



Development of Livelihood Security Index: A Tool for Household Level Assessment

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Authors' contributions

This work was carried out in collaboration between both authors. Both authors read and approved the final manuscript.

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ABSTRACT

A livelihood encompasses the capabilities, assets (stores, resources, claims and access) and activities required for a means of living. The ex-post facto research design was used for the present study. The study was conducted during 2018-19 to 2020-21 in the Bundelkhand region of India. From each village, 20 dairy farmers were selected proportionately from the list prepared based on land holding. Thus, a total of 320 dairy farmers was selected for the study. Data were accumulated relevant to survey with the help of a structured interview schedule with the farmer of the study area. The index was developed on the basis of different indicators of livelihood security of farmers. A list of seven components was prepared by referring to different literatures. Seven components of livelihood security were selected for this study were food security, economic security, health security, educational security, social security, institutional security and infrastructural security. Livelihood Security Index for one indicator was constructed, and then the composite overall livelihood security index was calculated. The most relevant parameters among social indicator was interaction with key informants/ progressive farmers followed by the availability of a police station in the village / locality, provision for having any kind of crop insurance policy, member of any social organization and awareness about one's right to utilize and access to government or public resources. Results obtained showed that the overall average livelihood security index value was 0.72. The livelihood security index value was very high (0.81) in food security indicator. This might

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be due to their assured high income from both agriculture and dairy. The average livelihood security index for economic was high i.e. 0.69. Among all, infrastructural security lied in medium level category i.e. 0.64. Whereas, average livelihood index of social security lied in medium level i.e. 0.66.

Keywords: Livelihood; food; indicators; household; index; dimensions.

1. INTRODUCTION

“The livelihood is a means of living; livelihood security can be defined as adequate and sustainable access to income and other resources to enable households to meet basic needs. This includes adequate access to food, potable water, health facilities, educational opportunities, housing, time for community participation and social integration” [1]. “A livelihood encompasses the capabilities, assets (stores, resources, claims and access) and activities required for a means of living” [2]. “Livelihoods are protected when households have secure ownership of or access to resources (both tangible and intangible) and income earning activities” [3]. “Livelihood outcomes are the goals to which people aspire, the results of pursuing their livelihood strategies, such as increased income, reduced vulnerability, increased well-being, improved food security and more sustainable use of natural resources” [4].

“In rural areas, there are 76.31 per cent of households earning their livelihood from agricultural activities, which includes 29.03 per cent of households who are working as agricultural labourers in the rural area of the state” [5]. “Although, several projects have from time to time been undertaken by the Government for poverty reduction purposes, the results have only been palliative without generating sustainable livelihood earning prospects. However, there often exists a sort of socioeconomic indolence in rural areas that inhibit the process of the best capability in terms of adoption of higher education and health service facilities” [6].

“The traditional monoculture and disciplinary approach is unable to meet the growing and changing food demand and improvement in the livelihood of these smallholders on a sustainable basis” [7]. “Therefore, an integrated approach to farming is critical to sustain agricultural production, maintain farm incomes, safeguard the environment and respond to consumer concerns about food quality issues” [8,9]. As the majority of dairy farming households adopted

integrated crop and livestock farming system, they derived income from both dairy and crop which enhances the level of economic development [10].

Recently, “with the objective of providing secured livelihood to the rural poor, the government has introduced a self-employment type poverty alleviation program (for the promotion of livelihood) namely National Rural Livelihood Mission (NRLM). The programme is introduced by restructuring the previous *Swarnajayanti Gram Swarozgar Yojana* (SGSY) programme. NRLM is a centrally sponsored scheme with a three tier structure-national, state, and district level” [11-14]. “At the national level, Ministry of Rural Development takes the responsibility. In the state level, Ministry of *Panchayati raj* undertakes the responsibility and at district level, District Rural Development Agency handles the functionality of the programme. The financing of the programme is shared between the centre and state. The ratio of sharing between the centre and the state is 75:25 in all the Indian states except North Eastern states, where it shares in the ratio of 90:10. This study empirically examining the status of livelihood security in a backward region overcomes the limitations of past literature and studied which were limited to the impact assessments of self-employment programmes on poverty alleviation in terms of income generation and agricultural production which are few dimensions of livelihood security” [11-14].

2. METHODOLOGY

The ex-post facto research design was used for the present study. The study was conducted during 2018-19 to 2020-21 in Bundelkhand region, which comprises of Uttar Pradesh (7 districts) and Madhya Pradesh (6 districts). Two districts from each state viz. Lalitpur and Banda from Uttar Pradesh, whereas, Datia and Damoh from Madhya Pradesh selected. Then, two blocks from each district were selected randomly. Two villages from each block were randomly selected. The selection of respondents is a crucial task, hence due care was taken while

selecting the respondents. From each selected village a list of dairy farmers based on land holding was prepared and respondents were selected based on proportionate stratified random sampling method. From each village 20 dairy farmers were selected proportionately from the list prepared based on land holding. Thus, a total of 320 dairy farmers was selected for the study. Data were accumulated relevant to survey with the help of a well-structured interview-schedule with the farmer of the study area. The interview schedule was pre-tested in the non-sampling area, among a homogenous population having similar socio-economic status.

Based on the feedback obtained from non-sampling area, the necessary adjustments were made in the "Interview-schedule", which was, consequently, used for the purpose of data collection from the respondents. The collected data were scored, compiled, tabulated and subjected to various appropriate statistical tools in order to draw significant results and reasonable conclusions. "Livelihood security" was operationalized as an adequate access to income and other resources to meet the basic needs, including food and nutrition, health facilities, habitat facilities, educational opportunities and community participation and social integration. The livelihood security of the respondents was calculated by developing one "Livelihood Security Index" as suggested by [15]. The index was developed on the basis of different indicators of livelihood security of farmers. A list of seven components was prepared by referring to different literatures. The seven components of livelihood security selected for this study were as Food security, Economic Security, Health security, Educational security, Social security, Institutional security and Infrastructural security. The index of livelihood security was developed by following the further down-mentioned steps. Weightage was given to different indicators of livelihood security by taking the ranks from the judges (Scientist and Experts of Social Science). Judge's response was taken by sending questionnaires to them. For transforming rank into weightage, the methodology given by [16] was followed. Further, the mean of these indicators was calculated and taken as a weightage of that specific indicator.

The statements representing particular indicators of livelihood security were selected by sending the statements to the experts/judges, for taking their response. On the basis of the

recommendations given by the experts, final selection of statements of each indicator was done.

$$Z_{indj} = \frac{\text{Indicator } j - \text{Min } j}{\text{Max } j - \text{Min } j}$$

Where,

Z_{indj}= Standard indicator j

Max j and Min j = Maximum and minimum value of indicator j

Then, 'Livelihood Security Index' for each indicator of the entire households was calculated by using the formula given as below:

$$LS_i = \frac{\sum Z_{indj}}{N}$$

Where,

LS_i= Livelihood Security for one indicator

∑ Z_{indj}= Summated standardized score of all respondents for one indicator

N= Number of households covered in the study

Once, Livelihood Security Index for one indicator was constructed, and then the composite overall "Livelihood Security (LS) Index" was calculated by using the formula given as below:

$$LS_i = \frac{\sum W_i HLS_i}{\sum W_i}$$

Where,

LS_i= Livelihood Security

HLS_i = Household Livelihood Security

∑W_i = Summated value of weightage of all indicators

3. RESULTS AND DISCUSSION

3.1 Dimensions of Livelihood Security Index

The results in Table 1 revealed that the most relevant parameters among food indicator was access to Public Distribution System (PDS) followed by food security ensures a special diet

for pregnant women/ children in a family, sufficient quantity of food is available to my family in case of any natural calamity, availability of the food supply from the Govt., NGO etc., balanced food available to all family members, the quality of food available is good. The above results show that there is a need to raise awareness regarding quality of food and there is a need to increase expenditure on food to ensure food security. Integrated Farming System of various situations enhanced productivity, profitability and nutrition security of the farmer through reusing of organic source of nutrient from the enterprises involved.

A perusal of Table 2 shows that the most relevant parameters among economic indicator was farmers should have more income per unit

area to ensure economic security followed by more no. of earning members in the family, higher the economic security, availability of the credit for better economic conditions, availability of employment throughout the year ensure economic security. To have the economic stability in the family there is a need to increase sources of earnings and to ensure economic security, number of enterprises should be more in the locality. The assistance particularly in terms of financial support given by the government at the present time might be appropriate for the farmers having less resources in most of the livelihood asset. However, this kind of assistance does not guarantee the sustainability of the poor's livelihood, otherwise it will promote their reliance on government assistance.

Table 1. Food security of households (n=320)

Parameters	Relevancy weightage (RW)	Mean Relevancy Score (MRS)
Balanced food available to all family members	0.87	2.61
The quality of food available is good	0.93	2.58
Food security ensures a special diet for pregnant women/ children in a family	0.86	2.89
Food of any kind is available throughout the year	0.89	2.68
Stock of food grain+ any other item available at the household level	0.92	2.63
Access to Public Distribution System (PDS)	0.91	2.96
Sufficient quantity of food is available to my family	0.92	2.87
In case of any natural calamity, availability of the food supply from the Govt., NGO etc.	0.87	2.83
There is a need to increase expenditure on food to ensure food security	0.84	2.71

Table 2. Economic security of households (n=320)

Parameters	Relevancy weightage (RW)	Mean Relevancy Score (MRS)
More no. of earning members in the family, higher the economic security	0.87	2.87
To ensure economic security, no. of enterprises should be more	0.84	2.65
Availability of employment throughout the year ensure economic security	0.96	2.74
Availability of the credit for better economic conditions	0.95	2.81
Farmers should have more income per unit area to ensure economic security	0.83	2.96
Current value of the savings of the household	0.85	2.68
Current value of debt/ loan of the household	0.87	2.77

Result showed in the Table 3 indicate that the most relevant parameters among health indicator was vaccination for major disease (like dpt, polio, mmr, hepatitis a, b etc.) followed by availability of toilet/ toilet facilities in the household/ village, good hygienic conditions maintained by the households, availability and accessibility to medical stores, availability of primary health centre (phc) and for better health, clean and safe drinking water should be available for the people in the locality. From Table 4, it could be interpreted that that the most relevant parameters among education indicator was the education level of the respondent followed by women's literacy level in the household, availability of college for higher education and adequate facilities available for children in the government school. However, to seizure this concern, the entrepreneurship projects that will be given to households must be diverse in terms of technical knowledge requirements, financial capital required and the level of risk that may be encountered. Training and intensive coaching

are necessary to increase their technical knowledge and skill to ensure the sustainability of the project and thus the sustainability of their livelihood. Moreover, to address this problem in the long term, it is necessary to raise awareness of education among the poor's children.

A perusal of Table 5 shows that the most relevant parameters among social indicator was interaction with key informants/ progressive farmers followed by availability of police station in village/ locality, provision for having any kind of crop insurance policy, member of any social organization and awareness about one's right to utilize/ access govt./ public resources. Thus, it is important to have an index by individual group of assets. This information is useful to help the government and policy makers in channelling all required assistances to the right target groups, based on their ability and preparedness. In fact, once they are ready to accept the development project given, the possibility of them to run the project continuously probably high.

Table 3. Health security of households (n=320)

Parameters	Relevancy weightage (RW)	Mean Relevancy Score (MRS)
Good hygienic conditions should be maintained by the households	0.82	2.89
People should have the availability and accessibility to medical stores	0.89	2.88
Farmers having any insurance policy ensure health security	0.91	2.59
For better health, clean and safe drinking water should be available	0.94	2.75
Availability of toilet/ toilet facilities in the household/ village	0.81	2.91
Availability of Primary Health Centre (PHC)	0.87	2.84
Emergency facilities with respect to medical	0.82	2.78
Vaccination for major disease (like DPT, Polio, MMR, Hepatitis A, B etc.)	0.93	2.92

Table 4. Educational security of households (n=320)

Parameters	Relevancy weightage (RW)	Mean Relevancy Score (MRS)
Availability of primary/ secondary school	0.88	2.75
Accessibility of books and other material to the children of the family	0.82	2.63
Education level of the respondent	0.91	2.94
Women literacy level in the household	0.95	2.91
Availability of college for higher education	0.84	2.85
Adequate facilities available for children in the government school	0.83	2.82

Table 5. Social security of households (n=320)

Parameters	Relevancy weightage (RW)	Mean Relevancy Score (MRS)
Member of any social organization	0.82	2.72
Participation in Kisan Mela/ Dairy Mela	0.84	2.62
Interaction with key informants/ progressive farmers	0.87	2.87
Availability of police station in village/ locality	0.91	2.84
Provision for having any kind of crop insurance policy	0.97	2.76
Awareness about one's right to utilize/ access Govt./ Public resources	0.83	2.63

Different parameters of institution presented with relevancy and mean relevancy score in the Table 6 shows that the most relevant parameter among institution indicator was accessibility to Krishi Vigyan Kendra/ farming training centre followed by availability of banks in the locality, availability of structured market/ Mandi in the village/ locality, availability of animal health centre in the locality and farmers' access to NGOs, cooperatives, etc. for getting help in terms of advice, supply of inputs etc. Thus, approaches toward enhancing their financial status, such as encouraging them to involve in microcredit system and cooperative might be alleviating the poor out of the poverty trap.

It could be observed from Table 7, that the most relevant parameters among infrastructural indicator was availability and accessibility to storing facilities followed by availability of kisan credit card facilities in the village/ locality, accessibility to mobiles/ means of telecommunication, availability of electricity in the village and farmers access to electricity and availability of transportation facilities like buses, trucks, auto-rickshaws, railways etc. The home based entrepreneurial activities such as food processing, telecommunication, retailing, sewing and crafts may be more appropriate. However, the agro-entrepreneurial activities might be

possible with the opening of agricultural land in rural areas, especially in the areas that inhabited by the poor.

3.2 Livelihood Security Index for Different Indicator

The perusal of Table 8 indicated that the overall average livelihood security index value was 0.72. The average livelihood security index value was very high (0.81) in food security indicator. This might be due to their assured high income from both agriculture and dairy. The average livelihood security index for economic was high i.e. 0.69. Among all, infrastructural security lied in medium level category i.e. 0.64. Whereas, average livelihood index of social security lied in medium level i.e. 0.66. These findings were in agreement with the findings of [17] indicating that the majority of small farmers (58%) were placed at a high level of the livelihoods security index while most of the marginal farmers (87%) belonged to the medium level category of livelihood security index. The majority of small & marginal farmers (50.84%) had high to very high level of integrated livelihood security followed by the medium level of livelihood security (40.41%) [18]. Thus, government should encourage employment generation programmes and provide better opportunities for improving their livelihood.

Table 6. Institutional security of households (n=320)

Parameters	Relevancy weightage (RW)	Mean Relevancy Score (MRS)
Availability of banks in the locality	0.82	2.85
Access to banks/ any money lending institution	0.88	2.71
Farmers' access to NGOs, cooperatives, etc. For getting help in terms of advice, supply of inputs etc.	0.87	2.67
Accessibility to Krishi Vigyan Kendra/ farming training centre	0.83	2.86
Availability of animal health centre in the locality	0.95	2.78
Availability of structured market/ Mandi in the village/ locality	0.97	2.84

Table 7. Infrastructural security of households (n=320)

Parameters	Relevancy weightage (RW)	Mean Relevancy Score (MRS)
Availability of transportation facilities like buses, trucks, auto-rickshaws, railways etc.	0.85	2.65
Availability of electricity in the village and farmers access to electricity	0.82	2.74
Accessibility to mobiles/ means of telecommunication	0.97	2.76
Proper road connectivity to nearby towns/ cities	0.96	2.69
Availability and accessibility to storing facilities	0.91	2.93
Availability of Kisan Credit Card facilities in the village/ locality	0.81	2.88

Table 8. Livelihood security index values for different indicators (n=320)

Indicators	Index value
Food security	0.81
Economic Security	0.69
Health security	0.73
Educational security	0.78
Social security	0.66
Institutional security	0.73
Infrastructural security	0.64
Overall livelihood security	0.72

Hence, it is recommended that there is a need for concerted efforts by the concerned n functionaries and development workers to increase the contribution and the resources for different income earning activities and processes for the households.

4. CONCLUSION

From the analysis, it shows that the most relevant parameters among food indicator was access to Public Distribution System (PDS) followed by food security ensures a special diet for pregnant women/ children in a family, sufficient quantity of food is available to my family in case of any natural calamity, availability of the food supply from the Govt., NGO etc., balanced food available to all family members, the quality of food available is good. Training and intensive coaching are necessary to increase their technical knowledge and skill to ensure the sustainability of the projects in locality and thus the sustainability of their livelihood. Moreover, to address this problem in the long term, it is necessary to raise awareness of education among the farmers. Thus, government should encourage employment generation programmes and provide better opportunities for improving their livelihood.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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