An exploratory research on income dynamics, inequality, determinants policy implications for sustainable livelihoods of tribal community in eastern India

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14 March 2016

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Abstract

A village level in-depth study was undertaken to measure the income dynamics, inequality, determinants, and policy implications for sustainable livelihoods of tribal households in Jharkhand. Data were solicited from 160 households during 2011-12. Study shows vast gap in annual income of tribal households i.e.₹ 8,493, while non-farm activities dominated (37.19 to 63.67%) over other sources. Highest income inequality observed among labour class (Gini ratio 0.55). Study reveals that education, family size, non-farming income and adoption of high yielding varieties were found main income determinants. Study has important policy implications; need to generate more non-farm incomes through public works that could lead the better infrastructure facilities and rural livelihoods. Providing labour opportunities outside agricultural activities can serve manifolds, and trim down income inequalities. Livestock sector could be revived through technical interventions from research institutes, state agricultural universities & line departments. However, education could be an instrument for reducing inequality & poverty among tribes.

Keywords: Income dynamics, income inequality, income determinants, tribal community, eastern India.

Introduction

Income and its sources are important measures to understand level of households' living standard and ways to achieve that level. Thus we obtain a better understanding of being poor, average, or affluent. Income along with households' expenditures and possessions reveals aspects of income volatility and provides an additional measure of inequality. However, to estimate an accurate income of rural households' is complicated because only few have regular income sources. In agriculture or business, incomes are irregular; therefore, considerable efforts are needed to obtain the estimates of revenue and expenditure before calculating the net income. Numerous studies have been undertaken to pinpoint contribution of different sources of income inequality in developing world (Kung and Lee, 2001; Leibbrandt *et al.,* 2000). It is a fact that incomes are usually not measured in developing country surveys, and rarely in India. Indian Human Development (IHD) reports (2004-05) show a large regional variation in both rural and urban incomes. In 2004, while a typical Indian household earned ₹ 27,856 per annum it was lower in Jharkhand state (₹ 24,000) and lowest annual incomes were in Odisha state (₹ 16,500). As compared to per capita income at national level (₹ 5,999), Jharkhand (₹ 4,833) state is far behind. Per capita Gross Domestic

Product (GDP) in eastern states of India can be perused from figure 1. The state-wise differences in incomes are especially pronounced for rural areas and somewhat narrow for urban areas. While economic resources themselves are insufficient to ensure better health, education, or gender equality within households, a lack of financial resources is often an important constraint. In Indian context, various studies have been conducted on methodological issues for estimating income inequality, poverty and also on actual measurement of these variables. But most of studies are either based on secondary data available from National Sample Survey Organisation (NSSO) and/or conducted for depicting picture at national level. Literature based on in-depth village studies is limited particularly for a predominantly tribal Jharkhand state. The empirical studies help policy makers to identify nature and character of income inequality within a society and devise policies to improve income distribution. The present study hence tries to evaluates income diversity, income inequality, determinants and policy implications in tribal households of Jharkhand state.

Research methodology

The study was conducted in Jharkhand state during 2011-12. Primary data were collected from four villages, i.e., two villages each from Ranchi and Dumka districts of Jharkhand state. Data pertains to these two representative districts, one representing socio-economically forward district (Ranchi) and other representing socio-economically backward district (Dumka). While Ranchi district has edge over other districts of Jharkhand with respect to education level, per capita income, health & hygiene, and infrastructure facilities. Dumka district has been inferior to a majority of districts with respect to education level, per capita income, health and hygiene, and infrastructure facilities in Jharkahnd. Besides simple statistical tools, loreze curve were plotted. Gini ratios are computed to measure the income inequality and diversification index is also computed to have an idea about diversity of income sources. Linear regression model was employed to identify the determinants of income.

i) Income diversity: Herfindahl-Hirschman Index (HHI)

$HHI_I = \Sigma S_i^2$ .....(Eq.1)

Where,

HHI_I is the Herfindahl-Hirschman Index for Income and

S_i is the share of source i to the total income of the household

$HHI_{ID} = 1\text{-}HHI_I$.....(Eq.2)

Where,

HHI_{ID} is the Herfindahl-Hirschman Index for Income Diversity

ii) Determinants of income

Ln Yi = $\boldsymbol{X}i'\boldsymbol{\beta} + \varepsilon i$, $i = 1,\ldots,$
Where,

Yi = Per capita household income

Xi = Vector of HH and farm characteristics

iii) Income inequality

G= $Cov\ (y,F(y))2/y$

Where,

G= Gini ratio

Cov= Covariance between income levels y and cumulative distribution of same income F(y)

y (bar) = average income

Results and discussion

Average per capita income

Per capita income reflects purchasing power and living standards of people. For inclusive growth, it is indispensable for states to put in efforts to raise income attributable to each person. The estimates of Triennium Ending (TE) in respect to per capita income in Jharkhand show ₹ 16,024 during 1993-94 which is higher from national average (₹15,653). TE for 2004-05 depicts a decreasing trend (₹ 15,617) while an increasing trend was observed at national level (₹ 23,235). During TE 2009-10, income of Jharkhand and also at national level increased. However, the compound annual growth rate of Jharkhand during 1993 to 2004-05 was negative (-0.3), while growth at national level was observed 3.9%. From 2004-05 to 2009-10, growth of Jharkhand was increasing @ 2.7% whereas the national growth in income was much higher (6.7%). For the period between 1993-94 to 2009-10, growth in Jharkhand state was positive (1.5%) but less than the national growth (4.8%) in per capita income.

Jharkhand state is growing at frantic pace in terms of per capita income as recorded by a study on *'States performance in per capita income'* which highlighted that the state registered 16.6% growth with per capita income of ₹14,990 (Assocham Eco Pulse, 2008). Table-1 shows the per annum per capita income in the sample villages of Jharkhand, which revealed

that the highest (₹16, 814) annual per capita income was among small households of Dubaliya village followed by medium (₹11,194) and large category (₹18,569). While in Dumariya and Hesapiri village, labour households had highest income of ₹15,470 and ₹12,788, respectively. Overall per capita income/annum in sample village was higher in Dubaliya village (₹ 14,871) followed by Dumariya (₹ 9,885), Hesapiri (₹9,066) and Durgapur (₹ 6,378).

Income composition

Source of income in sample household consisted of crop, livestock, farm labour, non-farm work, salaried job, caste occupation, business, remittance and pension. Income from the crop production was highest in Dumariya (31.36%) village followed by Hesapiri and Durgapur village. In Dubaliya village, crop production showed negative income (-2.04%). The income from livestock was highest in Heasapiri village at 4.51% as compared to less than 4% in Dubaliya and Durgapur each and negative in Dumariya (-11.65%). Farm labour also had little share in income in Durgapur village (4.80%) while it was negligible in other three villages. Non-farm activity is the most prominent source of income of all the villages, i.e. Hesapiri (63.67%), Durgapur (47.92%), Dubaliya (45.54%) and Dumariya (37.19%). After non-farm activity, salaried job was found to be generating much income for villagers. In Dubaliya, its contributed 38.27% followed by Dumariya (24.09%) and Durgapur (9.71%). Caste occupation (*Jajmani system*) is still prevalent in Jharkhand. Nearly one-tenth income of Dumariya village is accumulating from *Jajmani system* followed by Durgapur (6.91%). Significant contribution of business activity to household income was found in Durgapur village (16.31%) only while it was ranged between 3-7% in remaining three villages. Remittances as source income contributed 8.87% in Dubaliya and 4.59% in Durgapur village but was absent in the other two villages. Some income is also obtained through pension sources which ranged between 0.7 to 1.89 percent. Investigations revealed that households obtained 48.54% average income from non-farm activity followed by salaries job (18.50%), crop production (14.66%), and business (8.05%). Less than 5% were getting through caste occupation, remittances, farm labour, pension and livestock (Figure 2).

Income diversity

Diversification of income sources are a long practiced strategy by many livelihoods in order to reduce risk of external shocks since different sources of income are likely to be affected differently by external shocks. Income diversification is a key for risk management and helps

vulnerable households to meet consumption, social and labour needs. Income diversification opportunities can be within and outside agricultural production and include both on and off-farm strategies. Table-3 shows income diversity in Jharkhand state. In sample villages, maximum number of income sources was observed to be 9 while in Durgapur and Dumariya village the maximum income diversity sources were found to be 3.5 only. However, it was less in labour category but quite prominent in all other categories of households (small, medium and large) in all the sample villages. Table 4 and Figure 3 show the diversification indices of incomes in Jharkhand. Across villages, Dumariya had higher diversification index (0.50) followed by Durgapur (0.43), Hesapiri (0.40) and Dubaliya (0.28). The higher diversification index in Dumariya village indicates higher diversity in caste system at village compared to other villages. Higher diversity indices were observed among large (0.40 - 0.60) and small household category (0.30 - 0.59) in all the sample villages of Jharkhand. The indices were least among labour category as they had limited land (leased - in) and options for diversification. However, maximum income sources were recorded as 9.

Determinants of income

While trying to find out the relationship betwen different variable with the income of the respondent households, the variables like, education, size of households, share of non-farm income, and adoption of high yielding varieties had significant impact on households' income (Table-5). However other variables, i.e., own land, value of farm asset, members' earning, total land use and migration did not illustrate any relationship with income of respondents. The details are presented below:

Education: Education had a positive and significant impact on livelihoods of tribal community. Higher levels of education quality increases a country's rate of technological progress (Jamison, Jamison & Hanushek, 2006). Moreover, higher levels of education quality increases growth rates of national income. Asadullah and Rahman (2005) demonstrated that basic literacy and numeracy in farmers leads to an increased ability to process agricultural information and take advantage of available technologies.

Size of households: Size of households has negative relationship with income of households. Study confirms that households with less number of family members have more income compared larger households with more family members.

Share of non-farm incomes: Non-farm income includes income received from off farm activities like non-farm wages, salaries, pensions, and interest income earned by farm families. Non-farm income had significant impact on income of households in Jharkhand.

Adoption of High Yielding Varieties (HYVs): Dissemination of new agricultural technologies like HYVs has been gradually penetrating in Jharkhand state. However, present technological intervention of various research institutes, State Agricultural Universities (SAUs), Krishi Vigyan Kendras (KVK) had significant and positive impact on livelihoods of rural households.

The estimated coefficient of determination (R^2) for variability in data found to be 0.5418 which explained 54% variations due to variables under the study.

Income inequality

There are regional variations in income inequality in India, but variation lies almost wholly within variation observed among developing economies. The principal fact to be explained is not inequality variations within India, but enormous gap in inequality between developed and developing countries. Regional variations within India in income levels are more substantial. The higher income states have three to four times the income per capita as compared to the lower income states. Nevertheless, these state differences in income levels account for only 9% of national income inequality (Vanneman and Dubey, 2010). Most income inequality in India is within states. Between 2004-05 and 2009-10, inequality (Gini Coefficient) in rural India has marginally increased from 0.264 to 0.274 (ASSOCHAM India Report, 2012). This must have been direct result of fact that growth in lower Monthly Per Capita Expenditure (MPCE) class average consumption has been much lower than that experienced in higher MPCE classes.

The calculated Gini coefficient for Bihar including Jharkhand state indicates that income inequalities have increased by 4.9 percent. The village study in Jharkhand (Table-6) shows that among labour category, Gini ratio was observed from 0.24 to 0.55. Income inequality was highest (0.55) in Dumariya village while more equality was found in Dubaliya village (0.24). Among small category, there is less variation (0.20 to 0.34) than labour class. In medium class, trend is almost similar (0.20 to 0.37). Larger farmers have more inequality with higher Gini ratio (0.22 to 0.50). Overall highest inequality was found in Dumariya village (0.43) followed by Hesapiri (0.38), Dubaliya (0.36) and Durgapur (0.34). When

considering category of farmers, highest inequality was found among labour class (0.55), followed by large (0.50), medium (0.37) and small (0.34) category.

Sources of income inequality

Distribution of total income may change with change in individual components of income and/or changes in income share of components. If additional income is derived from a relatively equally distributed sources, income distribution will improve. Conversely, if faster growing sources of income are more unequally distributed, inequality in distribution of income will worsen. Economic position of a household depends on per capita income rather than on income from an individual component. A marginal increase in agriculture and salaried income leads to increase in inequality, however, a marginal increase in labour income leads to reduction in income inequality (Azam and Shariff, 2011). Thakur *et al.,* (2000) reported that in Bihar, income from rice cultivation (Gini, 0.37) and other agricultural activities (0.29) are less unequally distributed than income from non-agricultural activities (Gini, 0.46). The most unequally distributed sources of income are services (Gini, 0.54) and trade and business (Gini, 0.45). However, household access to these sources of income depends on endowment of physical and human capital and on state of infrastructure development of area. Obviously, high income households with educated members and favourable access to finance & credit are in a better position to take advantage of employment opportunities in services and trade sector compared with low-income households and get a larger share of income from this sources.

Concentration of income from non-agricultural labour (processing, transport and construction activities), although positive, is less than that of income from crop production activities. Since, major source of households incomes are from non-agricultural activities and income from these sources are more unequally distributed as more than two-third of concentration of household incomes are on account of non-farm activities. In less developed villages, contribution of rice cultivation (6% of total households' income) was marginal because it was a low-profit economic activity. While in technologically developed villages, it contributes to an augmenting of its share to 16%. The most favourable effect is on account of labour-based occupations-construction and processing activities and transport operations. The relatively less unequal distribution of incomes in developed villages was mostly on account of non-agricultural activities. It has been observed that per capita income and level of education are significant sources of income inequality (Fig-2). An increase in per capita income is likely to

increase income inequality but an increase in the level of education can increase income equality in villages under study in Jharkhand.

Conclusions and policy implications

The exploratory research has important policy implications at government level. There is an urgent need to generate additional non-farm labour opportunities through public works. These opportunities could lead to better infrastructure facilities and rural livelihoods. Providing labour opportunities outside the agricultural activities can help in increasing the household income manifolds. It can reduce income inequalities and help in reducing the poverty reduction interventions. It will also provide a safety mesh for income shocks. An increase in per capita income is likely to increase income inequality. However, increase in education level will lead to reduction in the income inequality among tribal community. Education is an instrument for change which brings changes in thinking process, knowledge, skills and attitude of people. There is also need to enhance productivity of livestock sector among tribal community for their sustainable livelihoods through technological intervention from research institutes, development departments and policy planners.

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Tables

Table 1. Average per capita income in Jharkhand, India (₹/person/annum) (N=160)

Village	Categories of households				
	Labour	Small	Medium	Large	All
Dubaliya	12701	16814	11194	18569	14871
Hesapiri	12788	7364	7306	9346	9066
Dumariya	15470	7636	7222	9760	9885
Durgapur	6279	4031	6905	8367	6378

Source: Primary data

Table 2. Composition of income in Jharkhand, India (N=160)

Village	Crop	Livestock	Farm labour	Non-farm worker	Salaried job	Caste occupation	Business	Remittance	Pension
Dubaliya	-2.04	3.99	0.00	45.54	38.27	0.00	3.48	8.87	1.89
Hesapiri	23.48	4.51	0.46	63.37	1.94	0.16	5.98	0.00	0.08
Dumariya	31.36	-11.65	0.78	37.19	24.09	11.20	6.46	0.00	0.57
Durgapur	5.84	3.86	4.80	47.92	9.71	6.91	16.31	4.59	0.07

Source: Primary data

Table 3. Income diversity in income in Jharkhand, India (N=160)

Village	Labour	Small	Medium	Large	All
Dubaliya	2.3	3.5	2.9	3.9	3.2
Hesapiri	2.7	3.6	3.6	3.5	3.4
Dumariya	2.9	3.8	3.8	3.5	3.5
Durgapur	3.3	3.8	3.4	3.4	3.5

Source: Primary data

Table 4. Diversification indices of income sources in Jharkhand, India (N=160)

Village	Labour	Small	Medium	Large	All
Dubaliya	0.09	0.30	0.31	0.40	0.28
Hesapiri	0.18	0.41	0.51	0.48	0.40
Dumariya	0.30	0.59	0.51	0.60	0.50
Durgapur	0.39	0.52	0.28	0.52	0.43

Source: Primary data

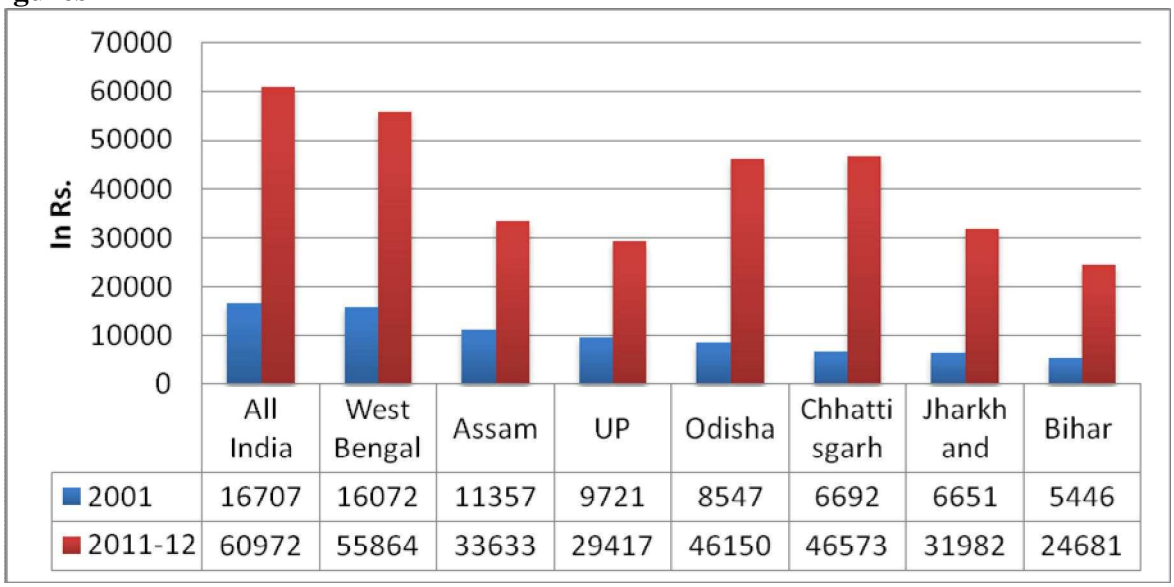
Table 5. Coefficients & corresponding standard error of variables for determining income in Jharkhand, India

Variables	'*t*' value	Standard Error	Pr >|t|
(X_1) Age (year)	1.21	0.28354	0.2327
(X_2) Education (year)	2.93	0.11241	0.0053***
(X_3) Household size (number)	-2.06	0.31736	0.0453**
(X_4) Land (acre)	-0.63	0.09196	0.5329
(X_5) Farm asset value (₹)	1.49	0.04704	0.1443
(X_6) Earning member (number)	1.35	0.24846	0.1838
(X_7) Livestock (number)	0.94	0.14162	0.3514
(X_8) Share of non-farm income (%)	-4.22	0.17347	0.0001***
(X_9) Migration (yes=1; no=0)	0.68	0.21754	0.4973
(X_{10}) High yielding varieties (%)	2.07	0.11426	0.0448**
*** Significant at 5% of probability, *** Significant at 1% of probability.*			

Table 6. Income inequality (Gini ratio) in Jharkhand, India (N=160)

Village	Labour	Small	Medium	Large	All
Dubaliya	0.24	0.34	0.20	0.50	0.36
Hesapiri	0.48	0.29	0.35	0.26	0.38
Dumariya	0.55	0.25	0.37	0.22	0.43
Durgapur	0.30	0.20	0.31	0.36	0.34

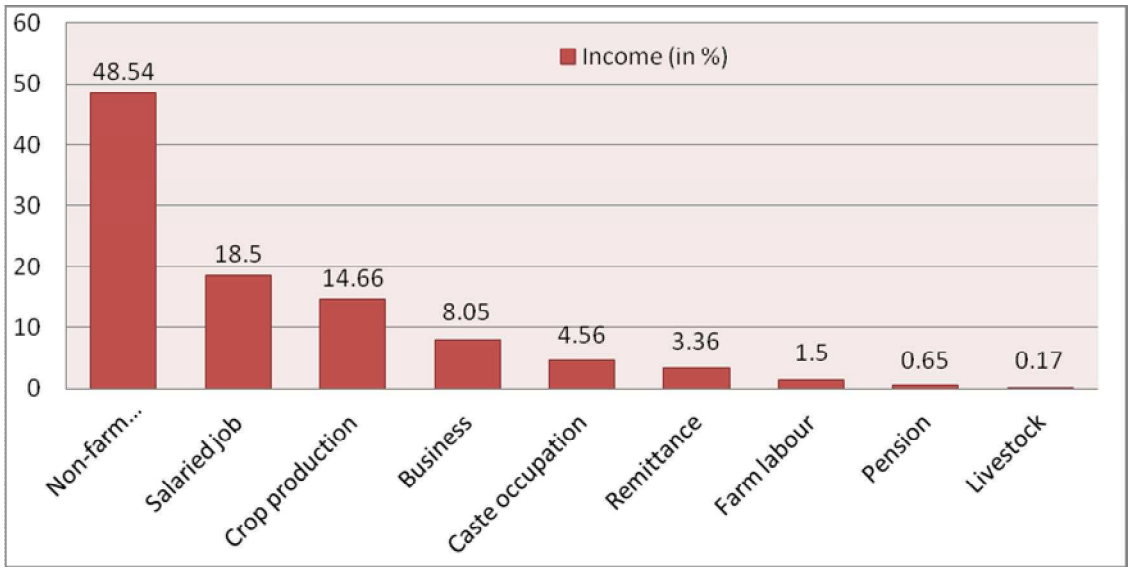
Figures



	All India	West Bengal	Assam	UP	Odisha	Chhattisgarh	Jharkhand	Bihar
2001	16707	16072	11357	9721	8547	6692	6651	5446
2011-12	60972	55864	33633	29417	46150	46573	31982	24681

Source: CSO various issues and Prabhat Khabar, 4 Nov., 2012 Patna edition.

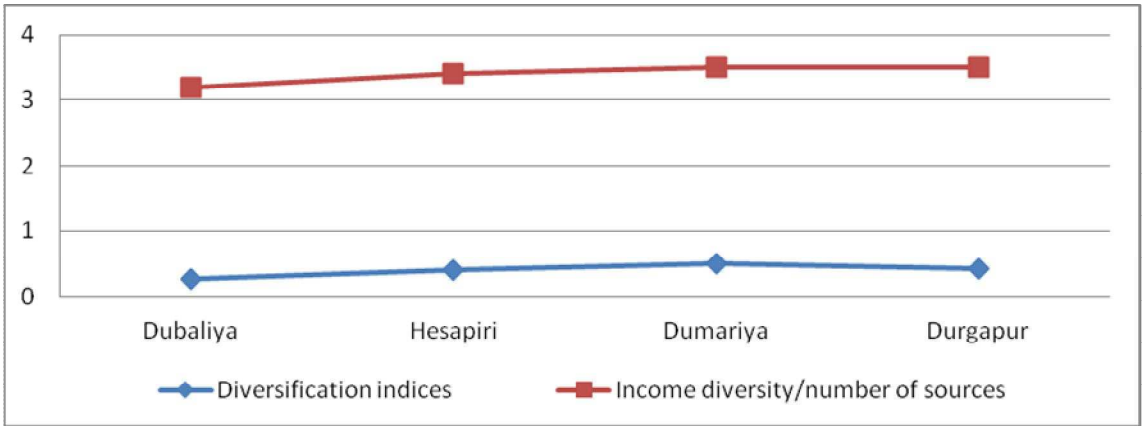
Figure1. Per capita gross domestic product in eastern states of India (on current price).



(Note: The negative contribution/income was deducted from positive income and divided by no. of villages for overall average).

Source: Primary data

Figure 2. Overall average incomes from various sources, Jharkhand, India (N=160).



Source: Primary data

Figure 3. Diversification indices and income diversity in villages of Jharkhand, India.