CHAPTER III

RESOURCE BASE APPRAISAL

OF

AHMADNAGAR DISTRICT
A) MEANING AND IMPORTANCE OF RESOURCES

Resource means the wealth, supplies of goods, raw materials, etc. which a person, country etc. has or can use. We use the word 'resources' to refer to all forms of matter or energy considered useful or essential by human societies. Typical dictionary definitions of the word "resources" read as follows: (i) That upon which one relies for aid, support, or supply, (ii) Means to attain given ends, (iii) The capacity to take advantage of opportunities or to extricate. The word "resource" does not refer to a thing or a substance but to a function which a thing or substance may perform or to an operation in which it may take part namely the function or operation of attaining a given end such as satisfying a want. In other words "resource" is an abstraction reflecting human appraisal and relating to a function or operation. As such it is a kin to such words as food, property, or capital but much wider in its sweep than any one of these. Resource as basis of regional planning.

The growing demand for energy has caused great importance to be attached to the exploration of new sources of energy. At the present firewood is being used by the bulk of the households for cooking. In addition to firewood animal dung is also used the combustion of which deprives the already poor soil of one of the chief source of fertilizer.
There has been large scale reduction in forests, this is because of non-availability of suitable fuels for cooking and other domestic uses, and materials for house construction. Electrical energy, oil, etc. cannot be made to reach all the rural area of the district in view of the high cost of transportation and distribution of electrical energy although causes of the very low per capita income of the rural population. Several districts in the state do not posses either coal or oil deposits therefore, people from those districts should direct their attention to developing new technologies to optimise the use of alternate and new sources of energy. If technologies can be innovated to meet these requirements through new sources of energy it would make a significant contribution in preserving districts rapidly diminishing forest wealth and thus avoid some of its serious consequences in the form of floods, droughts etc. The following aspects as water, wind, solar energy, biogas, natural scenery and population etc. have been considered as potential resources of the area under study.

(B) HYDROLOGICAL RESOURCES

Water supply is extremely vital to the economy based on agriculture. Surface water supply and underground water supply both play significant role in the success of agriculture. The details discussed below reveal the actual
and potential contum of water available in the various part of the district, for utilisation.

(I) **IRRIGATION SCHEMES**

There are some major, minor and small irrigation projects and schemes of lift irrigation and percolation tanks, etc. at different places in each tahsil of the district. These projects are either completed or ongoing or proposed for solving the problems of irrigation of various areas in the district. (Ref. table No 3.1 and fig. No. 3.1.) There are number of irrigation schemes at different places with more or less irrigation potential and all these schemes are on state level and or local level. The percentage of irrigation potential to total cultivable land are under big projects i.e. (23.25%), medium projects (3.78%) small scale projects (4.29%) lift irrigation (1.04%) and percolation tanks (4.49%). The percentage area of irrigation potential under completed projects are (18.76%) ongoing projects (13.56%) proposed projects (1.41%) proposed but yet to be sanctioned (3.12%) and the total irrigation potential of all these schemes (36.85%) to total cultivable land, (Ref. table No.3.2 and fig.No3.2). After completion of all these schemes 36.85% area will become under irrigation and the part of irrigation problem would be met.
IRRIGATION PROJECTS AND POTENTIAL TO TOTAL CULTIVABLE LAND (% in hectares)
Year 1983-84.

Legend:
- Percolation Tanks
- Lifts
- Small Projects
- Medium Projects
- Big Projects

Fig. No-32
Facility of irrigation is a serious problem in the district, as the entire region is prone to serious droughts and it is not traversed by major rivers in the centre and southern part. Therefore, these schemes of irrigation would be helpful to solve a part of the problem and it is necessary to complete all these schemes as early as possible. Since the central and southern segments of the district actually need facility of irrigation, these neglected areas should get priority in the development of this potential.

(II) GROUND WATER POTENTIAL

The ground water survey department of Ahmadnagar has identified eighty water sheds in the district on the basis of the three major river basins viz. Godavari, Sina and Bhima. The water recharge, withdrawal, balance in MCM, and number of feasible wells are also shown in each watershed. (Ref. table No.3.3 to 3.5) and fig. No.3.5).

There are seventeen watersheds in the Sina river basin and out of these five water sheds having water balance more than 10 MCM and less than 27 MCM, and also having more number of feasible wells in the same. These water balances and feasible wells would be useful if utilised properly to reduce the impact of famine in Ahmadnagar, Perner, Jamkhed and Shrigonda tahsils. These watersheds are as follows:-
AHMADNAGAR DISTRICT

WATERSHEDS

LEGEND

GODAVARI RIVER
BHIMA RIVER
BINA RIVER
DISTRICT BOUNDARY
TALUKA BOUNDARY
BASIN BOUNDARY
WATERSHED BOUNDARY
RIVERS

Fig. No-33
GROUND—WATER POTENTIAL OF AHMADNAGAR DISTRICT (Year: 1983-84)

- Recharge
- Withdrawal
- Balance

SA—Sina River basin
BM—Bhima ”
GV—Godavari ”

MCM—Million Cubic Meters

Fig.No-35
<table>
<thead>
<tr>
<th>Water shed Number</th>
<th>Water balance (MCM)</th>
<th>No of feasible wells</th>
<th>Included tahsils</th>
</tr>
</thead>
<tbody>
<tr>
<td>1) SA 1</td>
<td>24.146</td>
<td>1609</td>
<td>Ahmadnagar, Pamer</td>
</tr>
<tr>
<td>2) SA 2</td>
<td>26.424</td>
<td>1761</td>
<td>Ahmadnagar</td>
</tr>
<tr>
<td>3) SA 5</td>
<td>16.692</td>
<td>1112</td>
<td>Ahmadnagar, Shrigonda</td>
</tr>
<tr>
<td>4) SA 22</td>
<td>12.153</td>
<td>810</td>
<td>Karjat</td>
</tr>
<tr>
<td>5) SA 17</td>
<td>20.523</td>
<td>1368</td>
<td>Jamkhed</td>
</tr>
</tbody>
</table>

There are twelve watersheds in the Bhima river basin out of twelve watersheds six watersheds having more water balance (i.e. above 10 MCM and below 23 MCM) and more number of feasible wells (i.e. 700 to 1400) would be useful in Pamer, Shrigonda and Karjat tahsils. These watersheds are as follows:

<table>
<thead>
<tr>
<th>Water shed number</th>
<th>Water balance (MCM)</th>
<th>No of feasible wells</th>
<th>Included tahsils</th>
</tr>
</thead>
<tbody>
<tr>
<td>1) BM 14</td>
<td>11.898</td>
<td>793</td>
<td>Pamer</td>
</tr>
<tr>
<td>2) BM 15</td>
<td>17.460</td>
<td>1164</td>
<td>Pamer, Shrigonda</td>
</tr>
<tr>
<td>3) BM 29</td>
<td>12.550</td>
<td>836</td>
<td>Shrigonda</td>
</tr>
<tr>
<td>4) BM 32</td>
<td>17.056</td>
<td>1137</td>
<td>Shrigonda, Karjat</td>
</tr>
<tr>
<td>5) BM 33</td>
<td>22.529</td>
<td>1435</td>
<td>Shrigonda</td>
</tr>
<tr>
<td>6) BM 47</td>
<td>11.703</td>
<td>780</td>
<td>Karjat</td>
</tr>
</tbody>
</table>
In the river Godavari basin there are fifty one watersheds and out of these fifty one watersheds thirty watersheds having more water balance (i.e. 10 MCM to 65 MCM) and more number of feasible wells (i.e. 700 to 5000). These water balances and feasible wells would be useful in Kopergaon, Shrigamur, Rahuri, Sangamner, Akola, Sheogaon and Patherdi tahsils.

It indicates clearly that the water balance is considerable in the various watersheds that can be used for development of agriculture and other purposes. As well as the number of feasible wells are also considerable in various watersheds.

The "white" watersheds are located in Godavari basin (43) sina basin, (14) and Bhima basin (12). There is only one "Grey" watershed in Godavari basin and three "Grey" watersheds in Sina basin. The seven "Dark" watersheds occur in Godavari basin. Not a single "Dark" watershed occurs in the sina and Bhima basins.

C) SOLAR ENERGY

In Manusmriti the ancient Sanskrit work brings out beautifully that sun is the source of all life. In particular the human race stands out since it is bestowed with additional capability to further and explore new avenues of knowledge.
One such avenue of knowledge which is assuming great importance these days in the study of solar radiation and its utilization.

The time is ripe for the emergence of a sound and novel strategy for rural development using solar energy. Any scientific invention and technological innovation consensive to their environment would be acceptable to people. Few examples of this sort are as under:

a) **SOLAR RADIO STATION**

Bryan, a small city in Ohio (U.S.A.) operates the first solar radio station. An array of 33,600 photovoltaic cells (above) generates 15 kilowatts of electricity from sunlight. "The array will supply 70-90 percent of the electric power needed by the transmitter over the course of a year" says Thaman.

b) **KAPUR SOLAR FARMS**

In 1963, ten acres of barren unproductive land was acquired in the rural area of the Union territory of Delhi. The basic components of the integrated energy system now operating at "Kapur solar Farms" includes a three-stage solar water heating system. The solar energy plant is linked with a biogas plant with a facility for using animal,
plant and human waste and also the infrastructure to use the available energy for cooking, lighting not water supply, and various other applications. The plant serves a dual purpose. One is to meet the energy needs of a small community of between 15-20 people and the other to act as a prototype for carrying on advanced studies with the help of sophisticated controls systems, including a micro-computer.

The plant at the farm is connected with the solar energy plant. The constant temperature is maintained and methane gas generation is assured throughout the year. As a result this integrated plant provides adequate energy in one form or the other throughout the year. Can also be used for refrigeration milk pasteurisation and hot water supply. Other major benefits of the system would be to generate energy in the most desirable form available to the villages where it is needed and thus help the process of energy efficiency, energy conservation and building up of employment potential at site where the problems are rather than transferring many of these problems to the urban areas. The nitrogen rich slurry from the biogas plant will help agricultural production and improve the quality of the soil. This kind of system can also help preserve forests and agricultural wealth, improve sanitary conditions and create a network of decentralised energy
cooperatives, and avoid the devastation which is being caused too out environmental ecology and above all to our psyche. 6

This particular case of a farm is just representative of Indian scene anywhere in the country where the climate is semi-arid and plenty of sunshine is available throughout the year. In fact, such a farms could be developed in thousands in Ahmadnagar district and tremendous qualities of fuel wood, kerosene etc. could be saved per year.

C) SOLAR VILLAGE

A tiny undeveloped village "Khandia" (situated on the border of Sankheda and Wagodia tahsils near Baroda), with a population of 800 will be India's first solar village, under a Rs.15 lakh, experiment to meet its entire energy requirements through solar and other non-conventional energy sources. Khandia's obscurity and lack of most basic amenities were the main reasons for choosing it. The project envisages the distribution of 100 solar cookers free of cost of the 100-odd families, who now consume about 300 tonnes of firewood and 200 kiteras of kerosene every year to keep the kitchen fires burning. A 60-cubic metre biogas plant will also be set up to meet the requirements of cooking fuel, slashing the annual firewood consumption to about 50 tonnes. 7 And improvement of the micro ecosystem.
d) **SOLAR COOKER**

One Mr. P.K. Kulkarni started work on solar cooker in 1977 and tested the models on which the bread and chapati can be prepared and finalised design in 1979. 8

K.P. Thanvi and M.L. Purohit have calculated the solar energy potential for the village "Jahakdon ki-dhani" which is in the vicinity of Jodhpur, and radiation data pertaining to Jodhpur are utilised. The potential of solar energy for cooking purposes for a family of five persons has been estimated. (Ref. table No.3.6) The estimated solar energy potential for cooking food for a family of five persons using a solar steam cooker (collector area 1 m$^2$, efficiency 20%) varies from 1.12 to 1.48 KWH/day. Assuming that total energy consumption for cooking food, for a family of five persons is 4.29 KWH/day (1.5 KW for 2.0 hours, distribution efficiency 70%) about 26 to 34 percent of cooking energy can be saved by using a solar steam cooker. 9

In the district of Ahmadnagar the rainy season lasts for hardly three months and plenty of sunshine is available over the remaining part of the year. So that solar energy could be generated in most of the area saving firewood and kerosene in tremendous quantities to the advantage of the villagers as hinted above.
Moreover it will help in conservation of forests and improvement of the micro eco system. But author would like to say on the basis of this work since the climatic conditions at Jodhpur and Ahmednagar cities are almost identical (Ref. table No 3.7) therefore, this estimation of solar energy potential is more or less applicable to Ahmednagar as well.

In order to give an idea regarding the prospect of utilizing solar energy in Ahmednagar district data regarding sunshine is available on village Wadzire tahsil Parner. (Ref. table No. 3.8 A and B). In the village Wadzire (located at a distance of about 30 kms. from Ahmednagar city) about nine month bright sunshine is available and in this nine months January to June and October to December 8-10 hours of bright sunshine are available for nine months for 28-31 days bright sunshine is available for over nine hours. In the rainy months from July to September these values are low. Almost same conditions of sunshine occur in almost all tahsils excepting Akola. Therefore it is possible to use the solar energy for cooking drying heating and other so many uses. Since lot of research has been put in the development of solar energy and many techniques perfected by now, the need is to diffuse this techniques and solar gadgets in the rural masses of the district.
As indicated earlier such a change in the energy consumption would save lot of money and material to the society.

A model indicating small scale utilization of solar energy for rural development may be referred in this connection. (Ref. fig. No. 3.6). The strategy stresses the utilization of the sources of bio, solar, and other models of generating power. On the one hand and the social and cultural changes in the village life and other for its success.

D) BIOGAS POTENTIAL

Fire wood is used by the bulk of the households for cooking heating etc. in the rural area at on extremely low efficiency. There has been tremendous depletion in the forest wealth. This is because of the non availability of suitable alternative fuel for consumption. The biogas is therefore directed towards making a contribution in achieving some of these objectives. The biogas provides a crucial source of energy that could be generated locally and with locally available animal waste.

A very large proportion of the districts population is concentrated in rural areas and in small communities. The agriculture is the main occupation of the people.
SMALL SCALE UTILIZATION OF SOLAR ENERGY FOR RURAL DEVELOPMENT

A STRATEGY

R&D ORGANIZATION INVOLVED IN SOLAR ENERGY RESEARCH

VILLAGE LIFE
- MODE OF LIVING
- SKILLS & ARTS
- TECHNOLOGY
- CULTURE
- TRADITION
- SOCIAL SYSTEM etc....

VILLAGE RESOURCES
- MAN POWER
- ANIMAL POWER
- SOLAR ENERGY
- OTHER ENERGY SOURCES etc....

DATA

TECHNOLOGY ASSESSMENT

ANALYSIS

SYNTHESIS

APPROPRIATE TECHNOLOGY

TRAINING OF PERSONNEL

DISSEMINATION OF SOLAR SCIENCE

INTEGRATED RURAL DEVELOPMENT WITH SOLAR TECHNOLOGY

After: D. Prakash

Fig. No.-3-6
Therefore bovine population as the cows, and buffalos occurs in considerable number as part of the agricultural economy. It is possible to erect plant in each village or even in a family using the dung of the animals as the raw material. In order to give an idea regarding the potential of generating biogas and effort has been made here as indicated below. There were 9,49,322 cattle heads in the district (according to 1981 socio-economic review) and they generate 94,93,220 Kg. excreta every day that can produce 1,42,39,830 cft. amount of biogas per day (Ref. table No 3.9 and fig. No 3.7) if the dung is carefully collected by villagers every day. The total population of the district is 27,112,16 (1981) and it ideally requires 2,7,112,160 cft. gas per day as indicated in the table. However the potential indicated above is not being used at the moment.

A tahsilwise potential of the biogas has been indicated in (Ref. fig. No 3.7 and 3.8) it shows that considerable potential exists in Akola, Farner, Jamkhed, Patherdi, Karjat, Shrigonda, Shroogaon and Sangamner tahsils. The map also shows the biogas requirements of the people according to 1981 population. Thus, this source of energy is crucial to development of the district.

It is interesting to put the idea of gas production at home, based on household, the waste material, domestic waste material (Ref. fig. No 3.9). Domestic waste include
BIOGAS POTENTIAL TO TOTAL REQUIREMENT IN PERCENT

TAHSILWISE

(YEAR - 1981)

Fig. No-3.8
dry and green leaves, vegetable waste, spoiled food etc. A successful experiment has been made (by S.S. Mahajan Scientist N.C.L. Pune) using such waste material for generating gas in every house. Gas produced from 400 grams of such material lasts for one hour. The gas does not give any foul smell and it is safe to use at home. The estimated cost of preparing such a small domestic biogas plant is rupees five hundred approximately.

The Dutch company Montire Von stratam (B.V.) has designed five different kinds of plants which can produce a gas using the waste material like timber waste, dry coconut shell, spoiled fruits etc. and such other farm waste. 70-80% expenditure of Dizel can be saved by using this type of gas plant machine.

E) WIND POWER POTENTIAL

K.F. Thanvi and M.L. Purohit have worked out wind power potential for fulfilling the basic energy needs of rural masses in habitating in a typical village "Jahakdon Ki-ghani" (Dist. Jodhpur, Rajasthan). Utilizing data of normal wind velocities in kmph. in respect of Jodhpur, the average monthly wind power has been worked out (Ref. table No 3.10) using the following equation.

\[ P = 0.00064 AV^3 \]
Where:

\[ P = \text{Power in Kilowatts} \]
\[ t = \text{hours} \]
\[ A = \text{Area in sq. M. through which wind passes normally} \]
\[ V = \text{Wind speed in KMPH}. \]

Theoretically only 59.4 percent of the energy of the wind could be extracted by an ideal generator. However only twelve percent efficient wind machine can be designed owing to aerodynamic imperfection, mechanical losses etc. Particularly suitable sites/villages in Akola tahsil in the western ghat, Sangamner tahsil areas where reasonably satisfactory wind velocities (over 10 kms. per hour) are available could produce wind power for consumption in the farms and villages. In the absence of data concerning monthly average wind velocities, no power potential can be calculated.

F) NATURAL SCENERY AND CULTURAL HERITAGE AS A RESOURCE

Natural scenery places of historical and religious interest etc. can be utilised for development of tourism that generates job opportunities and wealth. According to the Oxford English Dictionary the meaning of the word "tour" is a going or travelling from one place to place, a round and excursion or journey including the visiting of a number of places in a circuit or sequence often qualified, as cycling, walking, wedding for especially
a circuitous journey embracing the principle places of the country or region mentioned.

"Tourists means one who makes a tour or tours especially one who travels for pleasure or education, visiting a number of places for their object of interest scenery or the like. Such traveller now a day called as tourist". Tourism: The theory and practice of touring, travelling for pleasure usually deprecatory. ¹³

Tourist product: An appraisal of the tourist potential of various cultural regions would be helpful in understanding its possibilities in future.

A brief resume given, in the following pages, confirms to this perspective. It will also serve for the reader to check to what extent possibilities of developing tourism exist in various parts of district, and how far this potential has been exploited to this day.

Spots of tourist interests also constitute resource for regional development. In this includes natural, cultural religious, historical centres of interest. (Ref.fig No.3.10). Bhandardara (Ref.fig No.3.11) lake is developed spot where forest Bunglows and/or holiday camps are available. This lake is surrounded by thick forests and are spots of exquisite beauty.
AHMADNAGAR DISTRICT
IMPORTANT TOURISTS CENTRES

KALASUBAI
RANDHA FALL
BHANDARDAR

SHIRDI

NEVASE

KANHUR

AHMADNAGAR

MEHARABAD (ARANGAON)

SIDHATEK

HISTORICAL
RELIGIOUS
NATURAL

Fig.No-3-10
There are interesting waterfalls like Randha fall on the Pravara river, Kalsubai is the highest peak (1646 m.) and, one of the most popular in Maharashtra. Its main attraction is its scenic beauty. The Bhandardara lake, Randha fall, Kalsubai peak, and forest of the western ghats occur in Akola tahsil in the west. These sites can be visited from Bhandardara holiday camp with facility, as they are not far away from each other.

The data regarding tourist arrival to the Bhandardara lake has been given. (Ref. table No. 3.11). It shows that a large number of tourists visits Bhandardara during the months of April 1983 to May 1984. 5135 tourists visited Bhandardara. Generally, majority of the visitors arrive during the months of December, January, February, April, May and November. The tourist come from various places of Maharashtra. There is rest house in Bhandardara with nineteen double bed rooms, and thirty eight people can be accommodated at a time a day. This facility has been instrumental in encouraging tourism in this district area. Besides these spots of the Kanhur (Taluka Parner) is the important spot of tourist interest and limestone scenery is there i.e., stalactites and stalagmites. Besides these spots of religious interest are Shirdi, Nevasa, Meherbad (Amgaon) and Sidhatek. The places of historical interest are Ahmednagar city fort, and the tomb of Salabat Jung (Chandbibimahal).
G) NOTE ON POPULATION AS A RESOURCE

Though India is set to be an over populated country the concept of "over population" it seems is not properly understood. Every human being born on the surface of the earth comes with a head to think and a pair of hands to work. What therefore really matter is not the absolute number of people inhabiting a particular region, but their qualities. In other words, by and large the people inhabiting a region are psychologically oriented towards creative, thinking. They are educated in this sense, they are ready to work hard goals set before them by themselves and are thus active participants in the socioeconomic progress of the society, then they are "resource" in the real sense of the term. Such variables as the age groups sex ratio, literacy when analysed in details provide more understanding regarding the nature of this resource.

Needless to say therefore, the share large number of people does not mean a liability particularly in India where the technologies used in agriculture, forestry are still by and large crude one. In many social groups for whom the government's development plans are meant, do not know the meaning of development and also the need for it. The most needed "Psychological revolution" in the people of the area marked for development, is invariably lacking.
Several plans of development backfire due to lack of this basic change in the people as well as in those employees/ workers who have to execute the development plans.

It is therefore felt that a psychological revolution convincing utter need for socio-economic change in the context of modern civilization, should proceed any process of development in any area. Such a development motivates the people and an improvement regarding their working habits, efficiency of work etc. is possible.

Lastly such motivated people alone can bring about favourable change in their life style through their own efforts, sincere efforts only as any socio-economic development occurs from within and not from without. Thus high population density constitutes a resource provided modern technologies are utilised properly and trained working force is judiciously utilised.

An attempt is made in the following chapter to through some light upon some of these aspects of demography.
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