

Measurement and Decomposition of Consumption Inequality in Nepal

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Abstract

This study aims at computing, comparing and decomposing the different inequality indices by rural and urban areas, sex of household head and ecological belt, so that policy maker can make the policy to reduce the inequality in Nepal. This study is based on the raw data taken from the 3rd Nepal Living Standard Survey-2011 conducted by the Central Bureau of Statistics (CBS). The study has used real consumption as the main variable to measure the inequality. In most of the cases five measures of inequality; Coefficient of variation (CV), Quantile Ratio Index, Gini Index, Generalised Entropy Index with parameter 0 and 1 were computed. The Gini index, Theil's L and Theil's T indices are 0.328, 0.175 and 0.194, respectively. The study has found no significant difference in inequality between male- and female-headed households; and the inequality in urban areas is higher than that in the rural areas. By ecological belts, the inequality is highest in hills and lowest in mountains. The country should place focus on urban areas and hilly belt to reduce inequality.

1. Introduction and Study Objectives

One major objective of development policy of any country is reducing poverty incidence and inequality. In developing countries, prevalence of high poverty and inequality in distribution of income, consumption, land, assets, education, health, etc., have been major focusing points to make the policy, development plan and foreign support. Various literatures show that there exists relationship between economic growth, poverty and inequality.

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Nepal is a least developed country and the per capita income expenditure is still low. According to World Bank, the per capita income of Nepal in 2018 was \$1033.19. Likewise, the probability of survival to age 5 is 0.97 and human capital index is 0.49. According to Nepal Household Budget Survey (NRB) the average household income and consumption per month are Rs. 30,121 and Rs. 25,938. According to Nepal Living Standard Survey (2011), nominal average household income in 1995/96, 2003/04 and 2010/11 are Rs. 43,732, 80,111, and 202,374 respectively. Although income and consumption in the country are continuously increasing in comparison to the past, they are still very low while comparing with other countries.

According to the Annual Household Survey (CBS, 2015) the average annual household consumption of Nepal is Rs. 322,730 and more than half (53.8%) of it spent on food. The annual consumption of urban and rural households are Rs. 43,1337 and 248,893 respectively. The urban households consume about 1.7 times higher than rural households. In terms of per capita consumption, an individual on average consumes Rs. 70,680 in a year and this figure in urban and rural areas are Rs. 1,01,659 and Rs. 52,207 respectively. It indicates that the consumption in urban areas is about two-fold more than that of rural areas. The consumption disparity between urban and rural areas lies not only in terms of monetary value but also on the pattern of habit and selection item. According to Household Budget Survey (2015), the household consumption in rural and urban area are 22,928 and 28,474 respectively. In mountains, hills and Terai, these figures are 19,858, 24,890 and 19,858, respectively.

Nowadays at least one member, especially male adults of various households, is working abroad or away from the birthplace as a labourer. Hence, the percentage of female headed household has been increasing. According to National Population and Housing Census (2011) the female headed households in the country has increased by about 11-point per cent from 14.87 per cent in 2001 to 25.73 per cent in 2011. This pattern also affects the consumption habit of household. Because at least one adult member of family is working in outside and getting remittance frequently, the expenditure on education of children, health, clothing items as well as food consumption is increasing. Specially, this kind of consumption pattern can be seen in poor and middle-class households across the nation. The remittance has been increasing the wellbeing of various households both in rural and urban areas.

Why Inequality : The issue of measuring inequality has attracted interest of policy makers and researchers from across the world. Generally, it is measured to compare the social welfare (household's wealth, income, consumption, etc.) from the past year, one country to another, one social group to another, one area to another, etc.

Measures of inequality are used by economists to answer a wide range of questions. Is the distribution of income more equal than it was in the past? Are underdeveloped

countries characterised by greater inequality than advanced countries? Do taxes lead to greater equality in the distribution of income or wealth? (Atkinson, 1970). This argument of Atkinson indicates the essence of measuring inequality. Likewise, Foster, Seth, Lokshin and Sajaia (2013) focused on the use of inequality, as inequality measures are used to assess the extent to which incomes are spread apart in a country or region and the way this level changes over time and space. Of particular interest is the interplay between a population's average prosperity, as represented by the mean income, and the income distribution, as represented by an inequality measure; It is because the government and policy makers require the measure of inequality not only to measure the current situation but also to assess and compare the inequality by time, social groups, subgroups, etc. They can use it to identify which time or social group or area/region has the highest inequality and how much it contributes to overall inequality. Generally, income and consumption are not directly measured; there might be several components of the income and consumption. It is also useful to decompose the total inequality into its components so that policy makers can develop the idea to determine and focus on major components which are significant to reduce the inequality.

Why consumption inequality: According to Folbre (2013), income is a measure of money that comes into a household and it is measured as a flow of resources into households, the sum of earnings, interest profits and transfers. Whereas consumption is typically measured as a flow of resources out of households-expenditures on capital goods such as housing, consumer durables and direct consumption goods such as clothing, meals etc. Ferreira and Ravallion (2013) argue that income is not the same thing as consumption. Although over the long run consumption should come quite close to permanent income, there can be considerable deviations in the short run, as households either save or dissave so that consumption is thus generally considered a better measure of current welfare than income.

In many developing countries, it is frequently argued that consumption is better suited than income as an indicator of living standards; one reason is that consumption is believed to vary more smoothly than income, both within a year and across the life cycle. Income is notoriously subject to seasonal variability, particularly in developing countries, whereas consumptions tend to be less variable. Likewise, it is also held to be more readily observed, recalled and measured than income and less suffered than underreporting problems (Duclos & Araar, 2006).

In the context of Nepal, the household survey is more readily observed, recalled, and measured and also less suffered than underreporting problems. The defining sources of income here are complex and not easy to gather correctly. In Nepal, various households are involved in agriculture and wage labourers and their income is not regular so that in household surveys it is very difficult to capture the correct income. The consumptions and its sources are clearly defined and

most of the households consume cereal products most frequently and the food expenditure of each household is almost smooth throughout the year.

Targeting of inequality remains an important issue in many countries. Identification of inequality indices is not only the major concern of the policy makers. It is also important to identify the distribution and decomposition of overall inequality into different subgroups.

It is obvious that consumption inequality is also one major concern of the government and policy makers. It varies from country to country, time to time and place to place. The measure of inequality is essential to make different policies such as reducing inequality, poverty and making growth and redistribution policy. Todaro and Smith (2016) focus that besides the inequality among the poor is a critical factor in understanding the depth of the poverty and the impact of the market and policy changes on the poor, it should be concerned with inequality among those above the poverty line also. There are three major reasons for this: first; extreme inequality above the poverty line leads to economic inefficiency, second; extreme income disparities above the poverty line undermine social stability and solidarity and third one; extreme inequality is generally viewed as unfair (Todaro & Smith, 2016).

In the context of Nepal, Rajbhandari (2005) has found that the income inequality in each subgroup is higher than the corresponding consumption inequality. He has computed different income and consumption inequality by using the data set of Nepal living standard survey, 1996. According to him the Gini index, Theil's L and Theil's T indices for consumption in rural areas are 0.35, 0.22 and 0.22 respectively. These indices in urban areas are 0.42, 0.33 and 0.33, respectively, and each inequality measure in urban areas are higher than the rural area.

According to World Bank (n.d.) ,the Gini Index in Nepal in 2010 was 0.328, in India it was 0.378 in 2011, Likewise, in Bangladesh in 2016, in Bhutan in 2017, in China in 2016, in Pakistan in 2015, in Maldives in 2016 and in Sri Lanka in 2016 this index was 0.324, 0.374, 0.385, 0.335, 0.313 and 0.398 respectively.

Tiwari and Uematsu (2016) have mentioned in World Bank's blog on end poverty in south Asia that, the estimate of the consumption Gini for Nepal was 0.328 in 2010-11 and it appears to have remained unchanged between 1995-96 and 2010-11 both at the national level and in rural areas. They also argue that relative to the level of economic development, inequality is fairly low in Nepal and it is at the very early stages of development and that the engine of growth has not started cranking up to the extent where it generates a widening consumption distribution.

During this present study, very few literature-works on the consumption inequality as well as its decomposition by subgroups were found; and the one in the Nepalese context is almost non-existent. Hence, there is a big research gap in this area.

Based on the above discussion and literature survey, the present study has set its main objective to identify current status of inequality in Nepal, its comparison and decomposition by different subgroups: such as sex of the household head, rural urban area and ecological belt.

2. Research methods

This study was based on the data generated from the raw data of the 3rd Nepal Living Standard Survey-2011 of the Central Bureau of Statistics, Nepal. The data were collected from 5,988 sampled households from 12 analytical domains. According to the NLSS report (2011), the consumption aggregation was constructed by adding together various goods and services consumed by each household during a period of 12 months.

For this study, mainly real household consumption was used. To make the real household consumption, nominal household consumption was divided by the price index of 12 analytical domains. Then the per capita consumption of each household was computed by dividing real household consumption by the corresponding household size. In the same way, the real per capita food and non-food consumption was computed.

In order to compare, decomposition and hypothesis testing on three grouping variables; sex of household head, rural urban area and ecological belt were used. The sex of household head consists of two subgroups; male and female, the rural urban area consists of two subgroups; rural and urban and the ecological belt consists of three subgroups; mountain, hill and Terai. In order to decompose the consumption into its sources, food and non-food consumptions were used.

To present the inequality in the graph, Lorenz curve was used. To measure the inequality, mainly five measures of inequality named as coefficient of variation, quantile ratio index, Gini index, Generalised Entropy index with parameter 0 and 1 (Theil's L and Theil's T) were used. Each index was compared by sex of household head, rural and urban area and ecological belt. To test the significant difference of each index between the subgroups t test was used.

To decompose the inequality into its subgroups mainly two indices; Generalised index with parameter 0 and 1 (GE(0) or Theil's L and GE(1) or Theil T) were used because they satisfy all the properties of good inequality measure and they can be decomposable into subgroups easily. To decompose the Generalised Entropy indices Shapley approach was used. In order to analyse the data. The STATA software version 16.0 with DASP was used.

Inequality Measures and Analysis: The main four properties of a good measure of inequality are: Mean Independence, Population Size independence, Symmetry, Pigou Dalton Transfer Sensitivity.

Besides the above properties, it is also desirable to have

1. Decomposability
2. Statistical Testability

All measures of inequalities do not satisfy the above characteristics. Some inequality measures which were used in this study are:

Lorenz Curve: The Lorenz curve has been for several decades the most popular graphical tool for visualising and comparing income inequality. It is defined as

$$L(p) = \frac{\int_0^p Q(q) dq}{\int_0^1 Q(q) dq} = \frac{1}{\mu} \int_0^p Q(q) dq$$

Where, the numerator is the sum of incomes of the bottom p proportion of the population. The denominator is the sum of income of all populations.

Coefficient of Variation: In statistics, standard deviation and variance measure the variability of the data from the mean. Statistically, the standard deviation also measures the inequality but it is not scale invariance and also dependent on the measurement unit.

As inequality analysis requires comparisons, it would be more useful to make the variance free from the measurement unit and at that time coefficient of variation is used and it is defined as:

Coefficient of variation (CV) = standard deviation/mean

When income is the same for all individuals/households, CV=0 (the numerator of the formula is zero because the variance is zero). It is scale invariant and satisfies the principle of transfer but it is not translation invariant. The most important flaw of CV is that it is not bounded in the upper side, i.e., it tends to become larger especially when mean income is low.

Quantile Ratio Index: A quantile ratio compares incomes of higher (Top 10 percent) and lower quantile (Bottom 10percent). Inequality across quantile groups provides a useful way to understand the dispersion across the distribution. One demerit is that this index does not consider the entire distribution so that this measure is a crude way of presenting inequality. It is defined as:

Quantile Ratio Index (QRI) = D1/D9

Gini Coefficient/ Index: The Gini coefficient, developed by Italian statistician Corrado Gini in 1912, is the most commonly used inequality measure. It is the ratio of area enclosed by the Lorenz curve and the perfect equality line (45°) to the total area below that line.

$$\text{Gini Index (GI)} = 1 - 2 \int_0^1 L(p) dp$$

The value of the Gini Index varies from 0 (perfect equality) to 1 (perfect inequality).

The Gini index satisfies all invariance properties: symmetry, population invariance, scale invariance, and normalisation. In addition, it satisfies the transfer principle i.e. Gini index satisfies four major characteristics but it is not easily decomposable or additive across the groups.

Entropy Indices (Theil's L and Theil's T): The final inequality measures that this study considered are in the class of generalised entropy measures and two well-known Theil measures are also in this class.

This index is highly used because by putting the different values of parameter θ , one can get the equivalent value to the family of Atkinson indices (limiting θ no greater than 1). Putting $\theta=0$, $I(\theta)$ gives the Mean Logarithmic Deviation (Theil's L) and putting $\theta=1$, it gives the well-known Theil index of inequality (Theil's T). Another merit of entropy index is that it can be easily decomposable into the subgroups (Duclos & Araar, 2006, Haughton & Khandker, 2010).

All measures in the generalised entropy class satisfy the invariance properties, symmetry, normalisation, population invariance, and scale invariance. Furthermore, they all satisfy the transfer principle and subgroup consistency.

For the practical purpose the decomposable inequality indices can be expressed as Generalised indices denoted by $I(\theta)$ and it is defined as

$$I(\theta) = \begin{cases} \frac{1}{\theta(\theta-1)} \left(\int_0^1 \left(\frac{Q(p)}{\mu} \right)^\theta dp - 1 \right) & \text{if } \theta \neq 0, 1 \\ \int_0^1 \ln \left(\frac{\mu}{Q(p)} \right) dp & \text{if } \theta = 0 \\ \int_0^1 \frac{Q(p)}{\mu} \ln \left(\frac{Q(p)}{\mu} \right) dt & \text{if } \theta = 1 \end{cases}$$

For the lower value of θ , Generalised Entropy (GE) is more sensitive to change in the lower tail of the distribution and for the higher value of θ , Generalised Entropy (GE) is more sensitive to change that affects the upper tail.

The most common values of θ are 0 and 1. $GE(0)$ and $GE(1)$ are also termed as Theil's L and Theil's T indices respectively.

The above index $I(\theta)$ can be decomposed into K mutually exclusive subgroups as

$$I(\theta) = \sum_{k=1}^K \phi(k) \left(\frac{\mu(k)}{\mu} \right)^\theta I(k; \theta) + \bar{I}(\theta)$$

Where, first component is within group inequality and second component is between group inequality,

$I(k; \theta)$ is inequality within subgroup k (Duclos & Araar, 2006).

Among them most widely used are Theil's indices and both belong to Generalised Entropy (GE) inequality measures.

3. Data Analysis and Discussion

For the data analysis, real per capita consumption was taken to measure the overall inequality and its comparison. The density curve (Figure 1) of consumption shows that the curve is right skewed that is most of the consumption concentrated towards the left side (around 20000).

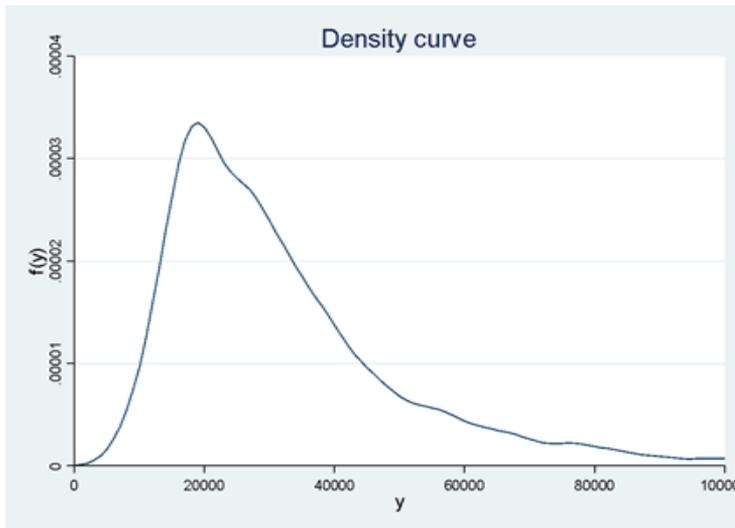


Figure 1. *Density Function of Consumption*

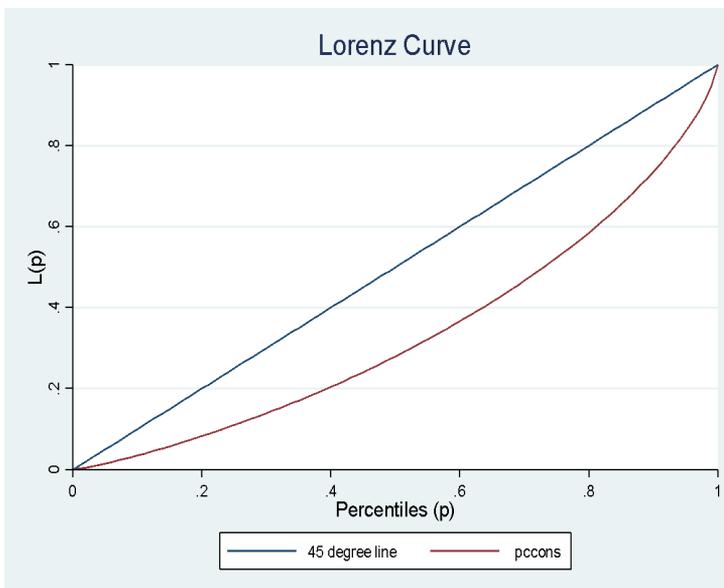


Figure 2. *Lorenz Curve of Consumption*

The Lorenz curve (Figure 2) for the overall food consumption indicates some inequality appears in per capita food consumption.

Table 1
Inequality Index

Inequality Index	Estimate	STE	LB	UB
CV	0.7408	0.0212	0.6991	0.7825
Quantile Ratio Index	0.2451	0.0046	0.2361	0.2542
Gini Index	0.3284	0.0038	0.3209	0.3360
Theil L	0.1754	0.0041	0.1672	0.1836
Theil T	0.1939	0.0058	0.1823	0.2054

Note. From the researcher's calculation by using NLSS data, 2011

The coefficient of variation, quantile ratio index, Gini index, Theil's L and Theil's T for overall consumption are 0.741, 0.245, 0.328, 0.175 and 0.194 respectively. All indices show that there is some inequality in consumption in Nepal.

3.1 Comparison of Consumption Inequality by Sex of Household Head

The density curve (Figure 2) shows that both male and female headed households concentrate towards the left side. However, the consumption of male headed households is more concentrated towards the left side since it is more peaked than the female headed households that is male headed consumption is less with comparison of female headed households.

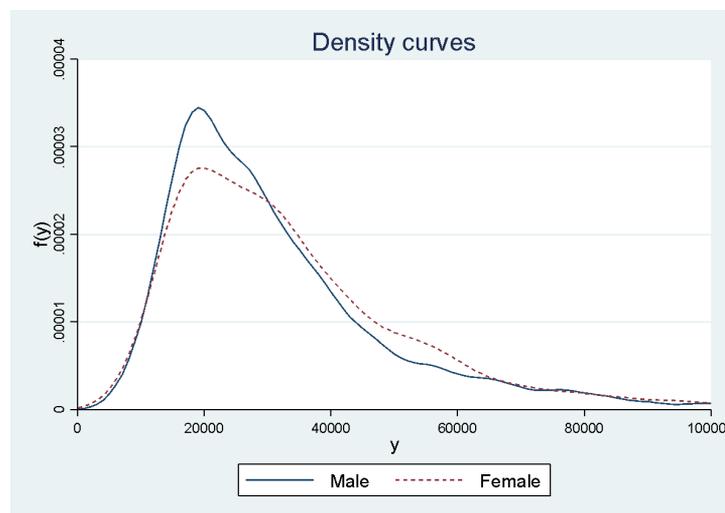


Figure 3. Density Curve of Consumption by Male and Female Headed Households

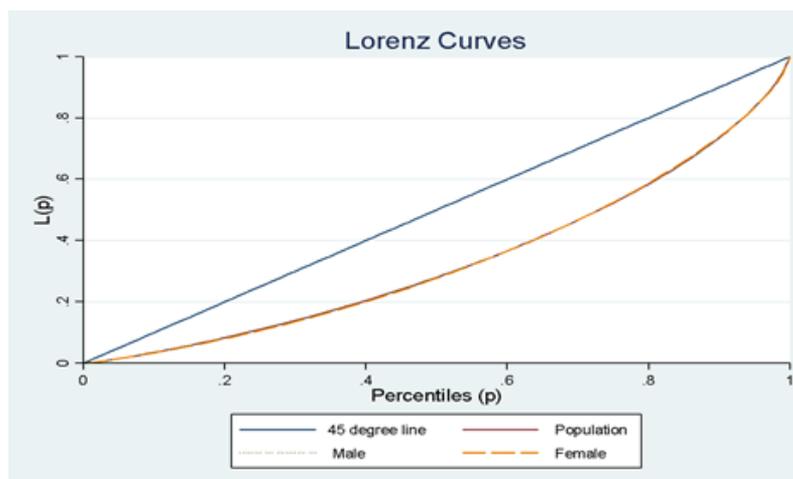


Figure 4. *Lorenz curve of consumption by sex of household head*

The Lorenz curve indicates the inequality curves of both male and female headed households are almost the same.

Table 2

Comparison of Consumption Inequality Index by Sex of Household Head

Sex of household head	CV	Quantile Ratio Index	Gini Index	Theil's L	Theil's T
Male	0.7317	0.2459	0.3273	0.1738	0.1918
Female	0.7663	0.2439	0.3306	0.1796	0.1993
Overall	0.7408	0.2451	0.3284	0.1754	0.1939
Difference	0.0345	-0.0020	0.0033	.0058	.0074
t-value	.718109	-.008819	0.383117	.59986	.53217
(p-value)	(0.4727)	(0.9930)	(0.70160)	(0.5486)	(0.5946)

Note. From the researcher's calculation by using NLSS data, 2011

*** indicates significant at 1% and * indicates significant at 5%*

Table 2 shows that the CV, Gini index, both Theil's L and T indices of female headed households are slightly higher than the male headed households but the quantile ratio index is almost the same between male and female headed households. The p-value of all indices indicates there is no significant difference in consumption inequality between male and female headed households.

Table 3 shows that the population shares of male and female headed households are 79.02 per cent and 20.9 per cent respectively. The absolute contribution (product of entropy index and population share) for male and female headed households are 0.1373 and 0.037687 respectively to within Theil's L index. The relative contribution (78.38%) of male headed households is slightly less than

the population share but for female headed households, the relative contribution is slightly higher than the population share. The relative contribution within and between the two subgroups are 99.77 per cent and 0.2 per cent respectively.

Table 3
Decomposition of Entropy Indices by Sex of Household Head

<i>Sex of household head</i>	<i>Population Share</i>	<i>Theil's L</i>	<i>Absolute Contribution</i>	<i>Relative Contribution</i>	<i>Theil's T</i>	<i>Absolute Contribution</i>	<i>Relative Contribution</i>
Male	0.7902	0.1738	0.1374	0.7830	0.1919	0.1494	0.7704
Female	0.2098	0.1796	0.0377	0.2148	0.1993	0.0441	0.2275
Within	-----	-----	0.1750	0.9978	-----	0.1935	0.9979
Between	-----	-----	0.0004	0.0022	-----	0.0003	0.0020
Population	1.0000	0.1754	0.175449	1.0000	0.1939	0.1939	1.0000

Note. From the researcher's calculation by using NLSS data, 2011

Likewise, for Theil's T, the absolute contribution of male and female headed households is 0.1494 and 0.0441, respectively. The relative contribution of male and female headed households to the Theil's T are 77.04 per cent and 22.75 per cent respectively so that there is altogether 99.79 per cent of variation within male and female headed households. The relative contribution of male headed households is lower than its population share but this contribution for female headed households is higher than the corresponding population share.

3.2 Comparison of Consumption Inequality by Rural Urban Area

The density curve depicts the significant difference in distribution of consumption between rural and urban areas. Although distribution of consumption in both areas is right skewed, the distribution of rural area is more skewed towards the right side than the urban area and which indicates the households located in rural areas consume less with comparison of urban areas.

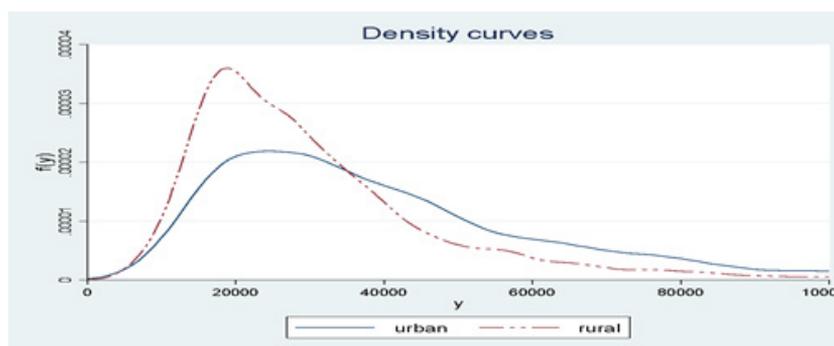


Figure 5. Density Curve of Consumption by Rural/Urban Area

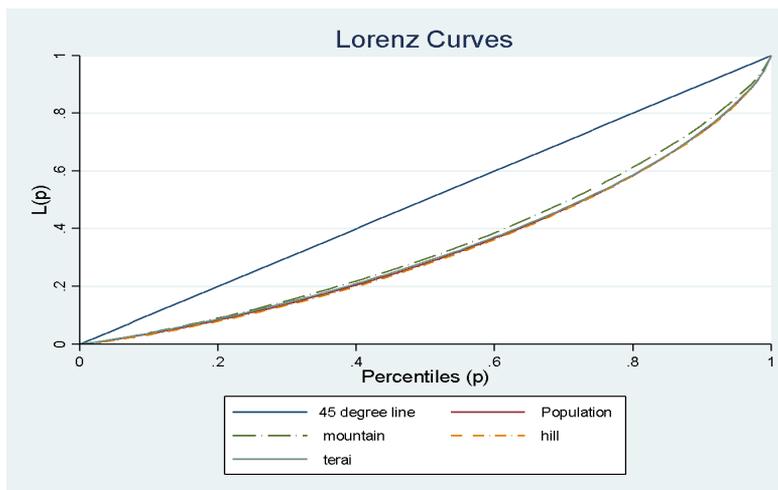


Figure 6. Lorenz Curve of Consumption by Rural and Urban Area

The above Lorenz curve shows that the inequality curve of rural lies inner side of population and closer to the 45° line and the inequality curve of urban lies outer side of the population curve hence the consumption inequality in urban is higher than the rural area.

Table 4

Comparison of Inequality Index by Rural/Urban Area

Rural Urban Area	CV	Quantile Ratio	Gini Coefficient	Theil's L	Theil's T
Urban	0.7724	0.2124	0.3529	0.2036	0.1993
Rural	0.6929	0.2618	0.3110	0.1574	0.1725
Overall	0.7408	0.2451	0.3284	0.1754	0.1939
Difference	-0.0795	0.0494	-0.0418	-0.0462	-0.0466
t-value	-2.0040*	2.1866*	-5.0962**	-5.024**	-3.7963**
(p-value)	(0.0451)	(0.0288)	(0.0000)	(0.0000)	(0.0001)

Note. From the researcher's calculation by using NLSS data, 2011

** indicates significant at 1% and * indicates significant at 5%

From table 4, it can be seen that the consumption inequality in urban is higher than the rural since major three measures Gini index, Theil's L, Theil's T indices are higher in urban than rural and the difference in consumption inequality between urban and rural are also significant since p-value of all measures are less than 5 per cent level of significance. Likewise, having higher coefficient of variation in urban is higher than rural indicates that variability in consumption is less uniform in urban. However, the quantile ratio index of rural is higher than urban, the difference is also significant.

Table 5
Decomposition of Theil's L and Theil's T Indices by Rural/Urban Area

Rural/Urban Area	Population Share	Theil's L	Absolute Contribution	Relative Contribution	Theil's T	Absolute Contribution	Relative Contribution
Urban	0.1902	0.2037	0.0387	0.2208	0.2191	0.0541	0.2793
Rural	0.8098	0.1574	0.1274	0.7265	0.1725	0.1299	0.6698
Within	-----	-----	0.1662	0.9473	-----	0.1840	0.9492
Between	-----	-----	0.0092	0.0527	-----	0.0098	0.0507
Population	1.0000	0.1754	0.1754	1.0000	0.1939	0.1939	1.0000

Note. From the researcher's calculation by using NLSS data, 2011

Table 5 is the decomposition of entropy indices by rural and urban areas. The absolute contributions of urban and rural are 0.038734 and 0.127467 respectively to Theil's L. In relative terms the inequality within urban is 0.220769 and within rural is 0.726521. Altogether the within inequality in relative term becomes 0.9472 and the between inequality in relative term is only 0.052771.

To the Theil's T inequality index, the urban area alone contributes 0.0541 in absolute terms and 27.93 per cent in relative terms. The relative contribution is higher than the percentage share so that it has more contribution to the consumption inequality. Likewise, for Theil's T, the absolute and relative contributions of rural areas are 0.1299 and 0.6698 respectively. Having less relative contribution than its population share indicates that rural areas have less impact on the inequality index.

3.3 Comparison of Consumption Inequality by Ecological Regions

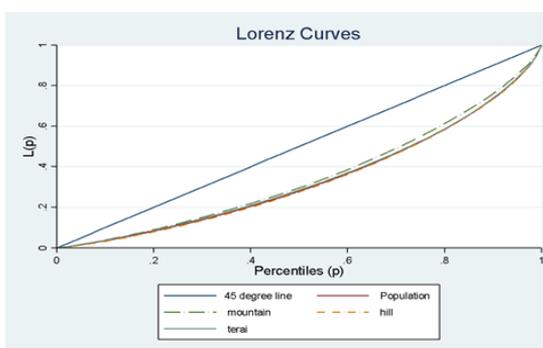
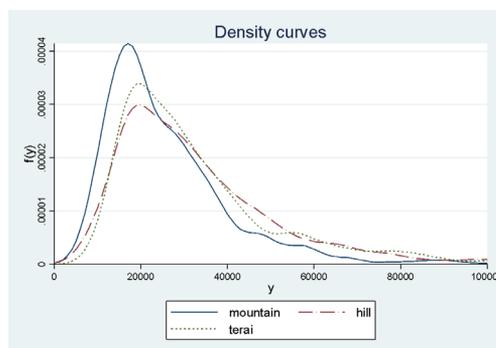


Figure 7. Density Curve by Ecological Belt Figure 8. Lorenz Curve by Ecological Belt

The density curve depicts the distribution of consumption across the ecological region. The highest peak of the mountain on the left side indicates that the households of lower consumption are highest in the mountain and it is followed by Terai and hills, respectively. Relatively, households located on hills consume more in comparison to mountains and Terai.

The inequality curve of the mountain is on the inner side indicates lowest inequality in the mountain and the curve of hill falling outermost indicates the highest inequality in the hill.

Table 6

Comparison of Inequality Index by Ecological Belt

<i>Ecological Belt</i>	<i>CV</i>	<i>Quantile Ratio Index</i>	<i>Gini Index</i>	<i>Theil's L</i>	<i>Theil's T</i>
Mountain	0.639159	0.270286	0.297636	0.142757	0.154862
Hill	0.735700	0.236005	0.335369	0.18512	0.199442
Terai	0.744903	0.249322	0.321654	0.166432	0.18857
Overall	0.740837	0.245165	0.328485	0.175449	0.193931

Note. From the researcher's calculation by using NLSS data, 2011

The coefficient of variation of mountain is lowest and it shows that the distribution of consumption in mountain is more uniform than hill and Terai and it is followed by hill and Terai. The quantile ratio of mountain is highest and hill is lowest among the three ecological belts.

The Gini coefficient of hill (0.297636) is highest and it is followed by the Terai (0.321654) and mountain (0.297636) consecutively. The same pattern can be seen in Theil's L and Theil's T indices. To test the significance differences, the table 7 shows the t-value and p-value for all combinations. According to p-value there is a significant difference in consumption inequality of four measures between mountain and hill except CV at 5 per cent level of significance. Likewise, the differences in these inequalities between mountain and Terai are not significant at 5per cent (p-value >0.05). But in Terai and hill, Theil's L index is significantly different but other indices are not significantly different.

Table 7

Hypothesis Testing

<i>Between</i>	<i>t value and p value for inequality index</i>				
	<i>CV</i>	<i>Quantile Ratio Index</i>	<i>Gini Coefficient</i>	<i>Theil's L</i>	<i>Theil's T</i>
Mountain and Hill	1.74472 (0.0811)	-2.29702* (0.0217)	2.99879** (0.0027)	3.34659** (0.0008)	2.65193 ** (0.0080)
Mountain and Terai	1.67801 (0.0934)	-1.1831 (0.2368)	1.8785 (0.0604)	1.85776 (0.0633)	1.91056 (0.0561)
Terai and Hill	.213055 (0.8313)	.614968 (0.5386)	-1.73087 (0.0835)	-2.15607* (0.0311)	-899266 (0.3685)

Note. From the researcher's calculation by using NLSS data, 2011

*** indicates significant at 1% and * indicates significant at 5%*

Table 8
Decomposition of Theil's L and Theil's T Indices by Ecological Belts

<i>Ecological Belt</i>	<i>Population Share</i>	<i>Theil's L</i>	<i>Absolute Contribution</i>	<i>Relative Contribution</i>	<i>Theil's T</i>	<i>Absolute Contribution</i>	<i>Relative Contribution</i>
Mountain	0.0705	0.1428	0.0101	0.0573	0.1549	0.0084	0.0433
Hill	0.4422	0.1851	0.0819	0.4666	0.1994	0.0908	0.4684
Terai	0.4873	0.1664	0.0811	0.4623	0.1886	0.0924	0.4768
Within	-----	-----	0.1730	0.9862	-----	0.1916	0.9885
Between	-----	-----	0.0024	0.0138	-----	0.0022	0.0115
Population	1.0000	0.175449	0.175449	1.000000	0.1939	0.1939	1.0000

Note. From the researcher's calculation by using NLSS data, 2011

The absolute contribution to overall Theil's L inequality index by mountain, hill and Terai are 0.010060, 0.081858 and 0.081108 respectively. They altogether within and between inequalities are 0.173027 and 0.0024210. respectively. The relative contributions of mountain, hill and Terai are 0.057, 0.466566 and 0.46229 respectively. The total relative contributions to the total Theil's index inequality within and between three ecological belts are 0.9861 and 0.01380 respectively and the relative contribution of hill is slightly higher than its population share. It indicates that to reduce the overall Theil's L index, hill should be more focused and the same pattern can be seen for the Theil's T index.

Table 9
Decomposition of Gini Index, Theil's L and Theil's T Indices by Sources

Source	Share	Gini Index		Theil's L Index		Theil's T Index	
		Absolute Contribution	Relative Contribution	Absolute Contribution	Relative Contribution	Absolute Contribution	Relative Contribution
Food Consumption	0.5641	0.1335	0.4063	0.0668	0.3810	0.0672	0.3465
Non-Food Consumption	0.4359	0.1995	0.5937	0.1086	0.6190	0.1267	0.6535
Total	1.0000	0.3285	1.0000	0.1754	1.0000	0.1939	1.0000

Note. From the researcher's calculation by using NLSS data, 2011

The above table is the decomposition of consumption inequality measures into its sources of food consumption and non-food consumption. The food and non-food consumption share on total consumption are 56.14 per cent and 43.59 per cent, respectively. It is seen that despite the less population share of non-food, the absolute contribution is higher than food consumption to three measures of consumption inequalities. Likewise, the relative contribution of non-food consumption on total inequality of three measures is higher than its population

share. Therefore, the role of non-food consumption is significant to make the overall consumption inequality.

3.4 Key findings

The coefficient of variation, quantile ratio index, Gini index, Theil's L and Theil's T for overall consumption are 0.741, 0.245, 0.328, 0.175 and 0.194 respectively. Mainly the three inequality measures Gini index, Theil's L and Theil's T of female headed households are 0.3306, 0.1796 and 0.1993, respectively and these are slightly higher than the male headed households but not significantly. The relative contribution of female headed households is higher than its population share in total. Likewise, these three measures of urban area are 0.33065, 0.2036 and 0.1993 respectively and each index is higher than the corresponding rural area. It is obvious that the urban households consume more non-food items such as clothing, expenditure on education, household rent, etc. and there appears higher inequality than the rural area. The relative contribution of the urban area on each measure is higher than its population share so that urban area needs more focus to reduce the inequality. Likewise, among the three ecological belts, the three measures in hill are highest and the major inequality measures in hill and Terai seem almost similar. The mountain has the lowest inequality index and the test shows that the inequality indices are significantly different from hill and Terai. The reason behind this may be the less consumption of non-food items in the mountains. Despite having more expenses on both food and non-food items in the mountains, less purchasing of non-food items, having a smaller number of private schools and hospitals and covering most of the rural area within this region, not having a large city, there seems less inequality in consumption. According to the absolute and relative contributions, to reduce the inequality the urban area and hill region should be more targeted.

4. Conclusion and Implications

According to the decomposition into its sources, despite the less share of consumption, non-food components contribute more inequality to the consumption inequality. In developing countries as well as developed countries, household's consumption will be constant or slow growth after crossing one point and individual or household expenses are spent more on non-food items. The non-food items or brands having high variability in price can be obtained in the market and individuals or households can purchase the expensive brands if they have the capacity and intention to purchase. Hence, there seems higher inequality in non-food items than the food items. According to absolute and relative contribution, the non-food item should be more focused to reduce the inequality.

The above result was based on the Nepal Living Standard Survey, 2011 and results were computed by sex of household heads, rural urban area and ecological belt. For further studies, it is also recommended to compute and decompose the inequality by province, recent rural and urban areas and other social factors.

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Conflict of interest

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