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Food security vis-à-vis energy, poverty and female literacy in Indian context

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Abstract

Food and energy security is a global concern which require multidimensional approaches and policy reforms. The study employed India States Hunger Index and two rounds of National Sample Survey Organization (66th and 68th) to analyze the relationship of food security on biomass usage, female literacy, poverty, transport fuel and non-food expenditure of different states in India. The study has presented that though ISHI can indicate the reduction in poverty levels in the states but, the index alone cannot not solve the problem of food and energy security. Therefore, empowering women through education and providing control and access to household expenditure and resources can act as one of the important tools for solving hunger, malnutrition and adopting clean and sustainable energy in the long run.

Keywords: India states hunger index, energy, female literacy, below poverty line, consumption expenditure, biomass

Introduction

Food security is still a worldwide concern especially hitting developing countries at a greater scale. New challenges to food security are posed by climate change and the morbidity and mortality of different outbreak of diseases. Food security in developing countries could be substantially improved by increased investment not only on agriculture but on multiple fronts and policy reforms ^[1]. Though the investment and policy reforms and income gains are necessary, but it not sufficient to eliminate hunger and malnutrition. The global problem of hunger cannot be solved by increasing productivity alone ^[9]. World Bank has estimated that about 648 million people are living in extreme poverty according to the new international poverty line set at \$2.15 using 2017 prices. As a result, they are deprived of adequate resources and food products remain inaccessible leading to undernourishment and malnutrition.

Energy market is a highly centralized structure; its linkage with agriculture being asymmetric has greater influence on agricultural prices. Also, energy prices lead to increase in production costs, competitiveness of biofuels as transport fuel and reduce supply of food commodities ^[2, 4]. Even the short-term commodity prices could have implication on the low-income people without consumption smoothing options inspite of less long-run impacts on biofuels ^[1].

Energy consumption has a strong correlation with the level of development, where transportation contributes to nearly one fourth of the energy consumed among developed economies ^[10]. In spite of that, around 770 million people don't have access to electricity, and even countries with access often have highly unreliable service. One in three developing countries experiences at least 20 hours of power outages a month ^[5]. Almost 3 billion still depend on polluting fuels like kerosene, wood, charcoal, and dung for meeting their household energy ^[6]. In this context, this paper will analyze the relationship of food security with energy, poverty and female literacy.

Methodology

The study is mainly based on secondary data. India States Hunger Index (ISHI) and two rounds of National Sample Survey Organization (66th and 68th) were taken to analyze the food security impact on biomass usage, female literacy, poverty, transport fuel and non-food expenditure of different states in India. This study employed simple averages and percentages for the purpose of comparisons and techniques such as correlation was used to achieve the set of objectives. Also, tabular and graphical methods have been used to present the results.

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Correlation

To measure the correlation of variable X and Y, correlation coefficient was used [7]. It is given by

$$r = \frac{\sum x_i y_i}{\sqrt{\sum x_i^2} \sqrt{\sum y_i^2}} \quad \text{----- (1)}$$

The r values ranges from -1 to + 1. If r is negative, it indicated that x and y move in the opposite direction. If r is positive, then it showed that x and y variables move in the same direction.

Where, r = Correlation coefficient.

Results and Discussion

The household biomass expenditure includes firewood and chips, dung cake and charcoal. According to 66th round of NSSO data, about 87 percent of the rural household used firewood and chips, thereby, accounting to 47 percent of rural

energy and light consumption expenditure. Further, firewood and chips expenditure decrease to 42 percent in the 68th round where 83.5 percent of the rural population still depends on it for household fuel consumption.

ISHI is computed by averaging three components namely – prevalence of calorie undernourishment, proportion of underweight among children below five and under five mortality rates. It was indicated that with the increase in scores, each state would struggle further against hunger and malnutrition. The figure 1 has shown that Punjab has the lowest ISHI of 13.63 followed by Kerala and Andhra Pradesh with an index of 17.63 and 19.53 percent respectively, whereas Madhya Pradesh tops the index (worst performing state) with a score of 30.87 percent followed by Jharkhand and Bihar. However, it was disappointing to note that most of the states fall under alarming category; even the state with lowest index (best performing state) falls under serious category [8].

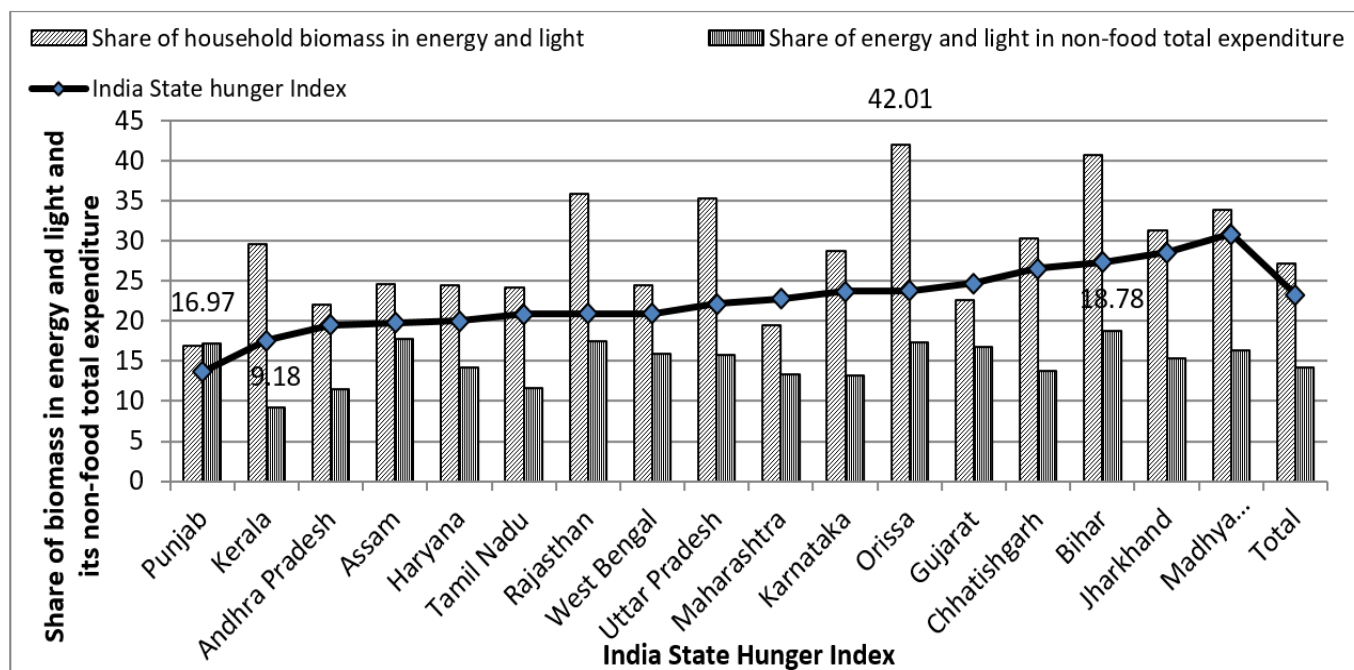


Fig 1: India State Hunger Index and share of household biomass to energy and light and its total non-food expenditure

Here, figure 1 showed the ISHI and the share of household biomass to energy and light and its non-food total expenditure. The share of household biomass energy only was lowest in Punjab accounting to 16.97 percent, where it was highest in Orissa with a share of 42.01 percent. But, with a share of 9.18 percent, Kerala has the lowest biomass share with respect to the total non-food expenditure. On the other hand, Bihar was at its peak accounting to 18.78 percent of the household biomass share of the total non-food expenditure. From the India States data, there exist a moderate degree of

positive correlation (0.541 per cent) between ISHI and share of household biomass to household energy and light expenditure. In low-income regions, where poverty and agriculture are predominant, poor household gave greater importance to food security as well as household energy needs rather than the transportation energy demand. Ewing and Msangi [3] also indicated the high degree of correlation between food insecurity and biomass usage for meeting household energy needs.

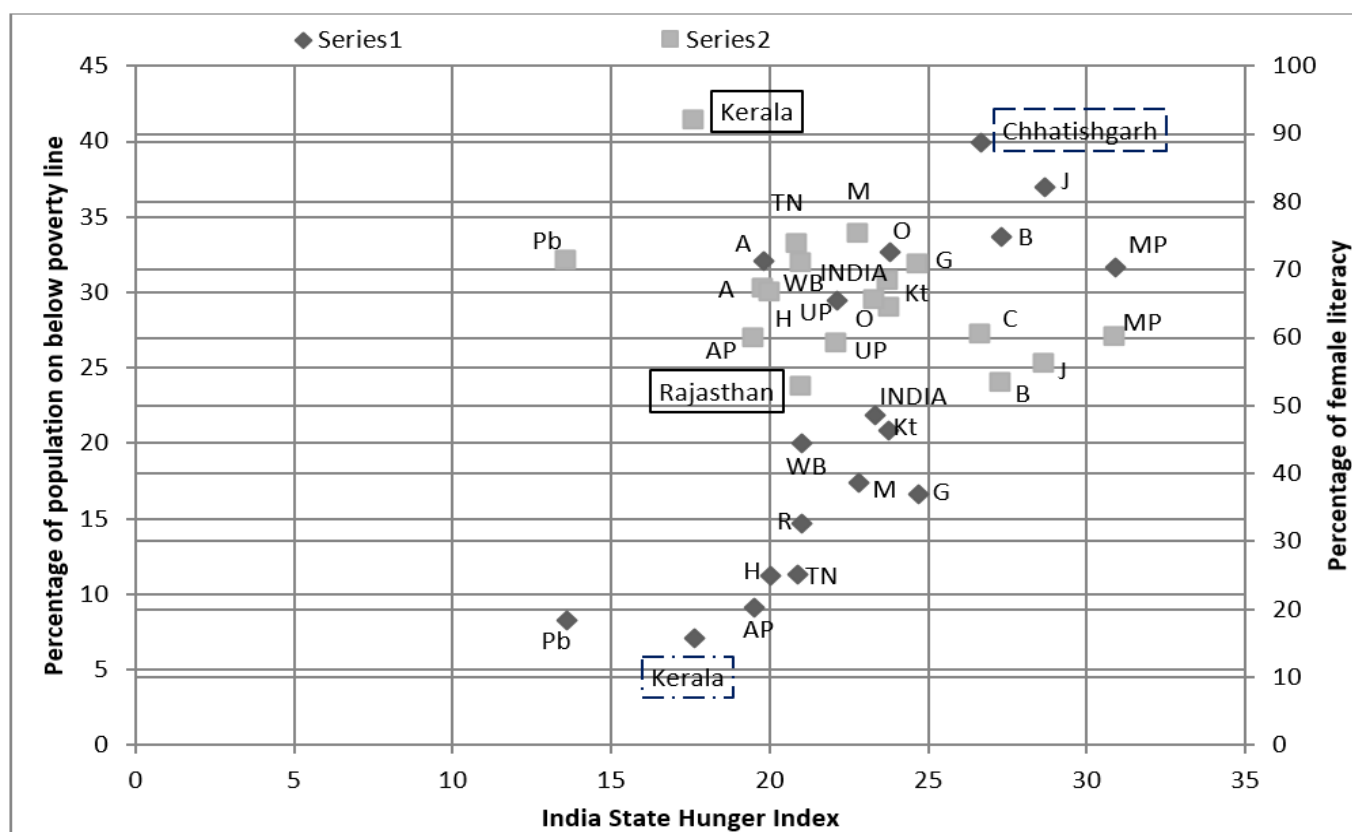


Fig 2: Percentage of population below poverty line and female literacy with respect to food security in Indian states

Figure 2: Percentage of population below poverty line and female literacy with respect to food security in Indian states

Again, from the states data, food security impact on poverty and female literacy in Indian states has been examined. Figure 2 Series 1 indicates the relation between ISHI and percentage of population below the poverty line. There exists a high degree of positive correlation accounting to 0.75 percent between ISHI and percentage of population below poverty line (BPL). Poverty line being developed using calorie cutoffs as one of its indicators, it reflects insufficient food intake, child malnutrition and child mortality. Moreover, the prevalence of BPL in the states account to as low as 7.1, 8.3 and 9.2 percent in Kerala, Punjab and Andhra Pradesh, while it rose to as high as 39.9, 37 and 33.7 per cent in Chhattisgarh, Jharkhand and Bihar.

Furthermore, the percentage of female literacy and ISHI was shown in figure 2 series 2. Kerala has the highest percentage of female literacy of 91.9 percent where it falters to 52.61 percent in Rajasthan. Though, lower scores of ISHI indicate higher percentage of female literacy rate yet the lowest rate was indicated by moderate index. Nevertheless, a moderate negative correlation of ISHI and female literacy of -0.51 per cent has been indicated. Though, Punjab owing to its highest performance of index might fare better in BPL situation than other states, but there is still room for growth on female literacy level.

Also, from the total household consumption expenditure in rural India, 56.98 percent has been allocated for food, 4.45 percent on biomass and 1.31 percent on transport fuel (petrol and diesel) in 2009-10. Again, in 2011-12, the expenditure changes to 52.90, 4.19 and 1.70 percent for food, biomass and transport fuel respectively. Food and biomass expenditure is lowest in Kerala followed by Punjab, whereas Punjab occupy highest share in petroleum expenditure in 2009-10. Again,

2011-12 follow the same suit for food and biomass expenditure. However, Haryana ranks highest in petroleum expenditure followed by Punjab. Though the food and biomass expenditure in Punjab have lower expenditure than the average Indian, but that of transport fuel was more than double of an average Indian household expenditure. Thus, there was a growing importance of transport fuel and decline of biomass especially in urban Punjab. However, the influence of biomass on the total expenditure cannot be ignored as consumers, particularly in rural areas, still depend on it and the share was not far behind transport fuel. In this situation, replacing the use of traditional biomass with cleaner and less time consuming energy can be developed. Also, the higher share of food expenditure in different states and India has indicated the importance of food in the consumption expenditure. Therefore, energy security cannot be resolved without meeting the food security concern of the states and India. However, the relationship of energy and poverty is closely connected as economic activity is impossible without appropriate, dependable and competitively priced modern energy^[5]. Hence, adequate access to sustainable, economical and clean energy needs to be address to fight against poverty along with food security.

Conclusions

This paper analyzed the influence of ISHI on share of food and biomass expenditure, poverty line and female literacy. Though good performance in the ISHI can indicate the reduction in poverty levels in the states but, it alone cannot solve the problem of food and energy security. Food and energy security is a highly complex process involving different approaches and solutions. For instance, the highest performing state of ISHI, Punjab does not fare well in female literacy. This has repercussions on the higher expenditure

share on polluting fuels for household consumption purpose as women are mainly involve in this activity. Thus, awareness to households on replacing the use of traditional biomass with cleaner and less time-consuming energy can be developed. Since India allocates higher portion of their household consumption expenditure on food rather than on energy. A slight change in food price, rather than energy price, would have greater impact to poor households by reducing consumption leading to caloric and nutritional deficiencies. Thus, energy security cannot be resolved without meeting the food security concern of the states and India. However, economic activity is closely connected with energy, therefore adequate access to sustainable, economical and clean energy needs to be address to fight against poverty along with food security. Consequently, empowering women through education and providing control and access to household expenditure and resources can act as one of the important tools for solving hunger, malnutrition and adopting clean and sustainable energy in the long run.

References

1. Condon N, Klemick H, Wolverton A. Impacts of Ethanol Policy on Corn Prices: A Review and Meta-Analysis of Recent Evidence. NCEE Working Paper Series Working Paper # 13-05. Washington; c2013.
2. Elobeid A, Hart CE. Ethanol expansion in the food versus fuel debate: How will developing countries fare? J Agr Food Ind Org. 2007;5:1-21.
3. Ewing M, Msangi S. Biofuels production in developing countries: Assessing tradeoffs in welfare and food security. Environ Sci Policy. 2009;12:520-28.
4. Hochman G, Rajagopal D, Zilberman D. Is biofuel the culprit? OPEC, food and fuel. Am Econ Rev, 2010;100:183-87.
5. Indrawati SM. What you need to know about energy and poverty. <https://blogs.worldbank.org/voices/what-you-need-know-about-energy-and-poverty>. July 28, 2015.
6. International Energy Agency (IEA). SDG7: Data and Projections, IEA, Paris; c2022 <https://www.iea.org/reports/sdg7-data-and-projections>.
7. Koutsoyiannis A. Theory of Econometrics. Second edition. Palgrave publishers, Houndmills, Basingstoke, Hampshire RG216XS and 175 fifth avenue, New York; c2010. p. 177-232.
8. Menon P, Deolalikar A, Bhaskar A. India State Hunger Index: Comparisons of Hunger across the States. Washington D C, Bonn and Riverside; c2009.
9. Prosekov AY, Ivanova SA. Food security: The challenge of the present. Geoforum. 2018;(91):73-77. <https://doi.org/10.1016/j.geoforum.2018.02.030>.
10. Rodrigue Jean-Paul. The Geography of Transport Systems. Edn 5. New York: Routledge, 2020. doi.org/10.4324/9780429346323
11. Rosegrant MW, Cline SA. Global Food Security: Challenges and Policies. Science. 2003;302(5652):1917-1919. doi: 10.1126/science.1092958

Appendix

Shares of food, biomass, petroleum and non-food excluding biomass and petroleum in the expenditure for 2009-10

(Percent)

Particulars	Share of food in total expenditure		Share of biomass in total expenditure		Share of petroleum in total expenditure		Share of non-food excluding biomass and petroleum in total expenditure		Total	
	Rural	Urban	Rural	Urban	Rural	Urban	Rural	Urban	Rural	Urban
States										
Punjab	48.21	44.26	3.03	0.64	3.53	4.26	45.22	50.84	100.00	100.00
Kerala	45.93	40.20	2.23	1.04	1.83	2.81	50.00	55.95	100.00	100.00
Andhra Pradesh	58.08	44.79	2.86	0.42	0.80	2.77	38.26	52.01	100.00	100.00
Assam	64.43	52.94	4.39	0.44	0.47	1.47	30.72	45.15	100.00	100.00
Haryana	53.99	43.13	3.62	0.67	2.24	3.75	40.15	52.45	100.00	100.00
Tamil Nadu	54.71	44.99	2.99	0.53	1.77	2.96	40.53	51.52	100.00	100.00
Rajasthan	54.82	47.99	5.54	1.36	1.61	3.38	38.03	47.27	100.00	100.00
West Bengal	63.45	46.15	4.66	0.52	0.30	1.60	31.59	51.73	100.00	100.00
Uttar Pradesh	57.93	46.28	5.38	1.26	1.05	2.38	35.64	50.07	100.00	100.00
Maharashtra	54.01	41.01	3.90	0.27	1.72	2.41	40.37	56.30	100.00	100.00
Karnataka	56.51	42.33	4.51	0.76	1.25	3.12	37.73	53.80	100.00	100.00
Orissa	61.91	48.38	6.36	1.86	1.06	2.61	30.66	47.15	100.00	100.00
Gujarat	0.00	46.22	4.25	0.49	1.84	3.51	36.23	49.78	100.00	100.00
Chhattisgarh	58.20	43.71	4.86	0.87	1.23	2.94	35.71	52.49	100.00	100.00
Bihar	64.71	52.93	5.79	1.66	0.59	1.81	28.92	43.60	100.00	100.00
Jharkhand	60.94	51.53	5.35	0.53	0.98	2.92	32.73	45.03	100.00	100.00
Madhya Pradesh	55.78	41.66	6.02	1.29	1.93	3.55	36.27	53.50	100.00	100.00
All India	56.98	44.39	4.45	0.68	1.31	2.85	37.26	52.08	100.00	100.00

Shares of food, biomass, petroleum and non-food excluding biomass and petroleum in the expenditure for 2011-12

(Percent)

Particulars	Share of food in total expenditure		Share of biomass in total expenditure		Share of petroleum in total expenditure		Share of non-food excluding biomass and petroleum in total expenditure		Total	
	Rural	Urban	Rural	Urban	Rural	Urban	Rural	Urban	Rural	Urban
Punjab	44.05	40.98	3.21	0.50	4.03	4.40	48.71	54.12	100.00	100.00
Kerala	42.99	36.97	1.74	1.05	1.96	3.42	53.31	58.56	100.00	100.00
Andhra Pradesh	51.40	42.29	2.28	0.28	1.19	3.10	45.13	54.32	100.00	100.00
Assam	61.34	47.67	4.55	0.71	0.80	2.78	33.31	48.85	100.00	100.00
Haryana	52.08	39.16	3.01	0.28	3.18	4.91	41.72	55.66	100.00	100.00
Tamil Nadu	51.48	42.69	2.50	0.37	2.44	3.68	43.58	53.26	100.00	100.00
Rajasthan	50.48	44.77	5.50	0.86	1.98	4.26	42.09	50.11	100.00	100.00
West Bengal	58.24	44.24	4.19	0.49	0.60	1.44	36.96	53.83	100.00	100.00
Uttar Pradesh	52.96	43.99	5.79	1.23	1.54	3.66	39.71	51.12	100.00	100.00
Maharashtra	52.42	41.56	3.00	0.22	2.14	3.01	42.44	55.21	100.00	100.00
Karnataka	51.35	40.08	3.71	0.62	1.54	3.72	43.40	55.58	100.00	100.00
Orissa	57.15	45.43	6.55	1.84	1.14	3.88	35.16	48.85	100.00	100.00
Gujarat	54.88	45.22	4.11	0.50	2.62	4.07	38.39	50.22	100.00	100.00
Chhattisgarh	52.74	42.18	6.71	1.68	1.79	4.23	38.77	51.91	100.00	100.00
Bihar	59.25	50.52	5.10	1.65	0.61	1.57	35.04	46.27	100.00	100.00
Jharkhand	58.39	46.54	5.38	0.41	0.94	3.22	35.29	49.83	100.00	100.00
Madhya Pradesh	52.90	42.20	5.85	1.17	1.76	3.79	39.49	52.84	100.00	100.00
All India	52.90	42.62	4.19	0.58	1.70	3.46	41.21	53.33	100.00	100.00