Oil and Gas Exploration: A Study for Desert Area Development of Rajasthan

Pushpa Kumari*; Dr. O. P Devasi**

*Research scholar, department of geography, Jai Narain University, Jodhpur

** Associate Professor, department of geography, Government College, Jodhpur

Natural oil is one of major energy resources on earth. Past experience shows that oil and gas exploration leads to a multi dimensional development of the region. With this viewpoint, it is necessary to examine that recent oil and gas exploration in the Barmer District of Rajasthan and its impact on desert area Development of the region with special reference to employment generation and sectoral mobilization aspects.

New set of employment opportunities, sectoral mobilization, infrastructure development, and industrial land service sectoral development, education and training needs are the key development priorities after oil and gas finding. These would have great impact on the Development of desert area.

Rajasthan based oil exploration in the Barmer region which is the biggest onshore oil finding in India, along with a proposal of establishing a refinery in the region is expected to have the biggest oil related canvas in the country. As same such big companies like Cairn India, JSW, RAJWEST, and ONGC occurs in the region which leads to vast employment generation.

This paper will study the development pattern of Oil and Gas exploration and its impact on Development of desert area.

Key words: Oil and Gas, Desert, Development, Exploration, Employment, Sectoral Mobilization etc.

1. INTRODUCTION:

The Thar Desert as a ecosystem is endowed with a variety of landforms with have been evolved through geomorphic processes over a period of time.

The desert areas of the country had remained backward in many respects due to difficult physiography varying agro-climatic conditions and distinct socio cultural features. Since the people living in these areas were facing hardships owing to geo-climatic conditions. Most of the farmers of these areas are living below poverty line. Several problems like illiteracy, lack of employment, lack of water, soil erosion, run-off, deforestation, low crop production, humans are still faced financial hardship.

The oil and gas exploration has been change the scenario of desertification and restoration of ecological balance in the desert areas for development.

For the overall development of land, water and other natural resources, there are many programmes under implementation in our country

Rajasthan has a vast tract of rock formations spread over in Barmer-Sanchore Basin, Jaisalmer Basin & Bikaner-Nagaur Basin, which has the potential of hydrocarbon and lignite deposits. These three petroliferous basins are now recognized as Category-Ion the basis of their proven commercial productivity. The Barmer Basin is located in the Thar Desert of western Rajasthan. The surface topography of the Barmer Basin is a stony desert with little or no surface expression of the underlying basin. It is the northernmost extension of the Cambay Basin, a more mature hydrocarbon province. These two oil-prone intracratonic rifts contrast with most of the proven hydrocarbon basins in India, which are dominated by offshore gas and a few high-volume offshore oil fields. The review paper also gave detail information about the desert area development after oil and gas exploration. Energy is obtained by human from exploration and which contribute to economy. There is thus strong relation between energy and the economy. This paper is aimed at examining the exploration-desert development relation.

2. OBJECTIVES OF STUDY

1. Promoting the overall economic development and improving the socio-economic conditions of the resource poor and disadvantaged sections of the society.
2 Encourage sustained long-term growth in Desert oil and gas sector and overall development of desert area.
3. Restoring ecological balance by harnessing, conserving and developing natural resource base, i.e. land, water and vegetative cover.
4. Encouraging village the community for active participation in the planning and implementation of developmental projects and the sustainable maintenance of the assets created through their collective wisdom and indigenous technology.
5. Enhance the overall quality of life and economic wellbeing across desert area communities.

3. STUDY AREA

The area of the study covers-North-West District of Rajasthan state.The western part of Rajasthan state, covering an area of 211867 square kilometres, is under arid climate. The location map of the study region western Rajasthan is shown in Fig. 1. The location lies between the latitude 6905'–7605'E and the longitude 24050'–30050'N. The Western Rajasthan consist of the following twelve districts: Barmer ,Bikaner ,Churu, Ganganagar, Hanumangarh, Jaisalmer, Jalore, Jhunjhunu, Jodhpur, Nagaur, Pali and Nagaur .these twelve districts account for 63.4 percent area of the hot arid realm of India .The land is covered by sand dunes with interdunal plains in the north, west and south and alluvium in the central and eastern parts. The climate of this part is characterised by extremes of temperature ranging from below freezing point (at times) in winter to over 50°C in summer. Precipitation is low and erratic, varying from about 130 mm in the north-western part to over 300 mm in the south-eastern side. Streams are few, ephemeral in nature and confined mostly to the rocky part of the desert, the prominent being the Luni River in the south-western side.
The estern districts in the water margin (Sikar Jhunjhunu, Nagour, Pali and Jalor) receve higher rainfall while Barmer, Jaisalmer, Bikaner, northern part of Jodhpur and Churu are rainfall deficit districts. Ganganagar and Hanumangarh are two the northern most districts which have a large area under canal irrigation and sand dunes have been levelled for irrigated agriculture. recentally, such advantages of canal irrigation are gradually spreading towards Jaisalmer, Bikaner through INGP canalsystem and to Barmer and Jalore district throuhg Narmada canal system.
As the present study is about the desert area development after oil and gas exploration.

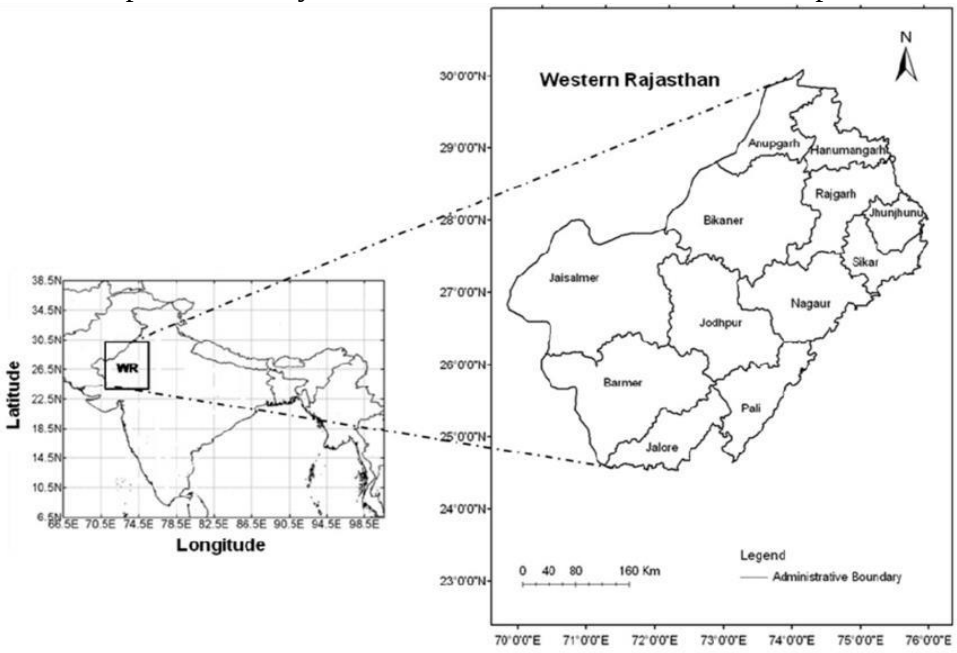


Fig1. Location Map

4. METHODOLOGY

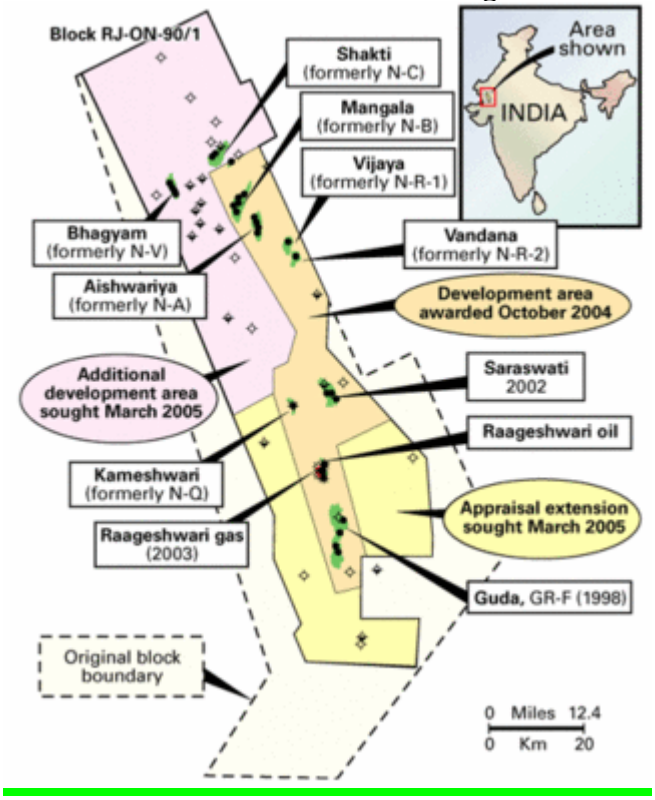
The data for the study was retrieved from reliable secondary sources. It aimed to examine the desert area development after oil and gas exploration. The present study is mainly based on secondary data obtained from statistical abstract(2016) and economic review of Rajasthan. Other relative data collected from various official sources such as publications of the Directorate of Economics and Statistics, Statistical Organization data of Rajasthan Economy, Rajasthan Economic survey reports, statistical abstract Rajasthan, State Human Development Update Report 2008 and RSMML report and ONGC report data, news paper reports and websites.

Present research aims to measure the spatial variation in the level of development in oil and gas exploration and surrounding area at district level, with the help of multi-variable data analyzing methods based on a determined system of viewpoints. In order to make the study comprehensive and more analytical both empirical and statistical methodologies have been adopted for the different aspects of the study.

5. RESULT AND DISCUSSION:

5.1 OIL AND NATURAL GAS EXPLORATION

The Rajasthan block is a world class asset and of significant national importance. The oil and gas field in the Rajasthan Block constitutes key assets in Rajasthan. Rajasthan has significant resource potential of hydrocarbons under 4 Petroliferous Basins. Due to hydrocarbon potentiality, 3 Petroliferous Basins of Rajasthan has been upgraded into Category-I i.e. equivalent to Bombay High, Assam and Gujarat. These 4 basins falls in the 15 Districts of the State namely Barmer, Jaisalmer, Bikaner, Nagaur, Ganganagar, Hanumangarh, Jalore, Jodhpur, Kota, Jhalawar, Baran, Bundi, Chittorgarh and Sawai-Madhopur spreaded over an area of 1,50,000 Sq.km.



Activities related to Oil and Gas exploration began in Barmer-Sanchore Basin in last two decades and Rajasthan has emerged on country's Oil and Gas map with the discovery of Mangla Oil field with the efforts of National and International companies.

The oil & gas discoveries started with Saraswati field that was the first oil discovery in 2001 followed by Raageshwari field discovery in 2003. In January 2004, Cairn discovered the Mangala field, the largest onshore oil discovery in India in more than two decades. This was followed by discovery of Aishwariya & Bhagyam fields.

The Mangala, Bhagyam and Aishwariya (MBA) fields (including Enhanced Oil Recovery (EOR) potential) have gross ultimate recoverable oil reserves and resources of approximately one billion barrels. This is (at USD 100 per barrel price / INR 5,000) equivalent to USD 100 billion in value (INR 5 lakhs crores).

Largest integrated solar energy park in Jodhpur and power generation from wind and sunlight in Jaisalmer gathering momentum, Barmer refinery project will give a boost to the economic prosperity of Rajasthan, especially in the backward desert region.

5.2 DESERT AREA DEVELOPMENT FIELD:

5.2.1 DEMOGRAPHIC SECTOR

This sector includes population growth (2001-2011), percentage of urban population to the total population and literacy rate according to census 2011. After oil and gas exploration the districts of western Rajasthan have been grouped based on the level of desert area development. The districts falling in highly demographic development zone are Jaisalmer and Jodhpur. They are developed in all demographic aspects, whereas Jaisalmer is less developed in regard to urban population and Jodhpur has low literacy growth rate. The districts like Barmer comes in Medium developed zone. Here population growth is most but have good literacy rate while Barmer has less percentage of urban population. The district coming in very less developed zone is Jalore. This district are very low in literacy rate. Literacy rate has increased due to various programmes run in the region after Oil and Gas exploration.

5.2.2 AGRICULTURAL SECTOR

Agricultural sector constitutes give indices percentage in irrigated area to net cropped area, agricultural output per 1000 population, and percentage of non-agricultural workers to total workers and percentage of double cropped area to total cultivated area. The less developed zone includes the districts like Barmer, Jaisalmer, Jodhpur and Jalore where in these districts the percentage of irrigated area to net cropped area is less and has average condition in all the agricultural aspects except for percentage of non-agricultural workers which is quiet low. The districts falling in very less developed zone are Barmer, Jaisalmer, Jalore, Bikaner and Pali are those districts that have limitation of fertile soil due to large cover of sandy soil.

Ganganagar and Hanumangarh are two the northern most districts which have a large area under canal irrigation and sand dunes have been levelled for irrigated agriculture. recentally, such advantages of canal irrigation are gradually spreading towards Jaisalmer, Barmer and Bikaner through INGP canalsystem and to Barmer and Jalore district throuhg Narmada canal system.

5.2.3 ECONOMIC SECTOR

Economic position of western Rajasthan was very dismal in the initial stage of planning. Only few districts of western Rajasthan show good position in economic profile while rest are even below average. The district Bikaner falls under highly developed zone. The districts falling in medium developed zone are Jaisalmer, Nagaur, Ganganagar, Hanumangarh and Jodhpur. The districts like Ganganagar, Hanumangarh, Jodhpur and Nagaur show good percentage of main workers to the total workers while Jaisalmer show good number of livestock. The districts falling in less developed zone are Barmer, Churu, Jalore, Pali and Sikar. In these districts population is involved more in agriculture and is having low literacy rate thus these are less developed in all economic aspects, also the district Jhunjhunu fall in very less economic developed zone.

After oil and gas exploration, employment opportunities are increased in Barmer, Jaisalmer and Jalore area resulting in economic development. Also per capita income has increased thereby resulting in improvement of life style.

5.2.4 INFRASTRUCTURAL SECTOR

This sector plays vital role in the level of development and act as the main instrument without which the study of regional disparities is incomplete. The indices have been selected for analysis namely road connectivity, electricity, educational centres, medical facilities, milk production and cooperative societies which indicates that may help in the identification of backward regions. The highly developed zone in this

sector includes districts like Bikaner and Jhunjhunu. Thus these districts are well connected with other states through good transportation system, maximum educational and medical facilities and these districts have other high infrastructural facilities too. The districts that fall in medium developed zone are Ganganagar, Hanumangarh, Sikar and Jodhpur. These districts show average conditions in infrastructural facilities. The less developed zone includes the districts like Chum, Jalore, Nagaur and Pali, while the very less developed zone includes Jaisalmer and Barmer.

Due to the extremes of temperature, low fertility, less number of settlements connectivity and communication is less developed here. After exploration road network has increased and connectivity has improved, results to change in the scenario. And road connectivity, electricity, educational centers, medical facilities and hotels are fastly developed.

An attempt has been made in the measures of different level of development to construct a composite index by combining and grouping different indicators into four sectors, so that the composite indicator could be used to differentiate spatial units like districts for level of economic development. The study summarizes 12 indices identified for each of the four sectors which reflect the development characteristics (Table 1)

Table 1. Development Indicators

S. No.	District	Population Growth (2001-2011)	% of net irrigated area of net cropped area	% of main workers to total workers 2011	% of villagers having electric facility	% of Urban population (2011)	No. of Livestock per 10000 population
1	Barmer	32.55	9.19	61.7	96.10	7.0	21179
2	Jaisalmer	32.22	13.96	60.7	78.21	13.3	48616
3	Jalore	26.31	41.09	73.7	99.12	8.3	12542
4	Jodhpur	27.69	19.37	70.9	100	34.3	1362

Development Indicators

S. No.	District	Number of Registered Vehicles/ 10000 population	Length of roads/ 10000 Sq.Km. (2011)	Literacy Rate (2011)	Number of beds in hospital & dispensary/ 10000 population (2011)	Agricultural output (Ton)/ 10000 Population (2011)	% of non-agriculture workers/total workers (2011)
1.	Barmer	380.70	1713.20	56.50	4	280.20	86.1
2.	Jaisalmer	298.75	826.73	57.2	6	227.7	78.8
3.	Jalore	470.24	2877.15	54.9	3	284.9	77.1
4.	Jodhpur	1456.16	2647.30	65.9	17	315.20	92.2

5.3: DEVELOPMENT OF INDUSTRIAL AREA ALONG WITH REFINARY:

The Rajasthan refinery will be the first in the state, which is blessed with immense oil and gas reserves. This refinery will benefit Rajasthan, especially the industrious youth of the state. In order to take full advantage of hydrocarbon resources of 900 million tonne (7.3 billion barrels) discovered in Barmer for value addition and employment generation in the state, The Government of Rajasthan conducted MOU with 9.0 million tonne capacity refinery will establish (Rajasthan state government and HPCl partnership) at Sajiyali, Sambhra village in Pachpadra tehsil of Barmer district where land already have been acquired for refinery purpose. Hon'ble Prime Minister on 16 January, 2018 has commenced work for 9 MMTPA Rajasthan Refinery. Project cost – `43,129 crore (on 4800 acre land). This project is a Joint Venture, in which HPCL's share is 74% and Government of Rajasthan's share is 26%. This will be the first project in India integrated with Refinery and Petrochemical complex. This oil will be most refined with high quality. Countries most advanced and of BS6 standard first refinery will be completed in 2022. 80 thousand to 1 lakh employment directly or indirectly will be available (who will work for five years). When it will be established will provide employment directly to 1 thousand persons. After establishment of refinery, nylon, plastic related industries, PBC industry, pesticide making factory, fertilizer industry, cosmetic, medicine cover manufacturing including many more type of industries will be set up around the refinery from which more than 1 lakh employment directly will be created. 262 MW (mega watt) electricity can be produced from the waste material of refinery. Along with first refinery of Region, big gift of refinery by product hub may be given to Barmer. This hub is proposed on 800 bigha Government land near Borawas Tilwara(Balotra). Barren land will be happy. 6000 types of products are formed during the process of oil refining. Industries will be made for 144 by product. 152 type of products including Wax, color, rubber, tarcoal will be produced. Thus this refinery will be boon for Barmer and for state.

6. CONCLUSION:

The main challenge of desert area development is undoubtedly to increase the living standard and welfare of local people. Usually the state of development of regions and sub-regions within one country significantly differs. In Rajasthan, the eastern part is emerging, and the western part, mostly the ones by the boarder are lagging behind. Desert area development should not be executed homogeneously, one should take into consideration the attributes and starting conditions of that certain area. The variety of starting conditions requires different interventions and strategies of desert area development from region to region. Due to their different conditions they cannot be developed by the same action plans. This research helps to analysis dimensions of development and typology of backwardness and also useful to formulate a future Plan for the balanced desert area development and a relevant strategy to minimize spatial variation in the level of development at micro-level.

7. BIBLIOGRAPHY:

1. Bagchi, K. K. (2011) Regional Disparities in India's Socio-economic development, New Century Publications, New Delhi.
2. Bharara, L.P.(1998): Man in Desert, CAZRI, Scientific Publication, Jodhpur, Rajasthan.
3. Rao, Hemlata, (1984). Regional Disparities and Development in India, shish Publishing House, New Delhi
4. Singh R. (2006). Regional Disparities in level of socio-economic Development in post Reforms Period: A District level Analysis, Annals of NAGI, Vol. 26, Dec., No.2, pp.87-94.the International Trade." Journal of Economic Geography
5. Singh S., Kar A., Joshi D. C., Kumar S. And Sharma K. D. 1994. Desertification problem in western Rajasthan. Annals of Arid Zone. 33(3): 191-202.
6. Choudhary, Dr. R. P,(2015)_ " Exploration and Prospecting of Petroleum in Western Rajasthan – A Review"
7. Sharma, Roopali ; Arora, Ritu;, "SOCIO-ECONOMIC ASSESSMENT OF OIL EXPLORATION IN BARMER REGION OF RAJASTHAN"
8. Kothari, V., "Discovery and petroleum system of the Barmer Basin, India". March 2015.
9. Kapoor, B.B.S., (2001). *An assessment of natural resources of the Indian desert.* India: Madhu Publications.
10. Sharma, Hari Shanker., & Sharma, Mohan Lal.(1992). *Geographical facets of Rajasthan.* India: Kuldeep Publications.
11. Directorate of Economics and Statistics, Jaipur, Rajasthan. (2013). District Statistical Review – Barmer.
12. Government of Rajasthan. (2016-17)_ Economic Review- Rajasthan.
13. Directorate of Economics and Statistics, Jaipur; Rajasthan. (2015). Statistical Abstract Rajasthan.
14. National Council of Applied Economic Research, West and Central India. (2011). Human Development Report. Oxford University Press.
15. Directorate of Petroleum, Government of Rajasthan,
16. Socio-economic statistics rajasthan_2010-11
17. Statistical Handbook, (2011) Directorate of Economic and Statistics, Govt of Rajasthan, Jaipur