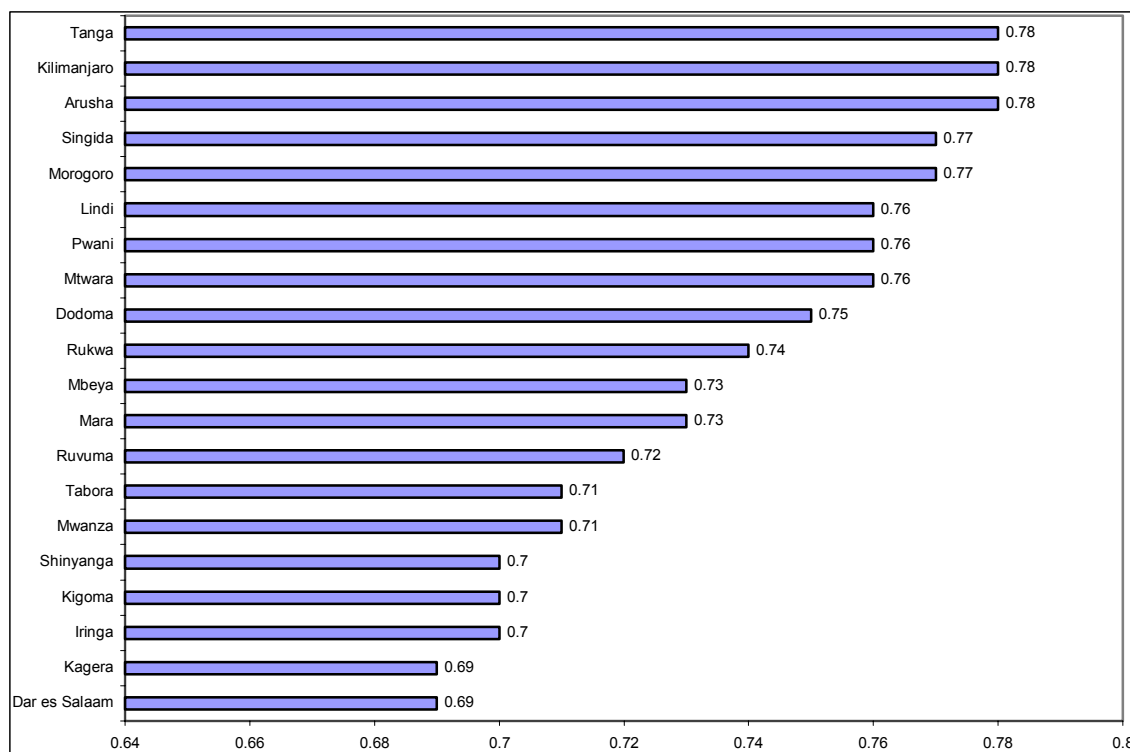
While Tabora and Dar es Salaam seem to have the smallest head count ratios, Dodoma seems to have the highest percentage of the population leaving below the food poverty line; 35.3 percent and 51.4 percent, according to the calculations using the expenditure adjusted for adult equivalent using Tanzania's adult equivalent scales and per capita expenditure, respectively. The head count ratio, derived from the expenditure adjusted

for adult equivalent using the Zambia's adult equivalent scale suggests that poverty incidence is highest in Singida. For detailed information on differences in ranking of regions based on poverty indices derived from per capita expenditure, and adult equivalent expenditures, see Appendix Table A2.

However, comparison of poverty incidence across regions should be done with care. A close examination of the pattern of head count ratios and shares of food in total expenditure shows that regions with low incidence of poverty are not necessarily those with smaller proportions of food expenditure. Similarly, regions with higher incidence of poverty are not necessarily those with larger proportions of food in total expenditure.

As Figure 1 shows, with the exception of Dar es Salaam, other regions with low incidence of poverty such as Tabora and Mbeya, have larger proportions of food in total expenditure than regions which have higher incidence of poverty, such as Iringa and Kigoma. NBS (2002) makes the same observation, and attributes the anomaly to measurement errors being 'more common in some regions than others'.

Figure 1: Proportion of Food in Total Expenditure



Comparison of head count ratios from this study and those from NBS (2002) raises two major issues. First, although both studies use the same data set, HBS 200, head count ratios from NBS (2002) are in most cases much lower compared to ratios from this study. Iringa provides an extreme case: the head count ratio from this study is three times that of NBS (2002). The discrepancy can be attributed to different approaches that the two studies have used to derive the poverty lines. Second, with the exception of Dar es Salaam and Tabora, which seem to have the lowest head count ratios in both studies, the two studies differ very substantially in ranking the regions.

4.2 Poverty Gap Ratio

Poverty gap indices derived from all the three types of expenditure suggest that Tabora has the smallest poverty gap index, and Tanga has the second smallest poverty gap index (See Table 4).

Table 4: Poverty Gap Indices

SN	Region	PI:(TZ adult eq. scales)	P1:(ZA adult eq. Scales)	P1:(per capita exp.)
1	Dodoma	9.9	11.1	17.7
2	Arusha	11.01	12.1	16.8
3	Kilimanjaro	6.5	8.1	11.3
4	Tanga	4.1	5	7.6
5	Morogoro	5.8	7.3	10.2
6	Pwani	4.8	5.9	9.2
7	Dar es Salaam	5.1	5.9	7.8
8	Lindi	7.6	8.9	13.2
9	Mtwara	5.2	6.2	9.1
10	Ruvuma	7.3	8.5	11.4
11	Iringa	7.1	8.8	12.46
12	Mbeya	5	5.5	8.5
13	Singida	11.1	12.4	16.0
14	Tabora	3	3.5	6.2
15	Rukwa	5	6	9.9
16	Kigoma	7.2	7.9	12.4
17	Shinyanga	7.7	8.9	13.4
18	Kagera	7.5	8.5	13.0
19	Mwanza	7.6	8.5	12.1
20	Mara	10.3	10.9	13.7

While Singida has the highest poverty gap index according to ratios derived from adult equivalent expenditures, Dodoma has the highest poverty gap ratio according to ratios derived from per capita expenditure.

4.3 Poverty Severity Index

Just like in the case of poverty gap ratios, poverty severity indices derived from all the three types of expenditure suggest that Tabora has the smallest poverty severity index, and Tanga has the second smallest poverty severity index (Table 5).

Table 5 : Poverty Severity Indices

SN	Region	P2 (TZ adult eq. scales)	P2: (adult eq. scales)	P2 (per capita exp.)
1	Dodoma	3.7	4.3	7.9
2	Arusha	5	5.7	8.3
3	Kilimanjaro	2.2	3	4.5
4	Tanga	1.5	1.9	3.0
5	Morogoro	2.1	2.7	4.1
6	Pwani	1.6	2.2	3.7
7	Dar es Salaam	2.3	2.7	3.5
8	Lindi	3.1	3.7	5.9
9	Mtwara	2.1	2.5	4.0
10	Ruvuma	2.9	3.4	4.8
11	Iringa	2.6	3.2	4.9
12	Mbeya	2.1	2.4	3.8
13	Singida	5	5.7	7.6
14	Tabora	1.1	1.3	2.5
15	Rukwa	1.7	2	3.8
16	Kigoma	3	3.3	5.5
17	Shinyanga	3	3.6	5.8
18	Kagera	3.5	3.9	6.6
19	Mwanza	3.3	3.8	5.7
20	Mara	5.1	5.6	7.5

Poverty severity indices derived from the three suggest that three different regions have the highest poverty severity index. While indices derived from expenditure adjusted for adult equivalent scales from Tanzania and Zambia suggest that Mara and Singida have the highest poverty severity index, respectively; indices derived from per capita expenditure suggest that Arusha has the highest poverty severity index.

Generally, it can be noted that Tabora, which is one of the two regions with the lowest proportion of population living below the poverty line, it is also a region with the lowest

poverty gap and poverty severity index. This suggests that probably the region has a more even distribution of income. This seems to be confirmed by the relatively low Gini coefficient for the region, which is 0.34, second only to Mbeya, with a Gini coefficient of 0.33 (See Table A1 in the Appendix).

4.4 *Stochastic Dominance Tests*

We also conducted stochastic dominance tests to ascertain the sensitivity of the poverty measures obtained to changes in poverty lines. The dominance tests were checked for robustness using a special t-statistics. The results of the stochastic dominance tests are reported in Table A3. We used Dodoma as the benchmark upon which dominance against each other region is tested. We found first order stochastic dominance for Dodoma and Singida and second order stochastic dominance for Kigoma and Dodoma. There is no other dominance at any order for the rest of pair-wise comparisons between Dodoma and other regions. This suggests that the ranking obtained using the poverty indices is not consistent; it changes at some levels as poverty line is altered. It is also interesting that the pair-wise comparison between Dodoma and Singida seems to give one ranking at the first order stochastic dominance, but the ranking is reversed at the second and third order.

5. **Conclusion**

There is still a way to go in refining the results and analysis presented in this report. There is also the task of undertaking multidimensional analysis of poverty ahead of us. In spite of the remaining task, this report brings out the following important issues:

- Poverty ranking across regions is sensitive to the adult equivalence scales adopted. There is a need to explore ways of resolving this conflict in ranking the regions and other categories. Perhaps a multidimensional approach would prove more useful here.
- Poverty indices used to rank regions by the levels of poverty did not stand the stochastic dominance tests for most of the pair-wise comparisons. This casts doubt on the usefulness of the single poverty indices for poverty ranking. We need to discuss in greater detail the crossing points detected in the stochastic dominance to see whether they shed more light on the severity of poverty in one distribution as compared to the other.

- The most challenging and interesting task that remains is to undertake multidimensional analysis of poverty along the lines discussed in Bidi (2003), Duclos, Sahn and Younger (1999) and others.

APPENDIX

Table A1 : Income Inequality: Gini Coefficients

SN	Region	Gini Coefficient	Sn	Region	Gini Coefficient
1	Dodoma	0.359	11	Iringa	0.48
2	Arusha	0.37	12	Mbeya	0.33
3	Kilimanjaro	0.35	13	Singida	0.54
4	Tanga	0.36	14	Tabora	0.34
5	Morogoro	0.40	15	Rukwa	0.38
6	Pwani	0.42	16	Kigoma	0.41
7	Dar es Salaam	0.47	17	Shinyanga	0.42
8	Lindi	0.42	18	Kagera	0.36
9	Mtwara	0.38	19	Mwanza	0.48
10	Ruvuma	0.43	20	Mara	0.43

Table A2 : Ranking of Regions Based on Poverty Indices Derived From per capita Expenditure, and Adult Equivalent Expenditures

	P0:M	P1:M	P2:M	P0:TZ	P1:TZ	P2:TZ	P0:ZA	P1:ZA	P2:ZA
1	Dar es Salaam	Tabora	Tabora	Tabora	Tabora	Tabora	Tabora	Tabora	Tabora
2	Tabora	Tanga	Tanga	Mbeya	Tanga	Tanga	Mbeya	Tanga	Tanga
3	Mbeya	Dar es Salaam	Dar es Salaam	Dar es Salaam	Pwani	Pwani	Dar es Salaam	Mbeya	Rukwa
4	Pwani	Mbeya	Pwani	Tanga	Mbeya	Rukwa	Pwani	Dar es Salaam	Pwani
5	Tanga	Mtwara	Rukwa	Mtwara	Rukwa	Mbeya	Tanga	Pwani	Mbeya
6	Mtwara	Pwani	Mbeya	Pwani	Dar es Salaam	Mtwara	Mtwara	Rukwa	Mtwara
7	Mara	Rukwa	Mtwara	Rukwa	Mtwara	Morogoro	Mwanza	Mtwara	Dar es Salaam
8	Morogoro	Morogoro	Morogoro	Mwanza	Morogoro	Kilimanjaro	Kigoma	Morogoro	Morogoro
9	Mwanza	Kilimanjaro	Kilimanjaro	Morogoro	Kilimanjaro	Dar es Salaam	Rukwa	Kigoma	Kilimanjaro
10	Kagera	Ruvuma	Ruvuma	Kagera	Iringa	Iringa	Morogoro	Kilimanjaro	Iringa
11	Kilimanjaro	Mwanza	Iringa	Kigoma	Kigoma	Ruvuma	Mara	Mwanza	Kigoma
12	Rukwa	Iringa	Kigoma	Kilimanjaro	Ruvuma	Kigoma	Kagera	Kagera	Ruvuma
13	Iringa	Kigoma	Mwanza	Mara	Kagera	Shinyanga	Kilimanjaro	Ruvuma	Shinyanga
14	Kigoma	Kagera	Shinyanga	Lindi	Mwanza	Lindi	Lindi	Iringa	Lindi
15	Lindi	Lindi	Lindi	Shinyanga	Lindi	Mwanza	Shinyanga	Lindi	Mwanza
16	Shinyanga	Shinyanga	Kagera	Ruvuma	Shinyanga	Kagera	Iringa	Shinyanga	Kagera
17	Ruvuma	Mara	Mara	Iringa	Dodoma	Dodoma	Arusha	Mara	Dodoma
18	Singida	Singida	Singida	Arusha	Mara	Arusha	Ruvuma	Dodoma	Mara
19	Arusha	Arusha	Dodoma	Singida	Arusha	Singida	Dodoma	Arusha	Arusha
20	Dodoma	Dodoma	Arusha	Dodoma	Singida	Mara	Singida	Singida	Singida

Table A3: Stochastic Dominance Tests

Dodoma against	Order 1	Order 2	Order 3
Arusha	No dominance	No dominance	No dominance
Kilimanjaro	No dominance	No dominance	No dominance
Tanga	No dominance	No dominance	No dominance
Morogoro	No dominance	No dominance	No dominance
Pwani	No dominance	No dominance	No dominance
Dar es Salaam	No dominance	No dominance	No dominance
Lindi	No dominance	No dominance	No dominance
Mtwara	No dominance	No dominance	No dominance
Ruvuma	No dominance	No dominance	No dominance
Iringa	No dominance	No dominance	No dominance
Mbeya	No dominance	No dominance	No dominance
Singida	<i>Dominance</i>	<i>Dominance</i>	<i>Dominance</i>
Tabora	No dominance	No dominance	No dominance
Rukwa	No dominance	No dominance	No dominance
Kigoma	No dominance	<i>Dominance</i>	<i>Dominance</i>
Shinyanga	No dominance	No dominance	No dominance
Kagera	No dominance	No dominance	No dominance
Mwanza	No dominance	No dominance	No dominance
Mara	No dominance	No dominance	No dominance

REFERENCE

- Bibi Sami (2003) "Measuring Poverty in a Multidimensional Perspective: A Review of Literature" Faculté des Sciences Économiques et de Gestion de Tunis, CIRPÉE, Université Laval, Québec, Canada.
- Burkhauser R. V, Smeeding T.M and Joachim Merz (1996) "Relative Inequality and Poverty in Germany and the United States Using Alternative Equivalence Scales", *The Review of Income and Wealth*., Series No. 42, No. 4, December.
- Central Statistical Office (1996) *Living Conditions Monitoring Survey Report*, Republic of Zambia.
- Collier Paul, S. Radwan and S. Wangwe (1986) *Labour and Poverty in Rural Tanzania: Ujamaa and Rural Development in the United Republic of Tanzania*, Clarendon Press, Oxford
- Deaton Angus (1997) *The Analysis of Household Surveys: A Microeconomic Approach*, Johns Hopkins University Press
- Deaton, Angus and John Muellbauer (1980) *Economics of Consumer Behavior* Cambridge University Press.
- Duclos, Jean-Yves, David Sahn and Steven Younger (1999) "Making Multidimensional Poverty Ordering" University of Laval, Canada
- Foster, J., Joel, Greer and Eric, Thorbecke, (1984), "A Class of Decomposable Poverty Measures" *Econometrica*, **52**, 761-766.
- Glewwe, Paul, (1991), "Investigating the Determinants of Household Welfare in Côte d'Ivoire", *Journal of Development Economics*, **35**, 307-337.
- Greer, J and Erik Thorbecke (1986a). "A Methodology for Measuring Food Poverty Applied to Kenya". *Journal of Development Economics* 24, 59-74.
- (1986b). "Food Poverty Profile Applied to Kenyan Smallholders". *Economic Development and Cultural Change*, Vol. 35, 115-141
- Kyereme, S.S. and Erik Thorbecke (1987). "Food Poverty Profile and Decomposition Applied to Ghana". *World Development*, Vol. 15, No. 9, 1189-1199.
- Lanjouw P. and M. Ravallion (1995) "Poverty and Household Size" *Economic Journal* 105, 1415-34.

- Lambert Peter (2001) *The Distribution and Redistribution of Income* Manchester University Press
- Latham M.C (1965) *Human Nutrition in Tropical Africa.*, FAO, Rome.
- Naho, A.M.(2003). “Food Poverty in Tanzania: A Profile for the Year 2000/01”. Progress Report Presented at the 8th REPOA Research Workshop, Dar es Salaam, 2003.
- Ndulu B.J (1982) “Unequal Regional Distribution of Economic Opportunities in Tanzania and Affirmative Policy Efforts Towards Equalization”. Economic Research Bureau Paper No. 82.8., University of Dar es Salaam.
- Sen, A.K (1976) “Poverty: An Ordinal Approach to Measurement,” *Econometrica*, 46, 437-46.
- Sen, Amartya (1992), “Capability and Wellbeing” in Nussbaum, Martha C. and Amartya Sen, (ed), *The Quality of Life*, Clarendon Press, Oxford.
- Sen, Amartya, (1984), “The Living Standard”, *Oxford Economic Papers*, 36,74-90.
- Sen, Amartya, (1985a), “Commodities and Capabilities”, Professor Dr Hennipman Lectures in Economics, Volume 7, North Holland, Amsterdam.
- Sen, Amartya (1985b), “The Standard of Living”, The Tanner Lectures, Clare Hall, Cambridge.
- Sen, Amartya (1987), *The Standard of Living: The Tanner Lectures*, Clare Hall, Cambridge.
- Tinios, P., A. Sarris, H. Amani and W. Maro (1993). *Households, Consumption, and Poverty in Tanzania: Results from the 1991 National Cornell - ERB Survey*.
- United Republic of Tanzania (2002) *Household Budget Survey 2000/01: Final Report* Dar es Salaam: National Bureau of Statistics
- United Republic of Tanzania (2002) *Poverty and Human Development Report 2002*, Mkuki na Nyota Publishers.