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RESEARCH ARTICLE

CHANGE OF RESOURCE BASE AND ITS REFLECTION ON ECONOMIC ACTIVITY: A CASE STUDY FROM BIRBHUM DISTRICT, WEST BENGAL

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ABSTRACT

Distribution of resources is not uniform over the earth surface. At the early stage of human civilization, people were habituated to lead their livelihood from natural resource base. Later on they identified new resource base from nature and produced new resources with the invention of new technology. By these ways, different types of economic activity have been creating through dynamic resource process or utilization. This paper is an endeavor to search the reflection of the economic surface by the influence of resource base change of Rampurhat-I and II C.D. Block, Birbhum District, West Bengal.

INTRODUCTION

Change of resource base and shifting of occupation of workers in an agrarian society may be explained through different reasons- need or crisis or choice or relative advantage and disadvantage. Whatever may be the reasons, change of resource base leads to change in production function and production relation. Under such circumstances, changing functional system and activity space definitely alter livelihood pattern and thereby culture of the communities. Here the panorama is highlighted under the change of physico-social landscape as well as economic surface with the introduction of new resource base like mulberry silk weaving (Rampurhat Block-II) and basalt quarrying (Rampurhat Block-I) in the traditional farm economy. At the earliest stages of growth, subsistence agriculture was the basic threshold of resource base of Rampurhat Block-II for the presence of alluvial tract. (O'Malley, L.S.S.1910). It got prosperity by resource base of Mulberry silk weaving which was initiated at least five hundred years back. People of a portion of this area who are treated as marginal farmers shifted their economy from agriculture to weaving. Hence, present now it has been experienced the combination with agricultural practice, mulberry silk weaving and associated agro-based small trade and essentially weaving based trade.

On the other hand, Rampurhat Block-I C.D. was devoid of this opportunity like Rampurhat-II C.D. Block and was low level agrarian economy in earlier. Rather than it provides the basis of basalt quarrying which was initially covered with dense forest before basalt quarrying. For the hard works in basalt quarrying industry, cheap labor is needed and it supplied from tribal society and non-creamy layer community like Muslim pleasant, Scheduled caste. After Santhal Rebellion (1855), most of the tribes of all over Birbhum District came from Jhakhand for preparing agricultural land through removing forested tract by the supervision of landlords (Hunter, W.W. 1877). But this biaxial framework of contrasting economy of two blocks was change with the introduction of quarrying after 1960s.

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The prosperity of quarrying is absorbing the people of Rampurhat Block-II from agriculture and also from weaving (O'Malley, L.S.S.1910). Resource base of these two blocks is now confined with three levels- basic agrarian economy, steady weaving economy and prosperous stone quarrying.

METHODOLOGY

Simple regression or co-relation is unable to chalk out the multidimensional impact of economic activities of the area. Through humble attempts of multivariate analysis, multidimensional factors have been applied to capture the interrelatedness and relative assessment for this perspective. To make it a systematic analysis, PCA has been applied here. This method of analysis was first proposed by Karl Pearson (1927) as factor analysis and fully developed as the method of principal component analysis by Harold Hotelling. The model for component analysis is simply-

$$Z_j = a_{ji} P_1 + a_{j2} P_2 + \text{----------} + a_{jn} P_n \qquad (j=1, 2, \text{----------} n)$$

Where, each of the observed variables is described as linear in terms of uncorrelated components, $P_1, P_2, \text{----------} P_n$. An important property of the method as far as the summarization of data is concerned so that each component, in turn, makes a maximum contradiction to the sum of variances of the 'n' variables. For a practical problem only a few components may be retained, especially if they reflect a large percentage of the total variance. A principal component analysis dealing with the correlation matrix of the variables is generally known as the R – mode analysis or R – technique while the component analysis dwelling on the transpose of the same data matrix is labeled as Q- mode analysis or Q – technique. The most common objectives of Principal Component Analysis are-

i. To extract the maximum variance explained,
ii. To choose the best of the observed correlation and,
iii. Finally the composite score gearing out of interrelatedness of the events.

Irrespective of the techniques, Principal Component Analysis model is basically a four-stage method:

i. Construction of a meaningful data matrix
ii. Computation of correlation matrix
iii. Extraction of principal component loading and Eigen value
iv. Measurement of the factors against the units of observation or the variables depending on the context

Mathematically speaking, every extract component is an eigenvector which is a combination of 'n' variables depending on their degree and direction of the interrelatedness which are essentially multidirectional. Hence, each vector indicates a particular dimension of the relationship and the strength of the associations is expressed by the Eigen value of each vector which tends to fall off sharply when the matrix of correlation co-efficient records moderate to strong relationship irrespective of the direction. It is to be noted that the sum total of Eigen values is equal to n variables of m individuals depending on the mode of analysis. A. B. Chowdhury (1992) has discussed widely the theoretical perspective of environmental impact assessment for coal mining in Raniganj Coal Field with the help of statement form as well as through relative weighted scores. Following this principle, assessment of weaving and stone quarrying and its impact on physical and cultural landscape has been analyzed to evaluate cress- cross advantages and disadvantages of different types of economic activities in a system framework in this pen-ultimate stage of enquiry.

RESULTS AND DISCUSSION

Present work mainly concerns impact of different economic activities due to change of resource base. Though, main enquiry revolves around the different dimensions of silk weaving and stone quarrying but here the impact analysis relating to economic activities concerns five activities- agriculture, silk weaving, trade related to silk weaving, quarrying and trade related to stone quarrying. To assess the relative advantage of these five activities, six variables have been taken into consideration. These-

X1- Number of *mouza* in which different activities are found to occur. It is tabulated in table by percentage calculation. The total *mouza* of the study area is 196 has been represent to 100.
X2- Number of Household involved in these activities. It is also tabulated by the percentage calculation.
X3- Sustainability of economic activities in terms of time consideration through relative score through the perception survey of associate workers and dealing authority of each activity.
X4- Risk assessment of different functions in terms of production, loss, professional hazards etc in terms of relative weighted scores.
X5 Profitability of different function through weighted scores,
X6- Earning through different activities in terms of relative weighted scores, Relative score of the variables of X3, X4, X5 and X6 has been calculated out of 100.

Q-Mode Analysis

For the Q-Mode analyses of functions, all these six variables have been loaded differently. For agricultural activity, high scores are found for number of *mouzas* and number of household but other variables showing scores are low. In quarrying activity, sustainability is relatively low. For other functions like silk weaving, weaving trade, quarrying and quarrying trade, profitability, earning and showing high scores (Table-1) The scores in the data matrix are wide ranging and four functions are showing striking contrast with agricultural activity. Considering all these initial result, all the activities other than agriculture in PC1 are showing high positive relationship, while agricultural activity is showing moderate negative relationship. In the present context, functional aspect of the activities like earning, profitability, sustainability etc. are showing domination and spatial variables like number of *mouzas* and number of households is sub-dewed. For such a contrast, agricultural activity is showing negative relation and other functions are showing positive relation. Such a result confirms that non-agricultural activities are more effective in terms of profitability, earning and risk. Highest loading occurs for trade related quarrying (+0.978). Close to it are quarrying (+0.947), silk weaving (+0.868) and weaving trade (+0.854).

Table 1. Data Matrix for the Assessment of Economic Activities

Activities / Variables	Agriculture	Weaving	Trade related to weaving	Quarrying	Trade related to Quarrying
Number of Mouza (in %)	78	9	4	6	3
Number of Household (in %)	56	18	8	14	4
Sustainability (100)	80	75	75	25	30
Risk assessment (100)	50	60	50	90	85
Profitability (100)	50	70	65	80	75
Earning (100)	50	70	95	75	90

(Source: Field Survey, 2010)

Table 2. Correlation Matrix of Economic Activities

Activities	Agri-culture	Weaving	Small trade related to weaving	Quarrying	Trade related to quarrying
Agriculture	1	-0.292	-0.286	-0.778	-0.706
Weaving	-0.292	1	0.946	0.706	0.776
Small trade related to weaving	-0.286	0.946	1	0.653	0.777
Quarrying	-0.778	0.706	0.653	1	0.976
Trade related to quarrying	-0.706	0.776	0.777	0.976	1
Eigen Value (£ji)	3.807 (PC1), 0.992 (PC2)				

Table 3. Component Loadings for PC Analysis of Different Activities

Different Activities	Component Loadings		
	PC1	PC2	PC3
Agriculture	– 0.686	0.690	0.230
Silk Weaving	0.868	0.462	– 0.046
Trade related to Silk Weaving	0.854	0.480	– 0.153
Quarrying	0.947	– 0.249	0.195
Trade related to Quarrying	0.978	– 0.104	0.146
Eigen value	3.807	0.992	0.138
Variables explained	76.139%	19.844%	2.778%
Cumulative variance	76.139%	95.983%	98.738%

Eigen value of PC1 is 3.807 and the variance explained is 76.139 percent, which is high enough to explain the reality (Table-2). In the second Principal Component Analysis (PC2) agricultural activity has only emerged as dominant loading (+0.690), preceded by silk weaving (+0.462) and Silk weaving trade (+0.480), where as quarrying and quarrying trade are showing negative loadings. Now it is clear that, in terms of spatial coverage and sustainability, agricultural activity dominates, through silk weaving and weaving related trade can't be avoided. Eigen value of PC2 is 0.992 and variance explained is 19.84 percent. As Eigen value in PC2 is less than one, and cumulative variance is 95.98 percent, it does not require further extension of the analysis (Table-3) In sum up of this Q-mode analysis, it can easily be ascribed that silk weaving and silk weaving trade are profitable and sustainable in economic space where as quarrying and quarrying trade are profitable but not sustainable.

Conclusion

Objective judgment through Principal Component Analysis in assessing impact on physical and social environment reveals that out of five types of activities (agricultural, weaving, quarrying, weaving trade, quarrying related trade); agricultural sustainability is higher than others and economic sustainability in better for quarrying and quarrying related trade, through weaving and weaving trade are showing good response in PCA, very close to quarrying. So, it is pertinent to really on agriculture, weaving and weaving trade rather quarrying and quarrying trade those are associated with huge negative impact. Quarrying not only has negative impact on physical environment but also it exploits laborers, especially unskilled laborers.

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