Original Research Article

Income Inequality and its Pattern among Farm Households in Southern Rajasthan

Abstract

The study was undertaken to analyse the income inequality and its pattern among farm households in Udaipur and Banswara districts of southern Rajasthan. The study was based on primary data collected from 240 households with the help of pre structured schedule during the year 2020-21. Selection of farmers categorized into two categories i.e., beneficiary farmers and non-beneficiary farmersunder assured and unassured irrigation, respectively. Lorenz curve and Gini Concentration ratio were used to analyzed the data. Results revealed that the Gini-concentration ratio for beneficiary farms was observed lower i.e., 0.36 and 0.40 as compared to non-beneficiary farms i.e., 0.46 and 0.48, respectively in Banswara and Udaipur districts. Thus, it can be concluded that income inequality was lower on beneficiary farms compared to non-beneficiary farms in the study area.Authors recommended that government should encourage the farmers to increase agricultural productivity, use of new technology providing byirrigation facilities~~by~~ water harvesting technologyin study area to increase the farm income andlower down the income inequality.

Keywords: income inequality, Lorenz curve, Gini Concentration ratio

Comment [Mu1]: Remove “by” and add “and” please

Comment [Mu2]: Kindly add more Keywords “beneficiary farmers and non-beneficiary farmers”

Introduction

Agriculture and allied sectors play an important role in the Rajasthan state's economy. A large segment of the population is dependent on agriculture and allied activities for its livelihood. The level of ground water in the state is rapidly going down. Despite this, agriculture and allied sectors continues to be the backbone of the state's economy and continues to be a large contributor to the state's GSDP. The Gross State Value Added (GSVA) increased from ₹ 1.57 lakh crore in 2018-19 to ₹ 2.09 lakh crore in 2022-23, showing an increase of 7.48 per cent per annum (CAGR) at constant (2011-12) prices while at current price the GSVA of Agriculture and allied sectors increased from ₹ 2.22 lakh crore in 2018-19 to ₹ 3.79 lakh crore in 2022-23 showing an increase of 14.33 per cent per annum (CAGR).

Per capita income was ₹ 86,134 at constant prices (2011-12) while ₹ 156149 at current price in the year 2022-23 (Economic Review 2022-23).

Income inequality among farm households can be influenced by various factors, such as landholding size, access to resources, agricultural productivity, market integration, government policies, and socio-economic characteristics of the households. In rural areas, agriculture is a significant source of income for many households. However, the distribution of landholdings can be quite unequal, with some households owning large land holding while others possess only small area of land. In rural areas, inequality of income has its origin in the unequal distribution of land holdings and assets, which shows a cumulative effect over time.

This disparity in land ownership can lead to variations in income levels among farmers.Moreover, access to irrigation, credit, and modern agricultural practices can impact agricultural productivity and consequently affect income levels. Farm households with better access to resources and technology might have higher incomes compared to those with limited access.Income and its sources are important measures to understand the level of households' living standard and ways to achieve that level. Income along with households' expenditures and possessions reveal aspects of income volatility and provides an additional measure of inequality.

Distribution of total income may change with change in individual component of income or change in income share of components among the farmers. Income from cultivation of crops is the most important factor in income inequality among farmers. In view of this, an attempt was made to study the income generation and inequality in households' income in study area.

Methodology

The present study was undertaken in southern Rajasthan during the agriculture year 2020-21. Primary data were collected from Udaipur and Banswara districts. Three tehsils (Vallabhnagar, Mavli and Girwa) from Udaipur district and three tehsils (Ghatol, Banswara and Garhi) fromBanswara district were selected on the basis of highest irrigated area under tube-wells and canal irrigation sources. Two villages from each selected tehsil were randomly selected having sufficient area under irrigation by tube-wells and canal in Udaipur and Banswara districts, respectively.A sample of 240 farmers was selected randomly in the study area. Selection of farmers categorized into two categories i.e., beneficiary farmers raised the crop under assured irrigation by tube-well and canal in Udaipur and Banswara district, respectively. Whereas, non-beneficiary farmers used either no irrigation or partly irrigation from unassured source of irrigation. To measure the inequality in income of the farmers following two methods were used.

Lorenz curve technique

It was used to measure the inequalities of the income distribution among selected farmers under tube-well and canal irrigation. To draw a Lorenz curve, the cumulative percentage of income receiving households was represented on the horizontal axis, the cumulative percentage of aggregate income on the vertical axis, and the curve represents the locus of all the combinations of the two cumulative percentages. The diagonal line presents a perfectly equal distribution of income, and hence was known as the line of equality or egalitarian line. In general, farther the line of equality from Lorenz curve, the higher is the degree of income inequality.

Gini- concentration ratio (GCR)

Gini Coefficient (Giovanni, 1990) as a measure of inequality of income distribution, can be obtained from the Lorenz curve. It gives the area enclosed between the observed Lorenz curve and the line of absolute equality as a proportion of the total area under the line of absolute equality. Thus,

$$\text{Gini Coefficient} = \frac{\text{Area between Lorenz curve and diagonal}}{\text{Total area under diagonal}}$$

Note: Gini coefficient has the maximum value of unity (absolute inequality) and a minimum value of zero (absolute equality).

The Gini concentration ratio was calculated by using the following formula-

$$\text{Gini - Concentration Ratio (GCR)} = 1 - \sum_{i=1}^{n} p_i \, (Q_i + Q_{i-1})$$

Where,

p_i = Proportion of households

Q_i = Cumulative proportionate income of i^{th} class interval

Q_{i-1}= Cumulative proportionate income of preceding class interval

Results and Discussion

Income and its sources are important measures to understand the level of household's living standard and way to achieve that level. Primary sources of income is generally from agriculture, service and hiring out human labour in the selected area. The contribution of these sub sectors is different on various size group of farms. Thus, the compare income distribution of household'sbeneficiary and non-beneficiarywas analyzed for Udaipur and Banswara districts.

Pattern of Income distribution on beneficiary and non-beneficiary farms in Udaipurdistrict:

The distribution pattern of gross income on beneficiary and non-beneficiary farms in Udaipur district are shown in Table 1. It indicated how sampled households were clustered into six groups based on their annual income level. The gross income of selected households for beneficiary farms was higher than non-beneficiary farms in Udaipur district. A better method provided by Lorenz curve (which takes into account the income of all households) showed that the lowest share of 36.67 per cent of households accounted 13.95 per cent of income while upper 8.33 per cent households shared 27.33 per cent of the income. Whereas, on non-beneficiary farms top 13.33 per cent of households shared 45.26 per cent of income and farmers having income less than Rs.1 lakh (19.14 per cent) shared by 31.67 per cent households. All these indicated presence of more income inequality on non-beneficiary farms as compared to households of beneficiary farms in Udaipur district.

Figure1 showed graphical representation of Lorenz curve drawn to see how income was distributed among sampled households in Udaipur district. Lorenz curve for the beneficiary farm income distribution among samples households was observed close to the equality line

than income distribution of non-beneficiary farms. Further results also indicated that income of sampled households on beneficiary farms was more equitably distributed as compared to non-beneficiary farms in Udaipur district. The quantification of difference was done by calculating the Gini-coefficient ratio for income distributed at both beneficiary and non-beneficiary farms. The Gini-concentration ratio for beneficiary farms was observed to be lower i.e., 0.40, as compared to non-beneficiary farms i.e., 0.48. Similar findings were also reported by Melkamu and Kumar (2015) and Nikam (2018).

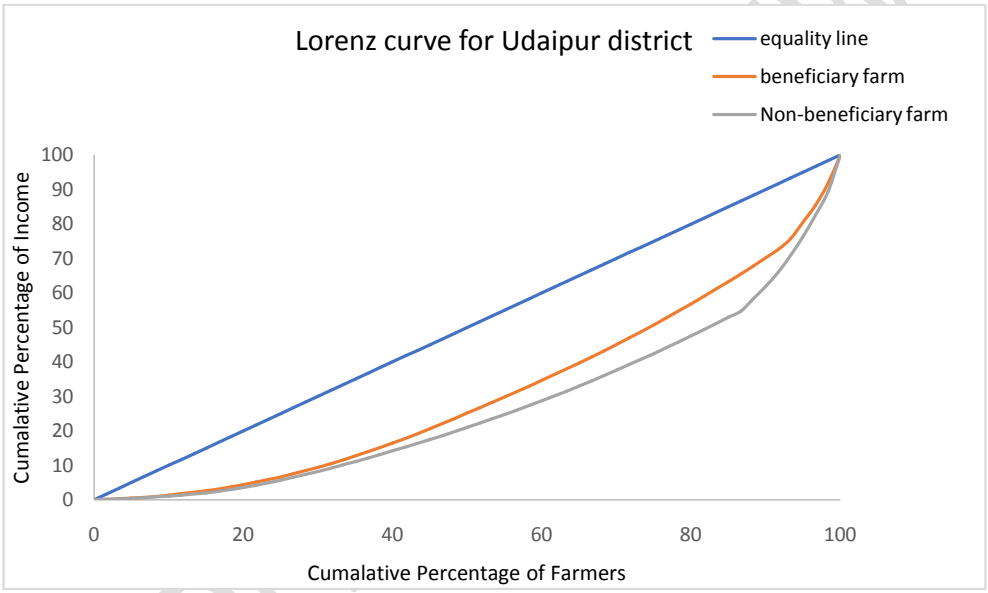

Fig 1: Lorenz curve for income distribution in Udaipur district (2020-21)

Table 1: Households' Income Distribution in Udaipur district

Income group in (in lakhs)	**Beneficiary farm**						**Non-beneficiary farm**					
	Households (No.)	Households (%)	Cumulative Percentage of Households	Total Income of Households (Rs.)	Income (%)	Cumulative Percentage of income	Households (No.)	Households (%)	Cumulative Percentage of Households	Total Income of Households (Rs.)	Income (%)	Cumulative Percentage of income
< 1.00	22	36.67	36.67	1137500	13.95	13.95	19	31.67	31.67	1007000	9.14	9.14
1.00-1.25	9	15.00	51.67	1039000	12.74	26.69	10	16.67	48.33	1171200	10.62	19.76
1.26-1.50	12	20.00	71.67	1646500	20.19	46.88	8	13.33	61.67	1139500	10.34	30.10
1.51-1.75	7	11.67	83.33	1161000	14.24	61.12	6	10.00	71.67	1002000	9.09	39.19
1.76-2.00	5	8.33	91.67	942000	11.55	72.67	9	15.00	86.67	1714500	15.55	54.74
>2.00	5	8.33	100.00	2229000	27.33	100.00	8	13.33	100.00	4989000	45.26	100.00
Total	60	100.00		8155000	100.00		60	100.00		11023200	100.00	
Gini-Concentration ratio			0.40				0.48					

Pattern of Income distribution on beneficiary and non-beneficiary farms in Banswara district:

The distribution pattern of gross income on beneficiary and non-beneficiary farms in Banswara district is depicted in Table2 and Fig 2. The results revealed that the gross income of selected households for beneficiary farms was higher than non-beneficiary farms in Banswara district. Results showed that bottom 33.33 per cent of households accounted 13.55 per cent of income while top 15.00 per cent households shared more than Rs.2 lakh (33.36 per cent) of the income. Whereas, on non-beneficiary farms 26.67 per cent of households shared only 8.28 per cent of income while top 13.33 per cent households shared 44.54 per cent of the income. This clearly showed that income distribution was relatively more uneven in the case of non-beneficiary farms as compared to households of beneficiary farms in Banswara district. The Lorenz curve for the beneficiary farm income among sample households was observed close to the equality line than income of non-beneficiary farms. Further results also indicated that income of sampled households on beneficiary farms was more equitably distributed as compared to non-beneficiary farms in Banswara district. The Gini-concentration ratio for beneficiary farms was observed to be lower i.e., 0.36 as compared to non-beneficiary farms i.e., 0.46. Similar findings were also reported by Melkamu and Bannor (2015) and Meena *et al*. (2017) in their study.

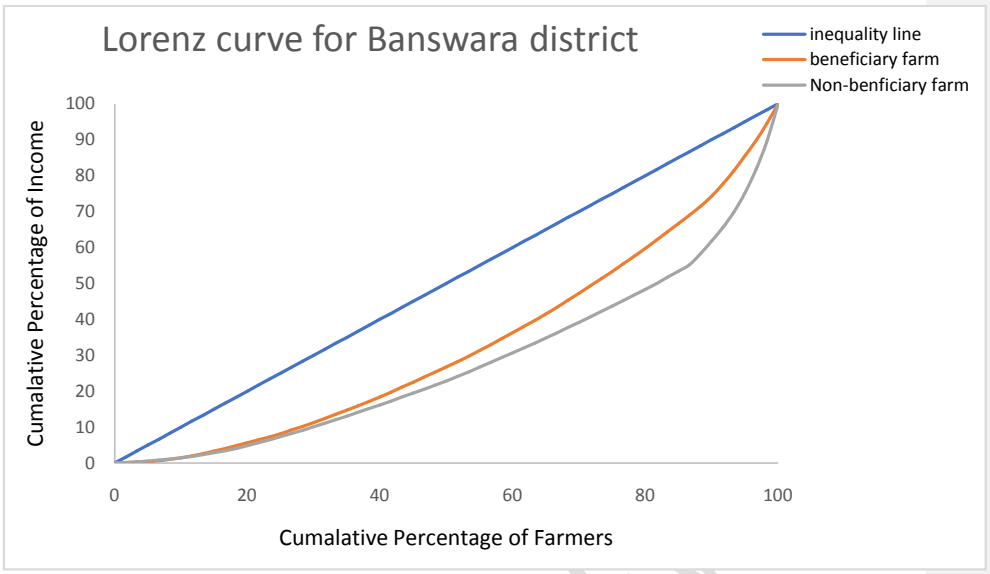

Fig 2: Lorenz curve for income distribution in Banswara district (2020-21)

Table 2: Households' Income Distribution in Banswara district

Income group in (in lakhs)	**Beneficiary farm**						**Non-beneficiary farm**					
	Households (No.)	Households (%)	Cumulative Percentage of Households	Total Income of Households (Rs.)	Income (%)	Cumulative Percentage of income	Households (No.)	Households (%)	Cumulative Percentage of Households	Total Income of Households (Rs.)	Income (%)	Cumulative Percentage of income
< 1.00	20	33.33	33.33	1173800	13.55	13.55	16	26.67	26.67	931000	8.28	8.28
1.00-1.25	11	18.33	51.67	1270000	14.66	28.21	13	21.67	48.33	1515200	13.47	21.75
1.26-1.50	8	13.33	65.00	1146300	13.23	41.44	6	10.00	58.33	866000	7.70	29.44
1.51-1.75	5	8.33	73.33	853500	9.85	51.29	12	20.00	78.33	1973000	17.54	46.98
1.76-2.00	7	11.67	85.00	1330000	15.35	66.64	5	8.33	86.67	954000	8.48	55.46
>2.00	9	15.00	100.00	2890000	33.36	100.00	8	13.33	100.00	5010000	44.54	100.00
Total	60	100.00		8663600	100.00		60	100.00		11249200	100.00	
Gini-Concentration ratio			0.36				0.46					

Overall comparison of income distribution in the study area:

Efforts were made to compare the income distribution of selected households of Banswara and Udaipur districts. Constructed a detailed income profile and correlated income distribution based on the sampled households survey data of 240 (60 for each category) farmers and presented in Fig 3. The evidence from empirical analysis shows that non-beneficiary farms were found to be with higher Gini concentration ratio compared to beneficiary households. The Gini coefficient of Udaipur and Banswara district were almost equal and were found far from the equality line on non-beneficiary households compared to beneficiary households in the study area.

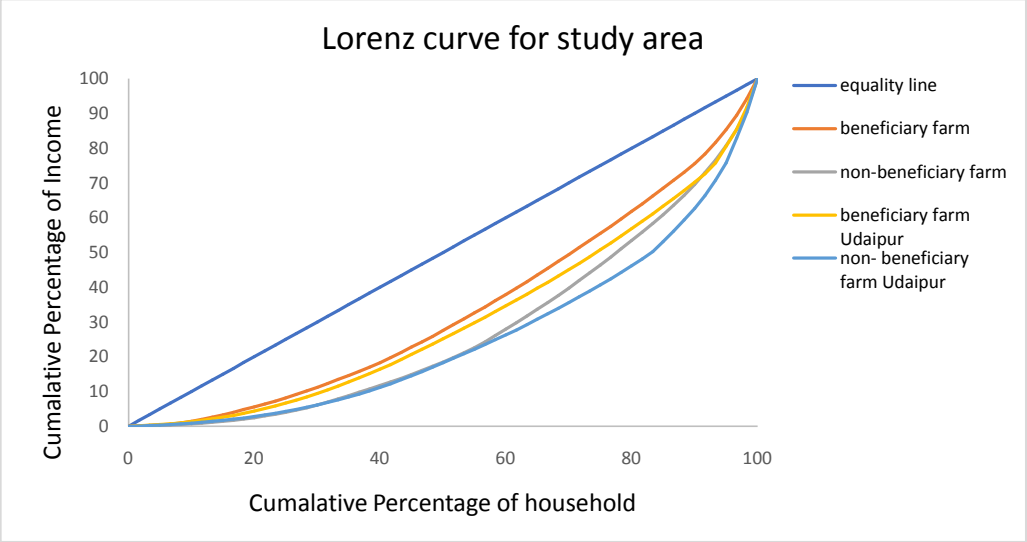

Fig 3: Lorenz curve for income distribution in Udaipur and Banswara district

Thus, it can be concluded from above graph that income equality was better on beneficiary farms than non-beneficiary farms in the study area. In the summary on fig 3, income distribution overlap on non-beneficiary farms in both the districts, which indicated almost equal distribution of income in both districts with Gini-concentration ratio of 0.46 and 0.48.

Conclusion and Recommendations

The findings concluded that income inequality was lower on beneficiary farms compared to non-beneficiary farms in the study area. The Gini-concentration ratio for beneficiary farms was observed lower i.e., 0.36 and 0.40 as compared to non-beneficiary farms i.e., 0.46 and 0.48, respectively in Banswara and Udaipur districts. Income distribution overlap on non-beneficiary farms in both the districts, which indicated almost equal distribution of income of households.

Based on the findings, the researchers recommend the following;

- Government programmes which are targeting towards increase in agricultural productivity should be encouraged so that income distribution on beneficiary farms and non-beneficiary farms above equitable distribution.
- Water harvestingprogrammes should be encouragedamong farmers who are not having theluxury of canals in their areas offarming to adopt new technology and package of practices on their farms.

References

Economic Review 2022-23, Directorate of Economics and Statistics, Rajasthan

Bathla, S. and Kumar, A. 2019. Factors contributing to income inequalities among agricultural households in India. *Economic and Political Weekly*, **54**(21): 55-61.

Chakravorty, S., Chandrasekhar, S. and Naraparaju, K. 2016. Income generation and inequality in India's agricultural sector: The consequences of land fragmentation (No. 2016-028). Indira Gandhi Institute of Development Research, Mumbai, India.

Husna, A.U., Ethen, D.Z., Begum, I.A., Yesmin, F., Khushi, H. and Mahfuza, E.J. 2020. Shrimp production and its effects on family income inequality in some selected areas of Khulna district. *Research in Agriculture Livestock and Fisheries*, **7**(1): 153-163.

Meena, M.S., Singh, K.M., Singh, R.K., Kumar, A., Kumar, A. and Chahal, V. 2017. Inequality and determinants of income among rural households in tribal dominated areas of Jharkhand. *Indian Journal of Agricultural Sciences*, **87**(1): 92-96.

Melkamu, M. and Bannor, R.K. 2015. Estimation of agricultural resource inequality in India using Lorenz curve and Gini coefficient approach. *International Journal of Current Research and Academic Review*, **3**(4): 174-184.

Comment [Mu3]: APA style, put it in right location sir

Comment [Mu4]: Please kindly cite these references or replace them sir

Melkamu, M. and Dinesh, K. 2016. Income and resource inequality in bikaner district of northern Rajasthan, india. *Journal of International Academic Research for Multidisciplinary*. **3**(11):235-250.

Melkamu, M. and Singh, N.K. 2016. Agricultural resource and income inequality in northern Rajasthan. *Indian Journal of Economics and Development*, **12**(2): 265-272.

Melkamu, M. and Sohan, L. 2015. Income and agricultural resource inequality in Sri Ganganagar district of Northern Rajasthan, India. *International Journal of Research in Economics and Social Sciences*, **5**(10):161-179.

Nikam, M.B. 2017. Economics of Integrated Farming Systems in North Konkan Region of Maharashtra, Ph.D. (Agriculture Economics), thesis submitted to MPUAT, Udaipur Rajasthan.

Pandey, D.K., Adhiguru, P., De, H.K., Upadhyay, A.D. and Radhakrishnan, K. 2021. Income inequality among indigenous people dependent on traditional agroforestry system in Indian Himalayas. *The Indian Journal of Agricultural Sciences*, **91**(6): 847-851.

Comment [Mu5]: Please kindly cite these references or replace them sir

Comment [Mu6]: Please kindly cite this reference or replace it sir