LIVELIHOOD VULNERABILITY OF AGRICULTURAL HOUSEHOLDS IN KERALA: A CASE STUDY OF KUTTANAD VILLAGE

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ABSTRACT

This study takes into account different factors related to human life and tries to analyse how vulnerable is the population. The Index of Livelihood Vulnerability is calculated based on six Prominent components namely: Social and Demographic Features and livelihood methods, Access to social networks, health Facilities, Access to food, Availability of safe water, and proneness to natural disasters and climate variability. The disastrous flood that Kerala witnessed in the month of august 2018 has made the life of the farmers in kuttanad miserable but the agricultural yield in the post flood punja cultivation gave very unexpected results. This study tries to analyse the change in yield of paddy in the pre flood punja and the post flood punja and the possible reasons behind the change. This study aims to calculate the livelihood vulnerability index of the rural farmer households and to compare the yield of agricultural production of six randomly selected paddy fields in the pre flood and post flood punja cultivation. The study showed a result that the population is less vulnerable when taken into account all the subcomponents together. But by taking into account the case of individual components which is analysed in the study the index values showed highest vulnerability towards the flood 2018 happened in Kerala followed by the components food and water. Moreover, the study showed that low income people are more vulnerable. The study revealed the irony that, even though Kuttanad is a land surrounded by waterbodies, is not able to ensure the availability of good and safe drinking water facilities for the people. This study analyses the possible causes and suggest some solution to these issues.

Key words

Vulnerability, Livelihood Vulnerability Index, Punja

1. INTRODUCTION

Kerala, a southern state in India is known for its prominent agricultural sector. The state has Arabian sea at its border and a wide network of backwaters, rivers and other water sources which paved way for a rich agricultural background. A wide variety of crops are cultivated in the state. There are many cash crops like rubber, tea, pepper, cardamom, coconut, nutmeg etc. and Food crops like tapioca, paddy etc. which are extensively cultivated across the state. The major food crop cultivated in the state is paddy. There are almost 600 varieties of paddy cultivated across the state.

The agricultural sector in Kerala depends highly on the weather conditions. Climatic conditions are uncertain and this uncertainty makes the lives of the agricultural households, who depend on agriculture alone for their day to day life vulnerable (Economic Review, 2017). Vulnerability is generally referred to as the tolerance towards getting wounded. It can be explained as the extent to which a system can withstand some hazard (Kelly P M, Adger W N, 2000). This term is commonly seen in subjects like disaster management, ecology etc. but in recent times this has importance in social sciences as well. Vulnerability of a population depends on several factors. It includes their socio demographic characteristics which in turn consist of their dependency ratio, educational status, employment status, income level, sources of income etc. A measure of vulnerability must take into account the access of the population to medical facilities, safe and hygienic drinking water facility, availability of food, access to social networking services, their proneness to natural disasters and climate variability and so on (Hahn, B., Riederer, M., Foster, O, 2008). Based on these variables an Index is obtained in this study to assess the Livelihood Vulnerability of the selected sample.

Kuttanad in the Aleppy district is nick named as the rice bowl or rice hub of Kerala as it is the major paddy producing region in the state. Rice cultivation in Kuttanad can be broadly classified into Punja cultivation and additional crop cultivation Kerala faced a disastrous flood during august 2018. The flood posed threat to the life and property of the people. Kuttanad, being a region below the sea level was severely affected by the flood. This study aimed at obtaining an index value representing the livelihood vulnerability of the agricultural households in the champakkulam region of kuttanad. A comparison of the yield in paddy during the pre-flood and post-flood punja is also made in the study.

2.   DATA AND METHOD

Kuttanad is a deltaic region formed of four rivers namely, Pampa, Achencoil, Manimala and Meenachil. The lands of kuttanad is a collection of paddy fields, locally called as *padasekharams* which are separated by channels or bunds. The seeds of Punja cultivation are sown in the month of November-December and are harvested during March-April. In the post flood period a Livelihood Vulnerability Index (LVI) calculation of kuttanad has been undertaken and results are obtained. Along with this an analysis of the agricultural yield in selected paddy fields of champakkulam panchayat in Kuttanad during the punja cultivation before and after the flood is done.

Data to construct LVI was obtained from primary survey conducted during 2019 in the champakkulam panchayat. For the purpose of the study six Padasekharams namely Moolapallikkadu, Ezhukaadu, Nattayam, Padachal, Illimuri Thekke 900 And Moolapongampra were randomly selected. A simple random sampling was used to find out Hundred sample points, i.e., the households from the selected padasekharams. Information was collected from the respondents using a structured questionnaire which contained questions regarding all the components considered for analysis.

While, secondary data collected from civil supplies office slips from the civil supplies department office of the panchayat which were available with the secretaries of each paddy fields in the selected region is used in the comparative analysis of the agricultural yield in the pre-flood and post-flood punja cultivation.

The primary data was used to obtain the index value indicating vulnerability of the selected households and the secondary data available was used to compare the yield in the selected padasekharams in the pre and post flood *punja* cultivation.

3.   LIVELIHOOD VULNERABILITY INDEX (LVI)

LVI was calculated on the basis of a composite index approach. LVI calculation included six Prominent components: *Social and Demographic Features and livelihood methods* (SDP), *Access to social networks(SN), health facilities* (H), *food access(F), Availability of safe*

water(W) and *proneness to natural disasters and climate variability* (NDC) ((Hahn, B., Riederer, M., Foster, O, 2008).

All these components were analysed based on certain sub components. The method of calculation is based on a balanced weighted average where each of the sub components have equal contribution to the overall index. As these subcomponents was measured on a varying scales they were at the initial step standardized as an index based on the following formula:

$$\text{Index}_{sd} = \frac{S_d - S_{min}}{S_{max} - S_{min}}.$$

S_d is the obtained subcomponent and S_{min} and S_{max} are the minimum and maximum values of each subcomponent (Hahn, B., Riederer, M., Foster, O, 2008).

After the standardisation each sub components were averaged and the value of their corresponding major component is obtained (represented as M_{di}) (Pandey R, Jha S, 2011). Once the values of each major component are obtained they are averaged (weighted average) to obtain the overall LVI as

$$LVI_d = (\Sigma_{i=i}^{6} w_{mi} M_{di)} / (\Sigma_{i=i}^{6} w_{mi}).$$

Here w_i represents the weights associated with each component (i represents SDP, SN, H, F, W and NDC)

The LVI was calculated using the formula

$$LVI_d = \frac{(w_{SN}SN_{d+} + W_{NDC}NDC_{d} + w_H H_{d+} w_F F_d + w_{SDP}SDP_{d} + w_W W_{d)}}{(w_{SN} + w_{NDC} + w_{SDP} + w_H + w_F + w_W)}$$

The variables or prominent components considered in the study are *Social and Demographic Features and livelihood methods, Access to social networks, health Facilities, Access to food, Availability of safe water, and proneness to natural disasters and climate variability* (Hahn, B., Riederer, M., Foster, O, 2008). These components were analysed using certain subcomponents. Social and Demographic features and livelihood methods were assessed on the basis of the dependency ratio of the family where the number of dependents and non-

dependents were considered, Educational status of the head of the household, employment status of the family head and income level of the household. Access to social Networks was mainly assessed based on the active participation of the family members in social media, the number of social networking devices in the family and the participation in Self Help Groups like Kudumbasree mission. The component of health was analysed based on the distance of the house to the nearest speciality hospital, incidence of illness in the family and report of any kind of post flood disease or illness in the family. Access to food was assessed on the basis of availability of food and source of food for the family. Availability of safe and hygienic drinking water was analysed on the basis of availability and frequency of availability of safe drinking water in the household. Proneness to natural disasters and climate variability was assessed on the basis of the distance between the house and the nearest water source, issue of water intrusion into the house during flood and the number of days the family stayed at the flood relief camps if any.

4. DISCUSSION

LVI value ranges from 0(least vulnerable) to 0.5(most vulnerable). The overall vulnerability index of farmers was found to be 0.1045 and the index values associated with each subcomponents are obtained as 0.0967 for socio-demographic profile and livelihood, 0.06 for social networking, 0.076 for health, 0.134 for food, 0.129 for water and 0.185 for natural disasters and climate variability. The LVI valued obtained was 0.104 which implies that the population as a whole is less vulnerable but when individual subcomponents were taken into account the population showed highest vulnerability towards the flood (Natural disaster component) followed by the components of food and water. The findings related to each variable are depicted in the table given below.

MAJOR COMPONENT	SUBCOMPONENTS	INDEX VALUE OF MAJOR COMPONENT
SOCIO-DEMOGRAPHIC PROFILE AND LIVELIHOOD	• Dependency ratio • Educational status • Employment status • Income level • Sources of income other than agriculture	0.0967
SOCIAL NETWORKING	• Number of social networking devices in the family • Number of members with active accounts in social media • Participation in SHG's	0.060
HEALTH	• Distance to nearest hospital • Proneness to illness • Proneness to post flood diseases	0.076
FOOD	• Source of food • Availability of food • Source of seeds for cultivation	0.134
WATER	• Source of drinking water • Availability of fresh water	0.129
NATURAL DISASTERS AND CLIMATE VARIABILITY	• Alert for flood • Source of information • Intrusion of water • Shift to flood relief camps	0.185

Table 4.1: LVI values of Rural farmers

A comparative analysis has shown that the overall LVI of people having an annual income less than Rs. 50,000 was found to be 0.271 and that of people with income more than 50,000 was 0.071, making the former more vulnerable in all the variables considered except in the availability of food. This is because most of them depend on own farms for meeting their daily food needs.

Component	Index value of population having income below 50,000	Index value of population having income above 50,000
Overall index	0.271219366	0.071778468
Socio demographic profile	0.426136364	0.15970516
Social networking	0.169811321	0.015666
Health	0.214286	0.12
Food	0.264705882	0.454545
Water	0.12345679	0.066667
Natural disaster	0.589286	0.271605

Table 4.2: Comparative LVI based on income.

As stated earlier, Kuttanad was severely affected by the flood. Flooding in Kuttanad was never a new phenomenon to the local residents of the region. Even though the region is prone to floods and waterlogging every year, the 2018 flood was more disastrous as compared to the earlier ones. So it was without much hope of a revival the farmers decided to do punja cultivation to sustain their lives and to bounce back to the smooth life that was distorted by the unexpected flood. Even though the punja was done without keeping much hope on getting a better yield the secondary data showed a very surprising result. Most of the padasekharams

(paddy fields) reported doubling of the yield in post flood punja when compared to the pre-flood cultivation.
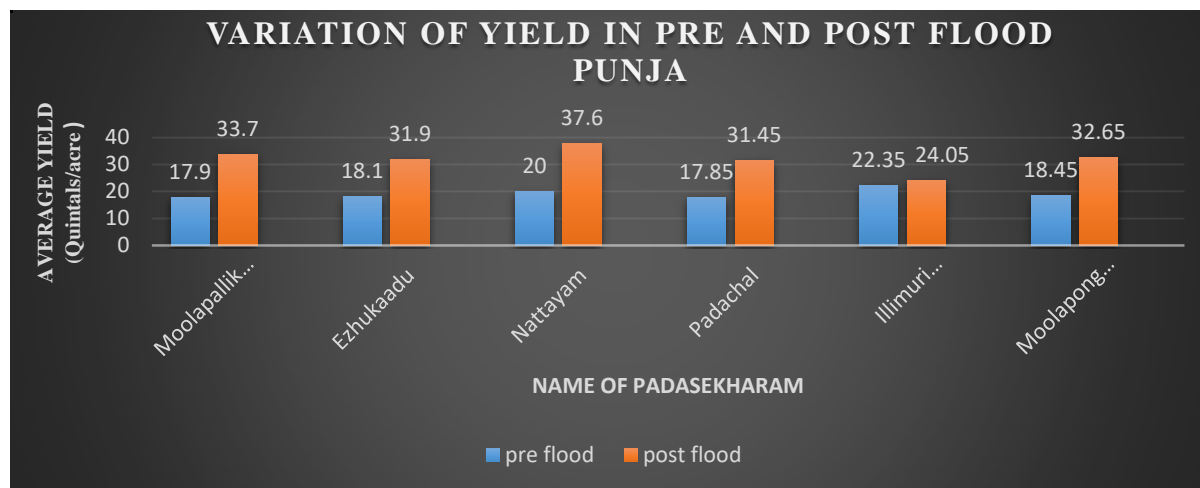

Figure 4.1: Comparison of paddy yield in the pre and post flood punja cultivation

The most important reason was the deposit of the organic component (*ekkal)* after the flood in the fields which ensured the availability of the growth promoting elements in the soil. Moreover, the biotic components of the mud have increased and the soil has retained moisture content. There were also less pest attacks and as a result less pesticides were used in all the fields considered.

5. CONCLUSIONS

This study calls for the attention of government towards natural disaster prevention and control programmes. People must be given more training and equipments to deal with unexpected natural disasters in consultation with the local natives. The accessibility for safe drinking water must be ensured in the region. Issues of waterlogging and loopholes associated with kuttanad development package must be resolved at the earliest. Even though the study came to a conclusion that the flood posed threat to the life and property of the people, the farm yield after the flood indicated that flood was never a curse alone for the farmer community in the region.

Thus, the study regarding the vulnerability of rural farmer households and agricultural sector of kuttanad revealed the important characteristics of the region and issues faced by the people

in the region. The study helped to gain necessary information regarding the history, progress and the present picture of the agricultural sector. It also helped to analyse the factors which makes the farmer households of the region vulnerable mainly at times of natural disasters. There must be enthusiastic support from the government as well as non-government agencies to find a permanent solution to the problems of the rural households of this region.

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1. Declaration of Conflicting Interest

I Deltta Kurian, hereby certify that I have No affiliations with or involvement in any organization or entity with any financial or non-financial interest in the subject matter or materials discussed in this paper.

2. Funding Information

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