

ISSN: 2393-8110

# J n a n a m

A Multilingual & Multidisciplinary  
Academic Journal  
Volume-V



---

DARRANG-UDALGURI ZONE  
ASSAM COLLEGE TEACHERS' ASSOCIATION  
2018-19

**ISSN : 2393-8110**

জ্ঞানম  
**Jnanam**

**A Multilingual & Multidisciplinary  
Academic Journal  
Volume- V**

**Editors**

Dr. Mausumi Saha Kalita

Dr. Barnali Sharma

Krishna Kanta Basumatary

**DARRANG-UDALGURI ZONE**

**ASSAM COLLEGE TEACHERS' ASSOCIATION**

**2018-19**

# Jnanam

A Multilingual & Multidisciplinary  
Academic Journal  
Volume- V

## EDITORIAL BOARD

- Advisors : Dr. Pranab Kumar Sarma  
Sri Rabinson Narzari  
Dr. Dulendra Nath
- President : Deepak Kalita
- Editors : Dr. Mausumi Saha Kalita  
Dr. Barnali Sharma  
Krishna Kanta Basumatary
- Members : Dr. Prasanna Kumar Nath  
Dr. Nareswar Narzari  
Dr. Seema Jyoti  
Umesh Chandra Sarma  
Sikdar Anowar Islam  
Archana Das
- Cover Design : Editorial Board
- Price : ₹ 300 (Three Hundred) Only
- Printed at : Paramount Offset, Bordoulguri, Darrang (Assam)

## Contents

1.	A Comparative Study of Structural Properties of Physically and Chemically Deposited CdSe Thin Films	Dr. Kangkan Sarmah & Dr. Ranjan Sarma	7
2.	Causes and Impacts of Water Pollution in Nonai River, Tangla Town, District: Udalguri, Assam (A case study of Bhergaon Sub-division, Udalguri, BTAD, Assam)	Archana Das	17
3.	Vegetable Farming and Land Use Pattern in Dalgaon-Sialmari Block of Darrang District	Dr. Mukut Sarma	25
4.	Women Entrepreneurship A Study of Empowerment of women Entrepreneurship in Assam With Special Reference to Bodoland Territorial Area Districts (BTAD)	Krishna Kanta Basumatary	32
5.	Enrolment Trends in Higher Education Among the Students of Mangaldai College – A Statistical Analysis	Pranab Das	44
6.	Carbon Sequestration by Aquatic Macrophytes in Wetlands of Lower Assam	Gunajit Kalita & Sahabuddin Ahmed	53
7.	Self Concept– The Core of Our Personality	Dr. Kashmiri Nath	60
8.	An Appraisal of Communicative English Course in Distance Learning Programmes in Assam	Narayan Ch. Gahatraj	66
9.	Motivation in Classroom Learning	Dr. Sultana Rezia	76
10.	Haba Methai of Bodos and Biyanaam of Assamese-A Comparative Study	Niran Brahma & Anjan Upadhayay	83

11.	Women Empowerment– Its Relevance and Future Concerns in Respect of India with Special Reference to Assam	Usha Rani Deka	91
12.	Challenges of Higher Education in Assam For Development of Human Resource	Umesh Ch. Sarma	99
13.	The Folk Culture of the District of Darrang of Assam :A bird's eye view	Dr. Abul Qasim	106
14.	A Reflection On Naga Movement	Mrs. Ranjita Goswami	111
15.	নিচুকনি গীতত নাবী মনৰ প্ৰকাশ	ড° সৰ্বিতা মজুমদাব	115
16.	বঙ্কিমচন্দ্ৰৰ "ৰাজসিংহ" আৰু ৰজনীকান্ত বৰদলৈদেৱৰ "মনোমতী" এটা তুলনামূলক আলোচনা	শম্পি চন্দ্ৰতী	124
17.	নন্দেশ্বৰ 'দৈমাৰিণি সুন্দ' সল'আব খেৰখাঁনায় সমাজাৰি সাধগাৰি	ড° সিতা বৰ'	132
18.	বৰ' হাৰি জীগানাযাব বিখাৰ মুগাৰি গৌধুৰ্মনি বিহোমা : দান্দিসে নোজোঁৱ	নৃপেন বৰ'	137
19.	জতিন্দ্ৰ নাথ বৰ'নি 'সিয়ুন ৰজা' : মোনসে সাবৰায়নাই	ড° প্ৰমিলা বৰ'	143
20.	আধুনিক হিন্দী কাব্য মেন্ গান্ধী দৰ্শন	সিকদাৰ আনবাৰুল ইসলাম	151
21.	প্ৰেমচন্দ্ৰ আঁৱ তনকা নাট্য সাহিত্য	আব্দুল মতিন	156



# A Comparative Study of Structural Properties of Physically and Chemically Deposited CdSe Thin Films

Dr. Kangkan Sarmah & Dr. Ranjan Sarma

## Abstract

*CdSe thin films are deposited separately by means of both physical vapour deposition (PVD) technique and chemical bath deposition (CBD) technique. Structural analyses of the deposited films are done by XRD technique. In case of both the deposition techniques large scale variation of crystalline size has been observed with the change of deposition parameters of the films. For physically deposited films variations of crystalline sizes of the films are studied with the change of substrate temperature of deposition whereas in case of chemically deposited films the same study has been conducted for the variation of molarity of the solution used for the deposition of the films. PVD technique has been generally found to be suitable for the deposition of films with larger crystalline size whereas CBD technique is mainly found to be helpful for the deposition of films with smaller crystalline size.*

**Key words :** CdSe thin films, Substrate temperature, Molarity

## INTRODUCTION

CdSe is a compound semiconductor and is being regarded as a prominent member of II-VI group of materials like ZnTe, CdTe, CdS, ZnS etc. It is being widely

---

*Dr. K. Sarmah, Asstt. Professor, Dept. of Physics, Mangaldai College*

*E-mail : ks\_guphys@rediffmail.com*

*Dr. R. Sarma, Asstt. Professor, Dept. of Physics, Mangaldai College*

used in the fabrication of different optoelectronic devices such as low-cost and high-performance hybrid solar cells [1], photoelectrochemical cells [2], optical sensors [3], green light-emitting diodes [4] etc. It is observed that optoelectronic properties of CdSe thin films are highly structure sensitive which in turn influence the device performance.

### OBJECTIVES

Among different deposition techniques of thin films the physical vapour deposition (PVD) and the chemical bath deposition (CBD) [5] techniques are found to be relatively inexpensive, simple and convenient to use in our available laboratory setup. The structures of physically deposited CdSe thin films are governed by different parameters like the rate of deposition, substrate temperature, film thickness etc, whereas the structure of chemically deposited CdSe thin films are mainly governed by the molarity of the solution, rate of stirring, deposition temperature etc. Considering these aspects, an experimental study of both physically as well as chemically deposited CdSe thin films have been undertaken. The objective behind the work is to have a comparative study regarding the variation of grain size with deposition parameter and the results this study are being presented in this paper. Though in both the techniques there are several deposition parameters, only the variation of substrate temperature in case of PVD technique and the variation of molarity for CBD technique have been taken into consideration here.

### METHODOLOGY

The complete work is based on experimental method. Thin films of CdSe of constant thickness,  $t$ , (2000Å) are deposited at different substrate temperatures,  $T_s$  (473-623K), on chemically and ultrasonically cleaned glass substrates with the help of a Hind High Vacuum Coating unit at a vacuum better than  $10^{-5}$  torr. The source to substrate distance is maintained at 6.5cm for all the cases. The prepared films are annealed in vacuum at elevated temperature for an hour. Pure (99.999%) bulk CdSe sample is used as the source material. Thin tantalum boats of proper size and shape are used as the source heater. Masks of proper sizes are used to have CdSe thin films of required sizes. A suitably designed and assembled multiple beam interferometer is used to measure the thickness of the films with an accuracy of  $\pm 15\text{Å}$ .

CdSe films are deposited on chemically and ultrasonically cleaned glass substrates by CBD method using solution of cadmium acetate, liquor ammonia and freshly prepared sodium selenosulphate solution. The sodium selenosulphate solution is prepared by mixing selenium powder with anhydrous sodium sulphite in double distilled water using a refluxing unit where constant refluxing of the solution at higher temperature is done.

The deposition bath contained the cadmium acetate, and ammonia solution is slowly

added to it with constant stirring at room temperature. Initially, the bath solution becomes milky and then turbid. Further addition of excess ammonia to the bath dissolves the turbidity and makes the solution clear as well as transparent. Cadmium acetate solution of different molarities is used to get such solution mixtures. Freshly prepared sodium selenosulphate solution is slowly added to each of such cadmium acetate solutions and constant stirring of it is done. The pH of the final reaction mixture is properly maintained.

The bath solution, kept at room temperature, is stirred for a few seconds and then chemically cleaned glass substrates are inserted vertically into it using specially designed sample holder. The substrates coated with CdSe thin films are removed at suitable intervals and then thoroughly washed and rinsed with doubly distilled water and then dried in air at room temperature. Films are allowed to deposit on the both surface of the glass slides.

X-ray diffractogram of CdSe thin films are taken by using Philips X-ray diffractometer (Philips X'Pert Pro) with  $\text{CuK}\alpha$  radiations of wavelength  $1.54\text{\AA}$ . The diffractometer is operated at 40 KeV and 30mA. The line profile is chart recorded at a scanning rate of  $(0.01^{\circ}-0.07^{\circ})\text{s}^{-1}$  with a Phillips automatic recorder. X-ray diffractogram analysis including the peak search is done by computer programming (Philips X'pert software) with minimum peak significance 0.65. XRD pattern of all the CdSe films are taken from  $10^{\circ}$  to  $70^{\circ}$ .

### Structural parameters

#### 4.1 Lattice constant

The lattice parameter,  $a$ , for cubic phase structure  $[hkl]$  is determined by the relation

$$d_{hkl} = a/(h^2+k^2+l^2)^{1/2} \quad (1)$$

where  $N = h^2+k^2+l^2$  is a number. Observing the distribution of  $N$  values, the type of the cubic lattice may be determined [6].

From the Bragg's law,

$$\begin{aligned} \lambda &= 2a \sin\theta / (h^2+k^2+l^2)^{1/2} \\ \Rightarrow \sin^2\theta &= (\lambda^2/4a^2)(h^2+k^2+l^2) = \lambda^2 N / 4a^2 \end{aligned} \quad (2)$$

For hexagonal crystals; the lattice constants,  $a$ , and,  $c$ , are evaluated from the following relations

$$1/d^2 = [(4/3)\{(h^2+hk+k^2)/a^2\}] + (l^2/c^2) \quad (3)$$

From Bragg's law

$$\sin^2\theta = [(\lambda^2/3)\{(h^2+hk+k^2)/a^2\}] + (\lambda^2 l^2/4c^2) \quad (4)$$

According to Vegard's law, the lattice parameters of hexagonal unit cell are nearly related to cubic lattice parameters of same material by [7]

$$a_{\text{hex}} = (1/2)^{1/2} a_{\text{cubic}} \quad c_{\text{hex}} = (4/3)^{1/2} a_{\text{cubic}} \quad (5)$$



Hence for 'ideal' Wurtzite lattice, the relation [8] between the two lattice parameters is

$$c_{\text{hex}} = (1.633)a_{\text{hex}} \quad (6)$$

which can be used for the calculation of lattice parameters of CdSe thin films.

There are several possible sources of error like divergences of X-ray beams, refraction and absorption of X-rays by the specimen etc in the measurement of  $\theta$  and  $d$  values. So accuracy in the determination of lattice constant is dependent upon the accuracy of their measurements. We have

$$d = (\lambda/2) \operatorname{cosec}\theta \quad (7)$$

$$\text{So } \delta d = -(\lambda/2) (\operatorname{cosec}\theta \cot\theta) \delta\theta$$

$$\text{For } \theta = 90^\circ, \delta d/d=0$$

The most accurate value of lattice parameters are estimated from the Nelson-Riley plot [9] when  $\theta = 90^\circ$ . It is plotted between calculated lattice constant values ( $a$  and  $c$ ) for different planes and the error function

$$f(\theta) = (1/2)\{(\cos^2\theta/\sin\theta) + (\cos^2\theta/\theta)\} \quad (8)$$

#### 4.2 Grain Size

The grain size ( $D_{\text{hkl}}$ ) for the thermally evaporated CdSe thin films are evaluated for the preferred planes [hkl] using the Scherrer formula [10]

$$D_{\text{hkl}} = k\lambda / \beta_{2\theta} \operatorname{Cos}\theta \quad (9)$$

with  $k = 0.94$ , where  $\theta$  is the Bragg's angle,  $\lambda$  is the wavelength of X-rays used,  $\beta_{2\theta}$  is the width of the peak at the half of the maximum peak intensity.

#### 4.3 Average strain

The origin of strain is related to lattice 'misfit' which in turn depends upon the growing conditions of the films. The microstrain ( $\epsilon$ ) developed in the thin films can be calculated from the relation [11]

$$\epsilon = (\beta_{2\theta} \cot\theta)/4 \quad (10)$$

where  $\theta$  and  $\beta_{2\theta}$  has their same significances.

#### 4.4 Dislocation Density

Dislocations are an imperfection in a crystal associated with misregistry of the lattice in one part of the crystal with respect to another part. Unlike vacancies and interstitial atoms, dislocations are not equilibrium imperfections. In fact growth mechanism involving dislocation is a matter of importance. The dislocation density of thin films are given by the Williamson and Smallman's relation [12]

$$\delta = n / D^2 \quad (11)$$

where  $n$  is a factor, which equals unity giving minimum dislocation density and  $D$  is the grain size.

## Results and Analysis

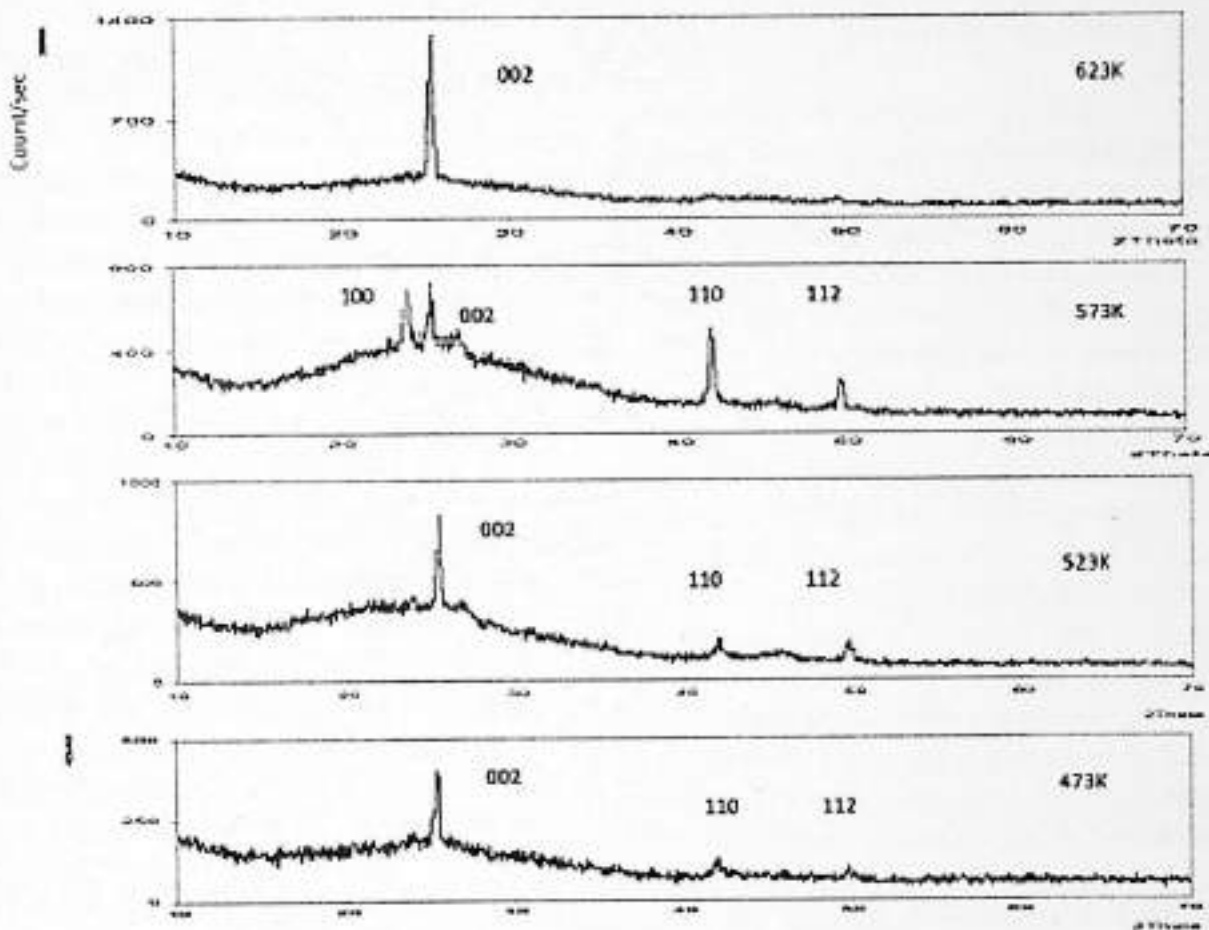


Figure 1. XRD patterns of PVD CdSe thin films same,  $t=2000 \text{ \AA}$  but deposited at different  $T_s$ .

The X-ray diffraction profiles of CdSe thin films (figures 1) of constant thickness,  $t$ , ( $2000 \text{ \AA}$ ) reveal that films grown at room temperature are amorphous (not shown in figure) and those grown at elevated substrate temperatures,  $T_s$  (473-623K) are polycrystalline having hexagonal ZnS type structure. This is confirmed by comparing the observed 'd' values of the XRD patterns of the films with the standard 'd' values of JCPDS X-ray powder file data [13]. In these films [002] plane is very clear and abundant. However small percentage of orientations of [110], [112] & [100] planes are also observed depending upon  $T_s$ . For the film deposited at 573K diffracted intensity from [100] and [110] is comparable to the corresponding intensity for [002] plane. The dominance of [002] hexagonal reflection indicates that the preferential growth of

crystallite is in this particular direction.

The broad hump that is observed in the background of XRD is due to the amorphous glass substrate and also possibly due to some amorphous phase present in the CdSe thin film.

Different structural parameters of the CdSe thin films of constant,  $t$  and different  $T_s$  are calculated by using relevant formulae and are systematically presented in table 1. The data of the table shows variations in the structural parameters with deposition temperature, and also along different orientation. The corrected values of lattice constants are estimated from Nelson-Riley plots (not shown here) which are found to be in the range (4.286-4.304Å) for,  $a$ , and (6.992-7.020Å) for,  $c$ . There is a change in lattice constants for the deposited thin films over the bulk values, which suggest that film grains are strained. This may be due to change of nature and concentration of the native defects. The density of the films is therefore expected to change in accordance with the change of lattice constant [14]. The standard values of,  $a$ , and,  $c$ , for strain free bulk CdSe sample are 4.299Å & 7.010Å respectively [13]. Thus it is observed that value of,  $a$ , and,  $c$ , are slightly greater for films deposited at  $T_s = 523\text{K}$  and  $573\text{K}$  than their bulk counterparts whereas the values nearly coincide for film deposited at  $623\text{K}$  and  $t = 2000\text{Å}$ . The values of,  $a$ , and,  $c$ , are less than the lattice parameters of the bulk CdSe for films deposited at  $T_s = 473\text{K}$  and  $t = 2000\text{Å}$ .

The grain sizes of the films corresponding to [002] hexagonal reflection have been found to increase with  $T_s$ . With increase of  $T_s$  the crystallinity of the films improves substantially. At higher  $T_s$  in the formation process of the films, ad-atoms possess greater mobility along direction parallel to the substrate surface, which thus contribute to improvement of the crystallization processes.

**Table 1.** Calculated values of the structural parameters of CdSe thin films of same  $t = 2000\text{Å}$  but deposited at different  $T_s$ .

$T_s$ (K)	hkl	$a$ (Å)	Cor- rected $a$ (Å)	$c$ (Å)	Cor- rected $c$ (Å)	$D_{001}$ (Å)	$\rho$ in $10^{21}$ $\text{cm}^{-3}$	$\delta$ in $10^{21}$ $\text{cm}^{-2}$
623	002	4.298	-	7.011	-	350	4.70	0.81
573	100	4.307	4.304	7.025	7.020	268	6.52	1.39
	002	4.310		7.029		308	5.35	1.05
	110	4.306		7.024		295	3.42	1.14
	112	4.306		7.023		253	3.40	1.56

523	002	4.296	4.302	7.006	7.017	283	5.80	1.24
	110	4.297		7.008		301	3.34	1.10
	112	4.301		7.015		201	4.26	2.47
473	002	4.303	4.286	7.018	6.992	280	5.90	1.27
	110	4.297		7.008		253	3.97	1.56
	112	4.293		7.003		221	4.17	2.04

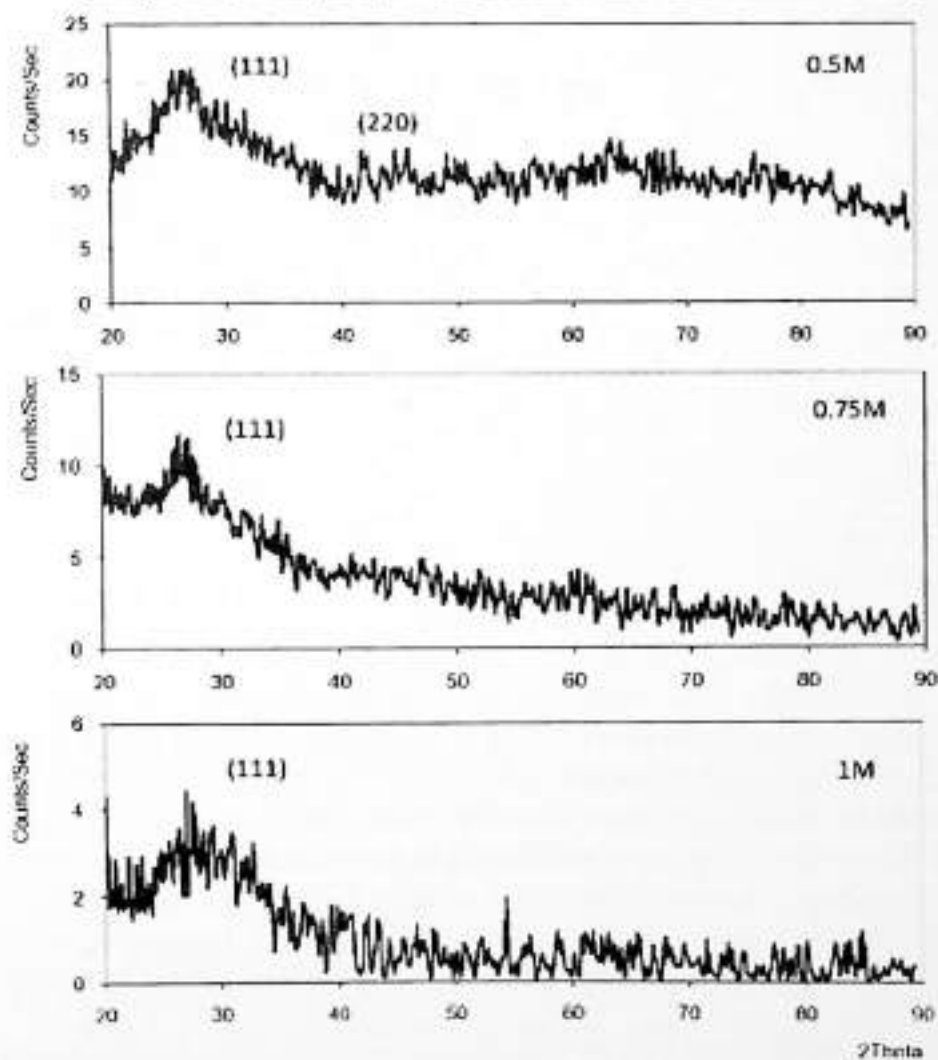


Figure 2. XRD patterns of CBD CdSe thin films at 0.5M, 0.75M and 1.0M at room temperature

CdSe films of thickness of 280 nm are deposited by the CBD method at room temperature by using cadmium acetate solutions of different molarities, namely 0.50 M, 0.75M and 1 M. The X-ray diffractograms of typical 'as-deposited' films (0.5 M) are shown in figure 2. The diffraction peaks can be indexed to diffraction from the (111) plane of zincblende structure of CdSe. The lattice constant 'a' from XRD pattern is found to be in between 5.642 and 5.844Å. This is almost in agreement with the standard data 6.077Å obtained from JCPDS [15]. It is seen that value of 'a' is less than its bulk value 6.08Å. This indicates that the films are under some strain. The full width at half maximum (FWHM) as obtained from the diffractograms of figure 2 is found to decrease with increase of molarity indicating there by that there is a decrease in lattice imperfections due to decrease in strain and an increase in crystallite size [16] which are found to be in the range of 38 nm to 56 nm for the said CBD CdSe thin films.

With the increase of molarities of the solutions larger number of Cd<sup>2+</sup> and Se<sup>2-</sup> ions react to form the deposit resulting in the increase of crystallite sizes. The negative value of internal strain for deposited films indicates the compressive strain. The compressive strain may be generated at the film substrate interface due to bond formation between very small crystallites and substrates during impurity free deposition. Also due to sufficient thickness of the prepared films, the compressive strain may be generated in the grain boundary when the adjacent surfaces of two grains come into contact during low temperature (300 K) of film growth. The origin of compressive strain may be due to the adhesive forces between glass material and film when deposited at lower temperature.

In this regards it may be mentioned that the calculated values (not presented here) of dislocation densities are also found to decrease with molarity. Due to low deposition temperature the film growth is based on slow release of Cd<sup>2+</sup> and Se<sup>2-</sup> ions in the solution. As a result, less number of ions participates, in a given time, in the formation of crystallites. This means reaction becomes slower due to slow rate of deposition which causes decrease in dislocation density. It indicates the formation of higher quality films at relatively higher molarities.

It is observed that after heat treatment (air annealing at 473K for 1 hour), more number of X-ray peaks appear (not shown here), showing the formation of the polycrystalline films. The intensities of the (220) and (311) peaks are very low in comparison with (111) indicating the dominant orientation of the grains along the [111] direction. The broad peaks imply the small crystalline nature of the films [17].

#### Conclusion

CdSe thin films deposited by PVD technique are of polycrystalline nature having hexagonal ZnS type structure. The films are found to have preferred orientation along

(002) plane and some small percentage of growth along (100), (110) & (112) are also observed depending upon the substrate temperature of deposition. The crystallinity of the films improves with the increase of substrate temperature of deposition. At any deposition temperature, there is a variation in lattice constants of the grown thin films over the bulk suggesting that built-in strains are present in the film grains. The built-in microstrains and dislocation density of the deposited films are found to be dependent on the growth temperatures.

CdSe thin films deposited by CBD technique are of nanocrystalline nature having zincblende structure. The films are found to have preferred orientation along (111) plane and some small percentage of growth along (220) are also observed depending upon molarity of the deposited solution. With the decrease of molarity, there is an increase in lattice imperfections due to increase in strain and a decrease in crystallite size. With the increase of molarity in the bath solution, the internal strain and dislocation density of the prepared films are also found to decrease.

#### References :

1. L. Han, D. Qin, X. Jiang, Y. Liu, L. Wang, J. Chen, and Y. Cao, *Nanotechnology*, 17, 2006, pp. 4736–4742.
2. S.S. Kale, H.M. Pathan and C.D. Lokhande, *J. Mater. Sci.*, 40, 2005, pp. 2635-2637.
3. D. Nesheva, Z. Aneva, S. Reynolds, C. Main and A.G Fitzgerald, *J. Optoelectron. Adv. Mater.*, 8, 2007, pp. 2120–2125.
4. D. Zhu, H. Ye, H. Zhen and X. Liu, *Synth. Metals*, 15, 2008, pp. 879–882.
5. R.B. Kale and C.D. Lokhande, *Semicond., Sci.Technol.*, 20, 2005, pp. 1–9.
6. I. H. Khan in L. I. Maissel and R. Glang (eds), 1970, *Hand Book of Thin Film Technology*, Mc-Grow Hill Co., NY, Chapter 9
7. W. L. Roth in M. Aven and J. S. Prener (eds), 1967, *Physics and Chemistry of II-VI Compounds*, North-Holland Publishing Co., Amsterdam, 124
8. N. G Dhere, N. R. Parikh and A. Ferreir, 1977, *Thin Solid Films*, 44, 83.
9. J. B. Nelson and D. P. Riley, *Proc. Phys. Soc. (London)*, 57, 1945, 160
10. H. P. Klug and L. E. Alexander, 1954, *X-Ray Diffraction Procedures*, John Willey and Sons, Inc New York, Chapter 9, 491
11. S. Sen, S. K. Halder and S.P. Sen Gupta, *J.Phys. Soc., Japan*, 38, 1975, 1643

- 51
12. D. P. Padiyan, A. Marikani and K. R. Murali, *Mat. Chem. and Phys.*, 78, 2002,
  13. *Powder Diffraction Data File, Joint Committee of Powder Diffraction Standard, International Center for Diffraction Data, 1984, USA, Card No. 8-459, 143*
  14. P. K. Kalita, B. K. Sarma and H. L. Das, 2000, *Bull. Mater. Sci.*, 23, 313
  15. *Powder Diffraction Data File, Joint Committee of Powder Diffraction Standard, International Center for Diffraction Data, USA, Card File No.19-0191.*
  16. N. El-Kadry, A. Ashour, and S.A. Mahmoud, *Thin Solid Films*, 269, 1995, pp. 112–116.
  17. Y.S. Xia and C.Q. Zhu, *Mater. Lett.* 62 (2008), pp. 2103–2105.



# **Vegetable Farming and Land Use Pattern in Dalgaon-Sialmari Block of Darrang District**

**Dr. Mukut Sarma**

## **Abstract**

*Land use pattern often reflects the socio-economic scenario of an area. By studying landuse, it can be assumed different aspects of an area like distribution of soil, socio-economic status, environmental issues etc. In recent decades a large acre of agricultural land of Dalgaon-Sialmari blocks has devoted to vegetable farming. The marginal farmers along with agricultural labourer of the area is mainly consists of minority Muslim, who are basically hard working and interested to vegetable farming. In method of vegetable farming, double cropping, and multiple cropping are found common that are applied extensively in this area. In this paper a land use analysis is made in the Dalgaon-Sialmari block where vegetable growing and its impact on the area is highlighted.*

**Key Words:** *Landuse pattern, marginal farmers, cropping pattern.*

## **INTRODUCTION**

Dalgaon-Sialmari block of Darrang District has a significant contribution of vegetable farming and occupies a place of respect in the economy of the state, Assam. The area grows an amazing number of different vegetable like potato, tomato, cabbage, cauliflower, cucumber, pumpkin, brinjal, carrot, green leaves and many more from both Rabi and Kharif season. It is the center of fertilizer shop, pesticide and machinery

---

*Asstt. Professor, Dept. of Geography, Mangaldai College*  
E-mail : mukut.mld@gmail.com



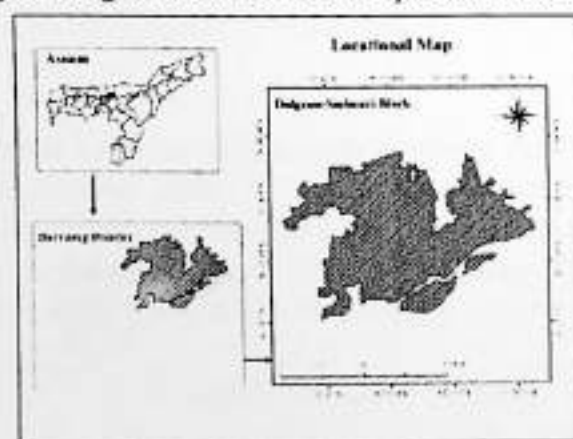
shop related to vegetable farming. Ghansimuli- Balugaon vegetable market of Kharupetia is one of the outstanding market center of north –east India. After the local needs are fulfilled, the vegetable is exposed for business purpose. A bulk amount of vegetables are exported through different market centers like Balugaon, Tangni, Bechimari, Koupati etc. Exported produce goes to different places including Guwahati, Nalbari, Dibrugarh, Lakhimpur, Silchar, etc. and out of the state Itanagar, Agartala, Dimapur, Mizoram, Tripura, Kohima etc. A small amount of vegetables are exported to Nepal, Bhutan, and Bangladesh. Subsequently, the urban center including Kharupetia, Mangaldai, Guwahati, Nagaon, Dalgaon etc. import various essential commodities needed for vegetable farming.

In the block of Dalgaon-Sialmari it is significant that lion's share of agricultural land is devoted to vegetable farming. Land is the basic resource that forms the basis of different agricultural produce. Land use represents a complex pattern of land resources. The complexity in the pattern of land use is the result of centuries of human occupation of land retraction of physical, historical, social and economic factors (Das, 1984). A scientific classification of land is essential to understand the present status and future prospect of land use in any region.

#### Location of Dalgaon-Sialmari Block

Dalgaon-Sialmari block of Darrang district, Assam has been playing a significant role in producing and marketing a large variety of vegetable commodities. Excess of these are not only transported to different parts of the nation but some other neighboring countries like Bhutan, Bangladesh, Nepal etc. The fig 1 reveals the location of Dalgaon-Sialmari block in Darrang district and state of Assam. Dalgaon-Sialmai block of Darrang District, Assam, is lying on the north bank of the mighty Brahmaputra River and formed by new alluvial soils of its extensive flood plain.

Fig:1 Locational Map of Dalgaon-Sialmari Development Block



The region is situated 26° 27' N and 26° 42' N latitude and extend out between 92° 5' and 92° 20' E longitude. The block occupies an area of 33061ha with 177467 total population (2011 census), where 90439 are male and 87028 are female.

#### **OBJECTIVES**

- To study the agricultural land use of Dalgaon-Sialmari Block.
- To identify the challenges faced by the marginal farmers related to land use change in the area.

#### **METHODOLOGICAL ISSUES**

The present study is mainly based on primary and secondary information. In this study, primary data are collected from 28 nos. of villages of the block. Of them 22 nos. of vegetables from both Rabi and Kharif season are selected. Then a schedule cum questionnaire has been prepared covering various aspects like land use pattern, crop pattern, socio-economic status etc. of the vegetable grower of the block. The secondary data relating to land use pattern is collected from District Agricultural Office, Darrang 2015. Finally data has been processed and arrived at findings.

#### **DISCUSSION AND ANALYSIS**

The present study focuses mainly the agricultural land use of Dalgaon-Sialmari block emphasizing the vegetable growing areas. To understand more precisely about land utilization a contrast land use pattern of both district and block level is analyzed. The study reveals different challenges faced by the marginal farmers related to land use change in the block.

##### **General Land use Pattern of Dalgaon-Sialmari Block**

The general land use means the use of lands which are used in general purpose, cultivable land, home shed, kitchen garden, orchard, fishery, fellow land, wasteland, land use put to non agricultural use like Settlement, Road, school, temple, mosque, courtyard etc. In all these land pattern the fragmentation of land holding have seen in the block. Most of the people have their own land and used the land in general purpose. It is found from the data that only a small amount of land is under built up area (159 ha. ), whereas 51.72% (18203 ha.) area is cultivated area.

It is found from the table that in the block is endowed with favorable amount of land for agricultural purpose, where 2500 ha. area is cultivable land and 18203 ha. under cultivated area. It shows that the land area of the block is highly suitable for vegetable cultivation. Major share of land is under Kharid agriculture (27%) which is very significant.

Table 1: Land use with specific cropping system

Sl No	Land Use Class	Area in sq. km	% of Area Cover
1	Agriculture - Kharid	143.7	27.53
2	Agriculture - More than double	86.66	16.60
3	Agriculture - Two Crope Area	63.29	12.13
4	Agriculture - Zaid Crop	2.38	0.46
5	Tea Gardens	12.14	2.33
6	Built Up Area (Urban)	1.59	0.30
7	Forest Area (Dense)	25.87	4.96
8	Grassland	27.17	5.21
9	Agriplantation / Settlement	81.51	15.62
10	River Sand	38.59	7.39
11	Water Body (River)	25.19	4.83
12	Wetlands	13.85	2.65
Total Area		321.94	100.00

Source : CDAP, Darrang District, 2015

It is found from the table (1) that occupy of specific crops in Dalgaon- Sialmari block is significant one. It reveals from the table that 16.60 % of the total area is covered by more than double crop. Brinjal and cabbage, potato and chilly are some common combination which give good yield from the same plot of land. Similarly, 12.13 % of area is under the Two Crop Area. It is mainly due to extensive cultivation of different vegetables in the area. Only 0.46% of land is under Ziad crop. River sand(7.39%)also plays an important role in producing seasonal vegetable in the area.

#### **Agricultural Land use of the Blocks**

Agriculture land use means the land used for agriculture purposes and practices. In Dalgaon-Sialmari block, the agricultural land is heavily used for vegetable cultivation. Besides vegetables, paddy, jute, oil seeds are also done in large scale for commercial purpose.

Due to tremendous pressure of increasing population, share of agricultural land has gradually increasing in recent times. The tendency of increasing vegetable farm is a common practice among the marginal farmers. Majority of them are not interested for rice farming. It is done by them on subsistence level. Similarly they think the fisheries and orchard land as non economic land. Under such circumstances large area of barren and uncultivated land, permanent pasture and grazing lands, miscellaneous tree crops

and groves, water and fallow land have also been reclaimed and gradually converted to agricultural land. Most of the lands of Dalgaon-Sialmari block with enough natural fertility are suitable for green vegetable cultivation.

In the study area along with vegetable crops, a number of other crops are practiced from both commercial and local consumption. Major crops include paddy, jute, oil seeds and vegetable.

Table: 2 Agricultural Landuse and size of Landholding (Dalgaon-Sialmari Block)

Type of Crops	Size of Land			
	Below 1 Bigha	1-5 Bigha	5-10 Bigha	Above 10 Bigha
Paddy (Rice, Wheat)	-	45%	25%	10%
Jute	-	53%	4%	2%
Oilseeds	1%	6%	-	-
Vegetable	24%	42%	18%	12%

Source : Primary data collected from field study, 2016.

The study reveal (Table:2) that vegetable crops occupy a significant area of the block, where 96% of farmer engaged in vegetable cultivation. In the study area it is found that 80% of farmer cultivate paddy both in summer and winter season. Among the land category vegetable is predominant in 1 to 5 bigha category. Similarly, paddy is also practiced heavily in the same group, 1 to 5 bigha. Another important crop in the area is jute, which occupy 59% of land holding. Oil seed's area is very insignificant. Only 7% people are found under oil seeds cultivation.

#### Agricultural Land Use in Darrang and Dalgaon –Sialmari Block

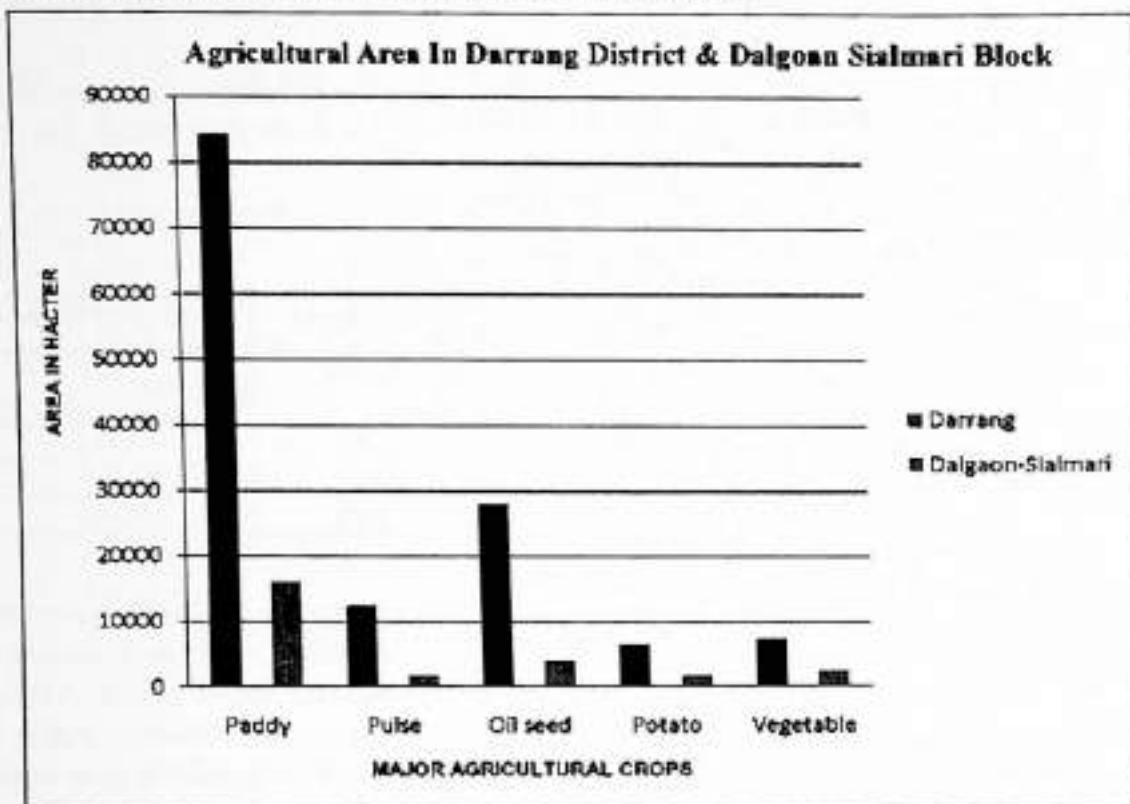
It is found from that in Darrang district more than 75% of vegetable comes from Dalgaon–Sialmari block. It is interesting to note that a very negligible number of farmers are farming other crops where area for other crop is also insignificant. It is significant that the block occupy a sizeable land (2500 ha.) for vegetable cultivation which is 33.55% of the district.

Table : 3 Agricultural Land Use in Darrang District and Dalgaon-Sialmari Block (area in ha.)

Dist./Block	Paddy	Pulse	Oil seed	Potato	Vegetable
Darrang District	84326	12440	28150	6475	7450
Dalgaon-Sialmari	16253	1830	4000	1800	2500

Source : District Agricultural Officer, Darrang, 2015

Fig 2: Agricultural area of Darrang district and Dalgaon Block



It is found from the table 3 that a sizeable amount of land of Dalgaon –Sialmari block is occupied by vegetable. The proportion of vegetable land is much higher than the district area. Table (3) reveals that the area of vegetable in whole district is 7450 ha. where 6 blocks are attached but the Dalgaon block alone occupy an area of 2500ha. of land of the block which is significant. In case of paddy the district occupies 84326 ha. but the block occupy only 16253 ha. It reveals that the farmers are not interested to grow paddy as compared to vegetable in this land.

### CONCLUSION

It is found that the block of Dalgaon-Sialmari is highly devoted to agricultural activity and more particularly for vegetable farming. The poor marginal farmers think that forestry, plantation agriculture, pisciculture, etc. are not profitable as compared to vegetable farming. Similarly they are also not interested for poultry, piggery, and orchard farming. For such an attitude they are depended to other part of the district for getting organic matter for manure, bamboo for vegetable shed etc. It is interesting to note that the block has gradually decline its orchard land, pasture and agricultural land. In recent

days the farmers have to invest a huge capital for maintenance the quality of soil. Due to ignorance of harmful impact of chemical fertilizer and pesticides the soil fertility is also getting deteriorated day by day. Under such circumstances an imbalance ecological and environmental situation also arose in the block. It is due to high emphasized on vegetable farming which leads an unsustainable land utilization of the entire block.

### **References :**

1. *Abay, A. (2007). Vegetable market chain analysis in Amhara National Regional State: the case of Fogera woreda, South Gondar zone. M.Sc. thesis presented to the school of graduate studies, Haramaya University. pp70.*
2. *Anonymous, (2015). Glimpses of Agriculture in Darrang district, Assam, prepared by District Agricultural Officer Darrang, Mangaldoi.*
3. *Choudhury B.(1967) : Vegetables, National Book Trust of India, New Delhi Dutta M.(2002) : Place of Rice Farming in the Culture and Economy of Assam, Ph. D Thesis, G. U.*
4. *Government of Assam: "Statistical Handbook of Assam" (2014), Directorate of Economics and Statistics, Assam, Guwahati,*
5. *Subramanyam K. V., Gajanan T. M. (2000) : Co-operative Marketing of Fruits and Vegetables in India, concept publishing company, New Delhi.*



## Enrolment Trends in Higher Education Among the Students of Mangaldai College—A Statistical Analysis

Pranab Das

### Abstract

*Mangaldai College was established in 1951 at Darrang district and the college is a premier institution of higher education in the district. The main objective behind this institution was to impart quality of higher education to which the college has tried its level best to fulfill the same right from the very outset. For the study the relevant data was collected from the office of the college pertaining to the trend in admission in B.A and B. Sc. courses during the period 2005 to 2014. The survey seeks to study the some objectives like—gender wise distribution of students, cast wise students enrollment trend, stream wise classification of students etc. From the study we observed that the enrollment trend in higher education among the students is increasing position. But one significant point is that admission trend of male students in B.A. course is decreasing one, but for female students trend is increasing one. The study also observed*

*Asstt. Professor,*

---

*Dept. of Statistics, Mangaldai College  
E-mail : pranab.das848@gmail.com*

*that the participation of SC/ST students for higher education is very low as compared to other category of the society. As per study, it can be said that the lack of awareness about the benefit of higher education, poor financial condition and other environment of society are the factors affecting the SC/ST students in participation higher education.*

*Keywords : students, gender, caste*

## **INTRODUCTION**

Mangaldai College was established in 1951 at Darrang district. The college is a premier institution of higher education in this district. The college is affiliated to Gauhati University and is recognized under the UGC Registration Act 1950 of section 2F and 12B and is under Provincialised category.

The mission and vision of the college is to revitalize the educational need of the masses in and around the district. Prior to the establishment of the college, attaining higher education was a distant dream. It was through the persistent Endeavour and contribution done by the founder teachers and the senior citizens and youth organization in general resulted in the establishment of the college and it has matured into a college of repute.

The main objective behind this initiative was to impart quality higher education to which the college has tried its level best to fulfill the same right from the very outset. For the study the data was collected pertaining to the trends in admission in B.A and B.Sc. courses at Mangaldai College during the period 2005 to 2014.

## **OBJECTIVE OF THE STUDY**

The survey seeks to fulfill the following objectives:-

- 1) To study the gender wise distribution of students.
- 2) Classification of students according to stream wise.
- 3) To study the cast wise students enrollment trend.
- 4) To identify gender wise choice of stream of the study of students.

## **METHOD OF DATA COLLECTION**

For any statistical enquiry, whether it pertains to business, economic or Social science, the preliminary requirement is to collect data relating to particular characteristic under study.

The investigation was restricted only Mangaldai College. So that the sample data was collected from the Mangaldai College office. Having regard to the fact that the nature of survey was extrusive and extends over a period of 10 years. The best suited technique of enquiry was a secondary data. So that the present study is based



only on secondary data. For collection of data, a questionnaire is prepared and relevant information, e.g. Total number of students, gender wise and cast wise number of students are collected. The nature of data is composed of total number of yearly admission subdivided into male and female categories, further sub-categories include admission taken by students into two stream and different casts.

#### TABULAR AND DIAGRAMATIC REPRESENTATION OF DATA

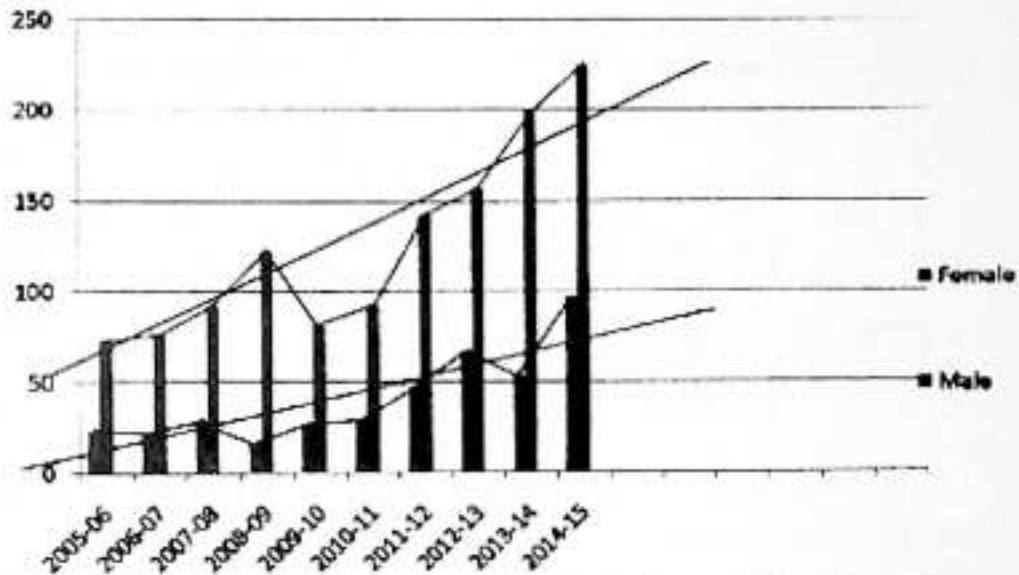
**Table 1 : Gender and Cast wise distribution of Students (Science Stream)**

Year	Gender		Cast				Total
	M	F	Gen.	OBC	ST	SC	
2005	81	27	55	45	4	4	108
2006	76	22	45	40	4	9	98
2007	92	29	78	34	5	4	121
2008	122	16	85	41	2	10	138
2009	81	27	72	29	4	3	108
2010	90	31	75	39	3	4	121
2011	142	47	124	52	4	9	189
2012	157	67	110	86	14	14	224
2013	199	53	140	88	14	10	252
2014	225	98	172	122	16	13	323
Total	1265	417	956	576	70	80	1682

**Table 2 : Gender and Cast wise distribution of Students (Arts Stream)**

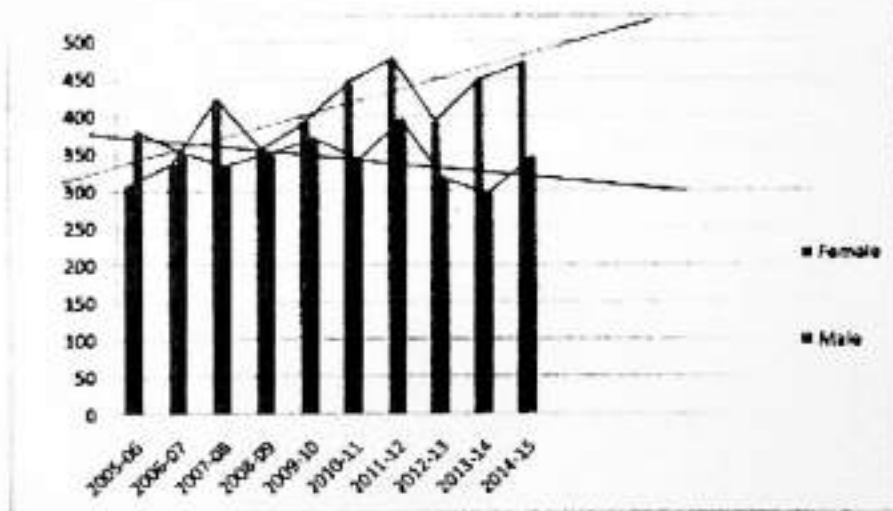
Year	Gender		Cast				Total
	M	F	Gen.	OBC	ST	SC	
2005	437	310	492	191	50	14	747
2006	350	337	386	236	17	48	687
2007	335	422	431	249	26	51	757
2008	348	354	431	200	34	37	702
2009	369	393	375	260	65	62	762
2010	341	444	409	262	56	58	785
2011	395	476	451	285	72	63	871
2012	317	391	336	263	49	60	708
2013	298	448	334	275	63	74	746
2014	343	471	390	271	80	73	814
Total	3533	4046	4035	2492	512	540	7579

**Figure 1 : Gender wise trend of students pursuing B.Sc.**



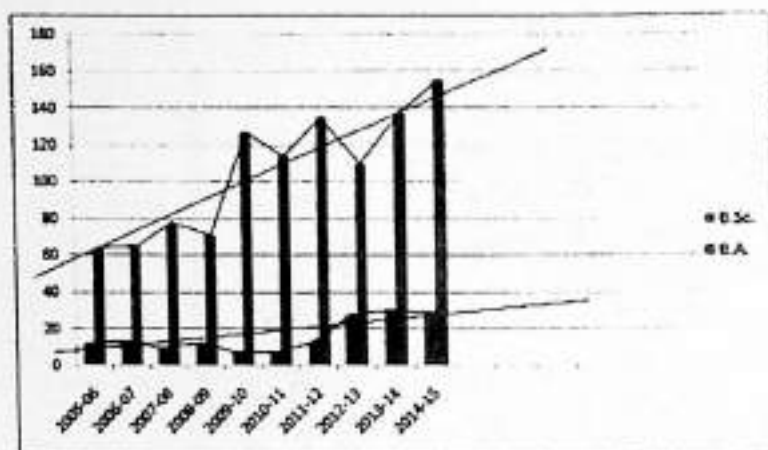
In the diagram (Figure 1) above the trend of male students and female students and female students pursuing B.Sc. is increased gradually.

**Figure 2: Gender wise trend of students pursuing B.A.**



In the diagram (Figure 2) above the trend of male students pursuing B.A. is a declining one as compared to that of female students. Also the trend of female students is in increasing one.

Figure 3: Stream wise distribution of students (SC/ST category)

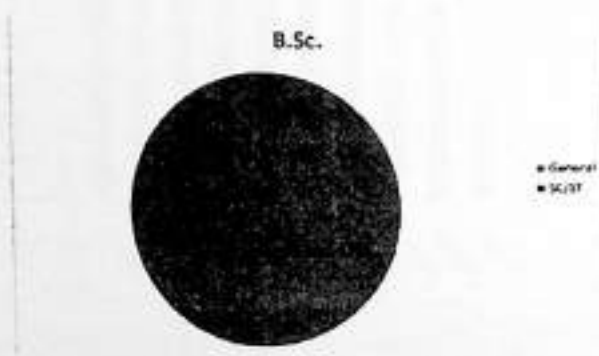


In the diagram (Figure 3) above we have the trend line depicting the rate of admissions taken by the students belonging to the SC/ST category in the B.Sc. & B.A. course.

In the B.A. Course, the trend gradually increased from 2005-06 to 2007-08, then it declined and increased in successive years from 2008-09 to 2012-13 after which it gradually increased till 2014-15. The marginal line shows that the belonging to SC/ST category students is increasing trend.

In the B.Sc. Course the trend gradually declined from 2005-06 to 2010-11 upon which it reached the lowest point. From 2011-12 the trend showed steady increase till 2014-15. The marginal line shows that the belonging SC/ST category students is slight in increasing trend.

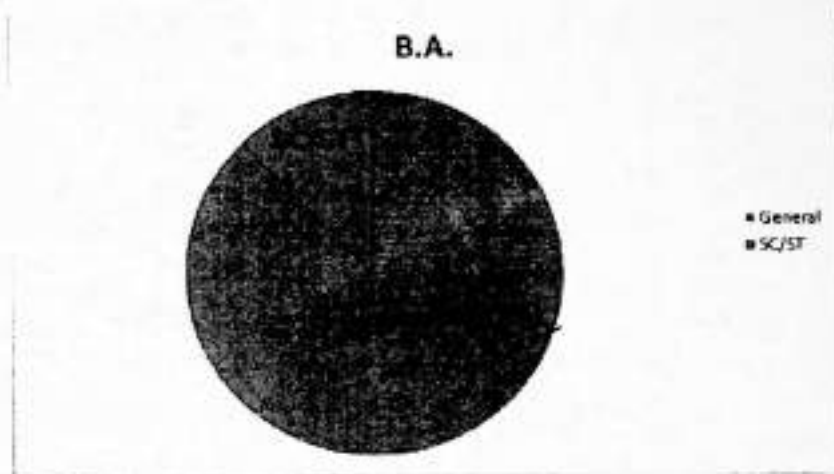
Figure 4: Category wise choice of B.Sc. stream of study



In the B.Sc. Course, 90.26% of all students is constituted by the students belonging to General and OBC caste and the remaining 10.74% is constituted by those belonging to SC/ST

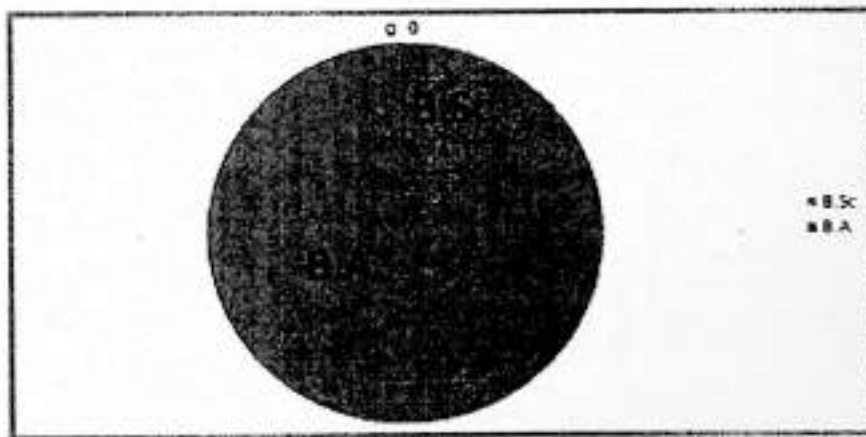
ST caste. This diagram (Figure 4) represents data for the whole decade, from 2005-06 to 2014-15.

Figure 5 Category wise choice of B.A. stream of study

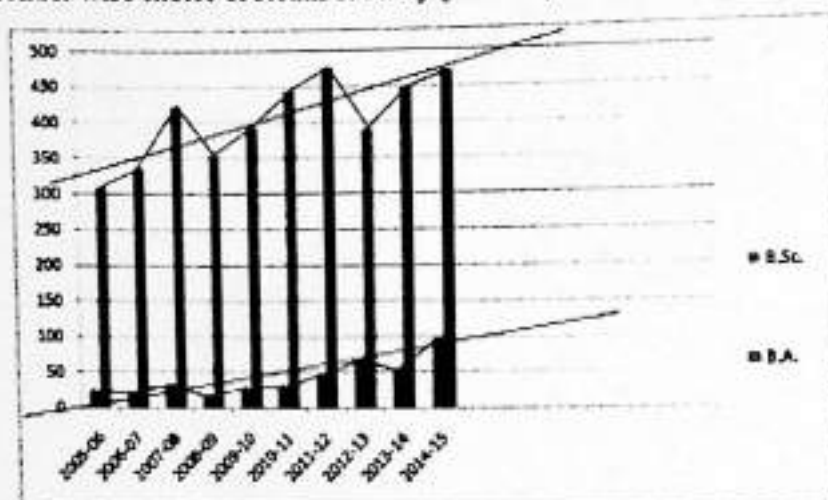


In the B.A. course, the students of General and OBC category constitute 90% of total admissions and the remaining 10% is constituted by the students belonging to SC/ST category. In the diagram above represents the data from 2005-06 to 2014-15.

Figure 6: Stream wise distribution of students (SC/ST Category) during the period from 2005-06 to 2014-15



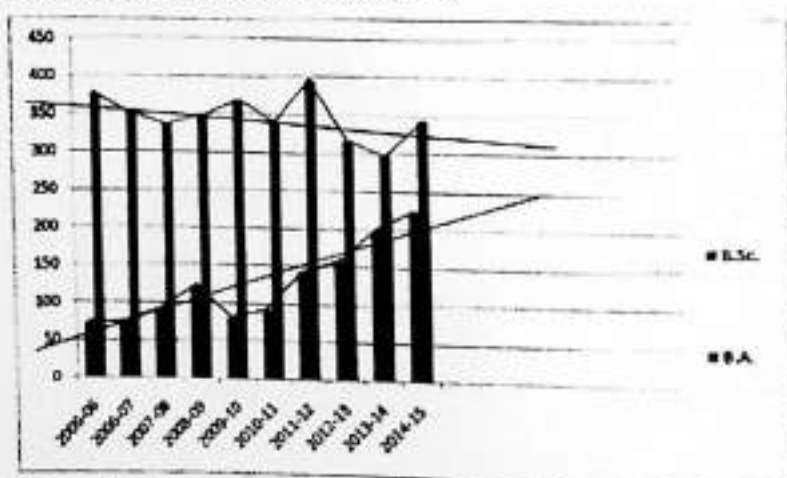
89% of SC/ST students have taken admission in the B.A. course & the remaining 11% have taken admission in the B.Sc. course. The large proportion of students belonging to SC/ST category enrolled in B.A. course as compared to B.Sc. course.

**Figure 7: Gender wise choice of steam of study (Female)**

From the diagram (Figure-7), above we see that the trend of total number of female students taking admissions in the B.A. and B.Sc. course.

In the B.A. course the trend showed gradual increase from 2005-06 to 2007-08. It then declined in 2008-09 but then gradually increased till 2011-12. Again it declined in 2012-13 and then again gradually increased till 2014-15.

In the B.Sc. course, the trend is more or less of gradually increasing nature.

**Figure 8: Gender wise choice of stream of study (Male)**

From the diagram (Figure-8), above we obtain the overall trend of admission of male student in the B.A. and B.Sc. course.

In the B.A. course, the trend is a gradually decreasing one. The trend declined from

2005-06 to 2007-08. It then increased from 2008-09 to 2009-10. The trend finally showed a gradual decline from 2010-11 to 2014-15 with sudden increased trend in 2011-12 and 2014-15 respectively.

In the B.Sc. Course the trend is gradually increased from 2005-06 to 2008-09, then declined in 2009-10 after which it is gradually increased till 2014-15. Overall trend is increasing one.

### APPLICATION OF STATISTICAL TECHNIQUES

**Problem:** To find whether the gender of students influences their choice of stream of study. Construct a contingency table for male and female students according to their stream.

Sex \ Stream	B.Sc.	B.A.	Raw Total
Male	1265	3533	4798
Female	417	4046	4463
Column Total	1682	7579	9261

### HYPOTHESES

Null hypothesis ( $H_0$ ): Gender of student and choice of stream of study are independent.

Alternative hypothesis ( $H_1$ ): Gender of student and choice of study are not independent.

### Analyze sample data

For this analysis we will conduct a chi-square test and taking the level of significance at 0.05. Applying the chi-square test for independence to sample data, we compute the degrees of freedom, the expected frequency counts, and the chi-square test statistic.

$$\therefore \chi^2 = \sum \frac{(O-E)^2}{E} = 450.8$$

O= Observed frequency  
E= Expected frequency

Table value of  $\chi^2$  for 1 d.f. and 5% level of significant= 3.841

Since the calculated value of  $\chi^2$  is greater than the tabulated value. So we reject the null hypothesis and accept the alternative hypothesis. So we conclude that there is significant relationship between the gender of students and their choice of the stream of study.

### FINDINGS

1) The study shows that the total number of students who have taken admission in B.Sc courses during the period extending from 2005-06 to 2014-15 is 1682. Out of this 1265 are male students and rest 416 are female students. Thus 80 % of the male students have enrolled in B.Sc course and the rest 20% students have enrolled in B.Sc. course. That is low percent of female students enrolled in B.Sc course. Also it is increasing

one for both male and female category.

2) The study shows that the total number of students who have taken admission in B.A. course during the period extending from 2005-06 to 2014-15 is 7579. Out of this 3533 are male student and rest 4046 is female students. Thus approximately 49% male students have enrolled in B.A. course and 51% female students have enrolled in B.A. course. From the study it is observed that enrollment trend is decreasing position for male students in B.A. course and it is increasing one for female students.

3) The study shows that the total number of students belonging to SC/ST category who have taken admission during the period extending from 2005-06 to 2014-15 is 1202. Out of this 150 have taken Science stream the rest 1052 have taken Arts stream. Thus approximately 11% students have enrolled in B.Sc. course and 89% students have enrolled in B.A. course. The trend have shown that the rate of SC/ST category students taking admission in B.A. course is gradually increasing one and the trend is also gradually increasing one in B.Sc. course. But it is observed that low percent of SC/ST students have student in B.Sc. course.

4) The chi-square test conducted to find out whether the gender of students influences their choice of stream of study, we have observed that there is significant relationship between gender of students and choice of stream of study.

#### CONCLUSION

It can be said that the enrollment trend in higher education among the students is positive. But one significant point is that admission trend of male students in B.A. course is decreasing one. But for female students trend is increasing one. This study also observed that the participation of SC/ST students for higher education is very low as compared to other section of the society. As per the study, it can be said that the people of SC/ST categories are not much aware about the benefits of higher education. Also poor financial condition and other environment of society are the factors affecting the SC/ST students in participating higher education.

#### References :

1. Hooda. H.K. - *Applied statistics*
2. Gupt. S.P. - *Statistical methods*
3. Gupta S.C. - *Fundamental of Mathematical statistics.*



# Carbon Sequestration by Aquatic Macrophytes in Wetlands of Lower Assam

Gunajit Kalita & Sahabuddin Ahmed

## Abstract

*Wetlands are among the most dynamic, productive and fragile ecosystem which provides valuable and sustainable benefits to the local communities. There are 3512 wetlands covering a total area of 101231 hectares in Assam. There are over 250 plant species reported from wetlands of Assam. These aquatic macrophytes are highly productive and has the potential to sequest atmospheric CO<sub>2</sub>. Five representative wetlands of lower Assam were selected for investigation. The macrophytic plant species present in those wetlands were recorded and investigated for productivity and rate of CO<sub>2</sub> sequestration throughout the year.*

*Keywords: Assam, macrophytes, sequestration, wetland.*

## INTRODUCTION

The wetlands of Lower Assam extending between 26.830431°N latitudes and 91.411608°E longitudes were considered for investigation. Carbon sequestration is the capture of excess carbon dioxide from the atmosphere Carbon dioxide sequestration is

---

Assistant professor, Department of Botany, Nalbari College

E-mail: gunajit\_kal@rediffmail.com

Assistant professor, Department of Botany, Mangaldai College

E-mail: dr.sahab1970@gmail.com



the term given for locking up CO<sub>2</sub> somewhere other than the atmosphere, it may also be called carbon sequestration because the carbon dioxide may be broken down into its component parts, and the carbon stored away while the oxygen is released to the atmosphere. Terrestrial carbon sequestration is the process through which carbon dioxide (CO<sub>2</sub>) from the atmosphere is absorbed by trees, plants and crops through photosynthesis, and stored as carbon in biomass (tree trunks, branches, foliage and roots) and soils. The term "sinks" is also used to refer to forests, croplands, and grazing lands, and their ability to sequester carbon. Carbon (C) is continuously removed from the atmosphere by forest ecosystem processes and stored both in vegetation and soils (e.g. McGuire *et al.* 2001). If C stocks of ecosystems increase, the C content of the atmosphere is reduced. On the other hand, if the C stocks in ecosystems were to reduce, the increase rate of carbon dioxide (CO<sub>2</sub>) in the atmosphere would be much faster than currently observed (Reich 2011). Therefore, global forests are very diverse and provide a range of ecosystem services such as C sequestration, flood and landslide protection, biodiversity preservations, aesthetic and health benefits (Pan *et al.* 2013) Agriculture and forestry activities can also release CO<sub>2</sub> to the atmosphere. Therefore, a carbon sink occurs when carbon sequestration is greater than carbon releases over some time period. There are two kinds of sequestration, biological and geological. In biological sequestration, carbon is naturally sequestered in plants, soils, and in ocean life. Geological sequestration is the storage of carbon dioxide directly in rocks or underwater. If all this sounds far-fetched, consider that until recently huge amounts of carbon were safely sequestered in underground hydrocarbons such as coal, oil and natural gas, and of course climate change is a result of humans undoing this process. Carbon sequestration (or re-sequestration) will probably be a useful tool in reducing climate change, but it must not be looked at as an alternative to other measures. Sequestration alone can't solve this problem. In 2004, the CEO of Royal Dutch Shell Ron Oxburgh told the Guardian newspaper that "no one can be comfortable at the prospect of continuing to pump out the amounts of carbon dioxide that we are at present." His answer to the problem? Carbon sequestration. Oxburgh went on to say that "sequestration is difficult, but if we don't have sequestration then I see very little hope for the world. I don't see any other approach."

What Oxburgh and many others are suggesting is that carbon dioxide (CO<sub>2</sub>) released from burning fossil fuels (usually at large point sources such as power plants) be pumped underground, or underwater, in areas where it is likely to remain stored for millennia. Candidate areas include depleted oil and gas reservoirs, saline formations (layers of porous rock that are saturated with brine), and deep in the ocean. The most promising areas are depleted reservoirs that once held oil and gas securely for millions

of years. It is believed that these areas will be able to safely contain carbon dioxide for very long time periods, as they once held hydrocarbons. This still needs to be tested, and a number of pilot projects are injecting carbon dioxide into abandoned wells and monitoring the results. To date, this type of sequestration looks promising. Saline formations are less well understood, but more widespread than oil and gas reservoirs. Using saline formations to sequester CO<sub>2</sub> would mean less piping of the gas over long distances, but it isn't known whether it would be contained for the very long term. The other potential long-term storage place for CO<sub>2</sub> is deep in the ocean. If it were deep enough in the ocean, carbon dioxide would actually turn into a liquid that sinks beneath the water. The technological challenge of doing this on a large scale might rule it out, and there is a problem of ocean acidification when carbon dioxide is dissolved in water, though this is likely to be a greater problem if it is dissolved in sea water at shallower depths vs. as a liquid in deep water. No matter how it is done, injecting CO<sub>2</sub> into the ocean could have complicated and unpredictable effects. Carbon is also stored in forests, soils, bogs, in ocean ecosystems, among other places. In many cases we are undermining carbon storage rather than enhancing it, by degrading soils, cutting down forests, polluting and acidifying the ocean, etc. Other than the important task of trying to minimize the damage to ecosystems, there are a few promising ways we might try to enhance nature's ability to trap carbon dioxide. Wetland vegetation removes CO<sub>2</sub> from the atmosphere and stores it in above and below ground tissues. When this vegetation dies, the saturated conditions typical of wetland soils create an anaerobic environment in which organic matter decomposition proceeds at a relatively slow rate, thus promoting a buildup of carbon in the soil. Through the ongoing processes of carbon accumulation and subsequent burial, naturally-occurring wetlands hold massive soil carbon stores, representing the largest component of the earth's terrestrial biological carbon pool, although they occupy less than 8 percent of the earth's surface (Mitsch and Gosselink, 2007). The U.S. Geological Survey (USGS) has documented significant quantities of carbon capture by wetlands constructed along the Sacramento-San Joaquin River Delta in a pilot "carbon farming" project (USGS, 2009). Though not specific to stormwater wetlands, carbon sequestration rates by created and restored wetland systems have ranged from 2.7 to 4.5 tons acre<sup>-1</sup> year<sup>-1</sup> (Anderson and Mitsch, 2006; Euliss et al., 2006). Other authors have noted that the carbon accumulation capacity of constructed wetlands can be high, particularly as the vegetation is establishing (Mitsch and Gosselink, 2007). Nutrient and sediment loads delivered to stormwater wetlands in urban runoff may also serve to promote carbon sequestration. Nutrients promote the growth of a productive, carbon-capturing plant community while potentially limiting methane production by encouraging the growth of denitrifying bacteria over methanogenic bacteria (Stadmark and Leonardson, 2005). Sediment deposition accelerates the burial of carbon sequestered in wetland soils while presenting the opportunity to capture carbon present in

sediments washed from the landscape (McCarty et al., 2008).

### OBJECTIVE OF THE STUDY

Global warming is a hot topic internationally, climate change is happening throughout the world due to global warming. Countries around the world are alarmed at climate change. Global warming brought about climate change which results in desertification, floods, acid rain etc. It effects the economy of the countries. Major contributors of green house gases are  $\text{CO}_2$ ,  $\text{CO}$  etc. Plants are natural carbon sequester and aquatic macrophytes are good carbon sequester. Assam has lots of water bodies where great diversity of aquatic macrophytes exists. The objective of the study is to identify the potential of aquatic macrophytes in mitigating the  $\text{CO}_2$  from the atmosphere.

### METHODOLOGY

Five representative wetlands of lower Assam were selected for investigation. The primary productivity of aquatic macrophytes were determined in those wetlands. Several field trips were made to gather all the relevant data and the macrophytes growing in those wetlands throughout the year (summer and winter) were collected for two years.

The estimation of biomass were done by following the harvest method of Odum (1971). Quadrats were used for collecting macrophytes as employed by Mishra (1968). Productivity study gave the amount of carbon fixed in those wetlands. Biomass analysis of macrophytes were done manually by separating and recording their numbers and then dried in oven at  $60^\circ\text{C}$  for 48 hours till constant weights are recorded. Chemical analysis were done to estimate carbon stock and mineral content in the form of ash.

Total carbohydrates were estimated by Anthrone method outline by Clegg (1956). 100mg of dry powdered sample were digested with 2.5 N HCl for 3 hours in a boiling water bath. Thereafter, the digest were neutralized with solid  $\text{Na}_2\text{CO}_3$  and then centrifuged to obtain the supernatant. The residue was extracted with distilled  $\text{H}_2\text{O}$  two more times and the supernatants were pooled. The volume was adjusted to 100ml. 0.4ml of extract were taken out and diluted to a total volume of 1.5ml, to which 6.0ml Anthrone reagent were added. Absorbance for the resultant green coloured solution was taken at 630nm. Distilled  $\text{H}_2\text{O}$  treated with Anthrone reagent were used as a blank. From the absorbance value, total carbohydrate were deduced from the standard curve prepared by using glucose as standard

### RESULTS AND DISCUSSION

The results shows that the productivity is maximum during summer months while it

decreases during winter months. This is due to absence of rainfall and shrinkage of wetlands during winter months. The wetlands shows great fluctuations in its size, during monsoon it swells and inundates large areas while during winter it gradually shrinks and confine to a central core area with a depth of about three meters. The rate of productivity increases with rainfall during the summer season and shows gradual decline as the monsoon retreats. The water plays an important role in the productivity of wetlands. The rate of energy transformation by phytoplankton is comparatively lower than macrophytes (Jhingran and Pathak, 1987).

Extensive investigation covering the summer and winter seasons in the wetlands for macrophytic productivity for a period of two years 2010, 2011 revealed biomass ranging between 154.6 gm/m<sup>2</sup> in Dora beel and 206.4 gm/m<sup>2</sup> in Deepor beel during summer months and 45.2 gm/m<sup>2</sup> in Dora beel and 68.4 gm/m<sup>2</sup> in Deepor beel during winter months.

The maximum proliferation of macrophytes occurs during the rainy season (June to September) across the study sites and hence maximum biomass was observed in summer (August). These wetlands are very luxuriant and shows species richness and due to its vast expanse and round the year availability of water, forms an ideal habitat for aquatic vegetation. Macrophytes like *Alpinia galanga*, *Eichhornia crassipes*, *Ceratophyllum demersum*, *C tuberculatum*, *Euryale ferox*, *Hydrophyllum canadense*, *Hydrostachys triaxalis*, *Hymenachne assamica*, *H acutigluma*, *Hydrilla verticillata*, *Hygroryza aristata*, *Ludwigia adscendens*, *Ottelia alismoides*, *Myriophyllum tuberculatum*, *Nymphaea nouchali*, *N rubra*, *Potamogeton indicus*, *Pistia stratiotes*, *Spirodella polyrrhiza*, *Trapa bispinosa*, *T natans*, *Vallisneria spiralis*, *Wahlenbergia gracilis*, *Cyclosorus gongyloides*, are the dominant species in all the five studied wetlands. Seasonal variation in primary production follows almost identical pattern in all the five wetlands studied. The plant species showed maximum growth during the summer season and thus increase in biomass, while minimum biomass was observed during winter due to less number of species and also species producing low biomass. During rainy season, water flows into the study sites carrying with them various organic debris, soil particles and salts. The freshwater of wetlands are rich in dissolved oxygen and carbondioxide. These influx of nutrients enriched water from river and the catchments areas during high floods may results in increased photosynthetic production during the summer seasons in all the study sites.

On the other hand due to decrease in water level during winter (December to February) many aquatic plants are exposed to less light intensity together with reduced temperature, results in less photosynthetic production. During this period many high biomass yielding summer species either do not grow or show scanty growth. Comparatively, in all the wetlands, the winter species are of less vigour and growth thereby producing less biomass.

Carbon dioxide sequestration is the term given for locking up Co<sub>2</sub> somewhere other

than the atmosphere, it may also be called carbon sequestration because the carbon dioxide may be broken down into its component parts, and the carbon stored away while the oxygen is released to the atmosphere. There are two kinds of sequestration, biological and geological. In biological sequestration, carbon is naturally sequestered in plants, soils, and in ocean life. Geological sequestration is the storage of carbon dioxide directly in rocks or underwater. If all this sounds far-fetched, consider that until recently huge amounts of carbon were safely sequestered in underground hydrocarbons such as coal, oil and natural gas, and of course climate change is a result of humans undoing this process. Carbon sequestration (or re-sequestration) will probably be a useful tool in reducing climate change, but it must not be looked at as an alternative to other measures. Sequestration alone can't solve this problem.

### CONCLUSION

The present study has shown that aquatic macrophytes were very efficient carbon sequester and plays a very important in the mitigation of atmospheric  $\text{CO}_2$ . The study showed that the rate of  $\text{CO}_2$  sequestration is not uniform throughout the year, it were related with the productivity. It was observed that  $\text{CO}_2$  sequestration were highest during the active vegetative growth phase of the aquatic macrophytes. Since aquatic macrophytes grows very luxuriantly during rainy season, they trap good amount of atmospheric carbon dioxide and undergo active photosynthesis which results in high primary productivity during the summer and rainy season. On the other hand during winter and dry season the rate of photosynthesis slows down which results in low productivity and thus less amount of  $\text{CO}_2$  sequestration.

The foremost achievement of the present study was that there is no work done in aquatic macrophytic  $\text{CO}_2$  sequestration from this region, as such no data or any kind of research information is available. This may be the pioneering work in the field of aquatic macrophytic  $\text{CO}_2$  sequestration in the wetlands of Assam which will pave the way for future research in this field.

### References :

1. Adams, D., R. Alig, B. McCarl, J. Callaway, and S. Winnett. 1999. Minimum Cost Strategies for Sequestering Carbon in Forests. *Land Economics* 75(3): 360-374.
2. Altor, A. E. and W. J. Mitsch. 2008. Pulsing hydrology, methane emissions and carbon dioxide fluxes in created marshes: a 2-year ecosystem study. *Wetlands* 28(2): 423-438.
3. Anderson, C. J. and W. J. Mitsch. 2006. Sediment, carbon, and nutrient accumulation at two 10-year-old created riverine marshes. *Wetlands* 26: 779-792.
4. A.O.A.C. (1965). In: *Official Methods of Analysis*, 9<sup>th</sup> ed. Association of Official Analytical Chemists, Washington D.C.
5. A.O.A.C. (1970). In: *Official Methods of Analysis*, 10<sup>th</sup> ed. Association of Official Analytical Chemists, Washington D.C.
6. Batjes, N. H. 1996. Total carbon and nitrogen in the soils of world. *European Journal of*

*Soil Science* 47:151-163.

7. Batzer, D. P. and R. R. Sharitz. 2006. *Ecology of Fresh-water and Estuarine Wetlands*, London, England: University of California Press, Ltd.

8. Bolund, P. and S. Hunhammar. 1999. *Ecosystem services in urban areas*, *Ecological Economics* 29(2): 293-301.

9. Chhabra, A., S. Palria & V. K. Dadhwal. 2003. *Soil organic carbon pool in Indian forests*, *Forest Ecology & Management* 173: 187-199.

10. Gupta, R.K and Rao, D.L.N.: 1994. *Potential of Wasteland for Sequestering Carbon by Reforestation*. *Current Science*. 66, 378-380.

11. Intergovernmental Panel on Climate Change, 2000. *Land Use, Land-Use Change, and Forestry: A Special Report of the IPCC*, Cambridge University Press, Cambridge, UK.

12. Intergovernmental Panel on Climate Change, 2001. *Climate Change 2001: Mitigation*, Cambridge University Press, Cambridge, UK.

13. Lal, R. 2004a. *Soil carbon sequestration impacts on global climate change and food security*. *Science* 304: 1623-1627.

14. Lal, R. 2008. *Carbon sequestration*. *Philosophical Transactions of the Royal Society B: Biological Sciences* 363: 815-830.

15. Schrag, D.P. 2007. *Preparing to capture carbon*. *Science* 315, 812-813.

16. Pacala, S.W. 2001. *Consistent land and atmosphere based U.S. carbon sink estimates*. *Science* 292, 2316-2320.



# Women Empowerment– Its Relevance and Future Concerns in Respect of India with Special Reference to Assam

Usha Rani Deka

## Abstract

*Women's role and relationships have changed and are changing but there is still a gap between her legal, political and economic rights and privileges she enjoys and utilises. Society's attitude in general has not changed significantly towards women's role and status. Even today, in Indian society the women in general are found to be lagging behind their male counterpart. They are traditionally branded as the weaker sex. In the developing and under developed countries of the world, more particularly this gender disparity stands as a great stumbling block to social progress. The present paper has made a minor attempt to study how the society's attitude regarding the gender role has adversely affected the process of socioeconomic development in India.*

*Key words: Empowerment, Status, Disparity, National Prosperity.*

## INTRODUCTION

Assam is situated between the parallels of 24°88'3" and 27°10'3" North longitude and 89°42'3" and 96°10'3" East latitude. Assam is bounded by Bhutan and Arunachal in the north; Nagaland and Manipur in the east; Bangladesh, Meghalaya, Tripura and Mizoram in the south; West-Bangal in the west. The land of Assam consists of valleys and hills and mighty rivers like the Brahmaputra and Barak. Assam has a geographical area of 78, 438 square kilometer stands about 3,12,05,576 people comprising of 1,59,39,443 males and 1,52,66,133 females (2011 census). The literacy rate stands at 73.18% (approximate whereas Male Literacy rate stands at 78.18% and Female literacy rate stands at 67.27%.) The Sex ratio stands at 958 female against 1000 male.

'Empowerment' refers to increasing the spiritual, political, social or economic

strength of individuals and communities. It often involves the empowered developing confidence in their own capacities. However, empowerment is probably the totality of the following or similar capabilities –

Having decision making power of their own.

Having access to information and resources for taking proper decision.

Having a range of options from which they can make choices.

Ability to exercise assertiveness in collective decision making. Having positive thinking on the ability to make change.

Ability to learn skills for improving one's personal or group power.

Ability to change other's perceptions by democratic means.

Involving in the growth process and changes that is never ending and self initiated.

Increasing one's positive self-image and overcoming stigma.

### **RATIONAL OF THE STUDY**

Women's empowerment at present is a vital area of social reform, so far as disparity between men and women are concerned. However, the term 'women empowerment' may be defined as the redistribution of social power and control of resources in favour of women. This definition implies giving social power equally to men and women and control of economic resources of the country in favour of women for their development. Because these two socio-economic situations may give effect to making them more powerful.

Women's empowerment essentially implies making them economically self-sufficient and self dependant also. Because women must turn to be economically responsible and productive member of the family. Thus, they must actively participate in the national productivity. Economic independence can make them truly empowered in the family as well as in the society.

But it is interesting to note that though women's role and relationships have changed and are changing but there is still a gap between her legal, political and economics rights and privileges she enjoys and utilities. Society's attitude in general has not changed significantly towards women's role and status. Even today, in Indian society the women in general are found to be lagging behind their male counterpart. In the developing and under developed countries of the world, more particularly this gender disparity stands as a great stumbling block to social progress. Thus, in our country this attitude has adversely affected the socio-economic development in very many ways. So, an attempt has been made to study about the relevance and future concerns relating to women empowerment in India with special reference to Assam.

### **OBJECTIVES**

1. To study about the discrimination between men and women.



2. To examine the nature of women empowerment at the local and national level as far as possible.

3. To give some possible measures to enrich the status of women.

### METHODOLOGY

It is an analytical study. So the investigator has followed the descriptive method and based on Secondary Sources like newspaper, journal, books, internet source etc.

### DISCUSSION AND ANALYSIS

It is an analytical study. So, the discussion and analysis of the present study has been made with the following tables:

TABLE NO. I  
Sex Ratio of India (1961-2011)

Census year	Sex Ratio
1961	941
1971	930
1981	934
1991	927
2001	933
2011	940
2011	Child sex ratio (0-6 years) 918

Sex ratio : Females per 1000 males

Figure No.1

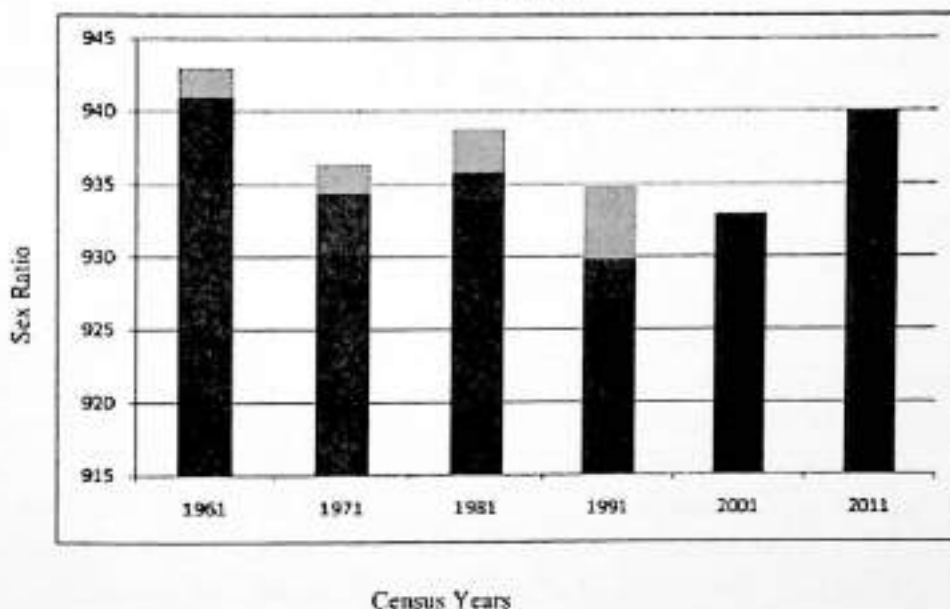


TABLE NO.2  
Indian States by Sex Ratio (2011 census report)

State/Union territory	Sex-Ratio (2011) Females per 1000 Male
Kerala	1,084
Tamil Nadu	996
Andhra Pradesh	993
Chhattisgarh	991
Manipur	992
Meghalaya	989
Orissa	979
Mizoram	976
Himachal Pradesh	972
Karnataka	973
Goa	973
Uttarakhand	963
Tripura	960
Assam	958
Jharkhand	948
West Bengal	950
Nagaland	931
Madhya Pradesh	931
Rajasthan	928
Maharashtra	929
Arunachal Pradesh	938
Gujarat	919
Uttar Pradesh	912
Punjab	895
Sikkim	890
Jammu and Kashmir	889
Bihar	918
Haryana	877
U.T.	
Pondicherry	1037
Lakshadweep	946
Andaman and Nicobar Islands	876
Delhi (National Capital Territory)	868
Chandigarh	818
Dadra and Nagar Haveli	774
Daman and Diu	618

**Total Sex Ratio of India (2011) - 940 female for every 1000 male**

**Rural Sex Ratio of India - 947**

**Urban Sex ratio of India - 926**

**Current sex ratio in India (yearly) :**

Year	Sex ratio (Female per 1000 Male)
2012	940
2013	941
2014	942
2015	943

From the Table No.1 and the Table No.2 shown above, it is evident that Indian sex ratio has shown major signs of improvement in the last 10 years. From a small number of 933 in 2001, the bar has been raised to 940 in the 2011 census of India. Although this improvement is fair enough in a developing economy, but still there is a long way to go. Because India suffers from a huge inequality of Male-female child ratio resulting in a poor sex ratio in some regions. With a overall improvement in sex ratio, the states of South India has shown major signs of improvement in comparison to the states of Northern India like Haryana (877) and Punjab (895), where sex ratio is far low than the National average figure (940). The improvement of sex ratio indicates a healthy growth rate among female to male population in India. The state of Kerala and Union Territory of Pondicherry are only two places in India where sex ratio is above 1000 or exceeds female to male ratio. Another three states which has shown a major signs of improvement in their sex ratio are Assam, Mizoram and Nagaland. Densely populated states of Andhra Pradesh, West Bengal, Punjab, Uttar Pradesh and Sikkim have also shown improvement in female to male ratio. According to the census report of 2011, all these states have taken necessary measures to improve sex ratio in Urban and Rural areas. Delhi and Chandigarh have also registered to sharp growth in sex ratio between 2001 to 2011 census. On the other hand, the states of Jammu and Kashmir and Haryana have shown no positive signs of overall improvement in their sex ratio. In fact, these two states have registered a decline in their sex ratio.

Besides, the table no. 1 makes it clear that although the overall sex ratio of India has been gradually increased, the child sex ratio (918) is declined in the most crucial age group of 0-6 years which is a matter of much concern. The very same declining trend got reflected in most of the states, even in the states like Punjab and Haryana which are economically more progressive states. This clearly points to the fact that economic growth may not necessarily bring about improvement in the status of women.

### MAJOR FINDINGS OF THE STUDY

1) Kerala with 1,084 female for every 1000 males has the highest sex ratio according to the Census report of 2011, which stands in the first rank in the literacy with 94% also; whereas Haryana shown the lowest sex ratio with 877 which is one of the economically progressive states of India.

2) With a overall improvement in sex ratio, the states of South India has shown major signs of improvement in comparison to states of Haryana and Punjab, where sex ratio is Far lower than national average figure (940).

3) In Union Territories of India, Puducherry has the highest female sex ratio (1,037), while Daman and Diu has the lowest female sex ratio (618).

4) The entire North-East India shown a good sign of improvement in respect of female sex ratio.

5) In respect of Assam though the sex ratio is comparatively a healthy figure (958), yet women are still considered powerless in the educational, economical, political and in socio-cultural fields. Social attitudes and values are still not congenial for consideration of them as equal partners with their male counterparts. It is observed that still now child labour, negligence to girl child, poor health and poor nutritional status in respect of women and girl, early marriage etc. are practiced. Above all, it is a matter of much concern that witch hunting is frequently practiced among some of the backward communities of Assam specially among the Tea-garden community and some of the Tribal Communities as a result of social superstitions and prejudices. Besides, dowry system, Purdah Pratha, Polygamy system make the education of the women unnecessary, insignificant and redundant.

6) According to the census report of India (2011), the child sex ratio (0-6 years) in India is one of the poorest figures recorded at 918 girls for every 1000 boys.

7) Rural sex ratio (947) is found to be higher than the Urban sex ratio (926).

8) A common belief in Indian society is dominated by preference for a male child, thus leading to a decline in sex ratio in various states across the nation.

9) In most of the cases it is found that economical and educational growth may not necessarily bring about improvement in the status of women. This could be attributed mainly to the discrimination that the girl child faces and the consequential problems of poor health and nutritional status. Adding to these are the problems of female feticide and female infanticide practiced and now increasing in the country. Poverty of the parents and Dowry System is interrelated in most of the cases.

### CONCLUSION

After independence, a large number of Committees and Reports have been constituted specially in order to enrich the status of women in India. Some of them are like -

the Reports of the Committee on Status of Women (CSWT) 'Towards Equality' constituted under the chairmanship of Dr. Phulrenu Guha in 1974, National Committee on Women's Education (1958-59) under the chairmanship of Smt. Durgabai Desmukh, National Perspective Plan for Women (1988-2000), National Policy for the Empowerment of Women 2001, Dowry Prohibition Act 1961, Domestic Violence Act, 2005, The Prohibition of Child Marriage Act, 2006 etc. These Reports and Committees has been analyzed extensively regarding the status of women in India. The impact of various developmental policies, plans and programmes put into action during the last few decades have brought forth and perceptible improvement in the socio-economic status of women in the country. But, there is still exists a wide gap between the goals enunciated in the constitution, legislation policies, plans, programmes and related mechanisms on the one hand and the situational reality of the status of women in India on the other hand.

Even, after the attainment of 69 years of independency by our country, gender disparity manifests itself in various forms, the most obvious being the trend of continuously declining female ratio in the population in the last few decades. Social stereotyping and violence at the domestic and societal levels are some of the other manifestations. Still now discrimination against girl children, adolescent girls and women persists in many parts of our country. Therefore, it may be concluded that unless and until the traditional attitudes, thoughts and beliefs towards the status and role of women have been changed, women empowerment will be remained as a cherished dream in our society.

### **SUGGESTIONS**

Some measures may be suggested for improving the present status of women in our society as –

- a) Creating an environment through positive economic and social policies for full development of women to enable them to realize their full potential.
- b) Equal access to participation and decision making of women in social, political and economical life.
- c) Strengthening legal systems aimed at elimination of all forms of discrimination against women.
- d) Changing societal attitudes and community practices by active participation and involvement of both men and women.
- e) Proper initiatives should be taken by the Govt. for empowering women in different fields of our society.

### **References :**

1. Aggarwal J.C. – *Development and Planning of Modern Education* – Vikas Publishing House Pvt. Ltd.

2. *Abhivyakti – Annual Journal, Vol. II, 2014, Women cell, ACTA, Assam.*
3. *Bhatia K. K. – An easy Approach to Education, 2011, 1<sup>st</sup> Edition, Kalyani Publishers.*
4. *Borua Jatin – An Introduction to Education (Part II), LBS Publications*
5. *www.importantindia.com*
6. *women's empowerment- Wikipedia, the free encyclopedia.*



## **Challenges of Higher Education in Assam For Development of Human Resource**

**Umesh Ch. Sarma**

### **Abstract**

*Achievement of sustained and equitable human development is an urgent need and a challenge before the present Indian society. Through there have been considerable progress in all walks of life over the last few decades, large section of people in India still live below the line of poverty. These people have in adequate access to education health care facilities and other economic resources. Any amend to such condition necessitate urgent development of human resources in our country. The role of higher education in the development of human resources can be never be disputed. However, higher education in India in general and in Assam in particular, has not been able to perform its optimize role in the direction of Human Resources Development. This paper aims to highlight the perceptible challenges of higher education in Assam in the way of developing human resources in the state.*

**Key Words :** *Higher education, Human resource Development*

### **INTRODUCTION**

Human Resource Development (HRD) in the process of helping people to achieve their individual and social goals by realizing their potential. It is the process that aims at developing competency among people and creating such condition as favorable Govt. Policies, programs or intervention etc. Where people can apply these competences for the benefit of all. According to the United Nation Development Program (UNDP), the process of HRD include the policies and programs that support and sustain equitable

---

*Asst. Prof. Dept. of Economics, Mangaldai College*  
*E-mail : umeshsarma76@gmail.com*

opportunities for containing acquisition and application of skill, knowledge and competences which promote individual autonomy and the mutually, bifacial to individuals the community and the larger environment of which they are a part (UNDP). Because for programmed policy and Evaluation BPPE, 1991, (P-19). Thus the concept of HRD includes the process of development of people including their physical, intellectual emotional, social, moral, political, economic, spiritual and all other forms of development. The focus of HRD initiative is not only on the development of individuals but also on developing the group or the society. It aims at developing the group to function better and acquire new competencies of socio economic activities. As an integrated approach, HRD aims at developing all people and is not limited to a particular group or section of the society. Although the development of human resources is important for all section of people, it is particularly important for all uneducated unemployed underprivileged and socio economically backward section of the society.

### **OBJECTIVE**

The present paper is designed to fulfill the following objectives.

1. To have over view of the profile of development of human resources in Assam with the challenges of higher education and improve the quality of life of the people.
2. To identify the difficulties suffered by the people of Assam regarding poverty unemployment, income inequalities etc.
3. To find out the suitable solutions to overcome these problems to enhance quality in education regarding development of human resources.

### **METHODOLOGY**

The study is based on secondary data collected from reputed articles or Research Journals, books, prominent sites relevant of higher education, magazines etc. It is also from the Economic survey of India.

### **IMPORTANCE OF HUMAN RESOURCE DEVELOPMENT**

Achievement of sustained and equitable human development is an urgent need as well as an enormous challenge before the present Indian society. Through there have been considerable programs in all walks of life over the last few decades, large section of people in India still live below the line of poverty (37.2 for India and 34.4 for Assam as per sources of planning Commission of India) These people have in adequate access to education, health care facilities and other economic resources that are essential for proper development and improvement of the conditions of their live. Any amend to such conditions necessitate urgent development of human resources in our country. Developed nation of the world have demonstrated how investment made in developing human resources meet such challenges and improve the quality of life of the people. The challenges of poverty and unemployment of our country must be addressed by



developing human capabilities for socio-economic development. As the same time it also requires to be seen that the fruits of development reach all through an equitable distribution of resources, opportunity and benefits

### **Role of Higher Education**

The role of higher education in the development of human resources for national development can never be disputed. Higher education can produce high level, professionals, technical and managerial personal generated new knowledge through research and impart such knowledge leading to development of human resources. In a world economy characterized by incredible technological advancement and cutting edge knowledge development, only higher education institution can provide high level of competency for problem, identification and solution for competitive development of manpower of country. Recognizing the crucial role of higher education in the development of human resources, way back in 1966 the Kathari Commission (1964-66) noted that "One the development of our human resources and in this there can be no limit to the education to be provided." In the view of Kothari Commission all educational effects should be directed towards the development of human resources. On a similar note the national Policy of Education (NEP-1986) also stated that, "Education develops manpower for different levels of the economy. It is also the substrate on which research and development flourish, being the ultimate guarantee of national self reliance. In sum, Education is a unique investment in the present and the future. This cardinal principle is the key to the National Policy on Education. The policy farther stated that, "Higher Education provides people with an opportunity to reflect on the critical social, economic, cultura, moral and spiritual issues facing humanity. It contributes to National Development through dissemination of specialized knowledge and skills. It is therefore a crucial factor for survival." Movement of our economy from industrial to service and then to knowledge one and the recent international development like opening up of markets for global players, market oriented of economics, increased completion between nations requires that developing countries develop their human resources refusing in them qualities like innovation, productivity, collaboration, teamwork's reflection, adjustment to change multiplicity of reactions and readiness to face the challenges of a globally competitive market oriented and knowledge society. Development of such skill is required by one and all of the members of the present society belonging to all wolks of life to shoulder their responsibilities properly. Higher education plays key role in this regard. However higher education institution in India in general and in Assam in particular, have not been able to perform its optimize role in the direction of human Resource Development.

### **Status of Human Development in Assam**

According to the Indian Human Development Report (2011) prepared by planning Commission of India, Assam is one of the more economically backward states in India and have recorded low net state Domestic Product (NSDP) and per capita NSDP growth rates in last decade, that were below the corresponding growth rates for the country. The human Development Index (HDI) for Assam was 0.444 against all India index of 0.467 in 2007-08 placing Assam at 16<sup>th</sup> position among all the states of India. In terms of literacy rates, Assam stands at 19<sup>th</sup> position in India with a literacy rate of 43.2% which is below the national literacy rates of 74.04% and against 93.9% in Kerela and 91.6% Mizoram as per the census of 2011. Gross Enrolment Ratio (GER) in Higher Education in Assam is 8.8% which is below the national rate of 10.8% (against world average of 26% and USA at the top with 83%) and Nagaland topping the national list with a GER of 19% and Kerela closely following with a GER of 18.5% (UGC) Report on Higher Education in India, 2008.

### **The Challenges before Higher Education in Assam**

Although Higher Education has gradually expanded in Assam since independence, issues involving access, equity and quality still confine to present challenge that need to be addressed. Imported among the challenge are :

#### **The Problem of Access to Higher Education**

As per UGC Report on Higher Education in India 2008, the Gross Enrolment Ratio (GER) in Higher Education in Assam is 8.8% which is below the national rate of 10.8%. The report also reveals that the availability of colleges (which is measured by the college population index, CPI, i.e. member of colleges per lakh population in the age group of 18-23) of general education in Assam is 9.5 against national average of 8.1%. However in case of professional colleges it is 1.9%, for agricultural and veterinary colleges it is 0.2% for technical colleges it is 0.1%, for Medical colleges it is 0.2%. For Women College it is 2% and for other colleges it is 0.1%. As a whole the CPI index in Assam is 10.8 against the national average of 12.4%. These figure indicate the great challenge of widening the access of higher educational in general and technical and professional education in particular in Assam.

#### **The Problem if inequality**

Besides the low GER for overall population of Assam, large variation exists among the various categories of population like male-female, rural-urban and SC/ST and the General categories. Due to urban Centric and uneven distribution of institutions of higher education, it is not equally available to all in the state.

#### **The Problem of Standard**

The incidence of many students from Assam moving to different place like Delhi

and Bangalore in search of general higher and technical institution raises questions on the quality of higher education in Assam. As per the sources with the directorate of Employment and Craft men Training of Govt. of Assam, the size of education job seekers has been quite high in Assam which point to the quality of higher education besides other factors. Education job seekers in Assam as per the live register of Employment exchanges in 20%. Out of the total 1,43,3218 education employed 28,3471 (20 percent to the total educated employed) were Graduates 21,352 were post graduates, 2839 were Engineering Graduation. Another indicator of quality in higher education in Assam is the status of Assessment and accreditation of universities and college by NAAC in Assam. As per the list of college by NAAC assessment in Assam (up to is the September 2016) all the 15 states and central Universities were awarded "A" and "B" grade. Out of all the 189 college in Assam. Only 146 colleges have got themselves assessed or re-assessed by NAAC. Non submission of the majority of the college to NACC assessment in Assam rises serious doubt about their quality. Moreover out of the 146 accredited college only 39 college have got "A" grade in NAAC assessment. As per latest record with the directorate of higher education. Govt. of Assam, the total student enrolment stands at 5,16,651 against the total number of 7,258 teachers. Another concern relating to the standard of education in Assam is the large scale presence of private players in the field of higher education. These private institutions are playing a major role in providing education in the market oriented courses owing to the insufficiency and/or traditional nature of education given by Govt. institutions, the standard of education in most of these institution is questionable, through the claim global standard and charge higher fees on students.

### **Falling standard of Research**

Though research is basically aimed at development knowledge and understanding for solution of vital problems faced by man and for developing theories and generalizations, current practice in the field can hardly claim to fulfill its basic purpose. Though there has been considerable increase in the recent times these cannot be considered as attempts to satisfy the inquisitive and scientific thirst for knowledge. The reason behind this assumption lies in the fact of increased interest in research among teachers and prospective teacher to meet the University Grant commission (UGC) of India directive making research eligibility to enter teaching at higher level, a criterion of promotion, incremental benefit and so on.

This supposition finds testimony from the fact of increased number of Ph.D. registration with private Universities, some of which are facing criminal producers due to widespread Violation of norms.

### **The Problem of Reservation in higher Education**

Caste based reservation in educational institution in India are a constitutional

obligation having its own logic of equalization social and educational inequality. However caste based reservation amounting up to 49% of the total seats in the Govt. institutions of higher education, including the institutions of excellence, prevent better talent coming in from un-reserved categories besides causing social unrest at times.

### **High Cost of Education**

Govt. funding on higher education and research in India and in Assam has always been meager. To make up for this and to make higher education globally competitive, presence of private players in the field have been allowed along with the self financing course in aided Universities resulting in very high cost of higher education owing to the insufficient number of Govt. institutions of higher education in Assam, there has been a mushroom growth of private institutions in traditional fields of knowledge like basic science, classical language and literature art etc. The enrolment register of College and Unniversities in Assam stand estimony to this fact.

Most of the talent student move out of the state after completing senior secondary course in search of good professional and technical college like medical engineering management etc. leaving only a few for pure and basic fields of knowledge diminishing enrolment in S. Sc./M.Sc. course verify this fact.

### **Problems of infrastructure in State run institutions :**

The provincialized college and the state universities in Assam suffer from the problem of lack of basic amenities and state of the art infrastructure which stand in stark contrast to the private college and universities. Even the central universities are endowed with better infrastructure and facilities for the student and the teachers. However, it is provincial colleges and the state universities that cater to the largest number of students in Assam including the poorer section who cannot afford to pay for education in private institution. These institutions find it hard and disadvantageous to compute with the private universities and colleges that better equipped to prepare student for the global employment market and overall development of human resource in the state.

### **Financial Problems**

Financial problems have always handicapped the desirable progress of quantitie and qualitative higher education in Assam. Assam is primarily an agrarian economy and nearly 70% of total population in the state is dependent on agriculture and allied sectors. Adult literacy rate is only at sixty five percent and gross enrolment ratio is higher education stands at 8.8% with 34.40% of people living below the poverty line and with a per capital income of Rs. 30569/- (Economic survey of Assam, 2014-15), Govt. can hardly afford to make massive investments that are required for proper growth of higher education. Though the Govt. talks of high standard of higher education, it has never able to

make the required budgetary provision of the same. Owing to the inadequate development of human resources in Assam, it was expected that Govt. would allocate more money for higher and technical education on its 2010-11 budgets. However the Govt. allocated only 6% of total budget outlay in education, out of which only 11.63% and 1.63% allocated for higher and technical education respectively.

## CONCLUSION

Higher Education in Assam is facing big challenges having them to compete with the global competitors. However institutions of higher education in Assam, with crying needs for basic amenities and infrastructure, are hardly ready for this Global competition. The Annual Exodus of Bright Student from the state in search of better education partially indicates the Defeat of the Institutions of Higher Education in Assam. If the Human Resources in Assam is to be saved from becoming bane on economy of the states, then a well thought policy of higher education combined with adequate Govt. funding and proper monitoring and control over standard of higher education only can bring much needed change in area.

## References :

1. *India Human Development Report (2015) towards social inclusion. Institute of Applied Manpower Research, Planning Commission Govt. of Assam.*
2. UGC, "Higher Education in India-Essence Related to Expansion, Inclusiveness, Quality and Finance." Nov. 2014
3. Ravi S. Samuel (2011) *A Comprehensive study of Education, Presentice Hall of India Pvt. Ltd. New Delhi.*
4. Narasiah, M L (2005) *Education and Human Resource Development, Discovery publishing Hanse, New Delhi.*
5. P. K Dhar, *Indian Economy.*
6. Sunil Bahadur, "Human Resource Development of India."
7. Sampat Mukherjee & Amitava Ghosh, "Manpower Research, Planning and Development."



# **The Folk Culture of the District of Darrang of Assam :A bird's eye view**

**Dr. Abul Qasim**

## **Abstract**

*Folk culture refers to a culture traditionally practiced by a small, homogenous, rural growth living in relative isolation, from other groups. Historically, handed down through oral tradition, it demonstrates the "Old Ways" over novelty and relates to a sense of community. Folk culture is quite often imbued with a sense of place. If elements of a folk culture are copied by, or moved to a foreign locale, they will still carry strong connotations of their original place of creation. Today, however, folk culture is more inclusively recognized as a dynamic representation of both modern and rural constituents.*

*Key words: Folk culture, locale, connotations, constituents.*

## **INTRODUCTION**

Darrang District of Assam is a land of multi cultural heritage and human resource. Being the home land of different races such as; Austric, Mongolian, Dravidian and Aryan that came to dwell in her hills and valleys at different times since remote antiquity; Assam has developed a composite culture of variegated colour.

---

Asst. Professor, Dept. of Arabic, Mangaldai College  
E-Mail- [qasimabul86@gmail.com](mailto:qasimabul86@gmail.com)

## OBJECTIVES

1. To study the basic customs and traditions of the people of the Darrang.
2. To emphasize the various cultural and traditional ethos that plays an important role for transformation of modern society.

## HYPOTHESIS

1. To adopt adequate measure to develop the style of performing cultural and traditional aspects.
2. To extend the area of entire socio-cultural front of progress of the people of the area.

## METHODOLOGY

The paper is based on primary data collected through interview method and the secondary data has been collected from different books, journals and internet.

**Darrang District:** Darrang district is located in the central part of Assam state of India. It is to the north of the Guwahati, the capital of Assam at a distance of 68 K.M. The NH 52<sup>nd</sup> runs through the district in an East west direction connecting it with neighboring Kamrup and Sonitpur district. The district is bounded in the north by Udalguri, in the South by the River Brahmaputra, in the east Sonitpur and in the west by Kamrup district. The district was created by the British in 1833 and was one of the large districts in Assam state which was divided twice, at first in 1985 and 2ndly on 2004, so now it becomes one of the small districts in Assam.

**Location of Darrang District :** Darrang district is situated in the Northern part of the Brahmaputra of Assam in north-east India, between longitudes 200N to 26095' N. and latitudes 91045' E to 92022'E and 35 meters above mean sea level.

**Geographical Area:** The district has a total geographical area of 1427.49 Sq. K.M. with population of 1504320 as per census report of 2001

**Culture of Darrang District:** Culture of Darrang District of Assam mainly reflects the prominent indigenous tribal traditions and beliefs of the people of the district. Darrang District has a population mostly representing diverse ethnic, religious and linguistic communities that have rich cultural heritage and social customs. Interestingly, these conventions and heritages are reflected in the culture of Darrang District. The major tribal groups of this district of Assam are Bodo Tribe, Rabha tribe, Koch tribe and Tea tribe.

A few folk customs and traditions of Darrang District are given below:

**Oja-Pali:** Oja-Pali is one of the unique forms of arts of Darrang District, which involves three main art forms, and these are Song, Dance and Drama. It is performed by a group of four or five men of whom the chief performer is called as 'Oja' who is supported by three to four Palis, and hence the name Oja-Pali has originated in this way. The only

instrument played by Oja-Pali is Khutitaal (palm sized Cymbal). The performers wear long sleeved white gowns, silver jewelry etc. and they wear 'nupur' (bundle of tiny metallic percussions played by body vibrations). Interestingly, Oja-Pali is divided into two forms based on the occasion and style and the two forms are Byah Oja-Pali and Sukananni Oja-Pali.

**Byah Oja-Pali:** The legends associated with this art form states that there were two very talented singers named Barbyahu and Sarubyahu during Koch Kingdom. They were often invited by Kings to sing various mythological and religious rhymes. With time, their style got popular among the people residing in the area. The central subject of Byah Oja-Pali is the epics - Ramayana and Mahabharata. Unlike other Oja-Pali forms, the story is sung in pure classical style involving Ragas. A noticeable element of this form is the different Mudras (Gestures of hands & fingers). Dance is another key part of the performance. Moreover, to make the presentation interesting and make people understand, they perform humorous dialogues and narrations in between.

**Sukananni oja-pali :** Sukananni Oja-Pali aims at presenting the tragic story of Behulaa-Lakhindar from Padma Purana among the masses. The easy yet high standard rhyme is accompanied by pleasant rhythm, tune and dance. Different Mudras are significant parts of this form also. This art is performed normally during Manasa Puja (Worship of the Goddess of Serpents). The Ojapalis first praise various gods and goddesses and then gradually move to the epic of Behula-Lakhindar. Though the presentation is targeted for the mass, it maintains high dignity and standard.

**Sivan geet:** Followers of Srimanta Sankaradeva introduced this form of folk song. It is almost similar to the common Assamese Lokageet or folk-song. The content of these songs is mostly Hindu mythology.

**Mangaldaiya folksong:** Another popular kind of folk song of Darrang District is often called Mangaldaiya folksong. It was perhaps introduced in pre Sankaradeva period. The content is spiritual and mystic, rather than religious, hence similar to Baul songs of West-Bengal. The instruments used are Khanjari (tiny hand held leather percussion, open at one end, with some metal discs attached), Dotara (string instrument), Tokaaree (single string instrument, the chamber made of matured water-gourd etc.

**Deodhani Dance:** Deodhani dance is performed solo or in-group of three or four females essentially on worship of Goddess Manasa. As per mythology, Behulaa had to dance before the goddess Manasa to get back her husband's (Lakhindar) life. The dancer wears Mekhla traditional colourful clothes and jewelleryes. They dance to the tune of Jaidhol (specific cylindrical percussion instrument) and Khutitaal, played by Palis. This dance form depicts the process of worship of Manasa.

**Dhepa Dhuliya:** It is another unique traditional folk art of Darrang District. Here, two



to four performers play the Dhepadhol, which is specially made to generate a unique thud, and accompanied by four to six persons playing Taals (Cymbal). The team dances while playing the instruments. Dhepa dhuliyas perform in wedding ceremony or other such social occasions.

**Bardhuliya:** This art form is performed by men (*Dhuliyas*) in groups of 10 or more. *Dhuliyas* play *Bardhol* which is a cylindrical percussion instrument measuring about in length & 1/2 mtr. in diameter. The *Bardhuliyas* specialise in exhibition of rhythmic somersaults while playing the *Bardhol*. *Bardhuliyas* perform in religious occasions such as *Deul* in spring, the *Mothenee* in *Kati* (Nov. in Julian calendar) month, *Durga* festival (mid. of Oct.) or other ceremonies.

**Kaleeya :** This ancient music form is at the verge of extinction. Similar to Shehnai of West-India, the Kaali is a beautiful bronze instrument. It is wide towards one end and the musician puts a mouthpiece on the other. It was very popular in local wedding ceremonies.

**Nangelee Songs :** Nangelee songs are unique to Darrang which are couplets of very informal colloquial words, sung by Garakhiyaas (cowboys). While singing Nangelee songs, the performers get divided into two groups and enact a conflict between them over silly issues.

**Bagurumba dance :** This dance is a vital part of the Bodo Tribe culture and depicts the beauty of nature. It has got 2 varieties and these are - Natural Bagurumba, which is performed with no song, and the Royal Bagurumba, which is accompanied by songs.

**Baishagu Dance:** This is the dance of spring, similar to Bihu dance in theme. Young boys and girls perform it during April Month when the Baishagu Festival is held.

**Kherai Dance:** Kherai, which literally means to bow down in prayer, is a Bodo religious dance and is essential part of Bathow worship. Bathow is actually Lord Shiva. Usually villagers celebrate the Bathow worship once in a year where Kherai is performed in five stages. First, the place is made sacred for dancing followed by cleaning. Tender Banana leaf is kept over the place as a symbol of welcome. Finally the dancers dance covering the place and praise the Gods.

**Jhumur Dance:** This dance belongs to Tea Tribe community of the Darrang District.

**Folk culture of Muslims of Darrang:** There are many folk cultures and traditions prevailing in Muslims in Darrang. Muslim communities folk performing art includes mostly chera dhek, pushna, Biya geet, Baishali geet, Dhuwa geet, Magun geet, Dheki geet etc.

**Bardoisikhla Dance:** It is another reputed Bodo dance. It depicts the might of Goddess Water and Air.

**Ranachandee Dance:** This is a spectacular war dance of Bodos.

**Farakanti Dance:** It is a very ancient Rabha dance of Rabha Tribe. The descendants of

the royal kingdoms of Assam and others during the ritual perform it to bring peace for soul of the deceased.

**Sathar Dance:** This is the dance depicting romance, and performed in spring, by young boys and girls.

**Khukchi Dance:** Performed by the male during the spring season to satisfy the Gods.

**Samzar Dance:** It is closely associated with agriculture. This dance is performed by villagers at the beginning the month of May for better crops.

**Conclusion:** Despite having its own diversity, Darrang district plays an important role in glorifying the cultural identity of Middle and Lower Assam. It has been observed that the socio-cultural dimension plays an important role for the transformation of new millennium society of Assam into a unique branch of its own identify. Assimilation of various communities seems to be progressed in the state and paved the way hand to hand for its future development. Cultural fusion clearly exists in present society of Darrang.

#### **References :**

1. *Asomor char chaporir sanskriti: Sarma, Upendrajit, Dhuburi Sahitya Sabha.*
2. *Darrangor Itihash: Saikia, Dimbeswar, Darrang Zila Sahitya Sabha.*
3. *www.wikipedia.com*



## A Reflection On Naga Movement

Mrs. Ranjita Goswami

### Abstract

*The Nagas, an ethnic group consisting of few tribes and sub-tribes inhabiting in the tri-junction of India, Tibet (China) and Myanmar, has been in logger heads with the Government of India for 'sovereignty and Independence' since 1947. In this paper an attempt has been made to reflect the Naga Movement since 1947.*

**Keywords :** *Naga, NNC, NSCN, Government of India.*

### INTRODUCTION

The Naga conflict is one of the oldest in the country which started even before India became independent. The Nagas then inhabited the Twensang district, Naga Hill District of the British Province of Assam and the northern part of Manipur. The Nagas consists of a number of tribes. The origin of Naga struggle is traced back to the foundation of the Naga

---

Asst. Professor, Dept. of Statistics, Mangaldai College

Email : [goswamiranjita@gmail.com](mailto:goswamiranjita@gmail.com)

Club, in Kohima in 1918 by a group of educated Nagas. They submitted a memorandum to the Simon Commission to exclude the Nagas from any constitutional framework of India. With the coming of Angami Zapu Phizo, popularly called as Phizo, the Naga Movement gained momentum in the late 1940s. Phizo along with some other prominent leaders fought on the side of the Indian National Army (of Netaji Subhash Chandra Bose) under the Japanese command against the Allied Force with the hope of attaining freedom.

#### **OBJECTIVES**

1. To make a study on the present status of the Naga problem and thus to help in solving the problem.
2. To investigate the different accords and stages of the Naga problem so that peace can be attained in the North-East.

#### **METHODOLOGY**

The present study is descriptive in Nature. The requisite information has been obtained from secondary sources viz. different books, journals, internet sources, etc.

#### **Formation of Naga National Council (NNC)**

The Naga Club later became the Naga National Council (NNC) in 1946 to voice for Naga freedom. The movement for separate homeland gained momentum after the formation of NNC under the leadership of A. Z. Phizo. Disappointed by the policy frameworks of the Indian National Congress, they went underground and started engaging in guerrilla warfare against Indian Security Forces. The NNC under Phizo's leadership declared Independence of Nagaland on 14 August 1947. It was greeted with great euphoria which echoed all over the Naga Hills. Phizo was arrested in 1948 by the Indian Government on charges of rebellion. On his release, Phizo was made the president of the NNC in 1950.

#### **Naga Conference**

The first conference of all Naga tribes was held at Kohima on May 14 and 15, 1950 in which the representatives decided that, the future of the Naga should be based on an independent state. During this conference, it was also decided to hold a plebiscite on the issue of Naga self-determination.

#### **Naga Plebiscite**

In keeping with the resolution adopted in the conference, the NNC went ahead by holding a plebiscite on the issue of sovereignty. It was successfully held on May 16, 1951 and lasted for about two months. About 99 percent of the Naga voted in favour of independence. The copies of the plebiscite documents were sent to the then President of India, Dr. Rajendra Prasad and then Prime Minister Jawaharlal Nehru and some foreign Ambassadors and dignitaries in New Delhi. However, it must be pointed out that the exercise did not have the support of the Government of India.

### **Election Boycott**

The stage was set for further conflagration in the Naga Hills. The people resorted to civil disobedience when the first 1952 General Election took place in the country. The election was boycotted by the Naga people.

### **Federal Government of Nagaland**

After the successful boycott of the first general election of 1952, the NNC decided to form its own government and accordingly the Federal Government of Nagaland was formed in 1956 at Phesinyu, a Rengma village.

### **Formation of Nagaland State**

Nagaland was created in 1963 as the 16<sup>th</sup> state of Indian Union. After further protests, violence and diplomatic discussions, the Government recognized Nagaland as a full-fledged state within the Union of India. Since then, the Naga nationalism has co-existed with Indian nationalism.

### **The Shillong Accord**

The Indian Army marched in to suppress the rebellion and to track down Phizo, however, Phizo managed to escape to East Pakistan and from there to London, where he remain exiled till his death in 1990. The armed rebellion continued led by a section of the NNC leaders. An agreement was reached by the Indian Government and the NNC in the year 1975. This came to be known as the Shilling Accord, which some leaders in NNC called as total betrayal including Isak Chishi Swu, Thuingaleng Muivah and S.S. Khaplang.

### **Formation of NSCN**

The National Socialist Council of Nagaland was formed in 1980 to establish a Greater Nagaland, encompassing parts of Manipur, Nagaland. The NSCN split in 1988 to form two groups namely NSCN (IM) and NSCN (Khaplang). As of 2015, both groups have observed a ceasefire truce with the Indian Government.

### **Reformation**

On 6 April 2015, a new faction NSCN (Reformation) was formed. Y. Wangtin Konyak and P. Tikhak officially announced the formation of a new Naga Political group going by the name 'National Socialist Council of Nagaland (Reformation)' or NSCN (R). The decision came after Wangtin Konyak, a senior minister (Kilonser) and personal secretary to Khaplang and Tikhak, the spokes person of the outfit were expelled by Khaplang after misunderstanding arose over the recent abrogation of ceasefire with the Government of India.

The duo, wanted to continue with the ceasefire maintaining that "Violence has never served a good purpose and the Naga political problem can only be resolved through peace and negotiation", while Khaplang had it abrogated because the "14 years of

ceasefire between NSCN (K) and India has become a mockery and futile exercise". The primary agenda of the new NSCN-R would be to "develop a sense of brotherhood among the Naga family and to re-build the trust and faith among the Naga Society."

On 3<sup>rd</sup> August 2015, NSCN leaders T. Muivah signed a peace accord, "Framework Agreement" with the Government of India in presence of Prime Minister Narendra Modi, Home Minister Rajnath Singh and National Security Adviser (NSA) Ajit Doval.

"Framework Agreement" has supposed to have marked the beginning of a new future.

### **References :**

1. Kabi Kh : *Naga Peace Process and Media*, B. H. Publishers (India), Guwahati-1, pp.74-76
2. Kumar B. B. : *Naga Identity. concept publishing company, New Delhi -110059,* pp. 145, 148
3. Kalita Tapan C. : *Society and Politics In Assam*, Mritunjay Publication and Ashok Book Stall, Panbazar, Guwahati-1, pp. 111-112
4. Hazarika Mr. Ranjit, Pathak Dr. Minoti, Borah Mrs. Rupali : *Issues of Peace and Conflict Resolution in North-East India*, Mahanta Dr. Nani Gopal (ed) POLITEIA, Annual Journal of NEIPSA, vol - XVII - (2008-2009) published by NEIPSA.

#### *Internet Sources-*

[https://ne.wikipedia.org/wiki/Naga\\_nationalism](https://ne.wikipedia.org/wiki/Naga_nationalism)  
[zeenews. india.com/tags/naga\\_movement.html](http://zeenews.india.com/tags/naga_movement.html)

