Indian Journal of Agricultural Sciences **91** (6): 847–51, June 2021/Article
https://doi.org/10.56093/ijas.v91i6.114271

Income inequality among indigenous people dependent on traditional agroforestry system in Indian Himalayas

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Received: 13 July 2020; Accepted: 05 January 2021

ABSTRACT

There is increasing concern about unequal distribution of income and wealth especially in developing economies, and to address this issue, there is greater thrust for inclusive development in the recent years. In this context, this paper looks into growing income inequality among the forest dwellers based on the empirical study conducted in North Eastern Hill (NEH) states of India. The primary data were collected through survey and personal interview covering a sample of 500 forest dweller households' sampled during 2016-17 from 52 villages located across six NEH states (Arunachal Pradesh, Manipur, Meghalaya, Mizoram, Nagaland and Tripura). Further, various options of income generation by providing equal access to resources has been dealt in the paper. It was observed that the shifting cultivation (SC) remains the main source of livelihood in all the studied sites. The clear-cut inter-state income disparities among the forest dwellers were demonstrated by Gini ratios. The high variation in Gini ratios indicates higher disparities in nonfarm income and it may be because of unequal opportunities for non-farm activities. In addition, other factors which are contributing significantly to income inequality are socio-personal factors, policies and programmes on SC management. The understanding on the role played by such factors would greatly facilitate in evolving appropriate policy perspectives for reducing economic inequality through measures like increasing investment in human capital and thus ensuring a stable farm economy in this region.

Keywords: Forest dwellers, Income inequality, Northeast India, Shifting cultivation

Around 1.6 billion people dependent on forests for their sustenance and livelihoods (World Bank 2006 and Nasar *et al.* 2016) and depend on forest products and services (FAO 2018). Total forest cover is 712, 249 km^2 which constitutes 21.67% in India (FSI 2019). Forest resources-based income is extremely important for households operating at subsistence level which helps to fill gaps in their short- or long-term income and serves as safety-net for income crises (Babulo *et al.* 2009, Nasar *et al.* 2016). Income from forest resources helps to reduce poverty and income inequalities (Nhem *et al.* 2018, Nguyen and Tran 2018). Income inequalities are becoming more pronounced in many developing economies, efforts towards a more equal distribution of income constitute one of the key components of the Sustainable Development Goals (Bathla and Kumar 2019). Thus, Indian Government also has initiated several anti-poverty flagship programs for socio-economic upliftment of their citizens, viz. Scheduled Tribes and other Traditional Forest Dwellers (Recognition of Forest Rights) etc. are being implemented to ensure economic empowerment and well-being. Consequently, sporadic positive changes were observed in SC (Shifting Cultivation) systems (Sarma *et al.* 2015, Bhagawati *et al.* 2015, Pattanaik *et al.* 2016, Teegalapalli and Datta 2016). Nevertheless, there exists varied views on such remarkable transformation because of factors like market economy, land use policies etc. (Li *et al.* 2014).

Literatures are scanty about the land use transition and developmental process had any consequence on economic well-being of forest dwellers. Both scientific community and Government institutions face the hurdle of limited data for informed decision making and appropriate policy formulation. The study was undertaken to reiteratively scrutinizing as to 'who is included' and 'who is excluded' from improvement of human well-being and society at large, and on what grounds, and how inequality in society can be reduced by empirically examining the income disparity, expenditure pattern, and environmental income options.

MATERIALS AND METHODS

The study was carried out at NEH region of India comprising six states, viz. Arunachal Pradesh, Manipur, Meghalaya, Mizoram, Nagaland and Tripura during

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2016–17. The region constitutes only 7.98% of India's geographical area, but it accounts nearly one-fourth of total forest cover. The total forest cover in the region is 170541 km^2, which is 65.05% of its geographical area (FSI 2019). The region houses about 200 of the 635 tribal groups in the country. Of the total area in the region, over 63% is mountainous, another 8% exists as plateau and only 29% area can be classified as plains which is suitable for cultivation or other human activities requiring flat terrain. The region is known for 'slash and burn' type of shifting cultivation, locally known as *jhum and* over 400000 families are still engaged in this kind of farming (Dikshit and Dikshit 2014).

In this region, the ownership over forest as well as land closer to people's settlements is historically possessed by Scheduled Tribes (ST). The ST households have been reclaiming the forest lands as per their agricultural requirements and livelihood, because such kind of reclamation of forest land did not warrant permission from authorities. This is one of the main reasons why ST households in the region generally possess more land in comparison with other social groups (GoI 2014). Over the years, especially in recent past, private land ownership has also evolved as means of livelihood of those STs who have changed towards more diversified, modern and market-oriented employment and economy (Marchang 2018).

Sources of data: The study mainly used primary data collected through household survey.Those districts where SC was more prominent as identified on the basis of available inputs from India's North-East and the North Eastern Council–the main agency for economic and social development of the region–and with the facilitation of the forest departments of the respective states have been included in the study. The extent or intensity of SC along with the density of *jhumia* families were the basis for selecting one district from each state. Within the selected district, taking into consideration the geographical area of the state, 50 respondents were selected from smaller states and 100 respondents were selected from larger states and all the respondents practising *jhum* were included in the sample. Accordingly, smaller sample (50 respondents) was drawn from Saiha in Mizoram and Dhalai in Tripura and larger sample (100 respondents) was drawn from Upper Subansiri district in Arunachal Pradesh, Churachandpur in Manipur, West Garo hills in Meghalaya, and Mon in Nagaland. The Tippett table of random numbers was used for carrying out random sampling and the total sample size was 500.

Methods of analysis: Inequality measurement is an important indicator in economy, because it indicates weather economic growth is taking place with equity or not? Also, the benefits of economic growth are concentrated with a few or it trickled down to large segment of the society. The primary household data were collected, tabulated and analysed using following analytical tools and procedures:

Estimation of income distribution and income inequality

Lorenz curve: The Lorenz Curve is a graphical tool used to represent income or wealth distributions. The curve indicates which proportion of total income is in the hands of a given percentage of population. The Lorenz Curve shows the cumulative proportion of income to the cumulative proportion of individuals. This curve depicted through graph in which x-axis represented the cumulative proportion of population ranked by income (wealth) level where as y-axis records the cumulative proportion of income for a given proportion of population, i.e. the income (wealth) shares. The 45^0 line is hypothetical line indicating perfect equality in income distribution. The shape of the Lorenz Curve is therefore a good visual indicator of how much inequality there is in an income distribution.

Gini coefficient/Gini index: The Gini coefficient, which is derived from the Lorenz curve, is commonly used to measure the income inequalities (Sloman 2000) using primary household data (Chen 2018). However, Gini coefficient gives the numerical measure of shape of the income distribution plotted as a Lorenz curve. It was calculated by taking the cumulated income of a given share of the population, divided by the total income Y, as follows:

$$GI = \sum_{i=1}^{n}\sum_{j=1}^{n} Ixi - xjI \,/\, 2n^2\overline{x}$$

where, GI-Gini Index, x is observed value and x bar is the mean value.

The Gini coefficient ranges between zero and one, higher value of the coefficient indicates more unequal distribution in income or wealth.

Environmental income

It refers to extraction of income from the non-cultivated sources – natural forests, and non-forest wild lands–wild plants (grass, bush and wetlands, fallows) and animals (Angelsen *et al.* 2014). Environmental income supports rural livelihoods broadly by (i) supporting current consumption, (ii) providing safety-nets in response to shocks and gap-filling of seasonal shortfalls, and (iii) providing means to accumulate assets and providing a pathway out of poverty. The data on forest resources including bamboo bearing area was obtained from the report of the Forest Survey of India.

RESULTS AND DISCUSSION

Income and expenditure pattern among respondents: The income, expenditure pattern and savings of the selected forest dwelling families of six north eastern states, viz. Arunachal Pradesh, Manipur, Meghalaya, Mizoram, Nagaland and Tripura were analysed. The results reveal that the total monthly income of forest dwellers was the highest in Nagaland (₹13450) and the income was lowest in Tripura (₹1609). However, the primary income (shifting cultivation and allied activities) hold a greater share (67.6–96.4%) in total income and the rest of the income was obtained from secondary sources (non-farm, daily wages, business or service) (3.6–32.4%). Thus, the results indicated that the forest dwellers were highly dependent on the forest for their livelihood. The monthly expenditure pattern of

respondents indicated that it was highest in Mizoram (₹9136) followed by in Arunachal Pradesh (₹7119), Nagaland (₹5633), Meghalaya (₹4429) and Manipur (₹4071). Food and education together accounted for 42% of total expenditure in Meghalaya and 72% in Mizoram.

The results obtained on share of expenses and saving in selected states shows that the highest share of saving in total income was in Manipur (60.30%) followed by Nagaland (58.10%), Meghalaya (45.4%), Arunachal Pradesh (44.1%), Mizoram (28.45%) and Tripura (15.1%) and remaining were spend as expenses. Access to indigenous foods and traditional shifting cultivation are helping the households to spend less on food expenditure. In Mizoram, due to shift in land use pattern towards cash crop based monoculture, the food expenditure of sampled households have gone up and thereby negatively affecting the share of saving, whereas in the case of Tripura, the similar change in land use pattern has negatively influenced the forest dependent households and in turn affected their indigenous food system services and subsequently their share on saving is the lowest.

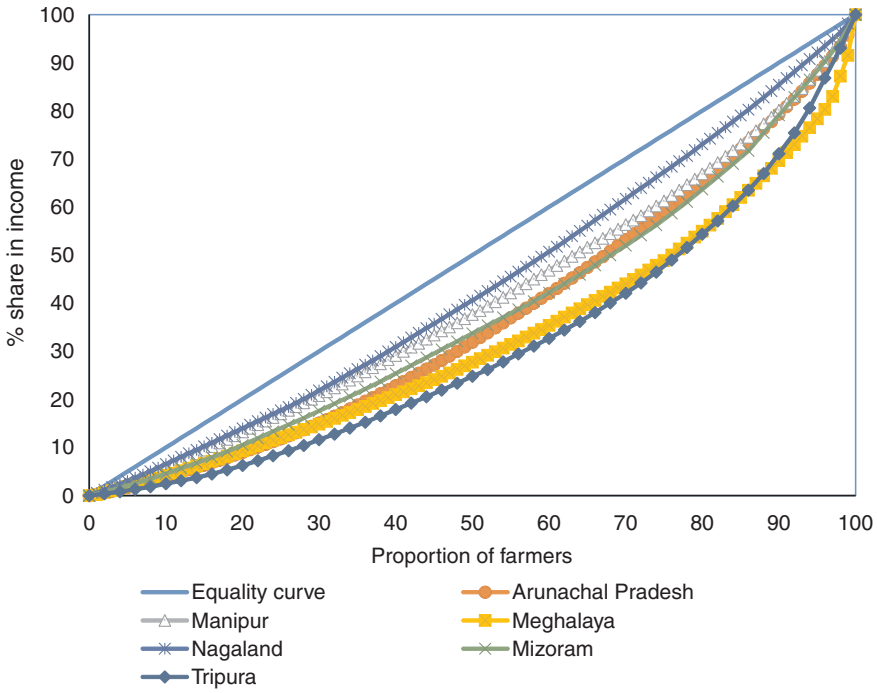

Fig 2 Lorenz curve of total income for the sample states.

Disparity in income distribution among the respondents: The share of the primary income in the present study was coherent to results obtained from other studies in different parts of the world. The inequality in income distribution among respondents is depicted in Lorenz curve (Fig 1). Lowest income was observed in Tripura as compared to the rest of the sampled states due to highest population density of 350 km^2 (Census 2011). Further, Tripura had highest Gini coefficient and lowest in Nagaland (Fig 2).

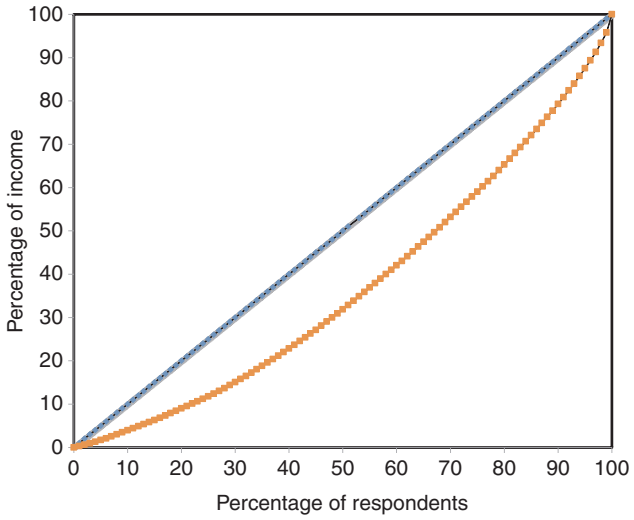

Fig 1 Lorenz curve showing inequality in income distribution among respondents.

For six sampled states, overall distribution of income is represented through the Lorenz curve which indicates unequal distribution in income of the respondents. It is observed that, the lower 50 percentile of the respondents had 32% of the aggregate income but top 10 percentile of the respondents had 20% of the aggregate total income. The percentage of aggregate income proportionally increased with rise in the percentile of the respondents. Further, state-wise distribution of income, the aggregate lower 10 percentile of the respondents in Tripura had 3.9% of the total income, whereas, top 10 percentile of respondents mainly from Arunachal Pradesh, Mizoram, and Nagaland had 20% of the aggregate income. The distance of the Lorenz curves from line of equality for the state Tripura, Meghalaya, Arunachal Pradesh, Mizoram, Manipur and Nagaland indicates descending order of inequality in distribution of income in these states.

The Gini coefficient increased as the distribution of income among the farmers departed from equality for income data of six sampled states of India. For Tripura, the Lorenz curve was farthest from line of equality and had a Gini coefficient of 0.381, whereas in case of Meghalaya Gini coefficient was 0.349 followed by Arunachal Pradesh (0.26), Mizoram (0.247), Manipur (0.191) and Nagaland (0.133), respectively. Overall for 500 respondents of all six states of NE Region of India, the GI was 0.32 indicated skewed distribution of income. The results of Gini indices calculated for primary and secondary income separately for the respondents at state level and overall.

These results showed the similar pattern in case of primary income, whereas there was a huge difference in GI

in secondary income of the farmers in all the NEH states except Mizoram, which is evident from the Gini coefficient. The estimated Gini coefficient primary income was higher in Meghalaya (0.32), followed by Arunachal Pradesh (0.26), Tripura (0.20), Manipur (0.16), Mizoram (0.16), Nagaland (0.12). The lowest Gini coefficient of secondary income was recorded in Mizoram (0.20), Tripura (0.27), Arunachal Pradesh (0.56), Nagaland (0.60), Meghalaya (0.76) and Manipur (0.88). The higher Gini coefficients are due to the high numbers of subsistence farmers and low numbers of large landowners with land use change across the region. However, 10% of the respondents in the present study were found to below the international poverty line of USD 1.25 per person per day.

Opportunities for enhancing environmental income: The study results revealed that all the sampled states had greater than 70% forest cover of their geographical area. Mizoram had highest forest area (86%) than those that of all other sampled states. The bamboo is commonly referred as "poor man's wood" and considered as green gold (Desai *et al.* 2015) recorded sizable bearing area in all the surveyed states. The area under bamboo was highest in Manipur (47.86%) of total geographical area followed by Nagaland (36.34%) and Tripura (34.39%). In the study area, people use forest resources to meet subsistence needs, as tradable goods to generate cash income (Angelsen *et al.* 2014), and as raw materials in a variety of processed products like paper production. It is also widely used in house construction, furniture, fencing, flooring tiles, conservation of soil, food purposes and cattle food. Legislative steps like Scheduled Tribes and the Other Forest Dwellers (Recognition of Forest Rights) Act 2006 which provide tenurial security and access rights to forest dwellers, and amending the Indian Forest Act and declaring the bamboo-taxonomically as a grass would increase the earning of the respondents. In fact these environmental resources reduce income inequality (Chhetri *et al.* 2015) and prevent poverty by functioning as safety nets (Shackleton *et al.* 2008) or reduce poverty through high earnings (Belcher *et al.* 2015).

This study analysed the income and expenditure pattern and income disparity among forest dwellers in 52 villages spread across in NEH region of India. The study also examined the available opportunities along with the potential challenges in order to augment their income. Firstly, the study found the significant inter-state disparity in total income distribution; probably this was contributed by unequal opportunities for engaging in non-farm activities among the respondents. Secondly, it can be learnt that though infrastructure status is relatively poor in the region, still there is considerable scope to enhance the economic well-being with available environmental resources.

In view of this, it is suggested that agricultural developmental policies need not lay more emphasis on specialization; instead such policies need to focus on augmenting incomes, minimizing poverty, and ensure balance by protecting of ecosystem services. As proposed by earlier researchers, in NEH region of India too, quality spending on education, health, social protection, enhanced spending on housing would be more effective pathways in reducing inequality. Public investments and developmental policies need to be dovetailed so as to act as drivers for enabling the poor to have increased access to assets which would help them overcome entry barriers for non-farm employment. As the wages for the workers would directly contribute to reducing income inequalities, the Government need to enforce minimum wages for ensuring a decent standard of living.

ACKNOWLEDGEMENTS

This study is a part of an extra-mural research project funded by the Agricultural Extension Division, Indian Council of Agricultural Research, New Delhi.

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