CHAPTER 3

3.1 Hypothesis, Methodology of the Research work:

3.1.1 Hypotheses:

1. The fishing settlements in the Alibag tahsil of Raigarh district are unplanned settlements in respect of location of the houses, roads and other structures and have an inadequate infrastructure.

2. Alibag tahsil of Raigarh district is passing through the stage of industrial and economic growth. The main threat to these settlements is the pollution of the seawater and the loss of land under mangrove vegetation due to the industrial growth in this region.

3. The geographical setup of the settlements, unhygienic conditions in the settlement and high illiteracy especially among women are partly responsible for the health problems of the fisher-folk.

4. The fishermen in the fishing settlements are not much aware about the Government-schemes like free housing etc.

The present work gives emphasis on the various aspects of the fishing settlements in relation to the geography of the coastal region. Raigarh district was selected from the konkan region in the state of Maharashtra. Raigarh is a coastal district located on the west coast of Maharashtra. The district has a long indented coastline (the length of the coast is about 240 kms) with a number of creeks and inlets that provide ideal protected areas for the development of harbors and also the fishing settlements. As per the district census book 2001, fishing ranks only next to agriculture as far as means of livelihood is concerned. The district is made up of 14 tahsils. Among 14 tahsils Uran, Alibag, Murud and Srivardhan are coastal tahsils. From these tahsils Alibag tahsil was selected. Alibag is the Headquarter of the Raigarh district and the tahsil has got a nodal location. To its north-west on an average hardly 30 to 60 kms away lies the industrial capital of India i.e. Mumbai. All settlements in the coastal parts of this tahsil practice fishing on large scale (District Census Book 2001). Many new industrial plants are coming up in the Alibag tahsil of Raigarh district because of its nearness to Mumbai. Alibag is an emerging tourist
place and even many other coastal settlements of this tahsil are gaining their importance as tourist places. In short the nature of the tahsil is dynamic and it is quite interesting to study the effect of the dynamic nature of the tahsil on the fishing settlements. From this tahsil three villages, one from the northern part of the tahsil to represent the northern section, second from the middle part of the tahsil to represent the middle section, and third from the southern part of the tahsil to represent the southern section were selected. As per the survey conducted by the Fisheries Department, Maharashtra state, during 2003, the number of fishermen at Bodni is 1398 (201 fisher-families) while the number of fishermen at Varsoli is 1317 (294 fisher families). Compared to many other fishing settlements in the tahsil these settlements have got sizable population of fishermen. The population of the fishermen at Rewdanda is relatively small i.e. only 136 (36 fisher-families). But the Rewdanda fishing settlement has got a nodal location. It is on the bank of the Kundlika River that forms a boundary between Alibag tahsil and Murud tahsil. 
(Source: Raigarh district gazetteer 1993)

The bridge on the Kundlika River near this settlement connects Alibag tahsil and Murud tahsil. From each village 35 to 40 % fisher-families were selected randomly. The families of active fishermen were selected. Active fishermen mean who are practicing fishing in the creeks and seas. The families that are engaged in other fishing allied activities like constructing the boats, working for co-operative societies of fishermen, running shops in the settlements etc. were omitted. The families of the active fishermen were selected to study the location, building material, structure of their houses and also the educational status, health status and economic status of the family members. The data was collected for the year 2008-2009 regarding Location, pattern of the distribution of the houses, housing material, inner structure of the houses, size of the settlement, type of the settlement, infrastructure of the settlement and structure of the settlement. Settlement dwellers i.e. mainly fishermen, fisherwomen and their kids are the integral part of the fishing settlement. Number of the settlement-dwellers, age composition the settlement dwellers, sex composition of the settlement dwellers, economic composition of the settlement dwellers, literacy of the settlement dwellers, occupational structure of the settlement dwellers and health conditions of the settlement-dwellers have been studied.
In this study the socio-economic parameters such as family size, age structure, educational and occupational pattern, customs, beliefs and the standard of living of the coastal fishermen household have been analyzed. In the socio-economic impact evaluation studies, the changes that have been brought about by the mechanization of fishing industry have been discussed. The recommendations to improve the socioeconomic conditions of the marine fishermen based on the studies have been proposed. Settlement is not a static thing. It is dynamic. The nature of all these aspects of the settlement may change because of the changing weather conditions during different seasons of the year, because of the calamities like cyclones, marine pollution and because of the technological advancement and Government policies. The present work therefore, considers each of these factors and interprets its effect on the various aspects of the selected fishing settlements of the Alibag tahsil of Raigarh district. Following factors have been considered.

1. Changing weather conditions during different seasons of the year and its effect on the accessibility of the settlement and the structure of the houses, infrastructure of the settlement, occupational structure, male-female ratio, health conditions of the settlement dwellers.

2. Natural calamities like cyclonic storms, surges that frequently appear on the coastal parts and its effect on the location and the structure of the houses, infrastructure of the settlement, occupational structure, male-female ratio, accessibility of the settlement, health conditions of the settlement dwellers, fishing etc.

3. Marine pollution and its effect on the fishing activity of the settlement dwellers etc.

4. Presence of the Mangrove vegetation in the nearby areas of the fishing settlements and its role in fishing and the development of fishing settlements

5. Technological advancement e.g. use of modern sophisticated fishing trawlers, new fishing techniques and its effect on the fish-catch, income, structure of the houses, infrastructure of the settlement, occupational structure, accessibility of the settlement, health conditions of the settlement dwellers.
6. Government policies and their effect on the fishing settlements. The necessary data has been collected from the different primary and secondary sources. The primary sources through which the data has been collected are the personal interviews with the settlement dwellers and with the physicians and with the people that operate co-operative societies in such fishing villages. Primary data was collected mainly through the household survey. The secondary sources through which the data, maps and related information has been collected are

1. The Director, Statistical Department, Wandre, East Mumbai
2. The central marine fisheries department, Warsova, Mumbai
3. The commissioner of fisheries, Mumbai, Maharashtra
4. The fisheries Training center, Alibag.
5. Fishermen’s Co-operative societies of all the three villages
6. IMD (India Meteorological Department Pune)
7. Reports and articles published in the periodicals of government and non government organizations.
8. Other Sources of information have been as follows:
   a. Annual reports of Fishermen’s Co-operative Societies.
   b. Reports published by the Ministry of Agriculture, the Planning Commission and the Departments of Fisheries from coastal States
   c. Data on marine fisheries production from the Central Marine Fisheries Research Institute (CMFRI)
   d. Published and unpublished reports and research articles
   e. Newspaper reports

This secondary data was mainly used to examine the changes in some aspects of the fishing settlements through the years. The five to fifteen years period has been considered to interpret the change in some aspects of the selected fishing settlements. Following demographic and other characteristics of the settlements have also been examined.
1. The average household income levels and economic status of the fishing community
2. The age composition of the settlement dwellers.
3. The sex composition of the settlement dwellers.
4. The literacy of the settlement dwellers.
5. The occupational structure of the settlement dwellers.
6. The health conditions of the settlement dwellers.
7. The Infant mortality rate and child mortality rate.
8. The average size of households
10. The housing structure of the settlement,
11. The infrastructure of the settlement.

In addition to this following factors have been considered which can be taken as the indicators to examine the socioeconomic status of the fisher women and also of the whole fishing community of the fishing settlements.

1. Educational status of the fishermen and the fisherwomen
2. Average age at marriage
3. Infant mortality rate

The study is built upon both primary and secondary data. While the secondary information has been collected from official sources and libraries, the primary data has been gathered through field survey. Stratified random sampling method has been adopted in this study, first to select sample villages and then to choose the sample respondents.

Since many fisherwomen are illiterate, questionnaire-based oral interviews were conducted. Prior to the preparation of the questionnaire, several informal discussions were conducted with individuals and groups from the selected villages. The questionnaire has covered some vital issues of traditional fishing communities with special focus on women. Besides the general information about the respondents and their families, the questionnaire covers the reasons for indebtedness; contribution of fisherwomen to the families and communities, fisher-folk’s control over natural and human resources, their
hardships and problems, and their opinion on environment and sustainability. The primary data collected from the field was meticulously entered into computer for processing and tabulation. Standard statistical tools, chi square test, t-test, s test were used to compare the three selected fishing villages in respect to the location of the houses, structure of the houses, building material, literacy level and educational level, health status, economic status, awareness of the fisher-folk regarding various government-schemes etc.

The information, collected through the primary sources, has been mainly used to get the present scenario of the fishing settlements. The information, collected through the secondary sources, has been mainly used to show the changing nature of the fishing settlements.

The household survey was the main field research activity and was carried out systematically. It aimed to explore describe and analyze demographic characteristics of the marine fisher folk in the selected settlements. The survey also aimed to further the understanding of the natural environment in which fisher folk live and make a living.

Questionnaires were prepared to obtain village level information from key-informants and house hold information from heads of households and eligible household members. Along with the coastal topographical sheets modern sophisticated instruments and techniques like geographical positioning system (G.P.S.) were used to collect information about the geographical locations of the settlements and the important features and sites in the settlements. The eligibility of household members for an individual interview was based on age and marital status selection criteria.

The household survey was carried out in the three selected fishing villages that were sampled from the 17 fishing villages of the tahsil on the basis of their locations. Bodni is to the extreme north of the tahsil, Rewdanda is to the extreme south of the tahsil and Varsoli is almost a mid-point between these two villages and very close to Alibag i.e. the Headquarter of the Raigarh district. In each selected village 35% to 40% households were sampled. The number of households sampled in each village is proportional to the population size of the village. Survey results of fisher folk households are representative of the particular village in which fisher folk households were sampled and interviewed.
The objective was to sample and interview 35% to 40% percentage of households in each of the three villages.

The following methods were used to process the data and to arrive at a right conclusion

3.2 Chi-square test:

The Chi square test is known as test of goodness fit and Chi square test of independence. In the Chi square test of independence, goodness of the frequency of one nominal variable is compared with the theoretical expected frequency. In the Chi square test of independence, the frequency of one nominal variable is compared with the different values of the second nominal variable. The Chi square test of independence is used when we have two nominal variables. The Chi square test of independence data may be in the RC form. In the Chi square test of independence, R is the row and C is the column. In the Chi square test of independence, the test variable may be more than two. The Chi square test has been used to compare the different aspects of the selected fishing settlements.

3.2.1 Criteria for using Chi-square test

1) In order to check the association between two qualitative variables. For ex. To check the equality of distribution of gender across three locations. Here both the variables are qualitative (variable 1 : Gender, variable 2 : Location)

2) Chi-square test has been used on the following assumptions

- Random sample— random sampling of the data from a fixed distribution or population.
- Sample size (whole table) – A sample with a sufficiently large size is assumed.
- Independence—

One way ANOVA analyses Observations are always assumed to be independent of each other of variance

Analysis of variance (ANOVA) is a general method for studying sampled data relationships. The method enables the difference between two or more sample means to be analyzed, achieved by subdividing the total sum of squares. One way ANOVA is the simplest case. The purpose is to test for the significant differences between class means,
and this is done by analyzing the variances. Incidentally if we are comparing only two different means then the method is same as the T test for independent samples.

List of parameters for which ANOVA was used.

Parameter 1-- Age (years) at the time of the death of a person from the selected household.

Parameter 2-- Age (years) at the time of the marriage of a person from the selected household.

Kupuswamy’s scale was used to measure the socioeconomic status of the fishermen’s families. The socioeconomic status is an important determinant of health and nutritional status as well as mortality and morbidity. Social status also influences the accessibility, affordability, acceptability and actual utilization of various available health facilities. There have been several attempts to measure the socioeconomic status, one such attempt was proposed by Kupuswamy in 1976 and was published in 1981. Kupuswamy’s socioeconomic status is an important tool in hospital and community based research in India. (Reference: Kupuswamy B. Manual of socioeconomic status, Manasayan Publishers, Delhi 1981)

This scale takes account of the education, occupation, health and income of the family to classify the study groups into high, middle and low socioeconomic status. Kupuswamy’s scale uses the variables such as education, occupation, economic status, physical assets, social-position etc. for classification of socioeconomic status.

The correlation between the fishing settlements and the geomorphic set up of the region has been interpreted with the help Toposheets or topographical map and the sea areas nearby the settlements has been examined with the help of Bathymetric maps. By taking toposheet as a base map the base map, Contour map, geomorphic map and the land use map of the Alibag tahsil have been prepared. These maps were prepared by using modern sophisticated GIS techniques. The maps are self explanatory and throw light on the geographical set-up of the region.