

# Impact of Exploration of Oil and Gas on Education Scenario in Rajasthan by Neural Network Technique

**Dr. Asha Sharma**

Assistant Professor  
Department of Accountancy and Statistics  
Mohanlal Sukhadia University,  
Udaipur

## **Introduction**

Natural gas and oil is one of the energy resources and past experience suggests that oil exploration and related ventures lead to a multidimensional growth and development of the region and nation as a whole. The natural resources are considered more efficient and appropriate for necessary survey and investigation for the assessment, subsequent planning and implementation of various developmental programmes. Rajasthan is emerging as the next energy hub of country. The State has emerged as a repository of wealth, of crude oil, natural gas and lignite. The extensive occurrences of petroliferous basins in Rajasthan have made it a large potential region for hydrocarbons.

## **Rajasthan Basin**

Rajasthan Basin is a sedimentary basin located in the North West part of India. This sedimentary basin is one of the major sources of hydrocarbons like petroleum and natural gas. This basin has a geographical extent of about 1,26,000 square kilometres. The formations of Rajasthan basin uncomfortably lies over a pre Cambrian Basement.

## **Petroleum in Rajasthan Basin**

Huge reserves of naturally occurring hydrocarbons are expected in clastic and carbonate reservoirs in cambrian to paleocene sequences like limestone and shales capped by intra formational shales and tight limestones. Oil & Natural Gas Corporation (ONGC), Oil India Limited and Focus energy are some of major petroleum companies in this basin

## **Sub-Division of Rajasthan Basin**

Rajasthan basin has been further divided into three sub basins.

- Jaisalmer sub basin or Jaisalmer basin
- Bikaner Nagaur sub basin or BNG basin (after Bikaner Nagaur and Ganganagar, town of Rajasthan)
- Barmer Sanchor sub basin

**Table 1 Petroleum Production**

|         | Average crude oil | Natural Gas | Total   |
|---------|-------------------|-------------|---------|
| 2010-11 | 125000            | 900000      | 1025000 |
| 2011-12 | 137500            | 950000      | 1087500 |
| 2012-13 | 175000            | 1050000     | 1225000 |
| 2013-14 | 182500            | 1250000     | 1432500 |
| 2014-15 | 187500            | 1800000     | 1987500 |
| 2015-16 | 167500            | 2050000     | 2217500 |

**Education Scenario In Rajasthan**

In elementary education, the State has achieved noticeable progress over the last decade. There are 49,861 Primary Schools (PS) with 161,000 teachers and 51955 Upper Primary Schools (UPS) with 161000 teachers and around 70 lakhs students enrolled in year 2010-11.

At present, now in the year 2015-16, there are 42577 Primary Schools (PS) with 117,000 teachers and 81409 Upper Primary Schools (UPS) with 138000 teachers in year 2010-11. Teacher pupil ratio is decreased upto 28 and 14 in primary schools and upper primary school from 32 and 18 in primary schools and upper primary school respectively.

**Table 2 Education Institute**

| Year    | Primary Schools | Upper Primary Schools | Secondary Schools | college | Total No. Institutes |
|---------|-----------------|-----------------------|-------------------|---------|----------------------|
| 2010-11 | 49861           | 51955                 | 22561             | 1312    | 125689               |
| 2011-12 | 51145           | 55507                 | 24127             | 1422    | 132201               |
| 2012-13 | 53243           | 56483                 | 24612             | 1527    | 135865               |
| 2013-14 | 55111           | 56106                 | 26613             | 1516    | 139346               |
| 2014-15 | 41523           | 79095                 | 27147             | 1583    | 107825               |
| 2015-16 | 42577           | 81409                 | 27698             | 1842    | 110949               |

**Table 3 Enrolment, teachers and teacher pupil ratio of primary schools**

| Year    | Enrolled Students<br>(in Lakh) | Number of teacher<br>(in Lakh) | Teacher pupil ratio |
|---------|--------------------------------|--------------------------------|---------------------|
| 2010-11 | 51.51                          | 1.61                           | 32                  |
| 2011-12 | 51.27                          | 1.54                           | 33                  |
| 2012-13 | 48.67                          | 1.56                           | 31                  |
| 2013-14 | 45.01                          | 1.58                           | 28                  |
| 2014-15 | 41.18                          | 1.16                           | 26                  |
| 2015-16 | 42.5                           | 1.17                           | 28                  |

**Table 4 Enrolment, teachers and teacher pupil ratio of Upper primary schools**

| Year    | Enrolled Students | Number of teacher | Teacher pupil ratio |
|---------|-------------------|-------------------|---------------------|
|         | (in Lakh)         | (in Lakh)         |                     |
| 2010-11 | 19.83             | 1.61              | 18                  |
| 2011-12 | 20.9              | 1.15              | 18                  |
| 2012-13 | 20.66             | 1.19              | 17                  |
| 2013-14 | 20.38             | 1.15              | 18                  |
| 2014-15 | 19.57             | 1.42              | 13                  |
| 2015-16 | 21.39             | 1.38              | 14                  |

### Research Objectives

The purpose of this study is to examine correlation between development of education scenario and Natural gas and oil Industry in western Rajasthan. The potential of Natural Gas and oil will also try to find out to know the impact of recent discovery of oil & gas reserves in Rajasthan. It is tried to find out the change in natural gas and oil in Rajasthan influence on social life of community in near future in western Rajasthan.

To analyze education scenario and its development in Rajasthan

To find contribution of oil and gas industry on education status of Rajasthan

To find out the rising trend of no. of education institute, no. of teachers, No. of students and teacher-pupil ratio

### Hypothesis

In order to realize the above objectives, the following hypothesis has been formulated.

H0 There is positive impact of oil and natural gas industry on education scenario on Rajasthan

### Research design & methodology

The researcher, being an external analyst, is depend mainly upon secondary data for the. The exploratory research techniques will have been used for this study and also the study is restricted only to Rajasthan based gas, oil and petroleum. Neural Network

**To prove the hypothesis statistical technique neural network is used.**

A neural network is a series of algorithms that endeavors to recognize underlying relationships in a set of data through a process that mimics the way the human brain operates. Neural networks can adapt to changing input; so the network generates the best possible result without needing

to redesign the output criteria

A computational neural network is a set of non-linear data modeling tools consisting of input and output layers plus one or two hidden layers. The connections between neurons in each layer have associated weights, which are iteratively adjusted by the training algorithm to minimize error and provide accurate predictions.

Multilayer Perceptron (MLP) Procedure is applied to measure and predict further study. They map relationships implied by the data. The MLP feed forward architectures, meaning that data moves in only one direction, from the input nodes through the hidden layer of nodes to the output nodes.

The PARTITION subcommand specifies the method of partitioning the active dataset into training, testing, and holdout samples. The training sample comprises the data records used to train the neural network. The testing sample is an independent set of data records used to track prediction error during training in order to prevent overtraining. The holdout sample is another independent set of data records used to assess the final neural network. You can specify:

—The relative number of cases in the active dataset to randomly assign to the training sample

—The relative number of cases in the active dataset to randomly assign to the testing sample

—The relative number of cases in the active dataset to randomly assign to the holdout sample —A variable that assigns each case in the active dataset to the training, testing, or holdout sample

### Data Analysis

**Table 5 Case Processing Summary**

|          |          | N | Percent |
|----------|----------|---|---------|
| Sample   | Training | 4 | 66.7%   |
|          | Testing  | 2 | 33.3%   |
| Valid    |          | 6 | 100.0%  |
| Excluded |          | 0 |         |
| Total    |          | 6 |         |

The case processing summary in table 5 shows that 4 cases or 66.7% are assigned to the training sample which is used

to train the model and 2 cases are assigned to the testing sample which is used to validate the model

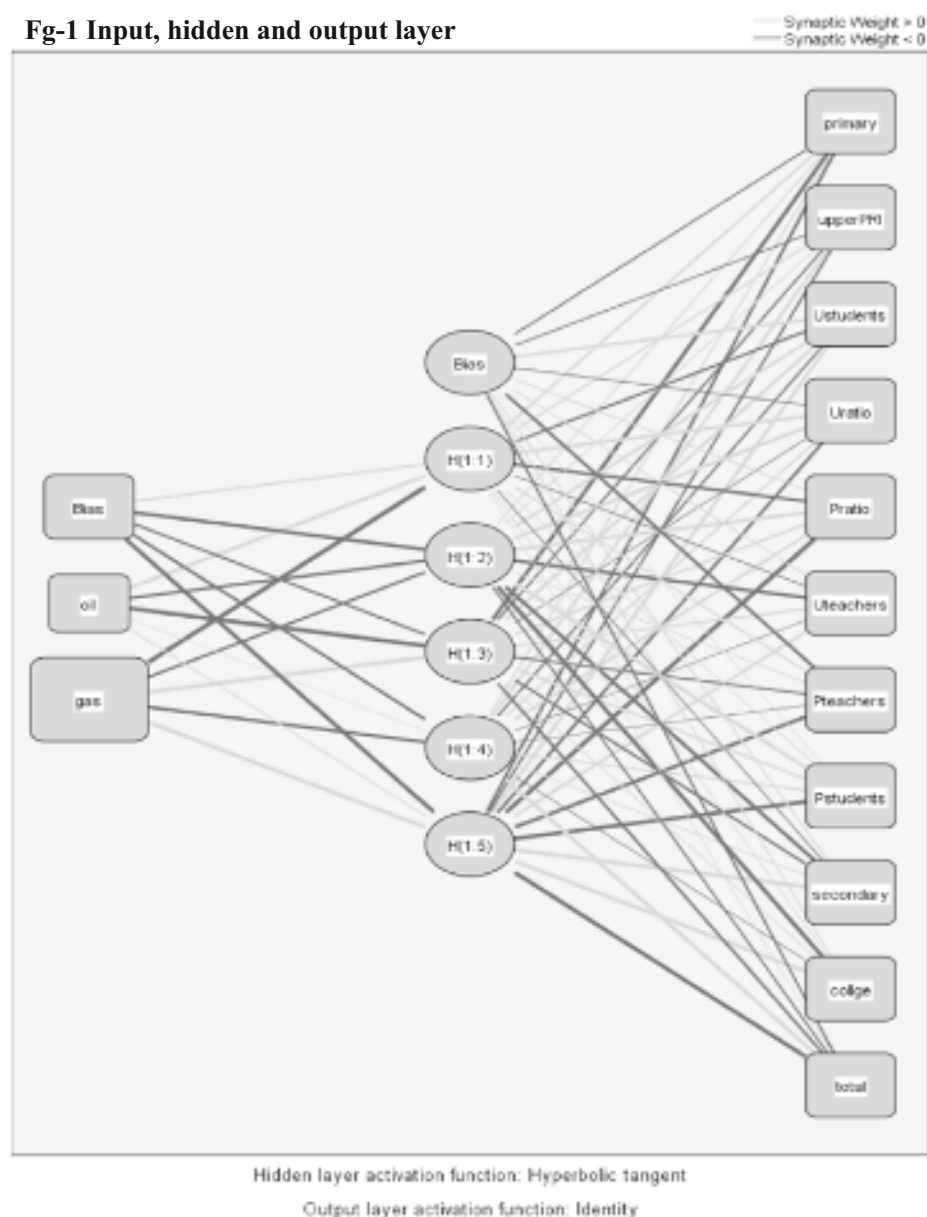
**Fg-1 Input, hidden and output layer**

Figure 1 gives the network information. It describes the process of working. It works into three layer- input layer, hidden layer, and output layer. It is a complete connected graph of input, hidden layer and output respectively. It also synaptic weight which is categorized as less than 0 and

more than 0. The layers which are grey in colour have impacted more than 0. These layer describing out of the entire factor which components have more weight or more important.

| Network Information |                                                |    |                    |
|---------------------|------------------------------------------------|----|--------------------|
| Input Layer         | Covariates                                     | 1  | oil                |
|                     |                                                | 2  | gas                |
|                     | Number of Units <sup>a</sup>                   |    | 2                  |
| Hidden Layer(s)     | Rescaling Method for Covariates                |    | Standardized       |
|                     | Number of Hidden Layers                        |    | 1                  |
|                     | Number of Units in Hidden Layer 1 <sup>a</sup> |    | 5                  |
|                     | Activation Function                            |    | Hyperbolic tangent |
|                     |                                                | 1  | primary            |
| Output Layer        |                                                | 2  | upperPRI           |
|                     |                                                | 3  | Ustudents          |
|                     |                                                | 4  | Uratio             |
|                     |                                                | 5  | Pratio             |
|                     | Dependent Variables                            | 6  | Uteachers          |
|                     |                                                | 7  | Pteachers          |
|                     |                                                | 8  | Pstudents          |
|                     |                                                | 9  | secondary          |
|                     |                                                | 10 | collge             |
|                     |                                                | 11 | total              |
|                     | Number of Units                                |    | 11                 |
|                     | Rescaling Method for Scale Dependents          |    | Standardized       |
|                     | Activation Function                            |    | Identity           |
|                     | Error Function                                 |    | Sum of Squares     |

a. Excluding the bias unit

Table 6 gives information about the network. It describes the process of working. It works into three layer- input layer, hidden layer, and output layer. It shows there are 2

units working under input layer, 5 units are under hidden layer and, 11 units are working under the output layer.

**Table 7 Independent Variable Importance**

|     | Importance | Normalized Importance |
|-----|------------|-----------------------|
| oil | .252       | 33.6%                 |
| gas | .748       | 100.0%                |

Table 7 Model proves perfectly fit with production of natural gas and oil. Importance ratio of oil is 33.6% whether it is 100% with natural gas.

### Conclusion

Rajasthan is one of the emerging states as a repository of wealth, of crude oil, natural gas and lignite. The extensive occurrences of petroliferous basins in Rajasthan have made it a large potential region for hydrocarbons. There is close relation between the both of the data. Education in Rajasthan is affected by development in oil and natural gas in Rajasthan. Neural network shows the fitness of model means proves the hypothesis that there is positive impact of oil and natural gas industry on education scenario on Rajasthan.

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