ENVIRONMENTAL IMPACT OF SARDAR SAROVAR PROJECT-

AN EIA STUDY OF THE COMMAND AREA PHASE - I

Summary of the

Thesis submitted to

The Maharaja Sayajirao University of Baroda

For the Degree of

Doctor of Philosophy
In
Geography

Guide:

Dr. (Mrs.) JAYASREE DE

Researcher:

YOGESH A. MANOHAR

DEPARTMENT OF GEOGRAPHY
FACULTY OF SCIENCE
M. S. UNIVERISUTY OF BARODA
VADODARA – 390 002.

2010

SUMMARY OF THESIS

ENVIRONMENTAL IMPACT OF SARDAR SAROVAR PROJECT

AN EIA STUDY OF THE COMMAND AREA PHASE - I

BY

YOGESH A. MANOHAR

GUIDE

Dr. (Mrs.) JAYASREE DE

DEPARTMENT OF GEOGRAPHY

FACULTY OF SCIENCE

M. S. UNIVERISUTY OF BARODA

VADODARA – 390 002.

INTRODUCTION

The Sardar Sarovar project is one of the largest and most ambitious river development projects in India. Its aim is to harness the water of the river Narmada which flows through 3 states, viz., Madhya Pradesh, Maharashtra and Gujarat and provides much needed water to the arid areas of these states, particularly Gujarat. The problem of water shortage has always been most acute in Gujarat. The western part of the state in particular has always been subjected to droughts due to paucity of rainfall and shortage of both ground and surface water. The Narmada dam (Sardar Sarovar) with its network of canals was expected to substantially change the land use pattern in Gujarat and help to recharge the ground water resources while ensuring perennial flow of surface water within the command area of the Sardar Sarovar project.

However, the progress and implementation of this project has been fraught with environmental, social economic and political controversies, ever since its commencement in the year 1961. It is appropriate at this stage to asses the environmental impact of this project so that corrective measures may be taken wherever shortcomings are noted.

Economic, social and environmental changes are inherent to development. Whilst development aims to bring about positive change it can lead to conflicts. In the past, the promotion of economic growth as the motor for increased well being was the main development thrust with little sensitivity to adverse social or environmental impacts. The need to avoid adverse impacts and

to ensure long-term benefits led to the concept of sustainability. This has become accepted as an essential feature of development if the aim of increased well being and greater equity in fulfilling basic needs is to be met for this and future generations.

In order to predict the environmental consequences of any development activity and to provide an opportunity to mitigate the negative impacts and enhance positive impacts, the environmental impact assessment (EIA) procedure has been considered as essential.

OBJECTIVES OF THE STUDY

1. To assess the existing quality, quantity and consumption pattern of the water resources.
2. To investigate the climatic variations for identifying water surplus and water deficit areas at the micro level.
3. To study the cropping pattern in order to estimate the water requirement for agriculture in the existing agriculture practice.
4. To study physical and socio-economic environment responsible for the existing cropping pattern.
5. Suggest an optimum cropping pattern for different agro climatic zones within the region based on land, water and soil resources and the cost structure of major crops.

6. To predict the possible future changes in level and quality, of ground water, soil characteristics and crop productivity that may occur once irrigation facility is made available thought out the year.

VARIABLES UNDER STUDY

1. Physical Factors.
2. Soil.
3. Land Irrigability Class.
4. Hydrology – Surface water & Ground water (Quality / Quantity)
5. Irrigation Needs.
6. Land Use and Cropping Pattern.

The Study Area

The Command Area Phase – I, of the project, comprising of about 7.91 lakh hectares (19.53 lakh acres) covering parts of Bharuch, Vadadora, Narmada and Panchmahal districts, lies between 21° 40' to 22° 50 N Latitude and between 72° 30 to 73° 50 E longitude. It is bounded by the rivers Narmada and Mahi in the south & north respectively. The main canal in the east and the Gulf of Khambat in the west form the other two boundaries of the command area.

Sampling

All villages covered within Sardar Sarovar Command Area Phase-I constitute the universe of study. From this universe the samples were selected

for the purpose of studying soil and water quality and the socio-economic conditions of the population.

Soil survey has been carried out in part of Phase – I area during the period 2002 to 2004. The base map of 1:50,000 or 1: 63,360 has been used. The physiographic units were delineated and verified during the field traverse. The open profile has been located in representative sites covering an area of 1000 ha. The open profile has been excavated up to depth of 180 cm or up to parent material or water table, whichever is met earlier. The open profile was described horizon-wise for its morphological characteristics like colour, texture, consistency, concretions, routing depth, lime content, coarse fragment, etc. The auger bore has been taken up to the depth of 240 cm and soil samples were examined for colour, texture and lime content. In the field information on land parameters such as slope, erosion, surface drainage conditions, depth to water table, land use and cropping pattern were coliected simultaneously.

The soil samples were collected from open profile horizon wise and brought to laboratory for testing for their physico-chemical properties such as particle size, distribution, permeability, moisture holding capacity, pH, electrical conductivity, calcium carbonate, organic matter and exchangeable cations.

For selecting ground water samples, the ground water data was first collected for 2058 open wells from Sardar Sarovar Narmada Nigam Limited (SSNNL) and Gujarat Water resources development corporation (GWRDC). The data comprised sub-surface water level, electric-conductivity (EC) and pH (Alkalinity) for the year 1981 (pre and post monsoon), 2000 (pre and post

Monsoon) and 2001 (pre monsoon). For a more detailed analysis the researcher had collected ground water samples from 258 of these open wells in the study area for the year 2003 (Pre & Post Monsoon). For selection of sample wells, the entire study area was divided into grids of 6 x 6 km and one well was selected from each grid. The water samples were then analysed for EC, pH, and different salts like Ca (calcium), Mg (Magnesium), Na (Sodium) K (Potassium).

The socio-economic survey of the PAP's was conducted in the year 2004 for nine randomly selected rehabilitated villages, three each from Gujarat, Maharashtra and Madhya Pradesh. The sample size of the survey was 100 rehabilitated families, who are relocated in the talukas of Dabhoi and Sinor in Vadadora District.

Plan for the Analysis of Data

While the chemical analysis of water and soil samples was carried out in the geo-chemistry lab, the statistical analyses were done using computer softwares. Mapping and final analysis of results have been carried out in the GIS environment.

Findings

The study area falls under four agro-climatic regions. Within each region, the study has identified at the micro-level, the changes in the general land use pattern, the hydrology, soil, land irrigability class and crop combinations at two points of time, namely, 1981 and 2001.

- On the whole, a sluggish and minimal change has been discerned over a period of two decades in the overall land use. Except in the cases of settlement and roads, all other uses of non-agricultural land have shown decline in area.
- The black soil is dominating in the study area with soil depth more then 90cm. The soil is imperfectly to poorly drained
- The depth of the ground water is 5m or more.
- Land irrigability Class-II and Class-III are dominating in the study area.
- 65 percent of the study area had non-saline soil and in the coastal area, salinity of soil is a major problem.
- The salinity intrusion is from west to east. The salinity levels have increased from the year 1981 to 2001. The entire agro-climatic regions III and IV are severely affected by salinity. The effects of salinity have started creeping in region-II, especially in Padra Taluka of Vadodara district.
- Soil and water influence the cropping pattern. Cotton and tur are the major crops of this study area,
- At the first point of time the ratio between the cotton and other crops in respect of their share in the G.C.A., was 4:6, showing a sort of balance between cotton (40.80 %) on one hand and the other crops (59.20%) on the other. By 2000-01, cotton declined to occupy 39.30% of the G.C.A., leaving 60.70% to other crops.
- Food crops in 1980-81, had reasonable significance occupying 39.90% of G.C.A., the lions share going to jowar (16.52%), followed by rice (5.72%) and

wheat (4.86%) each. By 2000-01, the cereals were confined to 23.02 per cent of G.C.A., with wheat occupying 5.23 per cent followed by paddy 4.82 per cent, Jowar 4.74% and bajra 2.79 per cent.

- So far as ranking of crops is concerned, jowar and tur maintained second rank at both points of time and the third rank was occupied by paddy, tobacco and other crops even though their individual share of G.C.A., were much reduced.
- Beside cotton, tur, bajra, oil seeds, sugarcane, and tobacco registered increase in their G.C.A. All other crops showed a downward trend.
- The catalysts of change include various components of the physical, man-made, social, economic, political and technological factors.
- Deficiency, seasonality and erratic nature of rainfall determines the land use pattern
- The salinity of soil as well as of the underground water is another permanent feature, which restricts the use of soil and water for growing the types of crops desired
- Irrigation provided by the Narmada canal may not bring the desired changes in the existing land use pattern unless some innovative measures are taken to adapt the system to peculiarities of soil and terrain