

Summary of the Final : Minor Research Project Report Geographical - Cultural Correlates of Zoo-diversity

A Case Study of Rajnandgaon -Kabirdham Districts C.G.

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It is the dialectics of Nature that gives birth to a new thing, or life and presents appropriate conditions for its growth. Here two opposites of positive and negative, pull and push forces work. It, therefore, gives rise to struggle. There is a struggle between life as yolk and hard shell of an egg. This continues until life grows stronger enough by using the energy stored within the shell. So literally, the hard shell protects the life within. However, thereafter, the developed life breaks the shell and comes out for a larger journey. It is obvious that development takes place due to contradiction that provides the foundation of struggle. It cannot be the same all over the time and place, as it is not only determined by the forces alone, but is also guided by the process, structure and stage. All these together produce its varying forms in shape, size and inner and outer characteristics.

Development in Nature or human society is an on-going activity. It never stops. It happens in a cyclic way. That is why; it is said that history repeats itself. Yesterday where there was deep sea, today there are high folded mountain ranges, and tomorrow there would be plain. The virgin uninhabited desert land was converted into human settlement' while the flourishing cities turned into ghost towns.

Natural development does not carry connotation like good or bad, as natural forces guide it. Biotic life or Abiotic feature/activity originates and grows whenever and wherever the forces are conducive to it. It follows the natural laws. Samaritan story puts forward the same message; seeds falling on stony land, on the footpath, or on dry land will not germinate, and therefore, there is no question of developing it into a tree. However, the

seeds falling on fertile land which also contains moisture, will all probability be germinate and become a tree. Geographers study that river works as denudation agent in the humid region, while they are wind and glacier in the hot desert and cold regions respectively. These processes act differently in varying structure and stages. And the whole functions are governed by the Law of Uniformitarian's in Nature which is the guiding principle of 'Present is the key to the Past'.

'Diversity' refers to 'variety, or 'the state, or fact of being diverse'¹. It means that each individual is unique, and individual differences in terms of qualities must be recognized. "It is the exploration of these differences in a safe, positive and nurturing environment". ([gladstone.uoregon.edu/ asuomca /diversity init/definition.html](http://gladstone.uoregon.edu/asuomca/diversity/init/definition.html)). It is natural when it is produced by Nature. This aspect of diversity is termed as 'natural diversity' that encompasses both living and non-living beings over the earth surface. For example diversity of landforms of first, second and third order, diversity in climate resulting in diverse climatic zones(the most accepted Climatic Classification of the World by Vladimir Koeppen in 1936) and corresponding vegetation zones(put forward by Kendall, Russian born Botanist in 1912), diversity of soil, of drainage system, and so on. This does not mean that man has no role to play in producing diversity. He, too, is capable of bringing diversity in the production of landscape. This is known as cultural landscape. He has been engaging himself in changing the face of the inhabited world since the Neolithic Age. This production is largely in tune with Nature of the given space. His economic, social, cultural and political needs have been instrumental in producing diverse economy, society and culture. However, this sort of diversity has roots in human society which had inherited natural qualities; where development of harmonial relationship of man with Nature that had; and that had developed utilitarian nature. It is a product of symbiotic relationship amongst the natural phenomena, or between natural and human. It is quite different from **disparity** which develops due to parasitic relationship wherein one thrives upon others by is oppressed, and another is exploiter.

Diversity is opposed to homogeneity. Diversity is imbedded in Nature. The simple region is Nature is itself diverse. There is typical geological structure, varied physiographic features, distinct climate, peculiar vegetation, and so on. This diversity has resulted in bio-diversity, which includes Vegetative Diversity and Zoo-Diversity at all three levels- micro,

meso and macro. Our green planet i.e. the earth is lovely only because of this diversity. It provides ever-lasting pleasure and immense inspiration to man. He finds immortal happiness in this diversity. Initially he got surprised at this arrangement of Nature. This design was beyond his understanding. However, he used to enjoy it.

The concept of diversity encompasses acceptance and respect. Diversity is plurality. Its determining factors vary in nature and magnitude. In addition, these factors are guided by physical forces, which also differ over time and space. When we say, 'India is a country of diversity', its natural diversity in the form of its geological structure, physiographic features, drainage, climate, vegetation, soil and wild animals appears first. This may be understood in the following equations;

Climate and Diversity

A High Temperature + High Rainfall + High Humidity = Hot & Humid Climate → Highly Diversified Flora & Fauna.

B Low Temperature + Low Rainfall + Low Humidity = Cold & Dry Climate → Lowly Diversified Flora & Fauna.

C High Temperature + Low Rainfall + Low Humidity = Hot & Dry Climate → Highly Diversified Flora & Fauna.

Altitude and Diversity

High Elevation + Low Temperature + High Snowfall = Cold Climate → Lowly Diversified Flora & Fauna.

Low Elevation + High Temperature + High Rainfall = Hot & Humid Climate → Highly Diversified Flora & Fauna.

Landforms and Diversity

Delta is a 3rd order landform. It is situated at the mouth of a river. It is a low lying area which is frequently inundated by tidal water. Thus, it creates a typical natural environment for the origin and growth of flora and fauna. Sunderban is an exemplary delta with rich biodiversity. Karewas of the Vale of Kashmir is a typical landform. It has originated due to

deposition of eroded materials on the bank of valley. To-day it is famous for saffron production in the world. Waterfall cannot be formed in the low lying plain. Similarly, meander cannot be formed in the hilly area. Likewise, other processes such as wind and moving glacier cannot make these two landforms. All diverse landforms are product of distinct natural processes, and in turn provide base for biological diversity.

Human Adjustment with Nature and Cultural Diversity

Man figures in animal kingdom. However, he has more articulate brain faculty. This makes him more capable to bring out needful desired changes in the given physical environment. Even then, his act was largely decided by the specific natural conditions in terms of climate and land features. His interaction with distinct Nature gave rise to classical social, economic and cultural personality of a region and society. Numerous regions or societies were/are like gardens with different varieties of flowers displaying their own fascinating look. Such heterogeneity is warranted, as it is in accordance with the physical set up. We have different crops and food habits, house types, dress, ornaments, dances and songs, fairs and festivals. This meticulous cultural diversity has its own essence. It leaves fascinating effect. So it receives appreciation. Look at the aspects of this diversity.

Food → Maachha-Bhata Bengal, Sambhar-vada, Sambha-Idli of South India,
Bread of wheat, Jowar and Bajra in semi-arid region,
Dhokla of Gujarat, Dal- -Bati- CHurma/Dal-Bafle of Rajathan, Liti-Chokha of Bihar,
House Types → Igloo of Eskimos (Made of Ice),
Huts of Pigmies & Masai (made of Bamboo, woods and grass,
Tents of Bedouins, Shikara of Kashmir(House-Boats)
Dress → Fehran of Kashmir, Lungi of South India, Kurta-Lungi-Turban of Punjab,
Kurta-Dhoti-Pagri of Rajasthan, Kurta-Dhoti of Bengal, Salwar-suit of Kashmir-
Punjab-Haryana, Saree of larger part of India.
Songs→ Kajri & Malhar of UP, of South India, Vidyapati Geet of Mithila.
Ravindra Sangeeta and Baul of Bengal,
Dance: Odissi of Odisha Chhau of Bengal, Bihu of Assam, Bhangra & Giddha of Punjab,
Garba of Gujarat, Jhumer of Tribes, Kathakali of Kerala,

Diversity refers to presence of more types or varieties. Had there been only one type or variety, it is the state of homogeneity. Diversity is, therefore, the opposite of homogeneity; and is used for understanding both types of phenomena – natural as well as cultural. Within the nature, it is diversity of physical element such as geological structure, relief, climate, soil, minerals; of biological elements e.g. vegetation, animals, bacteria and man. Bio-Diversity deals with all life taken together. Zoo-Diversity is concerned with animal only. Animals based on their origin and biological characteristics have been grouped into the following five categories; Birds, Amphibians, Reptiles, Mammals and Fishes.

Definition

Bruce A. Wilcox was first to give an explicit definition at the World National Parks Conference of International Union for the Conservation of Nature and Natural Resources (IUCN) in 1982. According to Wilcox, “Biological diversity is the variety of life forms...at all levels of biological systems (i.e., molecular, organismic, population, species and ecosystem)”.

The 1992 United Nations Earth Summit held at Rio de Janeiro, Brazil defined ‘biological diversity’ as “the variability among living organisms from all sources, including, ‘inter alia’, terrestrial, marine, and other aquatic ecosystems, and the ecological complexes of which they are part: this includes diversity within species, between species and of ecosystems”. A common definition seems to be “variation of life at all levels of biological organization”.

From the above definitions of bio- and zoo-diversity, it becomes clear that ‘Zoo-diversity’ is concerned with the animal variety found amidst Nature. This diversity is strongly embedded in basic geographic parameters like temperature, rainfall, humidity and wind conditions that together produce natural vegetation. Since, these parameters get changed over space; the variety of vegetation also gets changed; and the resultant effect is seen on the development of animal variety on this living planet.

Concept of Disparity

It refers to inequality, gap, or disproportion. Man for his own interests artificially creates it. It is, therefore, never natural, as Nature creates diversity where natural forces play an intrinsic role wherever the appropriate condition demands it.

Concept of Richness

Conversion of whole numbers into indices is an act of Indexing. It helps in presenting things in a quite simplified form. It is also useful for comparison and all other statistical processing. Diversity Index is a value in the form of magnitude on a given scale.

Increase in diversity index: It happens in two ways. One is when the number of types increases and another one is when evenness increases.

Maximization of diversity index: When the value of all types are equally abundant.

Richness

Biological diversity can be quantified in many different ways. The two main factors taken into account when measuring diversity are richness and evenness. Richness is a measure of the number of different kinds of organisms present in a particular area. For example, species richness is the number of different species present. However, diversity depends not only on richness, but also on evenness. Evenness compares the similarity of the population size of each of the species present.

Richness refers to number of species present in a sample. It is also a measure. If there is presence of more species, the sample is 'richer'; and vice versa. But, species richness as a measure on its own takes no account of the number of individuals of each species present. It gives as much weight to those species, which have very few individuals as to those which have many individuals. Thus, one daisy has as much influence on the richness of an area as 1000 buttercups.

Concept of Evenness

Simpson's Diversity Index is a measure of diversity, which takes into accounts of both richness and evenness. Evenness is a measure of the relative abundance of the different species making up the richness of an area. *A community dominated by one or two species is considered to be less diverse than one in which several different species have similar abundance.* As species richness and evenness increase, so diversity increases.

Nature and magnitude of diversity and evenness visible in Table 4.1 can be explained in quantitative terms for a better understanding. Quantification makes the presentation more scientific and more comparable. Basic statistics such as mean, mean deviation, standard deviation and co-efficient of variation have been used for this purpose.

Table 4.2 clearly displays that mean (333.33) of the three varieties of flowers is close to their distribution. A low level of difference in the distribution is also reflected in low mean deviation (22.22) and Standard deviation (26.56). Both the values are very close to zero. For an enhanced understanding, co-efficient of variation is used which presents the deviation in percent. It comes to only 7.97 per cent. This shows that there is minimal internal variation in the series. In other words, almost equal share of all the three species of flowers in the given distribution results in greater diversity.

Biodiversity and Its Geographical Distribution:

Variety of living beings found in a geographical area is called biodiversity. Amazon rainforests is the largest biodiversity hotspot in the world. Classification is process of groupings of animal.

This is one important group of animal kingdom. It appeared first in the evolutionary process of development of life on the earth. Thus, the study of evolution of other chordates is beyond imagination without study of fishes.

However, no classification has been universally accepted because of the confusion on staggering number of fishes and great diversity in their shape, size, habits and habitat.

Revelation of Zoo Diversity is made through Classification of Vertebrates. This Modern Classification has been given by Parkar & Haswell and Revised and Largely Written by A.J. Marshal & William A. Haswell. The old classification of the Gnathostomata into five classes- Fishes, Amphibia, Reptilia, Aves, and Mammalia- has, therefore, to be modified by the division of the fishes. Here they have been divided into three classes. 1 CLASS: PLACODERMI (Aphetohyoidea) 2. CLASS: CHONDRICHTHYES (Elasmobranchi, Selachii) 3. Class : OSTEICHTHYES (Teleostomi)

Magnitude of Diversity

Fish b. Amphibian c. Reptile d. Bird e. Mammal

Table 5.1 Reveals that half of the wild animals of the Rajnandgaon Districts has become rare. Amongst the rare wild animal groups species of carnivore mammals tops the list with about two - thirds share. On the opposite side, one-fifth animal's groups are found in abundance. Categories of frequent and occasional surprisingly show their equal propensity in the area.

Wild animals groups also exhibit that all the five groups of animals may be ranked based on number of these species in the total animals. Here, carnivorous ranks first while omnivorous mammals occupy last rank. Birds with second rank also show more and more number of species in its group.

Status of Wild life

Diversity of wild animals has been tried to find out from the field using structured questionnaires. Following sampling technique, respondents have been selected from northern and southern regions, which are largely forested in the study area. The tribes who seem to be the real conservators of wild life mostly inhabit these areas. Therefore, their observations about the status of wild animals are valuable. They have been asked about the percent decline of listed mammals, birds and fish, Amphibia and Reptiles.

Status of decline of wild animals have been categorized into four categories of low, medium, high and very high which may be taken as the synonyms categories of abundance (A), frequent (F), occasional (O) and rare (R) for the analysis purposes.

Field data reveals that wild animals in the study area have declined lowly that means they are present in abundance. Deer, wild boar, bear, monkeys, snakes, parrot, peacock, cormorant, egerat, etc are found in sufficient, numbers this is due to intact and less destruction of habitat of wild animals. Despite that, a few wild animals like Tiger, bison, hyena and python, Jaikal, frogs, local fishes like tegna, mogeri, etc. have become rare.

Correlates of Zoo- diversity

- Zoo-diversity in the study area is higher than average in the tribal belts.
- The magnitude of zoo diversity is associated with the area under forest cover.
- Level of zoo diversity is positively related with the share of forests in the total geographical area.

- Level of zoo diversity has significant positive relationship with the share of forests in the total geographical area.

This study is concerned with wild life. Wild life is dependent on both geographical and cultural factors. Had there been proper regular census of wild life as conducted by the Census of India at an interval of 10 years, there would have been ample data on various aspects of wild life. Then one could have worked upon it, and have produced fascinating inferences using basic and advanced statistics on zoo-diversity. In lack real data on zoo-diversity, percentage of forests land has been taken as 'Proxy Variable' assuming area under forest provides floral base for animals of all kinds.

Since zoo-diversity is intrinsically related with and highly dependent on forest cover. That's why Percentage of forests land is taken as proxy dependent variable, and it will be correlated with logically construed geographical and cultural independent variables for both secondary and primary data. Its relation will be positive with one set of independent variables, and negative with another set of independent variables. In other words, nature of relationship of dependent variable will have both positive and negative relationship with independent variables. It becomes more clear from the below hypotheses which will be tested at this place.

Hypothesis I:

- %-age of forestland is positively related with share of tribal population, sex ratio and refined literacy.

Hypothesis II:

- %-age of forest land is negatively related with density of population, Population growth and %-age of cultivators.

So, the dependent and independent variables for secondary data may be listed as follows;

Dependent Variable: Y = Percentage of forest land

Independent Variables:

X₁ = density of population

X₂ = population growth

X₃ = share of Tribal Population

X₄ = refined literacy

X_5 = Sex Ratio

X_6 = % of cultivator

Forest land is positively and significantly related with refined literacy at 5 per cent level of significance. Thus one variable – literacy- of the hypothesis I stands true as it indicates that literate people are more aware of saving the forest cover which also save plants and zoo-diversity.

Tribal population is positively related with forest land, it is of medium level; but relationship is not significant. This clearly points towards growth in tribal population also has some adverse bearing on the forest area. Sex-ratio is which is higher in tribal areas, has shown negative relation with forest land. Thus, this hypothesis is rejected.

It is shown that Percentage of forest land has significant negative relationship with density of population at 5 per cent level of significance. Thus hypothesis II is accepted that growth in density of population will have adverse impact on the share of forest land which will get shrink due to expansion of agriculture land officially, or non-officially as has been observed in the field.

It is further noted that out of 6 independent density of population (X_1) has positive significant relationship with population growth (X_2), negative significant relationship with share of Tribal Population (X_3); in both the cases relationship is significant at 5 per cent level of significance i.e. at 95 per cent level of confidence. The other two variables such as population growth(X_2) and share of Tribal Population(X_3) also show significant relationship with independent variables like Sex Ratio (X_5) and share of cultivator (X_6). However, the nature of relationship is opposite; it is negative in case of the former and positive in case of the latter.

Correlates of Concentration of Forest

Spatial distribution of forest like any element is uneven in nature. Somewhere it is more concentrated, while at other places it is scanty to absent. Here a simple percentage of forestland for each of 13 tahsils has been calculated from the total forestland of the study

area. This gives a new proxy variable for zoo-diversity to be correlated with cultural aspects given below;

Dependent Variable: Y = concentration of forest land

Independent Variables:

X₁ = density of population

X₂ = population growth

X₃ = share of Tribal Population

X₄ = refined literacy

X₅ = Sex Ratio

X₆ = % of cultivator

It is surprising to note that correlation result is the same as is in case of share of forest s in the total geographical area of the tahsil (see Table 5.8 and Table 5.9). Thus it once again proves the hypothesis that concentration of forest land (i.e. zoo-diversity) and density of human population are inversely and significantly (at 5 % level of significance) related.

Regression Result Analysis

The multiple correlations (R) are equal to the correlation between the predicted scores and the actual scores. A regression coefficient in multiple regressions is the slope of the linear relationship between the criterion variable and the part of a predictor variable that is independent of all other predictor variables.

In simple regression, the proportion of variance explained is equal to r^2 ; in multiple regressions, the proportion of variance explained is equal to R^2 . The sum of squares predicted is also referred to as the "sum of squares explained"

Table 5.10 shows that coefficient of multiple regression (R) is very high (0.94). That's why, the model explains 88 per cent variance ($R^2 = 0.88$). In this Regression result, density of population and refined literacy are significant independent variables, which explain the maximum variance. Wild life is dependent on both geographical and cultural factors. Had there been proper regular census of wild life as conducted by the Census of India at an interval of 10 years, there would have been ample data on various aspects of wild life. Then one could have worked upon it, and have produced fascinating inferences using basic and advanced statistics on zoo-diversity. In lack real data on zoo-diversity, percentage of forests

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If the wild life of the study area is to be enriched, developed, improved, improvised, in real sense, it needs a strong will power, appropriate management and strict monitoring, sincere participation of the local people and highest level of awareness in the society towards the wildlife. The effort made by the forest division of Kabirdham to carve out Bhoramdeo sanctuary for preserving and conserving wildlife is an exemplary model not only for the southern Rajnandgaon region but also for other regions of the country. This Nobel act will also yield very fruitful result when tourism as an industry will be developed to harness the sight scene of the natural scenery of the forest coupled with the thrilling experience of observing wild life in its natural habitats.

Creation of Van Chetna Kendra by forest Division of Rajnandgaon at Manghhatta near Mudhipar in the District is also welcome step towards wildlife conservation. Its gradual development as tourist spot in the district is a good indicator of overall development. Similar act is warranted in the dense hilly tribal regions of Dogargarh , churia in western fringe and Ambagarh Chouwky-Mohla -Manpur region in the south. After reading our below message, you decide yourself 'what do you want to be'? -Man or Human being:-

**"Man, without Wild Animals, is only a Mechanical Man,
And, Man along with Wild Animals, is a True Human. "
- Authors' View.**
