

**ROLE OF EDUCATION IN ECONOMIC DEVELOPMENT:-A REALITY IN
REFERENCE TO RURAL ASSAM**

Dr. Biren Saikia

ABSTRACT

Education is the most important instrument for changing the economic condition of the rural society. It is also crucial to every aspect of social and economic development. The economic development is a measure of the welfare of humans in a society and education is a prime leading piece for the development in a region. It's not only helps the farmers planning and management, rational decision making, record keeping, computation of cost and revenue, but it also provides knowledge to adopt improve methods of cultivation, to understand processing methods and storage procedures, to know the programmes, targets and policies of the government, to know the family welfare, health, nutrition and home economics etc. However, agriculture is the primary source of occupation to the Indian rural people who directly or indirectly depend on agriculture. The present paper deals with the role of education and economic development through agriculture at the micro levels in rural Assam. It also attempts to examine the spatial variation of agricultural development of the studied districts with the help of eight variables viz. net sown area (X1), cropping intensity (X2), crop productivity (X3) (Yag's Yield Index), irrigated area (X4), area under HYV seeds (X5), use of fertilizer (X6), agricultural Labours (X7) and commercial and Gramin Banks (X8) for determining the status of each districts separately on each variables. Besides, that the development of districts have been categorized into three classes viz, high, medium and low on the basis of their respective Z-score of the variables. On the basis of composite z-score the development of districts have been again categorized into three classes- high, medium and low. The result shows that there is a positive association between literacy and agriculture development of the different census years.

Keywords: Education, agriculture, planning, management and Economic Development etc.

I. INTRODUCTION

Development empowers people and stimulates vital changes in their lives. It cannot take place by itself. It requires an educated, skilled and competent people. Seen from this angle, role of education becomes the most essential factor for development as well as for empowering people. It has always been considered as the most powerful instrument for social change. It is necessary for the development of agriculture, industry and household workers for planning and management, rational decision making, record keeping, computation of cost and revenue, to adopt improve methods of cultivation, to understand the processing methods and storage procedures, to know the programmes, targets and policies of the government, to know the family welfare, health, nutrition and home economics etc. However, the result of the progress of agriculture and the gradual innovation of agriculture tools in the few past decades reveals that the improvement and spread of education and other human capital formation of a country. After 1960s, due to improvement of education and other human capital formation saw a remarkable progress in agriculture in all over the country. The innovation embodies in land, machines and man, which increase productivity in agriculture. This paper deals with the role of education and economic development through agriculture at the micro levels in three districts of rural Assam. It also attempts to examine the spatial variation of agricultural development of the studied district using the appropriate variables.

II. Review of Literature

There are enough literature on education and productivity. The World Development Report (1980) included several studies related to education where four years of primary schooling of the farmers contributed 18 per cent to 26 per cent in increasing farm output in some countries. Chaudhri (1979) studied the role of education in productivity, skills and rate of returns and he has found that elementary schooling affects positively on productivity particularly in times of rapid technological change. He has also found that, although there has been a link between the spread of education and economic growth which is stated as unquestionable, the former link between public education spending and the spreading of education has to turn into a bit of a debated area, particularly in India.

According to Saini, et al. (1979) education of farmers is a crucial factor for the transformation of traditional agriculture in-to modern agriculture. They have contended that resource use efficiency in agriculture improves with education. It constitutes the main factor in the diffusion of technological change i.e. a transition from a traditional to modern agriculture.

There is a wide range of literature that estimated the rates of returns to education for different countries. Pascharapoulos (1994) estimated the rates of returns to education at a global level. He has observed that there is a high degree of social and economic profitability of elementary education in all regions of the world. He has found that 18 per cent to 19 per cents profitability is derived from the investment in primary education in all over the world. He has also observed that the highest (39 per cent) private rate of returns in primary education was found in Asia as compared to other regions of the world. He has also identified those total earnings of an individual extensively increase in by an extra year of education in all regions of the world. He has identified 13 per cent in Sub-Saharan Africa, 10 per cent in Asia, 12 per cent in Europe/Middle East/North Africa and 12 per cent in Latin America respectively.

Bashir (2005) studied the relationship of education in science and technology and economic development of Pakistan by using time series data between 1951 to 1998 he has observed that the results of the earlier economists' studies are consistent with those of Lower Developing Countries (LDCs). The recent data of Pakistan show the literacy rate has increased from 26% to 45% and enrolment at the primary level has also increased by 67%. He has used a human capital model developed by Becker (1962) and Mincer (1974) and found that as the education in Pakistan has improved, human capital both in private and public sectors has moved towards less productivity to more productivity.

Heyneman (1983) found in his study that the general education in science has a significant bearing in the degree of productivity. He identified four basic stages of growth in agriculture activity and their learning requirements. The first stage is termed as the stage of traditional farming. It is the most elementary stage, where farming knowledge and skills are passed on from father to son and schooling is not required so much. The second stage is the stage of intermediate technology where peasants start using a single modern input like fertilizers. Its utilization is substantially improved with acquisition of rudimentary literacy and knowledge of addition, subtraction and divisions. The third stage is fully

improved technology. It requires simultaneous application of several modern inputs such as high yielding varieties of seeds, fertilizer; elementary principles of chemistry and biology are needed in skill full calculation of inputs per unit. The fourth stage is the modern stage, where innovative approach of technology supported by fully irrigation based technology, during the off-season. Proper utilization of researches and new information from printed and electronic sources enable the farmers to work out their own production functions in every year. It requires higher reading capacity and skills to decode information in chemistry, biology and physics.

Sudha Rao (1985) attempted to find out the relationship between education and development process by studying a village namely, Dalena in Karnataka. She finds that there is a considerable demand for education in villages as the economic pressure compels the youths to seek urban employment due to higher education. However, poor inhabitants are unable to avail educational opportunities as the opportunity cost is too high. In short, the study reveals that rich people are gaining from available educational opportunities but poor are not better off.

Goswami (1967) studies the relationship between education and family size preferences in the villages of Kamrup district in Assam and he observes that there is a considerable change in rural areas. He finds that majority of educated people like to have small size family and there is significant occupational shift in rural area due to educational expansion.

Dutta Choudhry (1978) in his "Arunachal Pradesh District Gazetteers" has included various human welfare measures which are undertaken by the government during the plan period. It is considered as significant contribution about the history of Arunachal Pradesh for people and the progress of agriculture, industries, banking, trade, commerce, administration, medical and public health services of various districts located in Arunachal Pradesh.

Abdul, A. (2005) have studied the problems of education in the Char areas of Chapar-salkocha Development Block in Dhubri district and found that there was no school in 23.07 per cent of Char villages of the Block. Again, 45 per cent of the fathers and 67 per cent of the mothers of the school going children could not assist their children in their studies as they themselves were illiterates. In the provincial primary schools only 16.67 per cent were male teachers. The average pupil teacher ratio was highly unfavourable at 1:63.

Almost all the works reviewed above reveal that the expansion of education and other human capitals lead to economic development. It is observed that previous studies are mostly at the macro level and it is found that these studies have not properly highlighted the major problems of education and other human capital formation relating to economic development at micro level. Although some researchers have attempted to study at micro level but these are very limited. However, these macro and micro levels studies generate a wide academic interest among the research scholars and economists for further study.

Thus, the researcher intends to undertake the current topic for identifying and analysing the role of education in economic development and its underlying problems and difficulties therein in the state in general and in the sample districts in specific.

III. Scope and Significance of the study

Assam, a constituent State of India, is situated in North Eastern part of the country bordering seven states viz. Arunachal Pradesh, Manipur, Mizoram, Meghalaya, Nagaland, Tripura and West Bengal and two countries' viz. Bangladesh and Bhutan with a geographical area of 78,438 sq. kms, i.e about 2.4 percent of the country's total geographical area, Assam provides shelter to 2.6 percent population of the country. The economy of the state is mainly agrarian in nature. In the size of population state of Assam ranks 14th position among the states of India, the population of the state is 3,11,69,272 according to 2011 census of which 1,59,54,927 are males and 1,52,14,345 are females. The decadal growth of the state's population works out to 16.93 percent during the decade 2001-2011 as against 17.64 percent for the country as a whole. The density of population of Assam has gone up to 397 in 2011 which was 340 in 2001 census. The corresponding all India figure was 382 as per census 2011. As regards sex ratio, it shows an improvement from 935 in 2001 to 954 in 2011 census per 1000 males. Basic data on the position of women in the state vis-à-vis men reveals that there is a glaring inequality between them. There was a considerable inter districts variation in its literacy rates and agricultural development. Although, annual average growth rate of female literacy (1.3 per cent) which was more than that of male literacy rate (0.997 per cent), but the enrolment rate of women in higher education segment was less than 33 per cent during 1991-2001. The female work participation rate which was 4.66 per cent in 1971 increased to

21.61 per cent in 1991 and future declined to 20.71 per cent in 2001 (Assam Human Development Report, 2003 and Govt. of Assam). The state of Assam is basically a flood affected one with sever transport and communication constraints. The lake of awareness about the importance of education, frequent occurrences of floods and abject poverty are some of the main causes of slow progress of education in the state. As education and other human capital formation is the key factor of economic development in any region of the state or country it is imperative to study the relations and their problems of the state of Assam in order to assess the potentiality of the state for its economic development. But no such research study has been so far conducted in Assam. However, it is an honest attempt to field up the gap into some extent. This study will not only help the researchers who have addressed themselves in the study of role of education in economic development through agriculture, but also benefit the policy makers in formulating the policy measures for agriculture and their problems and bringing sustainable economic development of the area.

IV. Research Methodology

Objectives of the study:

The present study has been pursued keeping in view the following objectives-

1. To examine the relationship between education and economic development in 1991 - 2011.
2. To examine the spatial variation of agriculture development in the studies state of Assam in particular.

Hypotheses of the study:

In view of the above objectives, this study sets the following hypotheses for testing in the process of investigation

H₁: The literacy rate of the different censuses periods have positive association in an average per-capita income generation in the state.

H₂: The rural literacy rates of the different census periods have positive impact of agriculture development in the studies districts.

Methodology of the Study :

The present study is an empirical one confined to three districts of Assam viz Lakhimpur, Jorhat and Dhubri. Out of 35 districts the Jorhat district are selected because this district shows the high literacy rate i.e 65.51% in 1991 similarly Dhubri district are selected because this district shows the low rate of

literacy viz 20%, 38.36%, 48.17% and 59.36% in 1971, 1991, 2001 and 2011 and the Lakhimpur district are selected because this district as a backward district and has a zero industry district of Assam in 2001 census. To examine the relationship between education and economic development and spatial variation of agriculture development of the studied districts the secondary data have been used for the period of 1971 to 2011, collected from district statistical Handbook and Statistical Abstract of Lakhimpur district, Bureau of Applied Economics and Statistics, Government of Assam etc. To determining the levels of agricultural development in 1971-2011 the following variables have been used such as-net sown area (X₁), cropping intensity (X₂), crop productivity (X₃) (Yag's Yield Index), irrigated area (X₄), area under HYV seeds (X₅), use of fertilizer (X₆), number of agricultural Labours (X₇) and number of commercial and Gramin Banks (X₈) etc., shown in the following table-1

Key Formula for Calculation of the Variables:

1. $X_1 = \frac{\text{Net Shown Area}}{\text{Gross Cropped Area}} \times 100$
2. $X_2 = \frac{\text{Gross Cropped Area}}{\text{Net Shown Area}} \times 100$
3. $X_3 = \frac{\text{Total percentage cropped yield district of the state}}{\text{Total cropped area of the district}}$
4. $X_4 = \frac{\text{Total irrigated Area}}{\text{Gross Cropped Area}} \times 100$
5. $X_5 = \frac{\text{Total HYV Area}}{\text{Gross Cropped Area}} \times 100$
6. $X_6 = \frac{\text{Total NPK}}{\text{Total Cropped Area}} \times 100$
7. $X_7 = \frac{\text{Number of Agricultural Labours}}{\text{Gross Cropped Area}} \times 1000$
8. $X_8 = \frac{\text{Number of commercial and Gramin Banks}}{\text{1 Lakh population}}$

Tools and Techniques for Analysis and Interpretation of Data Design:

For relevant statistical techniques like -

1. Co-efficient of correlation i.e. 'r' and r² is calculated for assuming two variables likes' literacy rate and per-capita income in order to test the first hypotheses.
2. To determine the relationship between literacy and overall levels of agricultural development and its uneven distribution in the study area the data

for all the variables have been transformed into indices using Z score technique and composite standard score (CSS) in order to test the second hypotheses. The formula is-

$$Z_i = \frac{x_i - \bar{x}}{SD_x} \dots\dots\dots(1)$$

Where, $SD_x = \frac{\sqrt{\sum(x - \bar{x})^2}}{N}$

Z_i = standard score for the i^{th} observation,

X_i =original value of the i^{th} observation and j^{th} years

[$i=1$ -----8]

[$j=1990$ -----2011]

\bar{X} =mean of all the values of X,

SD_x =standard deviation of X observation.

In order to classify the districts according to their levels of development the composite Z-score have been groped into high, medium and low.

Further, the results of the standard score obtained for different indicators, were aggregated by composite standard score (CSS) so, that the regional disparities in the levels of development of districts may be obtained on a common scale. The composite score may be algebraically expressed as-

$$CSS = \frac{\sum Z_{ij}}{N} \dots\dots\dots(2)$$

Where, CSS=composite standard score,

Z_{ij} =Z-score of an indicators j in district i ,

N=number of indicators.

In order to classify the districts according to the magnitude of the development, the composite score were divided in to three classes that are high, medium and low. For detail analyses of co-efficient of correlation between literacy rate and per-capita income and collected data kept for tabulation of the computer based Microsoft office Excel 2013 was used.

V. Discussion and Findings

A. Education and Economic Development:

According to Meir (1984) ‘Economic development is a process, whereby real per capita income of a country increases over a long period of time’. Michael P.

Todaro (1977) stated that, "Development must therefore be conceived of as a multidimensional process, involving major changes in social structures popular attitudes and national institutions as well as the acceleration of economic growth, the reduction of inequality and the eradication of absolute poverty." It is believed that the spread of education have impact on the aggregate earnings of the people in the state as well as in the District. Educational attainment and lifetime earning determine individual's earning capacity. Higher education has more scope to earn more income. Spatial spread of literacy is a factor for increasing per-capita income. In the present analysis, it is our attempt to identify the degree of association between the literacy rate and state income. The required data are presented in the table and co-efficient of correlation between these two variables with probable error, co-efficient of determination and coefficients of non-determination are also estimated. The finding $r=0.783$ or $r^2=0.613$ reveals that 1% increase in literacy rate will have the probability of having increase the per-capita income by 61.3% and coefficient of non-determination (k^2) =0.387 indicates that 38.7% chances are depends on other variables. The value of $r > 6 \times P.E(r)$ also indicates that the correlation between the two variables are highly significant. The estimated result in table-1.2 shows that the people's education is found to be significant and it has influenced positively on the increase in per-Capita income. It can be inferred that with every thousand increase of literate people will increase the probability of having Per-Capita income. Therefore the coefficient of correlation between literacy rate and per-capita income is found to be positive association between the literacy rate of the different census period and the per capita income during the same period. Thus, the first hypothesis as mention in this paper that is "The literacy rate of the different censuses periods have positive association in an average per-capita income generation in the state" is accepted.

B. Spatial Pattern and performance of Agriculture Development in the back-drop of year-wise:

In order to examine the performances of agriculture development in the studied districts we used eight different variables. On the basis of different variables Z-score ratios are calculated and accordingly district educational level and agricultural development are ranked. the keeping in mind the objective of analysis, the relationship between literacy rate and the magnitude of the agriculture development, the composite score were divided into three classes

that is high, medium and low. The Z-Score of the calculated ratios and its composite standard score are presented in the following table-3

It is evident from the table that the values of Z- score of different ratios are different in the studied district and they are discussed in the following-

a. Net Sown Area (X1):

It is evidence from the table –3 the top position is occupied by Jorhat District (2.9671) in the year 1991 followed by Lakhimpur District (2.2398) in the year 2011 in net sown area (NSA). The Z-Score of the district categorized under three groups. The values in the high levels of NSA range from (-0.5234) to (2.2398) in Lakhimpur district, (-1.2558) to (2.4361) in Dhubori District and (-0.9279) to (2.9671) respectively.

b. Cropping Intensity (X2):

The intensity of cropping refers to the use of a field several times during a cropping year. It is measures of land efficiency, which is defined as the extent to which the net area sown is cropped or resown. The value of cropping intensity ranging from (0.5471) to (1.1362) under high category which is listed in table-1.10. The value of cropping intensity top position is occupied by Lakhimpur district (1.1362) in the year 1991 followed by Jorhat District (0.5471) in the year 2001. The lowest cropping intensity is recorded in Jorhat District (-2.9650)

c. Crop Productivity Yield Index (X3):

The agricultural productivity of three seasons crops are calculated for each of the three districts of Assam in 1971 to 2011. In order to revival the variation and to demarcate the productivity region the index value further calculated the Z-score and categorized under three groups high, medium and low. The high crop Productivity yield Z-score values range from $<+2.2907$ to 5.5205 , medium value >2.2907 to $<+0.0021$ and low value range from >0.0021 to $<+-9.6306$. The high crop Productivity yield recorded in the Jorhat and Dhubori district were (5.5205) and (5.0705) in the 2004-05 season. The medium value of productivity yield recorded in Jorhat district (2.1405) in the year 1990-91 followed by Dhubori district in 2006-07 and Lakhimpur District in 2008 to 2011. All other seasons of the three districts productivity yields were found in low.

d. Irrigated Area (X4):

The need of agricultural and artificial water supply is always felt in successful farming operation. Irrigation plays a significant role in the entire agriculture sector. The total irrigated area has been calculated as percentage of the total

sown area and further calculated Z score of the percentage of total irrigated area. Table-1.3 indicates that high level of irrigation has been observed in Lakhimpur district (2.12559) in the year 2010 to 2011 followed by Dhubori district (1.9705) in the year 1992-93.

e. Area under HYV Seeds (X5):

The importance of better seed can be judged from then statement of H.B. Sprague (1958) that if the United States were suddenly to revert to older strains and varieties, we would be plunged into a famine and feed shortage of colossal proportion. The HYV of seeds are the most important factor in agriculture production under the new technique. The success of this programme has revolutionized agriculture and brought about a phenomenal and rapid increase in the food grains production in the India and study region. Table--1.3 shows the area under high yield varieties of seeds in different districts. It has been grouped into three categories. The high category occupied by Lakhimpur district (2.1448) in the year 2010-11 followed by medium categories occupied by Jourhat district (1.6407) during the same year. The lowest area under HYV is observed in Dhubori District (-3.0279) in the year 1990-91 in this category in the study region.

g. Use of Chemical Fertilizer (X6):

For the improving yield rate, timely and adequate provisions of inputs like fertilizers, HYV seeds and pesticides is of prim importance for agriculture. High level of consumption of fertilizer has been recorded in the district namely Lakhimpur District (2.1507) in the year 2008-09 and (2.0910) in 2010-11 followed by Dhubori District (1.0570) in the year 2004-05. The medium level of consumption of fertilizer has been observed in the studies districts the value varies between (0.2453) to (1.0223) in different years. The low rate of fertilizer has been recorded in the Lakhimpur district from 1990-91 to 2006-07 followed by Dhubori District in the year 1990-91 to 1994-95 and 2000-01 and Jourhat district (-3.0957) in the year 1990-91 respectively.

g. Agricultural Labourers (X7):

Like other input, such as chemical fertilizer, a HYV seeds agricultural labour also is the important factor for agriculture development. From the table-1.3 indicates that highest number of agricultural labour has been found in Lakhimpur District (2.1110) in 2008-09 and (2.1309) in 2010-11. The other districts in high category are Jourhat (0.5142) in 1990-91 followed by Dhubori District (0.0542) in 2010-

11. The lowest number of agricultural laboures is observed in Jourhat District from 2000-01 to 2002-03 followed by Lakhimpur District from 1990-91 to 2006-07 and Dhubori District from 1996-97 to 2006-07 respectively.

h. Commercial Bank and Gramin Banks (X8):

Commercial and Gramin bank plays a very important role in the agriculture development. These banks provide loan and subsidies to the farmers in terms of cash or machine and tools like tractors and pump sets. With the help of these facilities farmers accelerate their productivity. Table-3 shows that the Gramin and commercial banks are not equally distributed in the study region. It has been categories under three groups high, medium and low with the help of calculated Z-Score. The high Z-score of commercial and Gramin banks has been recorded in Jourhat District (7.6506) in 2006-07 followed by Lakhimpur District (4.3605) in 2010-11. The lowest Z-score of Commercial and Gramin Banks has been recorded in Jourhat District (-6.9806) to (-6.9806) from the year 1992-93 to 1996-97 followed by Lakhimpur District (-5.3405) to (-4.9006) from the year 1990-91 to 1998-99.

Levels of Agriculture Development:

To assess the general levels of agricultural development in three studies district all the eight variables have been aggregated. The Z-score value of all the eight variables transformed and combined with the help of Z-score and composite score was prepared in each district separately. On the basis of composite Z-score, the district year have been categorized into three classes viz, high, medium and low which clearly shows the spatial as well as the levels of agricultural development in the studies district separately where education influence the agriculture development. The composite score ranges from 1.099780 (highest) in 2010-11 to -0.30965 (lowest) in 2006-07 in Lakhimpur district. On the basis of the composite score, the development performance of agriculture sector is categorized high, medium and low and ranked systematically. The years are arranged according to their ranks in this way- in 2010-11 (rank 1) in 2008-09 (rank 2), in 1990-91 (rank 3), in 1992-93 (rank 4), in 1994-95 (rank 5), in 1996-97(rank 6), in 1998-99 (rank 7), in 2000-01 (rank 8), in 2002-03 (rank 9), in 2004-05 (rank 10), in 2006-07 (rank 11) respectively.

Similarly, in Jourhat district are - in 2010-11 (rank 1) in 2006-07 (rank 2), in 2008-09 (rank 3), in 2004-05 (rank 4), in 1996-97 (rank 5), in 1998-99(rank 6), in 1994-95 (rank 7), in 1992-93 (rank 8), in 2002-03 (rank 9), in 2000-01 (rank 10),

in 1990-91 (rank 11) respectively. In case of Dhubori District the year 2010-11 ranks 1st position followed by the year 2008-09, 2004-05, 2002-03, 2006-07, 1996-97, 1998-99, 2000-01, 1994-95, 1992-93, and 1990-91 respectively.

Education and Agriculture Development:

Education is necessary for the development of agriculture as well as for the development of a nation and the agriculture is the prim leading factor for development in a region. For seeking the relation between education and agriculture development we have applied composite Z score with the help of literacy rate of the studied districts separately. On the basis of composite Z-score the level of agriculture development have been categorized in to three classes viz, high, medium and low. The Z-score value $<+0.50$ assuming high, $+0.50$ to -0.28 medium and value range (>-0.28) assuming low in each districts separately. The table-1.4 (Annexure-I) shows the relationship between education and agriculture development in Lakhimpur district from 1990-2011. From the table it is clearly indicated that there is an increase of literacy rate in the different census years, but the agricultural production in that particular year is not satisfactory. The high value ($<+0.50$) is recorded in the year 2010-11, but the medium value ($+0.50$ to -0.28) is recorded in the year 2000-01, 1990-91 and low value (>-0.28) is recorded in the year 2002 to 2007 accordingly. For searching the reasons during this period it was found that due to the advent of natural calamity like flood, siltation and soil erosion etc., leads to decrease in the agricultural production. According to the Potential Linked Credit Plan (PLP) (2006-07) reported that due to the occurrence of floods during April-to August, which adversely affected the cropped area under cultivable land.

Similarly, from the table-1.5 and 1.6 (Annexure-I) in Dhubori, Jourhat and State level shows a quite different result where with the increase in the literacy rate the Z-score value also increase in the successive census years it shows the positive relationship between literacy rate and Z-score values. The high value ($<+0.50$) is recorded in the year 2010-11, but the medium value ($+0.50$ to -0.28) is recorded in the year 2000-01, and low value (>-0.28) is recorded in the year 1990-91 respectively. Therefore, there is a positive association between literacy rates and the agriculture development. Thus, the second hypothesis as mention in this paper that is “The rural literacy rates of the different census periods have positive impact of agriculture development in the studies districts” is accepted.

VI. CONCLUSION

For the ongoing discussion we can conclude that education provides a significant role in the levels of agriculture development in the study region. Although the agriculture development is not uniform in the study region it provides very significant information about the levels of agricultural development in the study district. The study also highlights the spatial pattern and performance of agriculture development in the back-drop of year wise. For the performance of agriculture development from the table Table:-1.4 (Annexure-I) it is clearly indicated that there is an increase of literacy rate in the different census years, but the agricultural production in that particular year is not satisfactory. The high value ($<+0.50$) is recorded in the year 2010-11, but the medium value ($+0.50$ to -0.28) is recorded in the year 2000-01, 1990-91 and low value (> -0.28) is recorded in the year 2002 to 2007 accordingly. For searching the reasons during this period it was found that due to the advent of natural calamity like flood, siltation and soil erosion etc, leads to decrease in the agricultural production. According to the Potential Linked Credit Plan (PLP) (2006-07) reported that due to the occurrence of floods during April-to August, which adversely affected the cropped area under cultivable land. It was also observed that there is a positive relation between education and economic development. But due to some natural calamity expansion the role of education and other human capital formation becomes neutralize in the study area. Thus to reap up the benefit of the education and other human capital formation these natural climatic conditions like flood and erosion are needed to be controlled.

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List of Tables

Table 1: List of Selected Variables

SL No.	Variables	Definition
1	X ₁	Percentage of Net Shown Area to Gross Cropped Area
2	X ₂	Cropping Intensity
3	X ₃	Agriculture Crop Productivity Yield Index
4	X ₄	Percentage of total Irrigated Area to gross cropped
5	X ₅	Percentage of Area under HYV
6	X ₆	Chemical Fertilizer (NPK) consumption kg/hect
7	X ₇	Number of Agriculture Labours per 1000 hect gross
8	X ₈	Number of Commercial and Gramin Bank/ 1 lakh

Table 2: Comparison of Literacy rate and Per-Capita Income in 1971-2011

Years	Assam		India	
	Literacy Rate	PCI (At current price)	Literacy Rate	PCI (At current Price)
1970-71	28.10%	1221	29.4%	635
1990-91	52.89%	1524	52.21%	4983
2000-2001	64.28%	10198	64.8%	14396
2010-11	73.18%	30413	74.04%	54527*
Mean (\bar{x})	54.6125	10839.00	55.1125	18635.25
St. Deviation (σ)	19.52855	13697.04963	19.3361	24607.46424
C.V	35.758	126.3628	35.0847	132.04794
Coefficient of Correlation (r)	$r=0.783$		$r=0.799$	
	<i>*Correlation is Significant at 0.01 level (1-tailed)</i>			
(Probable Error) P.E (r)	Probable Error of Coefficient of Correlation P.E (r)=0.130		Probable Error of Coefficient of Correlation P.E (r)=0.1219	

Years	Assam		India	
	Literacy Rate	PCI (At current price)	Literacy Rate	PCI (At current Price)
Coefficient of Determination($r^2 = \sqrt{r^2}$)	$r^2=0.613$		$r^2=0.638$	
Coefficient of Non-Determination (k^2)	$k^2=0.387$		$k^2=0.362$	

Table 4: Education and Agriculture Development in Lakhimpur District from 1990-2011

District	Literacy Rate	Years	Z-Score Value	Level of Agricultural Development
Lakhimpur	78.39%	2010-11	<+0.50	High
	64.28%	2000-01	+0.50 to -0.28	Medium
	52.89%	1990-91	+0.50 to -0.28	Medium
	-	2002-07	> -0.28	Low

Table 5: Education and Agriculture Development in Dhubori District from 1990-2011

District	Literacy Rate	Years	Z-Score Value	Level of Agricultural Development
Dhubori	59.36%	2010-11	<+0.50	High
	48.17%	2000-01	+0.50 to -0.28	Medium
	38.36%	1990-91	> -0.28	Low

Table 6: Education and Agriculture Development in Jorhat District from 1990-2011

District	Literacy Rate	Years	Z-Score Value	Level of Agricultural Development
Jorhat	81.36%	2010-11	<+0.50	High
	76.34%	2000-01	+0.50 to -0.28	Medium
	65.51%	1990-91	> -0.28	Low

Table 7: Education and Agriculture Development in Assam from 1990-2011

District	Literacy Rate	Years	Z-Score Value	Level of Agricultural Development
Assam	73.18%	2010-11	<+0.50	High
	63.25%	2000-01	+0.50 to -0.28	Medium
	52.89%	1990-91	> -0.28	Low

Table 3: Standard Score of the variables for the Agricultural Development in Different District of Assam (1990-2011)

DIST.	Literacy Rate	YEARS	X1	X2	X3	X4	X5	X6	X7	X8	Composit Z Score	Years Wise Rank	Over All Rank
LAKHIMPUR	52.89%	1990-91	-0.5234	1.1362	-0.0004	-0.4263	-0.4779	-0.4427	-0.4354	-5.3405	-0.14628	3	20
		1992-93	-0.5113	0.9132	-0.0004	-0.4814	-0.5041	-0.4485	-0.4521	-3.7205	-0.18560	4	22
		1994-95	-0.5067	0.8371	-0.0004	-0.5005	-0.4778	-0.4625	-0.4588	-3.7205	-0.19622	5	23
		1996-97	-0.5029	0.7775	-0.0004	-0.4635	-0.4720	-0.4746	-0.4737	-1.5705	-0.20123	6	24
		1998-99	-0.4638	0.2736	-0.0005	-0.4678	-0.4354	-0.4741	-0.4766	-4.9006	-0.25561	7	25
	64.28%	2000-01	-0.4536	0.1695	-0.0005	-0.4787	-0.4700	-0.4805	-0.4791	4.9007	-0.27412	8	26
		2002-03	-0.4348	0.0008	-0.0005	-0.4711	-0.4668	-0.4844	-0.4804	1.6705	-0.29218	9	28
		2004-05	-0.4165	-0.1416	-0.0004	-0.4665	-0.4689	-0.4858	-0.4830	1.6705	-0.30788	10	29
		2006-07	-0.4207	-0.1108	-0.0005	-0.4857	-0.4685	-0.4884	-0.5024	2.7405	-0.30965	11	30
		2008-09	1.9942	-1.9194	0.0021	2.11639	2.0971	2.1507	2.1110	4.3605	1.069042	2	2
78.39%	2010-11	2.2398	-1.9362	0.0021	2.12559	2.1448	2.0910	2.1309	4.3605	1.099780	1	1	
	Literacy Rate	YEARS	X1	X2	X3	X4	X5	X6	X7	X8	Composit Z Score Z Score	Years Wise Rank	Rank
DHUBORI	38.36%	1990-91	-0.5331	0.5328	-3.1205	-0.0022	-3.0279	-1.8173	0.0403	-3.7705	-0.60093	11	33
		1992-93	-1.2558	0.5328	-3.1205	1.9705	-0.1928	-1.8463	0.0417	-0.00104	-0.34018	10	31
		1994-95	2.4361	-2.4356	2.2907	-0.0020	-0.2182	-0.5316	0.0155	-2.7205	-0.09198	9	19
		1996-97	1.1001	-1.1003	-6.5106	0.0002	-0.2750	0.4274	-0.0074	-1.6705	0.018118	6	13
		1998-99	0.9329	-0.9331	-2.7606	0.0002	-0.2750	0.4274	-0.0074	-1.6705	0.018112	7	14

DIST.	Literacy Rate	YEARS	X1	X2	X3	X4	X5	X6	X7	X8	Composit Z Score	Years Wise Rank	Over All Rank
	48.17%	2000-01	-0.0872	0.0868	-7.8106	0.0004	-0.1005	-0.5156	-0.0118	4.3006	-0.07850	8	18
		2002-03	-0.4595	0.4592	-9.0906	0.0002	-0.0349	1.0223	0.0031	4.3006	0.123799	4	11
		2004-05	0.4849	-0.4853	5.0705	0.0004	0.0509	1.0570	0.0212	2.5305	0.141187	3	9
		2006-07	0.2119	-0.2123	1.2505	0.0006	0.0908	0.5705	-0.0279	3.0605	0.079230	5	12
		2008-09	0.5597	-0.5600	-1.0305	0.0006	0.8869	0.6656	0.0542	3.0605	0.200897	2	7
	59.36%	2010-11	0.5597	-0.5600	-1.0305	0.0006	0.8869	0.6656	0.0542	3.0605	0.200897	1	6
DIST	Literacy Rate	YEARS	X1	X2	X3	X4	X5	X6	X7	X8	Composit Z Score	Rank	Rank
JORHAT	65.51	1990-91	2.9671	-2.960	2.1405	0.0087	-1.747	-3.095	0.5142	-2.5305	-0.53980	11	32
		1992-93	-0.1582	0.1571	3.8305	-0.0017	-1.2884	0.2077	0.4670	-6.9806	-0.07706	8	17
		1994-95	-0.2347	0.2339	3.3205	-0.0029	-1.2884	0.3667	0.4656	-6.9806	-0.04072	7	16
		1996-97	0.2780	-0.287	-4.840	-0.0021	0.5303	0.0335	0.4859	-6.9806	0.130604	5	10
		1998-99	0.0921	-0.0942	-9.6306	-0.0024	-0.4206	0.0611	0.4746	3.3307	0.013806	6	15
	76.34%	2000-01	-0.5462	0.5471	-2.8806	-0.0025	0.0324	0.0194	-2.2617	3.3307	-0.27643	10	27
		2002-03	0.0436	-0.046	-1.451	-0.0004	0.1964	0.5887	-1.972	3.9906	-0.14867	9	21
		2004-05	-0.929	0.9314	5.5205	-0.0004	0.4417	0.5200	0.4565	3.9906	0.177690	4	8
		2006-07	-0.561	0.5621	-5.836	0.0014	0.8634	0.5561	0.4575	7.6506	0.234968	2	5
		2008-09	-0.699	0.7017	-3.085	0.0007	0.9063	0.4967	0.4562	1.5005	0.232752	3	4
81.36%	2010-11	-0.257	0.2520	-3.590	0.0016	1.6407	0.2453	0.4560	1.5005	0.292884	1	3	

Table 8:Standard Score of the variables for the Agricultural Development of Assam (1990-2011)

State	Literacy Rate	YEARS	X1	X2	X3	X4	X5	X6	X7	X8	Composit Z- Score	Ranks
ASSAM	52.89%	1990-91	-0.4723	0.4723	-0.4137	0.0066	-1.0177	-0.3412	-0.0819	-1.5920	-0.4300	10
		1992-93	-0.4714	0.4714	-0.4137	0.0067	-1.0366	-0.3407	0.59905	-1.5878	-0.3466	9
		1994-95	-0.4719	0.4719	-0.4137	-0.0016	-0.7520	-0.3308	-1.4795	-1.5852	-0.5703	11
		1996-97	0.12741	0.4714	-0.4137	4.4606	0.83813	0.09038	0.02593	0.0042	0.1429	4
		1998-99	-0.2474	0.4713	0.2834	-0.0016	-0.4433	-0.3252	-0.6019	0.3944	-0.0587	8
	63.25%	2000-01	0.1272	0.4710	0.2888	-0.0016	-0.1462	-0.3184	-0.5588	0.3730	0.0293	6
		2002-03	-0.4709	0.4709	0.2812	-0.0011	0.41457	-0.3093	-0.5608	0.4030	0.0284	7
		2004-05	-0.4713	0.4713	0.2852	-0.0013	0.42829	-0.2939	-0.2778	0.3871	0.0659	5
		2006-07	-0.4707	0.4707	0.2059	-0.0016	0.48251	-0.2917	0.38741	0.7402	0.1903	3
		2008-09	2.1201	-2.120	0.1692	-0.0016	0.46641	-0.2822	1.06843	0.9360	0.2945	2
	73.18%	2010-11	2.1225	-2.1225	0.1410	-0.0008	2.53611	3.1617	2.3268	1.1040	1.1586	1

ABOUT AUTHOR

Dr. Biren Saikia, (PhD in Economics) is presently working as an Assistant Professor (Guest) in the Department of Humanities and Social Sciences (NERIST) Nirjuli, Arunachal Pradesh. He has done his graduation from Madhabdev College, Narayanpur, Assam and Masters and M.Phil from Dibrugarh University, Dibrugarh, Assam. He has completed his Ph. D from North-Eastern Regional Institute of Science and Technology, Arunachal Pradesh. Dr. Saikia has published 6 research papers in international and 4 papers in national journals. He has also published 3 research papers in reputed ISBN books and presented many research papers in national and international seminars. He has been actively involved in research activities in Economics since the last five years.

