

## RURAL LIVELIHOOD DIVERSIFICATION IN WEST BENGAL: AN ANALYSIS FROM GENDER PERSPECTIVE

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**Abstract:** Agriculture alone fails to generate adequate employment opportunities to meet the needs of rural households. Therefore, rural people are being forced to go in search of alternative livelihood options to improve their standard of living, to raise income and to reduce vulnerability to different livelihood shocks. Livelihood diversification thus plays an important role in order to minimize seasonal fluctuations in income from agriculture by making supplementary income and reduce overall household's economic risks in the rural region. Attempt has been made in this paper to examine the nature and extent of rural livelihood diversification in the state of West Bengal, India. Livelihood strategies rural poor adopts are influenced by the gendered access to resources and gender power relations within the household and the community. Gender aspects of livelihood diversification are thus explicitly analyzed. Gender segregation in livelihood options are estimated and analyzed. Diversification and segregation Indices are used. Data from National Sample Survey Organization (India) are considered.

**Keywords:** Rural Livelihood, Diversification, Occupations, Gender Disparity, segregation

**JEL Classification:** O18, J21, C43, Y10

### INTRODUCTION

Agriculture serves as the primary source of income and employment for the rural people in India. It supports livelihood of a high proportion of rural population. But over time, livelihood associated with agricultural sources has been realized to be unsustainable. Land man ratio is declining with the rising population. Increased pressure on agriculture thus fails to generate adequate employment opportunities to meet the need of rural households. Moreover households have been facing the challenges of natural calamities like flood, draught, epidemics etc., at the time of cultivation of crops. Hence the importance of supplementary income sources has been perceived by the rural household members. They are being forced to go in search of alternative sources of livelihood to raise their incomes and thereby to reduce vulnerability to different livelihood shocks. Rural household members are trying to construct a diverse portfolio of activities to minimize the risk from seasonal fluctuations of earning from agriculture by making supplementary income. In fact, diversification of livelihood draws immense interests among the Researchers in the recent era of globalization.

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With the inception of liberalization policies in India during 1990s, demand for several goods and services has increased in the economy. During the period, the rural parts of the nation have witnessed several opportunities for earning livelihood that are typically based on low-skilled or semi-skilled non-farm sources. Contrary to the prototypical image of being purely dependent on agriculture, rural households have inclined to be associated with many activities and income sources for their livelihood. Diversification of livelihood thus play an important role in controlling risk and uncertainty related to future earning and food security (Dimova and Sen, 2010). Interest thus arises on rural livelihood diversification and the related issues in the context of West Bengal, one of the leading states of the country.

There are significant differences in livelihood opportunities and outcomes between women and men in rural areas of a developing economy like India. In respect to men, rural women's employment prospects are severely limited. Most of the women workers are contributing as family labourers (Cecile & Rao, 2004). Participation of rural women in agriculture and labor markets is characterized as low paid and more precarious employment. Women in rural India are mostly seemed to be unprivileged and discriminated from long back to its tradition. Even in the agricultural sector contribution of women workers are unrecognized. Women face systematic discrimination in the rural labour market even in access to the resources and services. Employment opportunities for the rural women are very much limited from the long back. Recently, the scope of women in the rural sector has been widened after adoption of globalization policies. Attention has also been given on women empowerment which is not only looked upon as a means for accessing livelihood or having better financial status, but also to potentially participate in intra-household decision-making activities. In such a context, question arises on the differences of rural livelihood diversification between men and women. Question also arises on the degree of occupational gender segregation. Hence, this paper also attempts to examine the gender differences in rural livelihood diversification in India and in the state of West Bengal.

Several studies have so far been done on various aspects of livelihood pattern in various developing countries. Ellis (1996) has observed the shift of rural livelihood from agricultural sources to non-farm sources. He found that rural households having dependent on diversified income sources possess a much sustainable livelihood, rather than those who rely on single income source. Ellis and Freeman (2005) has figured out the probable reason for income diversification which may lies behind the diversity of different employment in different seasons, rather than diversity of employment in a particular season. Several studies have contributed towards employment diversification in rural India (Basant & Kumar, 1989; Hiremath, 2007; Mukhopadhyay *et al.*, 2007; Kumar 2009). Kumar (2009) has remarked that to reduce the barriers to entry to rural non-farm occupations, education level and skill development should be enhanced. Works have also been done based on the determinants of livelihood diversification in India (Degefa, 2008; Khatun and Roy 2012; Barbier and Hochard 2014, Rahut, *et.al* 2014; Melkamu and Mesfin, 2015). According to Khatun and Roy (2012), higher the dependency ratio in a household, greater will be the diversification of its income source. Moreover, availability of land is another important determinant of

livelihood diversification in a region (Barbier & Hochard 2014). Melkamu et.al (2015) highlighted on the role of saving and family size to the participation of rural people in non-farm activities. It has been shown that increasing expenditure on education positively influence livelihood diversification (Rahut, et.al 2014). Though works are available on livelihood diversification in the context of Indian economy, studies on livelihood diversification encompassing the gender differences are almost rare. Attempt has thus been made in this paper to examine nature and extent of livelihood diversification in rural West Bengal, one of the faster diversifying economies in India. Gender differences are analytically examined.

## METHODOLOGY

There are several measures of livelihood diversification being used in a number of empirical studies (Singh et al, 2006, Babatunde, R.O., 2009; Babatunde, R.O and Qaim, M., 2009, 2010; Dilruba, K. and B.C. Roy, 2012; Mandal, R., & Bezbaruah, 2013). They are Herfindahl Index, Ogive Index, Inverse Simpson Index, Entropy Index, Modified Entropy Index and Composite Entropy Index. Each of these measures has its merits and limitations. In the context of the present study, we have selected four indices as Simpson Index, Entropy Index, Modified Entropy Index and Composite Index to estimate the degree of rural livelihood diversification.

Let the economy having n number of occupations or livelihood options.  $P_i$  is the number of persons or household members associated with the occupation i. Thus the distribution of persons among different livelihood sources may be written as

$$P = (P_1, P_2, P_3 \dots P_n)$$

If  $P_1 = P_2 = P_3 \dots = P_n$ , then it implies that the livelihood pattern is perfectly diversified. When  $P_1 \neq P_2 \neq P_3 \dots \neq P_n$ , the question of livelihood diversification (concentration) arises. The degree of livelihood diversification depends on the magnitude of  $P_1, P_2, P_3, \dots, P_n$ .

There are several measurement Indices to measure the extent of livelihood diversification based on the distribution of persons among different occupations as follows:

**Simpson Diversification Index (SI):** The Simpson Index of diversification considers the number of livelihood sources and the distribution of persons associated with different occupations/livelihood options. This index is defined as:

$$SI = 1 - \sum_{i=1}^n S_i^2$$

Where,  $S_i$  as the proportion of population engaged in occupation i. When all the people are employed in one source of income then  $SI=0$  which indicates lowest diversification.

**Entropy Index (E):** Entropy is regarded as an inverse measure of concentration having logarithmic character. Entropy is calculated by this formula:

$$EI = \sum_{i=1}^n S_i \log \frac{1}{S_i}$$

The index would increase with the increase in diversification and it approaches zero when there is perfect concentration. The upper bound of the index is  $\log n$ . The upper limit of the entropy index is determined by the base chosen for taking logarithm and the number of occupations. Hence, the major limitation of Entropy Index is that it does not give standard scale for assessing the extent of diversification.

**Relative Entropy Index (REI):** Relative Entropy Index is used to overcome the limitation of Entropy Index by changing the upper value. It is computed by the formula given below:

$$REI = \frac{\sum_{i=1}^n S_i \log \frac{1}{S_i}}{\log n}$$

This index too is bounded by the number zero and one. The index assumes the lower limit zero when there is complete concentration, and upper limit of one in case of perfect diversification. The Relative Entropy Index gives uniformity and fixity to the scale used as norm to examine the degree of diversification. This index measures diversification given the number of occupations and the index is not sensitive to the changes in the number of occupations/livelihoods.

**Composite Entropy Index (CEI):** Composite Entropy Index is used to compare diversification across situations having different and large number of activities since it gives due weight to the number of activities. The formula of CEI is given as follows:

$$\begin{aligned} CEI &= - \left( \sum_{i=1}^n S_i \log_n S_i \right) * \left( 1 - \frac{1}{n} \right) \\ &= REI * \left( 1 - \frac{1}{n} \right) \end{aligned}$$

The CEI has two components, viz., distributions and number of income sources, or diversity. The value of CEI increases with the decrease of concentration and rises with the number of income sources. Both the components are bounded by zero and one. Since the index uses  $-\log_n S_i$  as weights, it assigns more weights to lower quantity and less weight to higher quantity.

We have used these four indices to estimate the degree of livelihood diversification in rural West Bengal, one of the major states of India. Gender disparity has been explicitly examined.

## ESTIMATES

Data on livelihood in West Bengal and India has been collected from Employment and Unemployment Survey Reports of National Sample Survey Organization, India (50th Round 1993-94; 55<sup>th</sup> Round, 1999-2000; 61<sup>st</sup> Round, 2004-05; 66<sup>th</sup> Round 2009-10). In our study livelihood diversification refers to variations in the distribution of rural employment among various occupations or income sources. In order to estimate the extent of livelihood diversification we have used the employment distribution across different agricultural and non-agricultural occupations as *Agriculture (AGRI)*, *Mining & Quarrying (MQ)*, *Manufacturing (MANU)*, *Electricity (ELEC)*, *Construction (CON)*, *Wholesale/retail trade etc (WRT)*, *Transport, storage etc. (TRANS)*, *Financial, insurance etc. services (FIN)* and *Community etc. services (COMMU)*.

In India, Agriculture and allied activities is the predominant source of employment and income. More than 60% of the rural people are engaged in agriculture activities in 2009-10 (Table 1). The figure was about 77% in 1993-94 and a declining trend is observed over time. Manufacturing is the second largest segment of rural non-farm sector followed by wholesale and retail trade in rural India. Construction sector has become more pronounced in employing the rural people. Percentage of people engaged with construction sector has increased from 2.8% in 1993-94 to 9.5% in 2009-10. A clear increasing trend is observed during the periods under consideration.

**Table 1**  
**Percentage Share of Different Livelihood Sources in West Bengal and in India: 1993-2010**

Livelihood Sectors	1993-94		1999-2000		2004-05		2009-10	
	WB	India	WB	India	WB	India	WB	India
<i>Agriculture</i>	61.7	76.9	64.6	75.1	62.4	70.8	57	66.8
<i>Mining &amp; Quarrying</i>	0.2	0.7	0.3	0.5	0.3	0.6	0.7	0.7
<i>Manufacturing</i>	15.1	7.1	14.5	7.4	11.9	8.2	14.2	7.2
<i>Electricity</i>	0.1	0.2	0.1	0.2	0.1	0.2	0	0.2
<i>Construction</i>	2.8	2.6	2.3	3.5	4.3	5.4	6.3	9.5
<i>Wholesale/Retail trade etc</i>	8.4	4.6	9.1	5.4	10.4	6.7	10	6.8
<i>Transport, Storage etc.</i>	3.2	1.6	3.5	2.3	4	2.7	4.7	3.2
<i>Financial, Insurance etc. services</i>	0.5	0.3	0.4	0.4	1	0.5	0.9	0.6
<i>Community Services</i>	8	5.9	5.2	5.2	5.6	4.9	6.2	5.1

Source: Computed from NSSO data

More than 50% of the rural population in West Bengal is engaged in agriculture and allied activities in 2009-10 (Table 1). Since 1993-94, this proportion has been declining though it has increased slightly in the year 1999-2000. Compared to the national level, persons associated with non-farm activities are relatively more in rural West Bengal. The employment share in the non-farm sector of rural West Bengal has increased from 38.3 percent in 1993-94 to 43 percent in 2009-10. In case of rural India the corresponding figures

are 23.1 percent and 33.2 percent. Manufacturing sector is the second largest sector where about 15% of rural people are employed. Rural manufacturing sector in West Bengal is relatively more pronounced in employing household members compared to India as whole. During 1993-94 to 2004-05, there has been a decline in percentage of people engaged in manufacturing sector while it has increased again during 2004-05 to 2009-10. Participation in wholesale or retail trade, construction and wholesale and retail trade sector has been increasing over all the periods under consideration. The share of employment has declined in manufacturing, electricity, and community services etc. over the period from 1993-94 to 2009-10. At the same time, higher proportion of rural labor force in West Bengal has moved to construction, wholesale or retail trade, transport and storage, mining and quarrying and financial, insurance services.

### RURAL LIVELIHOOD DIVERSIFICATION: WEST BENGAL & INDIA

Most of the literatures have established the fact that in the Third World Countries like India, livelihood diversification is important for the rural people to meet the domestic needs and to minimize household risks. In the present study a variety of diversification indices viz. Simpson Index (SI), Entropy Index (EI), Modified Entropy Index (MEI), Composite Entropy Index (CEI) are used in order to measure the extent of diversification in West Bengal and India and its comparison in between.

**Table 2**  
**Rural Livelihood Diversification: Different Indices, 1993-2010**

<i>Year</i>	<i>WB/India</i>	<i>SI</i>	<i>EI</i>	<i>REI</i>	<i>CEI</i>
1993-94	West Bengal	0.582	0.543	0.569	0.506
	India	0.397	0.404	0.423	0.377
1999-00	West Bengal	0.549	0.515	0.540	0.48
	India	0.423	0.427	0.447	0.398
2004-05	West Bengal	0.579	0.555	0.582	0.518
	India	0.482	0.479	0.502	0.447
2009-10	West Bengal	0.636	0.609	0.638	0.568
	India	0.533	0.524	0.549	0.489

*Source:* Author's Calculation

SI: Simpson Index ; EI: Entropy Index ; REI: Relative Entropy Index ; CEI: Composite Entropy Index

Rural livelihood diversification has increased in India and in West Bengal during the period 1993-94 to 2009-10. An increasing trend is observed in the Indian economy over all the time points under consideration. In West Bengal, extent of livelihood diversification has declined only during the period 1993-94 to 1999-2000 (Table 2). Degree of rural livelihood diversification is higher in West Bengal economy compared to that of the national level. Change in rural livelihood diversification in WB is more pronounced during the last phase of our analysis (2004-05 to 2009-10).

### RURAL LIVELIHOOD DIVERSIFICATION: GENDER DIFFERENCES

Agriculture is the predominant source of income and employment for the rural people in India and also in West Bengal irrespective of the male and female (Table 3). It is very much interesting to note that in 2009-10, more than 78% of rural female are employed in agriculture in India and the figure is only 42% in case of West Bengal economy. Female participation in the rural non-farm sector of West Bengal is higher than male participation.

**Table 3**  
**Population Share of Different Livelihood Sources: Gender Disparity**

Livelihood Sources	1993-94		1999-2000				2004-05				2009-10					
	WB		India		WB		India		WB		India		WB		India	
	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F
AGRI	64.2	44.7	73.7	84.7	66.3	57.1	71.2	84.1	63.9	53.9	66.2	81.4	59.1	42	62.5	78.9
MQ	0.2	0.4	0.7	0.5	0.4	0	0.6	0.4	0.3	0.1	0.6	0.4	0.5	2.3	0.8	0.3
MANU	11.9	35.8	7	7.5	11	30.5	7.3	7.7	8.9	29.1	8	8.7	12	29.9	7.1	7.6
ELEC	0.3	0.1	0.3	0	0.1	0	0.2	0	0.1	0	0.2	0	0	0	0.2	0
CON	2.8	2.8	3.3	1.1	2.7	0.6	4.5	1.2	5	0.6	6.9	1.7	7	1.6	11.4	4.2
WRT	9	4	5.5	2.2	10.3	3.4	6.8	2.3	11.5	4.3	8.3	2.8	10.7	5.1	8.2	3.1
TRANS	3.6	0.6	2.2	0.1	4.3	0	3.2	0.1	4.7	0.2	3.9	0.2	5.3	0.5	4.2	0.3
FIN	0.5	0.1	0.4	0.1	0.4	0.1	0.5	0.1	1.1	0.2	0.7	0.1	0.9	0.8	0.8	0.2
COMM	7.5	11.5	6.7	3.9	4.5	8.3	5.6	4.2	4.5	11.6	5.2	4.5	4.5	17.8	4.8	5.5

Source: Authors' calculation from the NSSO data

M- Male; F- Female

The employment in rural non-farm activities are mostly concentrated in manufacturing, wholesale or retail trade, and community, etc. services. In 2009-10, around 66.50 percent and 91.03 percent of the total non-farm male and female employment in rural West Bengal are found to be concentrated in manufacturing, wholesale or retail trade, and community, etc. services respectively, compared to 53.60 percent of male employment and 76.78 percent of female employment in rural India. In the rural manufacturing sector female employment is 30% and 8% respectively in India and West Bengal. Participation of the male in WB is higher in the wholesale and retail trade sector compared to the female over all the periods. Women's participation is higher in community service sector and it has increased over the period. During the period from 1993-94 to 2009-10, female labor-force in West Bengal have showed an increasing preference to be engaged in mining and quarrying, wholesale or retail trade and community, etc. services for their livelihood.

In the context of Indian economy, higher degree of diversification is observed in case of rural male compared to rural women household members (as depicted from the values of the diversification indices in Table 4). But the degree of livelihood diversification is higher for female members of rural WB in the periods 1993-94 and 2009-10. Though the extent of livelihood diversification has slightly declined over the period 1993-94 to 1999-00 but later during 1999-00 to 2009-10 it has increased for both male and female population in rural

west Bengal. In comparison to the national level, degree of rural livelihood diversification for female population in West Bengal is significantly higher. High gender disparity in livelihood diversification is exhibited in rural India. Although, it is relatively lower in the economy of rural West Bengal.

**Table 4**  
**Rural Livelihood diversification: Gender Differences**

Year		SI		EI		REI		CEI	
		Male	Female	Male	Female	Male	Female	Male	Female
1993-94	West Bengal	0.557	0.656	0.532	0.552	0.558	0.578	0.496	0.515
	India	0.443	0.278	0.448	0.280	0.469	0.293	0.418	0.261
1999-00	West Bengal	0.533	0.576	0.509	0.462	0.533	0.484	0.475	0.431
	India	0.477	0.288	0.478	0.287	0.501	0.301	0.446	0.268
2004-05	West Bengal	0.564	0.611	0.546	0.498	0.572	0.522	0.509	0.464
	India	0.539	0.327	0.532	0.323	0.558	0.338	0.496	0.301
2009-10	West Bengal	0.616	0.699	0.592	0.612	0.620	0.641	0.552	0.571
	India	0.580	0.369	0.566	0.364	0.593	0.381	0.528	0.339

Source: Authors' Calculation from NSSO data

### GENDER SEGREGATION IN LIVELIHOOD OPTIONS

Gender segregation across different livelihood options has a negative impact on the society from the perspective of gender discrimination. It is also a major source of labour market rigidity and economic inefficiency (Anker, 1997). Very little attention has been paid on the issues of sex segregation in terms of rural livelihood option in West Bengal. Gender segregation may be defined as tendency for men and women to be employed in different occupations across the whole spectrum of occupations. There are several measures that have been used in the most of the studies of gender segregation. In order to explore the degree of gender segregation in rural livelihood options in West Bengal as well as in India, we have calculated the Duncan's Measure (Duncan and Duncan, 1955) of dissimilarity which is the most widely used measure of segregation, defined as

$$D = \frac{1}{2} \sum_{i=1}^k |F_i / F - M_i / M|$$

Where,

$F_i$  = Number of women involved in the  $i^{\text{th}}$  occupation or livelihood options

$M_i$  = Number of men involved in the  $i^{\text{th}}$  occupation or livelihood options

$M$  = Total number of men

$F$  = Total number of women

$k$  = Total number of occupations or livelihood options



To examine the degree of gender segregation in livelihood options and to assess if there is tendency for it to decline in rural West Bengal and in rural India also, we have calculated Duncan's dissimilarity index for different years. This index expressed as percentage that can be interpreted as the proportion of women or men who would have to change occupation for the occupational distribution of men and women to be the same.

Using the data of National Sample Survey Organisation (NSSO), we have estimated Duncan's index of dissimilarity (D) for four time points – 1993-94, 1999-2000, 2004-05 and 2009-10. Degree of occupational segregation by gender has been rising in India since the year 1993-94 (Table 5). Whereas in West Bengal it has declined during the period 1993-94 to 1999-2000, but has increased again later during the period 1999-2000 to 2009-10. Gender segregation is quite prominent in rural West Bengal in comparison to the overall country. The degree of gender segregation is almost double in case of WB with respect to overall India. In 2009-10, about 33% of women or men in rural WB would have to change occupation for the occupational distribution of men and women to be the same. In case of overall rural India, the figure is only 18%.

**Table 5**  
**Gender Segregation in Livelihood Options: Duncan's Dissimilarity Index (D)**

<i>WB/India</i>	<i>Duncan's Dissimilarity Index (D)</i>			
	<i>1993-94</i>	<i>1999-2000</i>	<i>2004-05</i>	<i>2009-10</i>
West Bengal	28.1	23.3	27.3	33.0
India	11.4	13.2	15.9	17.5

## CONCLUDING REMARKS

The diversity of livelihoods is an important feature of rural survival. Diverse livelihood systems are less vulnerable than undiversified ones. It minimizes household risk, enhances income and becomes more sustainable by allowing positive adaptation to changing circumstances. Percentage of rural population engaged in agriculture has declined in WB over the period under study. Manufacturing is the second largest segment of rural non-farm sector followed by retail industry and community services. Community services sector has witnessed a clean decline over the period 1993-94 to 2009-10. Participation in wholesale or retail trade sector has been increasing over the period. Livelihood diversification in rural West Bengal has increased during the last phase of the analysis. Degree of diversification is observed to be higher in case of female population in WB. However the opposite scenario is exhibited in the economy of India as a whole. Gender disparity in rural livelihood diversification is substantially low in West Bengal. Although high disparity is observed at the national level. Degree of gender segregation has been rising significantly over time in rural WB and in all over the nation and there exhibits no tendency to decline. Gender segregation is quite prominent in rural West Bengal in comparison to the overall country.

Livelihood diversification is thus a precondition for improved and sustainable rural levels of living. Govt. should take targeted income generated policies other than agriculture

and allied activities in order to enhance rural livelihood diversification. Cottage and Small scale industries should be reformed and promoted. Proper education and training for the rural poor specially the youth should be provided so that they can access different livelihood sources within their territory. Inter regional migration may be stopped through the arrangement of alternative livelihood sources from the part of the invention of the Govt. Emphasis of policy makers should be on improving the educational attainment and empowerment of future female generations to choose market oriented jobs over traditional roles. This can be achieved through training and retraining that is in accordance with labour market demand, and by removing gender stereotyping to encourage diversification of educational and occupational choices of boys and girls.

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