



Research Article

AGRICULTURAL FARM HOUSEHOLD SITUATION IN THE NORTH EAST INDIA

LIMASUNEP OZUKUM* AND SANJOY DAS

Department of Agricultural Economics, School of Agricultural Sciences and Rural Development, Nagaland University, Medziphema, 797106, Nagaland, India

*Corresponding Author: Email - sunepzswaggyp@gmail.com

Received: July 01, 2020; Revised: July 17, 2020; Accepted: July 18, 2020; Published: July 30, 2020

Abstract: This study assessed the income of farm households based on the Situation Assess Survey of farmers conducted during the 70th round of National Sample Survey with special reference to North East Region. The indicators The Gini coefficients of total income among farm households of the NE states are 0.26. The Gini for was highest non-farm business (0.42). The share of a component in income inequality is highest for non-farm business (72%) and more than its share of income. The share of farming from animals' income in income inequality is 17%, cultivation (9%) and wages (1%). Income from non-farm business increase income inequality where a 1% increase in share of this income will raise inequality by 25%. Cultivation income and wage income are inequality decreasing where a 1% increase in the share of these incomes will reduce income inequality by 9% and 1.6% respectively. Therefore, cultivation income and wage income have potential to reduce income inequality in the NE as lower strata earn more incomes from these sources than the high-income strata.

Keywords: Farm household, Income, Gini coefficient, Income inequality

Citation: Limasunep Ozukum and Sanjoy Das (2020) Agricultural Farm Household Situation in the North East India. International Journal of Agriculture Sciences, ISSN: 0975-3710 & E-ISSN: 0975-9107, Volume 12, Issue 14, pp.- 10048-10052.

Copyright: Copyright©2020 Limasunep Ozukum and Sanjoy Das, This is an open-access article distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution and reproduction in any medium, provided the original author and source are credited.

Academic Editor / Reviewer: Dr Hemangi Mehta, Dr Prashant Shrivastava

Introduction

The North East Region (NER) constitutes eight states of Arunachal Pradesh, Assam, Manipur, Meghalaya, Mizoram, Nagaland, Sikkim and Tripura. Its population of 45.77 million constitutes 3.78% of country's population. The NER comprises an estimated number of 4.46 million of agricultural household with a work force of about 6.61 million agricultural cultivators [1]. With the country towards pushing the agriculture sector into a new era under the vision of double farmers' income by 2022-23, an essentiality to determine the current situation of the North East Region farmers arises. Therefore, this study has been initiated to acquire acumen of the north-eastern farmers in the voyage of doubling farmers' income.

This study has been commenced to estimate the income of NE farm households based on the Situation Assess Survey of farmers conducted during the 70th round of National Sample Survey with special reference to North East Region. Other sources of information as secondary data were collected from various government publications and websites [2,3].

Material and Methods

Pearson's correlation was used to determine the significant relationship between various parameters. Descriptive statistics were used to represent the data in the form of pie charts and tables. The income inequality was measured using Gini coefficient using method suggested by Lerman and Yitzakhi (1985) to understand which income components contribute to income inequality more. The Gini index or Gini coefficient was used as the measure of economic inequality which is shown as

$$G = \frac{\sum_{j=1}^n \sum_{i=1}^n (|x_i - x_j|)}{2 \sum_{j=1}^n \sum_{i=1}^n (x_j)} = \frac{\sum_{j=1}^n \sum_{i=1}^n (|x_i - x_j|)}{2n \sum_{j=1}^n x_j} = \frac{\sum_{j=1}^n \sum_{i=1}^n (|x_i - x_j|)}{2n^2 \bar{x}}$$

Results and Discussion

Household income composition

The average income from farming in India during 2002-03 was 34 percent of the total annual income which decreased to 8 percent. Average income from wages/salaried employment and livestock increased from 34 percent to 56 percent and 3 percent to 22 percent respectively. From [figure 1.2], we observed that for the NE states, the average income from non-farm business constitutes a major share in the total annual average (47%) followed by income from cultivation (18%), wages (18%), livestock (17%).

State wise farm household income

On an average the total farm household income is about ₹18243.00 per month in which the non-farm business (₹8618.25 per month) has the highest income. Among the NE states, Arunachal Pradesh and Nagaland have the highest income while Tripura, Assam and Mizoram have lower total income. With respect to income from cultivation, Arunachal Pradesh and Meghalaya earn the highest while Sikkim, Manipur and Tripura earn the lowest. In terms of shares, income from crop cultivation is higher for Assam (38.33%) and Mizoram (35.41%) in comparison to the other NE states. In farming of animals, Manipur, Arunachal Pradesh and Nagaland have high income while Mizoram, Assam and Tripura have low income. In terms of shares, Manipur constitutes 35% of the total income while farm households in Meghalaya and Sikkim earn less than 10% of their income from farming of animals. In nonfarm business, farm households in Arunachal Pradesh (₹25406 per month) and Sikkim (₹12066 per month) earn the highest on an average while the average income from non-farm business is the lowest for Mizoram (₹1168 per month). In terms of shares, the income from non-farm activities constitute more than 50% of the total income for states like Sikkim, Tripura and Arunachal Pradesh while the rest of the NE states have less than 50% share of income from non-farm business in the total income. In income from wages, Nagaland, Manipur and Meghalaya have high income in comparison to Assam and Tripura.

In terms of shares, Mizoram constitutes about 31.35 percent of the total income from wages while for Arunachal Pradesh, the share of income from wages comprised of less than 10 percent in the total household income.

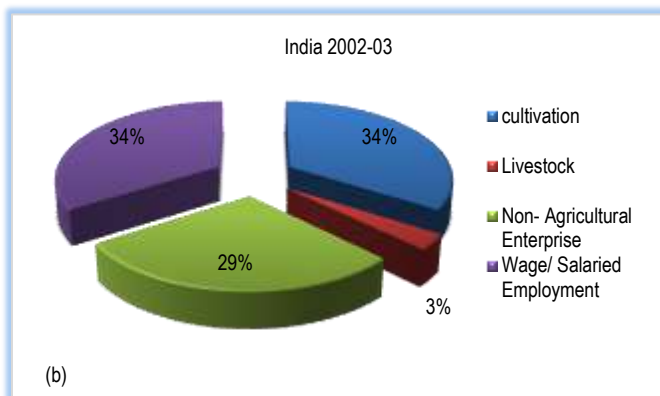
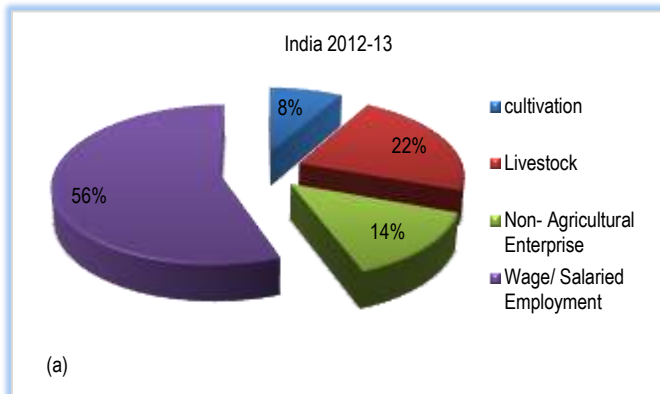


Fig-1 Annual Income distribution of farm household in India

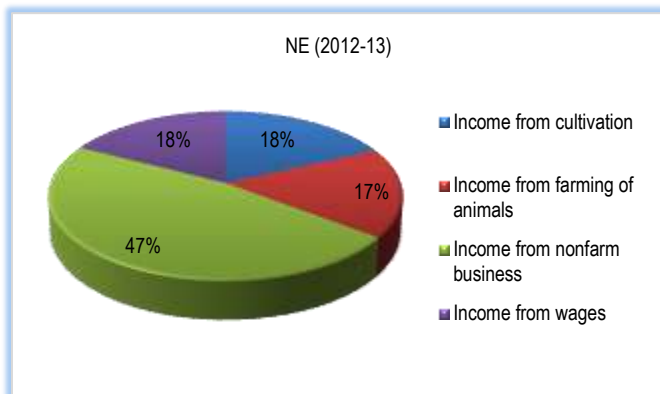


Fig-2 Annual Income distribution of farm household in NE states

To observe the relation between income from different sources and total income across the NE states, it was observed that the Pearson correlation between income from non-farming business and total income is the highest and positively significant (0.952) followed by income from farming of animals (0.740) which was significant and positive. The income from cultivation (0.135) and wages (-0.013) was low and insignificant. This depicts that income of the NE states is driven non-farm business and income from farming of animals. Higher the non-farm business and income from farming of animals in the region, higher is the farm household income in the state

Table-2 Relationship between total income and different share of income components using Pearson correlation

Variables	Coefficient
Income from cultivation	0.135(NS)
Income from farming of animals	0.740**
Income from nonfarm business	0.952**
Income from wages	-0.013(NS)

** Indicates significant at $p < .05$

Income from Cultivation for farm households

Among the cultivation economics across the NE states, we find that the total value per unit cost is highest in Mizoram (10.41) and Sikkim (10.23) and lowest in Manipur (3.94) and Tripura (3.99). [Table-5] shows the effect of various cost components shares on total expenses where correlation between total expenses and different cost components was analyzed. Significant and positive results was identified for seed cost shares, human labor and other expenses, which indicated that total expenses responded positively to increased seeds, human labor and other expenses share. [Table-6] shows that except for interest rates which showed significant negative relationship which indicates that with decrease in the share of interests there is increase in profitability, there was no significant relationship between GVO/Cost ratio and different shares of cost components.

Table-4 Relationship between total expenses and different share of cost components using Pearson correlation

Variables	Coefficient
Seeds	0.84**
Fertilizer /manure	0.60(NS)
Plant protection chemicals	0.71(NS)
Irrigation	0.69(NS)
Minor repair and maintenance of machinery and equipment	0.73(NS)
Interest	0.19(NS)
Lease rent for land	0.18(NS)
Human labour	0.98**
Animal labour	0.73(NS)
All other expenses	0.76**

** Indicates significant at $p < .05$

Table-5 Relationship between GVO/Cost ratio and different share of cost components using Pearson correlation

Variables	Coefficient
Seeds	-0.178(NS)
Fertilizer /manure	-0.422(NS)
Plant protection chemicals	-0.023(NS)
Irrigation	0.2490(NS)
Minor repair and maintenance of machinery and equipment	0.4083(NS)
Interest	-0.694*
Lease rent for land	0.1966(NS)
Human labour	0.0490(NS)
Animal labour	0.4084(NS)
All other expenses	-0.0023(NS)

Income from farming of animals

[Table-7] shows the share of value earned by households through sale of different products and share of different cost components in total cost. We find that milk and sale of live animals constitutes a major share in the total income from farming of animals in the NE states where Arunachal Pradesh earns the highest income (₹9511) while Meghalaya earns the lowest income (₹1710). Nagaland has the highest share of sale of live animals (94.17%) while Sikkim (17.06%) and Tripura (19.77%) has the lowest share of sale of live animals in the total income from farming of animals.

Table-7 Relationship between total expenses and different share of cost components using Pearson correlation

Variables	Coefficient
Cost of animal 'seeds'	0.415(NS)
Animal feed	-0.775**
Veterinary charges	-0.528(NS)
Labour charges	-0.028(NS)
All other expenses	0.383(NS)

Sikkim (80.81%) has the highest income from milk while states like Manipur, Meghalaya, Mizoram and Nagaland, the income from sale of milk constitute less than 10% in the total income from sale of farm animals. The GVO/Cost ratio showed the highest value for Meghalaya (7.38) and the lowest for Nagaland (1.63). The correlation between the GVO/Cost ratio and the different cost components showed no significant relationship. [Table-8] shows the correlation between total expenses and share of cost of animal feed was significant and negative, which indicates that with decrease in the share of animal feed leads to an increase in the total expenses,

Table-1 State wise farm household composition and income

State	Income from cultivation (₹)	Income from farming of animals (₹)	Income from nonfarm business (₹)	Income from wages (₹)	Total income (₹)
Arunachal Pradesh	5929(14.53)	7405(18.14)	25406(62.25)	2076(5.09)	40816
Assam	3621(38.33)	1263(13.37)	3132(33.16)	1430(15.14)	9446
Manipur	1099(8.47)	4592(35.38)	3473(26.76)	3815(29.39)	12979
Meghalaya	5538(28.17)	1148(5.84)	9200(46.79)	3776(19.20)	19662
Mizoram	4128(35.41)	2706(23.21)	1168(10.02)	3655(31.35)	11657
Nagaland	2783(12.83)	5338(24.61)	8174(37.69)	5393(24.87)	21688
Sikkim	1514(8.48)	1163(6.51)	12066(67.57)	3113(17.43)	17856
Tripura	1863(15.73)	1465(12.37)	6327(53.44)	2185(18.45)	11840
NE	3309.38 (18)	3135.00 (17)	8618.25(47)	3180.38 (18)	18243

Source: NSS, 2016

Table-3 Income from Cultivation for farm households

States	A.P.	Assam	Manipur	Meghalaya	Mizoram	Nagaland	Sikkim	Tripura
%Cropped area	75.79	68.92	100	75.44	100	77.71	53.47	53.8
Av. unirrigated land under cultivation	0.71	0.07	0.54	0.43	0.51	0.71	0.66	0.86
Total value	9509	5197	4057	7412	5110	3643	1882	3733
Seeds	345	68	32	26	38	29	8	56
Fertilizer /manure	33	181	142	238	1	59	3	191
Plant protection chemicals	12	66	20	149	2	10	0	24
Irrigation	27	4	7	0	12	5	3	18
Minor repair and maintenance of machinery and equipment	78	10	2	0	12	3	9	3
Interest	0	1	3	0	0	0	0	1
Lease rent for land	6	5	28	10	0	1	13	16
Human labour	791	228	461	426	201	135	95	398
Animal labour	136	26	61	16	24	6	53	26
All other expenses	361	199	274	71	199	182	1	201
Total expenses	1790	788	1029	937	491	430	184	935
Returns	7719	4409	3028	6475	4619	3213	1698	2798
GVO/Cost	5.31	6.6	3.94	7.91	10.41	8.47	10.23	3.99
GVO/Cost (2002-03)	5.57	5.57	5.57	5.57	5.57	5.57	5.57	5.57
Change	4.57	-18.41	29.28	-42.17	-87.61	-52.1	-82.64	28.24

Source: Agriculture situation in India, 2015

Table-6 Income from farming of animals

States	A. P	Assam	Manipur	Meghalaya	Mizoram	Nagaland	Sikkim	Tripura
Costs								
Cost of animal 'seeds'	803(38.13)	141(22.45)	873 (50.58)	119(21.17)	664 (46.11)	346 (27.31)	109(12.04)	187(24.74)
Animal feed	477(22.65)	294(46.82)	552 (31.98)	339(60.32)	314 (21.81)	487 (38.44)	731(80.77)	412(54.50)
Veterinary charges	26 (1.23)	29(4.62)	59(3.42)	19(3.38)	14(0.97)	0(0.00)	22 (2.43)	51 (6.75)
Labour charges	235(11.16)	14 (2.23)	35 (2.03)	20(3.56)	16(1.11)	0(0.00)	35 (3.87)	8(1.06)
All other expenses	565(26.83)	150(23.89)	207 (11.99)	65(11.57)	432 (30.00)	434 (34.25)	8(0.88)	98 (12.96)
Total expenses	2106	627	1726	562	1440	1268	906	755
Receipt								
Milk	1478(15.54)	506(26.77)	159 (2.52)	91(5.32)	204(4.92)	66(1.00)	1672(80.81)	1331(59.93)
Egg	131 (1.38)	102 (5.40)	53 (0.84)	16(0.94)	299(7.21)	319(4.83)	44 (2.13)	35 (1.58)
Live animals	6995(73.55)	1052(55.66)	5640(89.27)	1596 (93.33)	3581 (86.37)	6220(94.17)	353 (17.06)	439 (19.77)
Wool	160(1.68)	2 (0.11)	10 (0.16)	4(0.23)	0(0.00)	0(0.00)	0(0.00)	3 (0.14)
Fish	371(3.90)	222 (11.75)	346 (5.48)	0(0.00)	62(1.50)	0(0.00)	0(0.00)	273(12.29)
All other receipts	376 (3.95)	6 (0.32)	110 (1.74)	3(0.18)	0(0.00)	0(0.00)	0(0.00)	140(6.30)
Total	9511	1890	6318	1710	4146	6606	2069	2220
GVO/Cost	4.52	3.01	3.66	7.38	4.59	1.63	2.45	2.94

Source: NSS, 2016

Table-8 Poverty, inequality and Indebtedness among farm household in India

State	Per capita poverty line (INR per capita per month)	%of population earning per capita incomes below poverty line	%farm household outstanding loan	%farm household outstanding loan (2002-03)	Change in %farm household outstanding loan	Average outstanding loan amount (₹)	Average outstanding loan amount (₹) per ha
Arunachal Pradesh	13812	48.1	19.07	6	13.07	123112	83363
Assam	12080	50.38	17.51	18	0.49	3436	3186
Manipur	14222	54.88	23.89	25	1.11	6072	7054
Meghalaya	13328	30.17	2.37	4	1.63	1375	1290
Mizoram	14772	51.61	6.2	24	17.8	2096	2784
Nagaland	14758	53.63	2.48	37	34.52	601	544
Sikkim	13515	38.88	14.39	39	24.61	9864	14645
Tripura	11226	49.41	22.86	49	26.14	5049	7016
NE		48.96	15.86	32.39	16.53	18948.26	14982.89

Source: data compiled by authors from NSS, 2016 and Agricultural situation in India. 2015

Table-9 Decomposition of Gini coefficient

Source	Share of source in total income	Source Gini	Gini correlation	Share	Percent change
	S_k	G_k	R_k	$(S_k G_k R_k)/G$	$[(S_k G_k R_k)/G] - S_k$
	1	2	3	4	5
Income from cultivation	0.18	0.24	0.58	0.09	-0.09
Income from farming of animals	0.17	0.37	0.74	0.17	0
Income from nonfarm business	0.47	0.42	0.95	0.72	0.25
Income from wages	0.17	0.2	0.1	0.01	-0.016
Annual income		0.26			

Poverty, inequality and indebtedness among farm household in India

The overall farm households earning below poverty line is 48.96%. A very high proportion of farm households in Manipur (54.88%), Nagaland (53.61%), Mizoram (51.61%) and Assam (50.38%) earn less than poverty line. From [Table-5] we find that 15.86% of farm households of NE were under debt in 2012-13 while 32.39% farm households were under debt during 2002-03. Manipur (23.89%), Tripura (22.86%), Arunachal Pradesh (19.07%) and Assam (17.51%) had higher than the average NE share (15.86%) farmers who had outstanding loans. The share of farm household decreased for all the NE states except for Arunachal Pradesh which showed an increase of 13.07%. The average outstanding loan amount and average outstanding loan amount per ha was the highest for Arunachal Pradesh (₹123112 and ₹83363) and lowest for Nagaland (₹601 and ₹544) respectively.

Inequality among farm households in India

From [Table-10] we find that the Gini coefficients of total income among farm households of the NE states is 0.26 which is quite low. The Gini coefficient among components income would be higher as not all households are involved in all activities and the zero income would play a role in higher component Gini. The Gini for non-farm business is highest (0.42) followed by farming of animals (0.37), cultivation (0.24) and income from wages (0.20). This does not mean that the income component with highest inequality will contribute highest to total income inequality as the share of income and the distribution will also matter.

The Gini correlation (R_k) helps to indicate how correlated a component with total income distribution. If farm households earning high income from farming are the ones who earn high total income then, the Gini correlation for farming income will be high. If farm household belonging to lower total income strata earn high farming income, then this correlation will be low. So, a low Gini correlation means that an income source is biased towards the lower income strata and is likely to reduce income inequality. From the table we find that the share of a component in income inequality is highest for non-farm business (0.72) and more than its share of income. The share of farming from animals' income in income inequality is 17% which is same as its share in income. For cultivation, the share in income inequality is 9% and its share in total income is 18% while for wages, the share in income inequality is 1% and its share in the total income is 17%. By subtracting the values of column 4 from column 1 we estimated the impact of income component on total income inequality. It was found that income from non-farm business increase income inequality where a 1% increase in share of this income will rise inequality by 25%. Cultivation income and wage income are inequality decreasing where a 1% increase in the share of these incomes will reduce income inequality by 9% and 1.6% respectively.

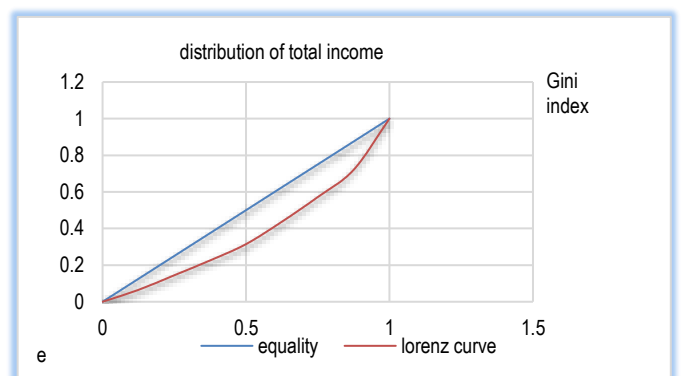
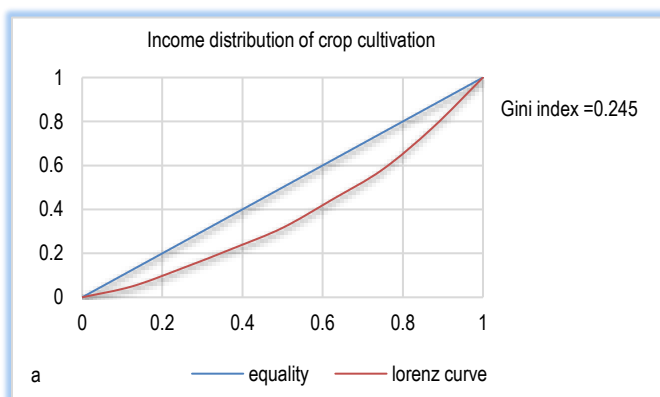
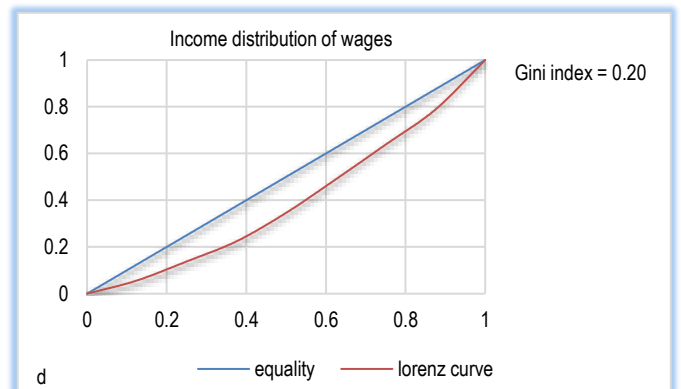
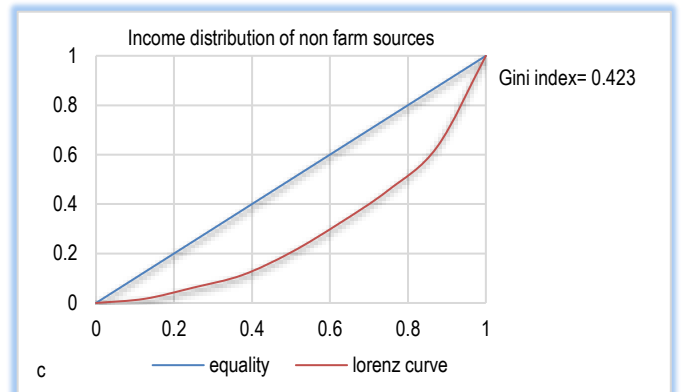
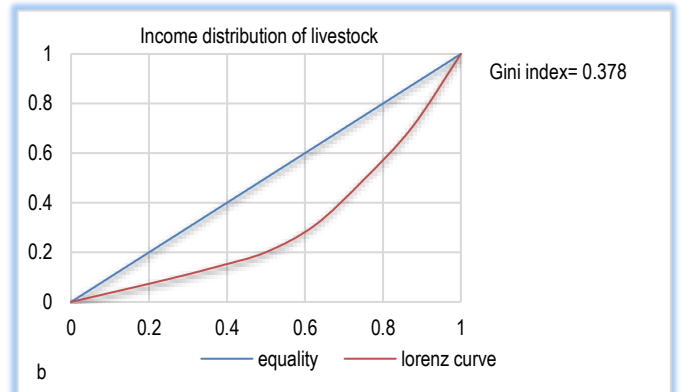


Fig-3 Gini coefficients of different components of household income

Therefore, cultivation income and wage income have potential to reduce income inequality as lower strata earn more incomes from these sources than the high-income strata.

[Fig-3] depicts the income inequality of different income components which is the area bounded by the blue and the red curve and the sensitivity shown by the Gini index. It is clear from the figure that a high Gini index shows a sloppier curve. Lower the Gini index, lesser will be the area bounded by the two lines which shows decreasing income inequality.

Role of the funding source

The author is currently a recipient of "National Fellowship and Scholarship for Higher Education of ST Students" from Nagaland University, Nagaland.

Application of research: This study will be helpful to understand the situation of the income components of the agricultural households in the NE region and to identify the key components which affect the income inequality.

Research Category: Agricultural income components

Abbreviations: GVO: Gross Value Output, INR: Indian Rupees
NER: North East Region, NS: Non Significant

Acknowledgement/Funding: Author are thankful to Department of Agricultural Economics, School of Agricultural Sciences and Rural Development, Nagaland University, Medziphema, 797106, Nagaland, India

****Research Guide or Chairperson of research: Dr Sanjoy Das**

University: Nagaland University, Medziphema, 797106, Nagaland
Research project name or number: PhD Thesis

Author Contributions: All authors equally contributed

Author statement: All authors read, reviewed, agreed and approved the final manuscript. Note-All authors agreed that- Written informed consent was obtained from all participants prior to publish / enrolment

Study area / Sample Collection: Nagaland

Cultivar / Variety / Breed name: Nil

Conflict of Interest: None declared

Ethical approval: This article does not contain any studies with human participants or animals performed by any of the authors.
Ethical Committee Approval Number: Nil

References

- [1] GOI (2011) Population census of India. Office of the Registrar General & Census Commissioner, India Ministry of Home Affairs, Government of India.
- [2] Agricultural situation in India (2015) Agricultural Economics Research Unit (AERU), IEG, New Delhi.
- [3] NSSO (2016) Income, Expenditure, Productive Assets and Indebtedness of Agricultural Households in India, 2012-13, NSS Report No. 576.