INTRODUCTION

The domain of Land Utilization is vast. Herein meet the General Geographer, the Soil Scientist, the Agricultural Meteorologist, the Agronomist, the Crop Ecologist and so on. In this wide domain each specialist has his own sphere of interest but he has often to depend on other specialists for data. The Agricultural Geographer mostly relies on the facts and figures given by the above mentioned specialists. The Agricultural Geographer attempts to make a real correlation between Nature and Man in the field of activity defined as agriculture.

Even a sketchy account of this vast domain would be too unwieldy to be compressed into one volume. Only specific points can be investigated. The main purpose of this particular work is specifically to determine the influence of environmental factors on the agricultural conditions of the area chosen for study, especially on the distribution of crops and agricultural techniques. The influence of these factors on the distribution of rural population and settlements is another line of investigation. Only passing reference could be made to the various other attendant aspects of the agricultural scene.

The choice of the subject and of the area in question was based on various considerations. In our country any research worker in Geography is beset with problem of lack of data as "the amount of specifically geographical writing about India is small...but the amount of literature
with a geographical bearing is vast. The position is worse in the case of Gujarat about which there is a great paucity of geographical information.

The Area under Investigation:

The Central Gujarat Plain, the area chosen for study, is primarily confined to the districts of Baroda and Panchmahals of the new State of Gujarat which came into being with the bifurcation of the bilingual Bombay State in May 1960. (Fig. 1). The area under investigation is drained by the lower waters of the Narmada and Mahi and their several tributaries. Some part of the area is also drained by the river Gadhbar, which does not belong to the Narmada system but joins the Gulf of Cambay (Fig. 4).

The choice of this area for the study of land utilization was influenced by four considerations. Firstly, the location of the territory is itself significant, for the area lies in the centre of the main land of Gujarat, a transitional zone between the fertile and older agricultural lands of the Northern Gujarat Plain and the patchy and newer forest clearings of the Sarpudas. In the chapters that follow it will be made clear that the districts under study are not only transitional as regards relief and structure, but also as regards natural vegetation and crops.

Secondly, the area in question has been relatively little studied and is poorly known.

LOCATION OF THE AREA UNDER INVESTIGATION

Fig 1

SOURCE:
SURVEY OF INDIA MAPS.
Thirdly, the area chosen for the study represents two contrasting districts differing in respect of relief, soils, density and distribution of population, technique of cropping, crops grown and yields obtained.

Finally, the author had had a long association with the district of Baroda and its surrounding region. The author being in residence at Baroda felt that an intensive land-use study of the two districts of Baroda and Panchmahals in relation to the natural and cultural landscape could be a profitable pursuit.

The Districts:

The area chosen for study comprises the districts of Baroda and Panchmahals, extending from 21° 48' N. to 23° 27' N. latitude and from 72° 52' E to 74° 28' E, longitude. The area thus lies within the tropical belt. The districts form a central compact block in the heart of the main land, Gujarat being surrounded by the districts of Kaira in the west, Sabarkantha district of Gujarat and the State of Rajasthan in the north, Madhya Pradesh State in the east and the district of Broach and the State of Maharashtra in the south (Fig. 2). The districts are divided into 23 talukas, viz., Godhra, Kalol, Halol, Jambughoda, Devgadh Baria, Limkheda, Dohad, Jhalod, Lunawada, Santrampur, and Shahera (all in the district of Panchmahals) and Baroda, Savli, Waghodia, Dabholi, Sankhed, Naswadi, Karjan, Padra, Sinor, Chhota Udepur, and Jabugam (all in the district of Baroda.)
The two districts have a total area of 6,463.5 sq.miles (or 0.55 per cent of the Indian Union; and 8.95 per cent of the Gujarat State) and supported in 1961 a total population of 2,996,272 which gives an average density of 463 persons per sq.mile. But as will be made clear in chapter VI, the distribution of population is very uneven, the density varying from more than 1,500 to less than 270 per sq.mile, if taluka-wise figures are considered.

Sources of Data:

One of the chief handicaps for the author has been the lack of published data. The only source of extensive data is the Census Reports which give data for talukas. The Settlement Reports and the District Gazetteers are also basic sources of information but are out-dated. Agricultural data are available in published form only for the districts as a whole. Much of the data was collected by the author from the various Government Offices; while valuable information about the yield of crops, techniques of cultivation and the use of land at village level was collected by the author in the course of his field work. The author himself visited the villages and collected the necessary data especially with regard to land utilization. The author also obtained information in the form of replies to brief questionnaires which he issued to Talathis, Gram Sevaks etc. References to other sources of data are mentioned in the appropriate chapters. Most of the data presented here are usually not available to the public.
The work is mostly based on an on-the-spot study of agricultural conditions made by the author and a careful interpretation of the various maps. In various trips made to districts and taluka headquarters and several villages, the author had the opportunity of obtaining first-hand information from various officers and also from the villagers themselves. The maps have all been drawn on two or three uniform scales and their interpretations are given in the appropriate chapters. Of the 67 maps, 32 were originally drawn on double the size and then reduced photographically; 27 maps were drawn nearly the same size. The Geology, Relief, Physiographic Regions, Drainage, Land Use, Transportation and Bus Frequency maps were drawn on the scale of 1" = 4 miles.

The Plan of the Work:

The plan of the work is as follows: There are three parts. In part I the elements of physical setting have been described. Chapter I discusses the distribution, characteristics and the various geological formations; a brief indication is also given of the geology of the area to the agriculturists.

Chapter II deals with the relief and drainage of the districts. The three principal divisions, viz., the Gulf Area, the Western Plain and the Eastern Hilly Tract and Plateaus have been separately described; in describing the latter, the influence of topography on crops and settlements have been indicated. The second half of the Chapter deals with the drainage system of the area. One main system is recognized and described—viz., the Gulf of Cambay drainage (i.e., the Narmada and its tributaries, the Mati and its tributaries and the Mahi).
In view of its significant role in the field of agriculture the climate of the area has been described fully in the Chapter III. Both the individual weather elements and the seasonal rhythms are discussed. The Chapter ends with a note on the variability of rainfall which has an important bearing on agriculture. The discussion on climate is followed by a brief description of the various types of soils found in the area; this description is, however, most important from the point of view of agriculture.

Chapter V gives an account of the forests. The factors underlying the distribution and types of forests, and their importance to the agriculturist of Central Gujarat have also been indicated. These five chapters comprise Part I.

The solitary Chapter in Part II, deals with Population and Settlements. In the first half of the Chapter, the distribution, growth and occupational structure of population are discussed. The influence of environment has been brought out in explaining the distribution of population. While discussing the growth of population and the occupational structure, an idea has been given of the pressure of agricultural population on cultivated land. In the second half, a detailed treatment is given of the size, location, growth and patterns of settlements. A short analysis of towns follows this account.

Part III which forms the main part of this work opens with an analysis of the use of the land in different parts of Central Gujarat Plain. The influence of the environmental factors has again been brought out. Man's close adjustment to Nature in this regard has been interestingly shown.
The next two Chapters are the result of field-studies and enquiries. In chapter VIII, the numerous techniques, cultural practices and methods of cultivation, cultural practices like mixed cropping, double-cropping manuring etc. are fully described. Irrigation, which is quite insignificant in the area, has also been dealt with in this Chapter. In the next Chapter, each of the seventeen most important crops has been described. Cotton, Rice, Maize, Jowar, Gram, Groundnut, and Tobacco have naturally been described in much greater details because they are the principal crops of the area. Apart from areal distribution, such other points as methods of cultivation, varieties grown, pests and diseases have also been described.

After an attempt to divide the area under study into Crop Regions on the basis of Weaver's method, various criteria have been used in arriving at a division of the area into Agricultural Regions and Sub-Regions in Chapter XI. The basis of the division is first discussed. Each Region is then fully described and for each region and sub-region a village has been chosen for a detailed study. Village maps have been drawn to bring out the crop-characteristics of each agricultural region.

The distribution and breeds of cattle are discussed in the next Chapter. The discussion on grazing grounds shows what facilities are at present available in the area.

The significance of the various means of communications, roads, and railways is discussed in Chapter XIII. The nature of goods carried along the different roads and railways has also been described.
In the last Chapter, the greatest socio-economic revolution under the aegis of the Government, viz., Community Development, is discussed. An attempt has been made to assess the effects of this movement in the fields of agriculture, irrigation and animal husbandry.

In the conclusion the author rather than summing up the facts presented in the text of the thesis, has given definite assessment of the potentialities of the land as regards its uses and its capacity to support people. The nutritional aspect of the diet of the people is also dealt with here and certain positive suggestions have been given. It is hoped that these suggestions in the light of the interpretations given in the preceding chapters will prove of real use to those in charge of planning. In giving these suggestions the author has not overestimated the capacity of the land; the suggestions are workable and will, it is fondly hoped, help to raise the standard of living of the inhabitants of Central Gujarat Plain.