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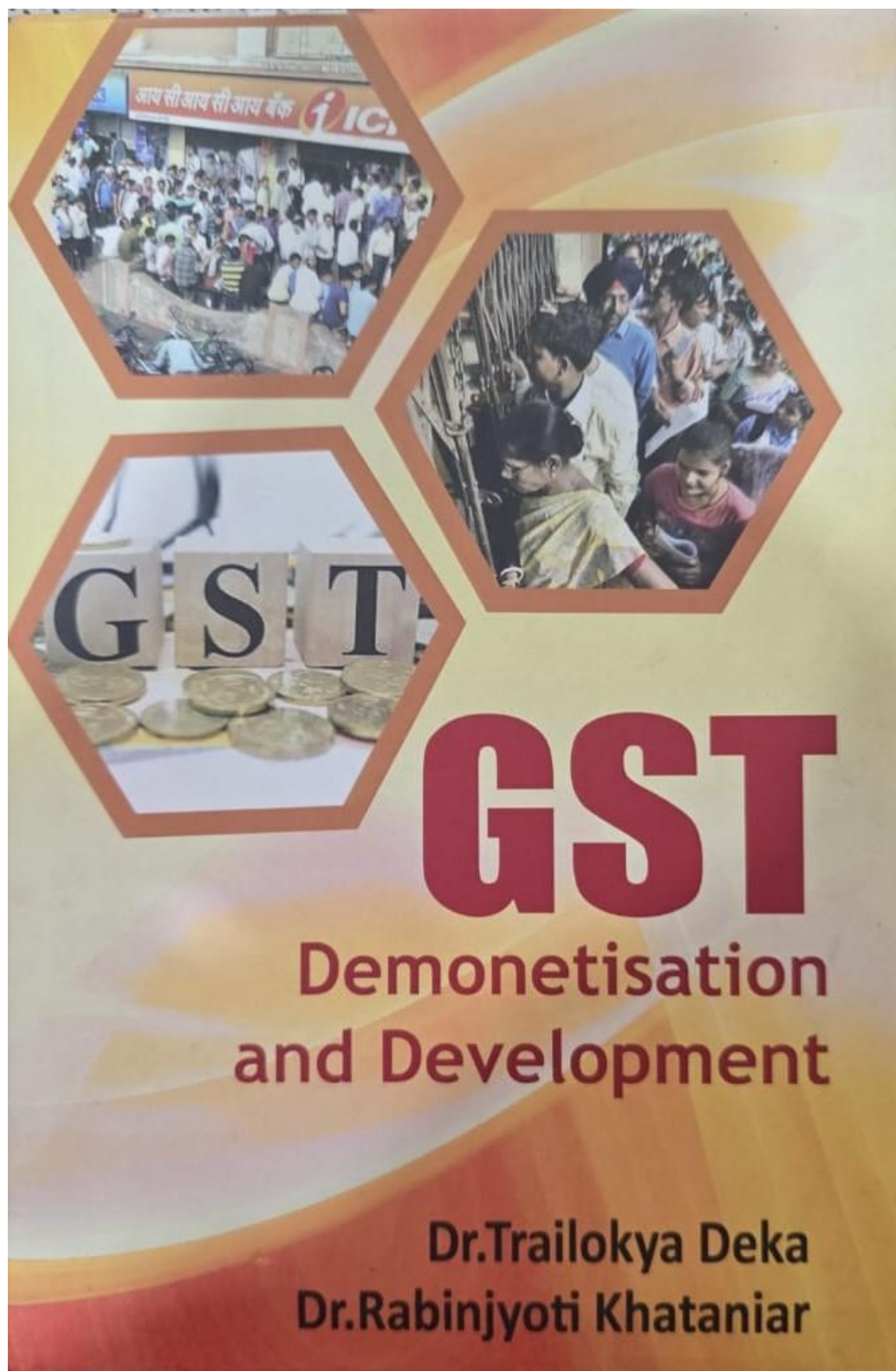
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## Implications of GST for the Informal Sector of India

Dr. Ashima Majumdar

### Abstract

*With the introduction of Goods and Services Tax (GST), Indian economy has witnessed the largest tax reform in 70 years. The economy which is predominated by a huge informal sector is facing a cloudy picture as to the impact of GST on the small and the tiny units operating in the informal segment of the economy. While most of such units prefer to stay out of it, the benefits of getting registered under GST are attracting them to join the formal economy. The present paper is an attempt to review the situation of informal sector in India economy and to analyze the probable impact of GST on these small actors of the economy.*

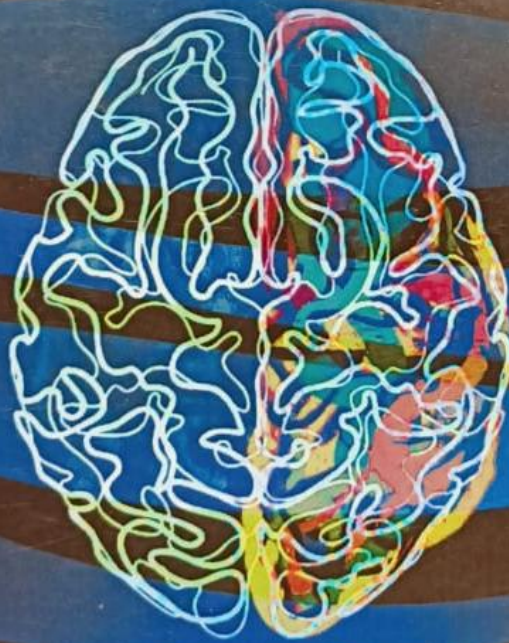
**Keyword:** Informal sector, India, GST etc.

### Introduction

Indian economy is growing at a rapid rate and it is expected to top the list of world real GDP growth from 2018 and 2020 (Global Economic Prospects, 2018). International Monetary Fund too is optimistic about the growth of the economy. However, the economy is beset with a huge informal sector which is contributing positively and in a significant way to the GDP growth of the country. It is also acting as a vast reservoir of the ever increasing pool of unemployed. This sector and its dependents are deprived of the benefits earned by the formal sector. At the same time, the government also loses a large amount of tax revenue from these sectors as they do not comply with prevailing tax regulations of the country. The newly introduced Goods and Services Tax (GST)

# Srotasvini

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Srotasvini

Cascading Knowledge

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# Queer in Indian Literature : An Overview

✎Devastuti Sharma\*

## Abstract:

Discourses help in shaping our social structures, cultural codes and patterns. In Foucaultian terms, our 'episteme' has no independent existence, but is formed by a network of discursive practices that are dominant during the given historical period. Literature happens to be one of the machineries through the use of which discourses are spread and internalized. The present write-up looks at how queer discourses play out in India in the context of literature. While talking about the prevalence heteronormativity and homophobia in the contemporary socio-cultural milieu of India, the write-up espouses the use of the term 'anti-queer anima' over 'homophobia'. It looks into the trajectory of literature in India, with more emphasis on contemporary Indian English writings where queer identities contest. It presents a bird's-eye-view of some of the important contemporary titles that have contributed towards

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# **Education as a Tool of Skill Development for Human Resources**

***Development in Making Make in India  
Campaign a Success***

✍ Nilakshi Borah\*

## **Abstract**

Make in India is an initiative of the Government of India to encourage multinational, as well as domestic, companies to manufacture their products in India. It was launched by Prime Minister Narendra Modi on 25 September 2014. India would emerge, after initiation of the programme in 2015, as the top destination globally for foreign direct investment, surpassing the People's Republic of China as well as the United States. Prime Minister Narendra Modi launched the "Skill India Mission" and said that India can become the human resources capital of the world. Making India a 'human resource capital' of the

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DEVASTUTI SHARMA



**ADAPTING THROUGH CENTURIES:  
THE (DE-) EVOLUTION OF THE  
FEMALE VAMPIRE IN LITERATURE  
FROM CARMILLA TO THE TWILIGHT SAGA**



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# Emerging Trends in Multidisciplinary Research

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# People's cultural response towards natural disaster flood: A case study of Dhemaji development Block, District Dhemaji Assam

**Anup Hazarika**

*Assistant Prof., Anthropology Department  
North Gauhati College*

## **Abstract**

*Flood is a natural phenomenon and is a response to rainfall but it becomes hazard and disaster when it causes colossal loss to human lives and property. It is also important to note that floods are also aggravated by human activities and thus flood hazard is both natural as well as man induced rather man-accentuated phenomenon. Floods are very often associated with alluvial rivers draining extensive alluvial and flood plains.*

*The district Dhemaji, is one of the prominent district of Assam which is still under the severe of environmental problems especially due to flood, where hundreds of villages and towns were affected by floods every year after 2003. As a result of which almost all the respondent's family locally try to*

# বিশ্ব বন্ধুনাথ গান্ধী

মুখ্য সম্পাদক : মদন শৰ্মা



অসম অনুবাদ প্রতিষ্ঠান  
অসম সাহিত্য সভা



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সৰ্বস্বত্ব সংৰক্ষিত : লিখিত অনুমতি অবিহনে এই কিতাপৰ কোনো অংশৰেই কোনো ধৰণৰ পুনৰ মুদ্ৰণ নাইবা কোনো যান্ত্ৰিক উপায়েৰে (গ্ৰাফিক, ইলেক্ট্ৰনিক বা আন কোনো মাধ্যম, ফটোকপি, টেপ বা পুনৰুদ্ভাৱৰ সুযোগ সম্বলিত তথ্য সঞ্চয় কৰি বন্ধাৰ কোনো পদ্ধতি) প্রতিলিপি কৰিব পৰা নাযাব। এই স্বত্ব উলংঘিত হ'লে উপযুক্ত আইনী ব্যৱস্থা গ্ৰহণ কৰা হ'ব।

মুদ্ৰক : ভৱানী অফছেট এণ্ড ইমেইজিং ছিষ্টেমছ প্রাঃলিঃ, গুৱাহাটী-৭৮১০০৭

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অৱশ্যে প্ৰথমে শিশুহঁত আহি উপস্থিত হ'লহি। গ্ৰীষ্মৰ বাবে স্কুল মাথোঁ বন্ধ হৈছেহে আৰু এই বন্ধনহীনতাৰ আমেজটোত সিহঁতৰ বেছিভাগে ডুবি আছিল। সিহঁত একগোট হৈ মাত্ৰ কেইমুহুৰ্তমান নীৰৱে থাকি প্ৰাণচঞ্চল খেলত নিয়োজিত হৈ পৰিল আৰু সিহঁতৰ কথাত তেতিয়াও স্থান পাইছিল শ্ৰেণীকোঠা আৰু শিক্ষকসকলে, কিতাপ আৰু গালি-শপনিয়ো। ববী মাৰ্টিনে ইতিমধ্যে তাৰ পকেটকেইটা শিলগুটিৰে ভৰাই লৈছিল আৰু অন্য ল'ৰাকেইটাইও অতি



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**Identical Sensation Identifies  
No Border Line: A Comparative Study of  
Eunice de Souza, Nirmal Probha Bordoloi  
and Indira Goswami**

**Dr. Maloshi Choudhury**

---

**Abstract**

Eunice de Souza, the great author and poet departed on 28<sup>th</sup> of July, 2017. A regular contributor in 'Mumbai Mirror' a local daily, de Souza will be remembered for her frank and blunt uttering. Known for her brevity, unexpectedness and urgency of telegrams she adorns her style with self-deprecation, black humour and powerfully vents her thoughts and emotions in her works by using of her acerbic tongue. Similar trenchantly strong voices are heard in the writings of two other great writers Nirmal Probha Bordoloi and Indira Goswami (Mamoni Raisom Goswami). A comparison of the works of these three writers has been attempted in the paper. With the rise of feminism in India in the seventies, these writers articulated the peculiarly feminine issues and experiences confronted by feminist sensibility. Voicing the pain, sorrow and sacrifice of women these great authors has paved the path for resurrection of the broken.

*Keywords:* Resurrection, Voice, Pain, Feminism

**Ode to Eunice de Souza**

India lost a gifted poet, committed teacher, critic, novelist, anthologist, columnist and also a writer for children Eunice de Souza, on 28<sup>th</sup> of July, 2017. She retired from the department of

অনামিকা

অনামিকা বৰা

### **Shabdoprem**

A collection of Assamese poems written by Anamika Borah, Asst. Professor, Dept. of Assamese, North Gauhati College and published by Purbayon Publication, Satmile, Guwahati- 14

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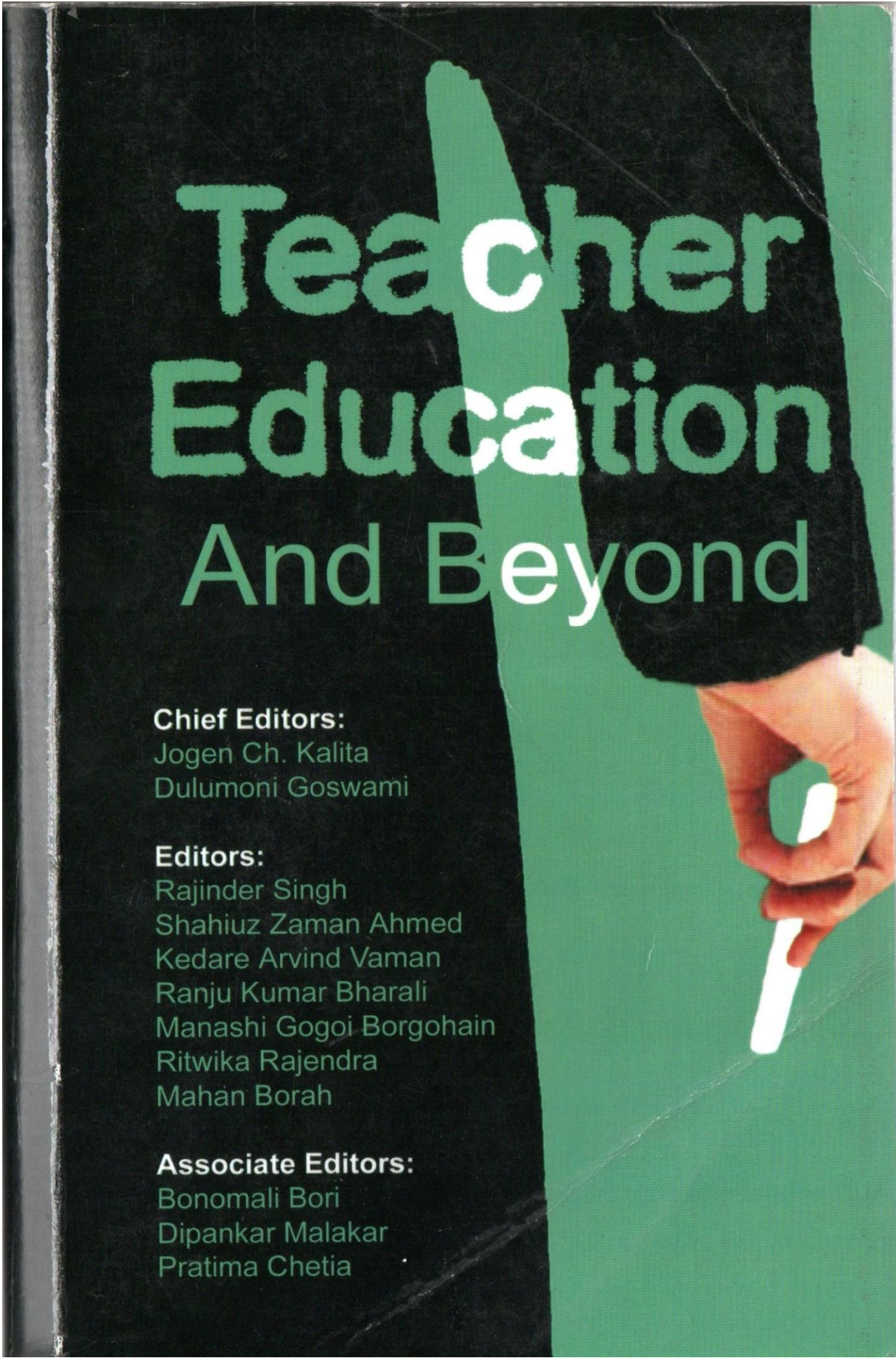
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## Gender Gap in Employment in Manufacturing Sector

Sanjoy Pathari\*

### Introduction:

Female participation in the manufacturing sector is one of the significant indicators of measurement of development of an economy (Choudhury & Panigrahi, 2013). In India, women form an integral part of total workforce in the manufacturing sector. They contribute a significant proportion to real GDP growth in the Indian manufacturing sector. But what is notable with women workers is that they lag far behind men in achieving opportunities. (Kumari, Pandey, 2012). Gender Gap in employment has been a pervasive feature of the Indian manufacturing sector. In India, women's participation in the labour market is influenced by social norms governing gender roles and responsibilities as much as it is by economic and structural factors (Lahoti, 2013). Since the initiation of economic reforms (1991), although female participation in the organised manufacturing sector has increased, 'Gender Gap' in employment in this sector has also been widening and women are found to be marginalised in quality employment and wages within the sector (ILO, 2016).

The Government of India has been making and adopting different acts, laws and policies to protect workers both in the organised and the unorganised sectors. Despite many welfare policies adopted for the protection and safety of female workers with a view to improving the female labour force participation in the organised manufacturing sector, it has been observed that female participation has not increased. Female participation, especially in the organised

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\*Asstt. Prof. Dept. of Economics, North Gauhati College



কৃষ্ণকান্ত সন্দিকৈ ৰাজ্যিক মুক্ত বিশ্ববিদ্যালয়  
Krishna Kanta Handiqui State Open University

স্নাতকোত্তৰ কলা (Master of Arts)

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**POSTGRADUATE  
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অসমীয়া সাহিত্যত পাশ্চাত্য প্ৰভাৱ

**অসমীয়া**  

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**ASSAMESE**

## বিষয় বিশেষজ্ঞ মণ্ডলী

ড° মালিনী গোস্বামী, অধ্যাপিকা, গুৱাহাটী বিশ্ববিদ্যালয়

ড° উপেন বাভা হাকাচাম, অধ্যাপক, গুৱাহাটী বিশ্ববিদ্যালয়

ড° খগেশ সেন ডেকা, সহযোগী অধ্যাপক (অৱসৰপ্ৰাপ্ত), পূব কামৰূপ মহাবিদ্যালয়

সমন্বয়বক্ষী : ড° নিভা বাণী ফুকন, কৃষ্ণকান্ত সন্দিকৈ ৰাজ্যিক মুক্ত বিশ্ববিদ্যালয়

## প্ৰস্তুতি গোটৰ সদস্য

অধ্যায়

অবিহণা যোগাইছে

১ আৰু ২

ড° প্ৰভাত ভূঞা, প্ৰাগজ্যোতিষ মহাবিদ্যালয়

৩

ড° গীতাঞ্জলী তালুকদাৰ, পূব বংশৰ মহাবিদ্যালয়

৪ আৰু ৫

ড° ৰুণমনি বৰা ফুকন, চন্দ্ৰপুৰ মহাবিদ্যালয়

৬

ড° তাৰিণীকান্ত হালৈ, উত্তৰ গুৱাহাটী মহাবিদ্যালয়

৭

কৌশিক কলিতা, গৰেবক, কৃষ্ণকান্ত সন্দিকৈ ৰাজ্যিক মুক্ত বিশ্ববিদ্যালয়

## সম্পাদনা :

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(অধ্যায় ১, ২, ৪, ৫, ৬ আৰু ৭)

গাঁথনিক সম্পাদনা

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উপ-মুখ্য কাৰ্যালয় : হাউচফেড কমপ্লেক্স, দিচপুৰ, গুৱাহাটী-৭৮১০০৬

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## অধ্যায় ৬ : অসমীয়া নাটকত পাশ্চাত্য প্ৰভাৱ (১৮৫৭ৰ পৰা ১৯৪০ চনলৈ)

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- ৬.২ পৰিচয়
- ৬.৩ আধুনিক অসমীয়া নাটকত পাশ্চাত্য প্ৰভাৱ
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- ৬.৫ অধ্যায়টিৰ পৰা আমি কি শিকিলোঁ
- ৬.৬ অধিক জানিবলৈ
- ৬.৭ অগ্ৰগতিৰ খতিয়ান (কেৱল ৰূপৰেখা)
- ৬.৮ আৰ্হি প্ৰশ্ন

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### ৬.১ উদ্দেশ্য

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এই অধ্যায়টি অধ্যয়ন কৰি আপুনি—

- আধুনিক অসমীয়া নাটকৰ সৃষ্টিৰ পটভূমি সম্পৰ্কে এটা ধাৰণা লাভ কৰিব
- পাশ্চাত্যৰ ৰোমাণ্টিক নাটক, বিশেষকৈ বিশ্ব-বিশ্ৰুত ইংৰাজ নাট্যকাৰ শ্বেইক্সপীয়েৰৰ নাটক সম্পৰ্কে ধাৰণা লাভ কৰিব
- পাশ্চাত্য, বিশেষকৈ শ্বেইক্সপীয়েৰৰ নাটক আৰু নাট্যৰীতিৰ প্ৰভাৱ অসমীয়া নাটকত কিদৰে পৰিছে সেই বিষয়ে আলোচনা কৰিব পাৰিব
- ১৯৪০ চনৰ পিছৰ অসমীয়া আধুনিক নাটক আৰু সেই নাটকত পাশ্চাত্য প্ৰভাৱ সম্পৰ্কে চমু ধাৰণা লাভ কৰিব
- পাশ্চাত্যৰ বাস্তৱবাদী, উদ্ভট, মনস্তাত্ত্বিক, অস্তিত্ববাদী, চেতনাত্ৰোত আদি ধাৰাৰ নাটকৰ বিষয়ে কিছু আভাস পাব।

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### ৬.২ পৰিচয়

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ইয়াৰ আগৰ অধ্যায় দুটাত আপুনি অসমীয়া চুটিগল্পত পাশ্চাত্য প্ৰভাৱ সম্পৰ্কে জানিব পাৰিলে। ইয়াত অসমীয়া নাটকতনো পাশ্চাত্য প্ৰভাৱ কি দৰে পৰিছে তাৰ ধাৰণা লাভ কৰিব। 'অসমীয়া নাটকত পাশ্চাত্য প্ৰভাৱ' (১৮৫৭-ৰ পৰা ১৯৪০ চনলৈ) শীৰ্ষক এই অধ্যায়টিত মূলতঃ ১৮৫৭ চনৰ পৰা ১৯৪০ চনৰ ভিতৰত ৰচিত আধুনিক অসমীয়া নাটকৰ বিষয়ে আলোচনা কৰা হ'ব। তাৰ সমান্তৰালভাৱে এই নিৰ্দিষ্ট সময়ছোৱাৰ ভিতৰত ৰচিত নাটকসমূহৰ অনুপ্ৰেৰণা স্বৰূপ পশ্চিমীয়া নাটক, বিশেষকৈ বিশ্ববিশ্ৰুত নাট্যকাৰ উইলিয়াম শ্বেইক্সপীয়েৰৰ নাটক সম্পৰ্কেও

অসমীয়া সাহিত্যত পাশ্চাত্য প্ৰভাৱ



কৃষ্ণকান্ত সন্দিকৈ ৰাজ্যিক মুক্ত বিশ্ববিদ্যালয়  
Krishna Kanta Handiqui State Open University

স্নাতকোত্তৰ কলা (Master of Arts)

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**PGAS S4 03  
(Literature)**

**Exam Code 126 N**

তুলনামূলক সাহিত্যতত্ত্ব  
আৰু ভাৰতীয় সাহিত্য

**অসমীয়া**  

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**ASSAMESE**

## বিষয় বিশেষজ্ঞ মণ্ডলী

ড° মালিনী গোস্বামী, অধ্যাপিকা, গুৱাহাটী বিশ্ববিদ্যালয়

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ড° খগেশ সেন ডেকা, (অবসৰপ্ৰাপ্ত) সহযোগী অধ্যাপক, পূব কামৰূপ মহাবিদ্যালয়

সমন্বয়ৰক্ষী : ড° নিভা ৰাণী ফুকন, কৃষ্ণকান্ত সন্দিকৈ ৰাজ্যিক মুক্ত বিশ্ববিদ্যালয়

## প্ৰস্তুতি গোটৰ সদস্য

### অধ্যায়

১ আৰু ২

৩ আৰু ৬

৪

৫

৭

৮ আৰু ৯

### অবিহণা যোগাইছে

ড° নয়নমণি বৰুৱা, পূব কামৰূপ মহাবিদ্যালয়

ড° ৰুণমণি বৰা ফুকন, চন্দ্ৰপুৰ মহাবিদ্যালয়

ৰূপাঞ্জলী চেতিয়া, গৱেষক, কৃষ্ণকান্ত সন্দিকৈ ৰাজ্যিক মুক্ত বিশ্ববিদ্যালয়

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ড° তাৰিণীকান্ত হালৈ, উত্তৰ গুৱাহাটী মহাবিদ্যালয়

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### ৮.১ উদ্দেশ্য

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এই অধ্যায়টি অধ্যয়ন কৰি আপুনি—

- অসমীয়া নাটকৰ পটভূমি সম্পৰ্কে এটা ধাৰণা কৰিব পাৰিব
- অসমীয়া নাটকৰ প্ৰকাৰভেদ সম্পৰ্কে জানিব পাৰিব
- আধুনিক নাটকৰ লক্ষণ আৰু বৈশিষ্ট্যসমূহৰ বিষয়ে এটা ধাৰণা লাভ কৰিব
- নাটকৰ মাজত নিহিত হৈ থকা শিক্ষামূলক দিশটোৰ বিষয়ে অৱগত হ'ব পাৰিব
- নাটক আৰু লোক-পৰিৱেশ্য কলাৰ মাজৰ সম্পৰ্কৰ কথা জানিব
- নাটকৰ যোগেদি সামাজিক পৰিবৰ্তনো যে সম্ভৱ তাৰ বিষয়ে অৱগত হ'ব।

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### ৮.২ পৰিচয়

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স্নাতকোত্তৰ অসমীয়া চতুৰ্থ বাণাসিকৰ সাহিত্য শাখাৰ শিক্ষাৰ্থীৰ বাবে আগবঢ়োৱা তৃতীয় পাঠ্যবিষয় 'তুলনামূলক সাহিত্যতত্ত্ব আৰু ভাৰতীয় সাহিত্য'ৰ অন্তৰ্গত এইটো অষ্টম

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## অধ্যায় ৯ : নির্বাচিত নাটক মহাৰাজা আৰু নাগমণ্ডল

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### ৯.১ উদ্দেশ্য

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এই অধ্যায়টি অধ্যয়ন কৰি আপুনি—

- সতীশচন্দ্ৰ ভট্টাচাৰ্যৰ মহাৰাজা নাটকৰ পৰিচয়ত লাভ কৰাৰ লগতে নাটকখনৰ কলা-কৌশল আৰু আংগিক সম্পৰ্কে সম্যক ধাৰণা লাভ কৰিব
- নাগমণ্ডল নাটকৰ আংগিক তথা কলা-কৌশল সম্পৰ্কে আলোচনা কৰিব পাৰিব
- দুয়োখন নাটকৰ বিষয়বস্তু আৰু উপস্থাপন শৈলীৰ বিষয়ে তুলনামূলক আলোচনা কৰিব পাৰিব
- নাটক দুখনৰ অন্তৰ্নিহিত তাৎপৰ্য সম্পৰ্কে অৱগত হ'ব পাৰিব।
- আধুনিক কালৰ লোককলাধৰ্মী নাটক সম্পৰ্কে আৰু নাটকত লোককলাৰ প্ৰয়োগ সম্পৰ্কে এটি সম্যক ধাৰণা লাভ কৰিব।

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### ৯.২ পৰিচয়

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ইয়াৰ আগৰ অধ্যায়টিত আপুনি নাটকৰ বিভিন্ন ধাৰা সম্পৰ্কে, সেই ধাৰাৰ নাটকৰ লক্ষণ-বৈশিষ্ট্য সম্পৰ্কে আৰু বিশেষকৈ আংগিক আৰু কলা-কৌশল সম্পৰ্কে অধ্যয়ন কৰিলে। তদুপৰি ভাৰতীয় তথা অসমীয়া নাট্যসাহিত্যৰ নৱতম সংস্কৰণ লোককলাধৰ্মী নাটকৰ বিষয়েও এটা ধাৰণা লাভ কৰিলে। এইটো অধ্যায়ত আপুনি দুখন লোককলাধৰ্মী নাটকৰ বিষয়ে অধ্যয়ন কৰিব। তাৰে এখন হ'ল বিশিষ্ট অসমীয়া নাট্যকাৰ সতীশচন্দ্ৰ ভট্টাচাৰ্যৰ মহাৰাজা আৰু আনখন হ'ল বিখ্যাত কানাড়া নাট্যকাৰ গিৰীশ কাৰ্ণাডৰ নাগমণ্ডল। দুয়োখন নাটকৰ আংগিক, কলা-

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## **Indigenous Knowledge and Sustainable Agricultural Practices: Some Anthropological Observations from Assam**

**Dr. Ripunjoy Sonowal**

Assistant Professor,

Department of Anthropology, North Gauhati College, Guwahati, Assam

### **I**

Indigenous Knowledge (IK) refers to the systematic body of knowledge (skills, technologies, know-how, beliefs and practices) of the indigenous or local communities around the world about relationships between people, habitat and nature. This knowledge is the holistic sum of facts that are known or learned from experiences or acquired through careful observations, and trial-and-error experiments and handed down from generation to generation usually by word of mouth and cultural practices. IK is adapted to the local culture and environment; it encompasses knowledge commonly known within a community as well as knowledge that may be known only to a single person or to the tribal elders, a lineage group or a gender group, applied to maintain or improve the livelihood of the community. According to Warren (1991), IK is the local knowledge – knowledge that is unique to a given culture or society. It is the basis for local-level decision making in agriculture, health care, food preparation, education, natural-resource management, and a host of other activities in rural communities.

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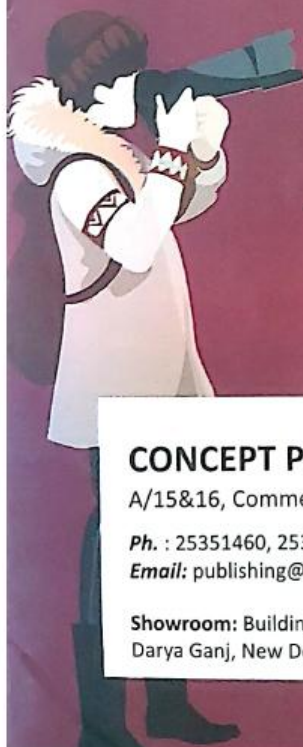
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## Characteristics of Tourists in Nameri National Park, Assam

An Assessment

*Niranjan Das, Utpal Kumar De and Sujata Deori*

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### Introduction

Ecotourism is a field of human activity where conservation and development can wisely effectively be balanced to achieve a mutual goal to the benefit of the people in the community. The term 'Ecotourism' was first coined by *Hector Ceballos Lascurain* in 1983, and was initially used to describe nature-based travel to relatively undisturbed area with an emphasis on Education. This new approach of tourism is becoming an increasingly popular expression to conservation and sustainable development of the biodiversity (Yadav, 2002). It involves education and interpretation of natural environment and to manage it in an ecologically sustainable way. Here 'natural environment' includes cultural components and the term 'ecologically sustainable' involves appropriate returnees to the local community and long term conservation of resources (Grant, 1995). In this way a person eventually acquires a consciousness and knowledge of the natural environment, together with cultural aspects, that will convert people keenly involved in conservation issues (Cebaballos, 1998).

### Study Area

The study region covers Nameri National Park of Assam located in 26°50'48" N to 27°03'43" N Latitudes and 92°39' E to 92°59' E

# **FLOOD, EROSION AND BIG DAM ISSUES**



**EDITORS  
DHANJIT DEKA  
RAJAT SUBHRA PAUL**



**ASSAM COLLEGE  
TEACHERS' ASSOCIATION**

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## Human Responses Towards Flood Hazard in Noa-Mangaldai River Basin, Assam

Purabi Hazarika<sup>1</sup>

A. K. Bora<sup>2</sup>

### Abstract

Flood plains have been recognized as an ideal place for human settlement from times past due to the proximity to rivers, alluvial soils, ample water supplies and means of transport. Floods are the high flow of water that overtops the natural channels and its role and importance in nature are diverse. Floods help in maintaining the natural function of river and source of fresh water and other natural resources, which bring the opportunity of livelihood. At the same time, it also causes hazard when people and their activities are exposed to flooding and can create severe loss and damages of people. The Noa-Mangaldai basin with 63.75% plain areas has the experience of recurring floods and associated hazards mainly in the middle and the lower reaches ranging from very high magnitudes to moderate magnitudes throughout its history. About 58.57% area of the basin suffers from severe floods which receives 2 to 4 flood waves every year. The nature and extent of flood hazard and the modes of human responses and their adjustment in the study area have been analysed in this paper.

**Keywords:** *Flood plain, high flow, hazard, human response*

---

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# Contemporary Issues and Insights of the Anthropology of North East India



Editors  
Prof. Haobijam Vokendro  
Milonjyoti Borgohain

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## **Sustainable Traditional Pest Management Techniques Applied by the Sonowal Kachari Farmers: Some Anthropological Observations**

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*— Dr. Ripunjoy Sonowal, Somnath Sonowal,  
Nilutpal Sonowal and Mayurtrishna Hazarika*

### **Introduction**

The 21<sup>st</sup> century has created an ever greater need for research based information and practical utilization of anthropological skills. Globalization, economic and political strife, indigenous peoples varied issues, industrial development and its impact upon nature and traditional cultural values, global attention on sustainable ecological resource management, environmental protection, climate change, poverty, food security, health, violence, militarism, human rights, demographic shifts, etc. have created new work contexts and challenging opportunities for applied anthropologists in multiple settings.

Exploration, systematic documentation and scientific evaluation of Traditional Knowledge (TK) or Indigenous Technical Knowledge (ITK) of the tribal communities worldwide has become a significant emerging area of anthropological research. ITK refers to the complex bodies and systems of knowledge, specific skills and technologies, intangible traditions, beliefs, practices and representation maintained

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# ENVIRONMENTALLY SUSTAINABLE NATURAL RESOURCE MANAGEMENT: A CASE STUDY OF ZIRO VALLEY, ARUNACHAL PRADESH

**Lekha Borah**

*Research Scholar, Gauhati University*

*Email: lekhaborah01@gmail.com*

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### Abstract

Apatanis are one of the major ethnic tribal communities inhabiting in the northeastern state of Arunachal Himalaya in eco-culturally valued zone in Ziro valley, sharing 2.26% population of the Arunachal Pradesh. This paper is an attempt by the use of both primary and secondary data to throw light on the ecological management of natural and human-modified ecosystems in Apatani plateau of Arunachal Himalaya in North East India. The analysis is based on the sample survey of two (Tajang and Hari-I) out of seven Apatani villages in the Ziro valley. The community fosters and practices a unique form of land use management and possesses rich ecological knowledge of natural resource management and conservation, acquired over the centuries through informal experimentation. Resource conservation in case of Apatanis is not only confined only to forestry, but also to agroforestry and unique rice cum paddy cultivation. Water management traditional techniques practiced by this group is scientifically too advanced that can be adopted in other areas also for sustainable development. They are not only highly conscious of maintaining their rich socio-cultural heritage but also to safeguard nature and natural resources. The group stands out as an example of ecosystem protection and conservationist in Arunachal Pradesh by their enhanced livelihood security, quality of life and farmer developed indigenous agroforestry system where

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# আধুনিক অসমীয়া কাব্য সাহিত্যত মহিলা কবিৰ যাত্ৰা : এটি আলোচনা

অনামিকা বৰা\*

আৰম্ভণি:

এগৰাকী নাৰীৰ সমাজত প্ৰভাৱ অপৰিসীম। আদিম কালৰ পৰাই অৰ্থাৎ বৈদিক যুগ বা পুৰাণ, ৰামায়ণ, মহাভাৰতৰ যুগৰ পৰাই নাৰীয়ে সমাজত যথেষ্ট প্ৰভাৱ পেলাই আহিছে। এখন সুস্থ সবল সমাজ গঠনত নাৰীৰ ভূমিকা অনস্বীকাৰ্য। এখন সমাজত পুৰুষতকৈ নাৰীৰ অৱদান বেছি বুলি ক'লেও মিছা কোৱা নহয়।

অসমীয়া সাহিত্যৰ ইতিহাস খুঁচৰিলে দেখা পোৱা যায় শংকৰী যুগৰ পৰাই মহিলা লেখকে কাব্যচৰ্চা কৰি আহিছে। পদ্মাপ্ৰিয়া আই প্ৰথম মহিলা কবি। এখেত কেবল অসমৰে নহয় সমগ্ৰ পূব ভাৰতৰে প্ৰথম মহিলা লেখিকা। আই পদ্মাপ্ৰিয়া আছিল মাধৱদেৱৰ মৰমৰ শিষ্য গোপাল আতাৰ কন্যা। চৰিত পুথিত উল্লেখ থকা মতে তেৱেঁই মধ্যযুগৰ একমাত্ৰ মহিলা যিয়ে গীতপদ ৰচনা কৰি অসমীয়া সাহিত্যত এখন সুকীয়া স্থান দখল কৰি গৈছে। বৈষ্ণৱ আদৰ্শত বিশ্বাসী হৈ লিখিছিল —

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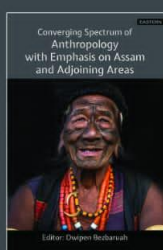
# Converging Spectrum of Anthropology with Emphasis on Assam and Adjoining Areas

Converging Spectrum of Anthropology with Emphasis on Assam and Adjoining Areas



Editor: Dwipen Bezbaruah

Bezbaruah



## The book

Highlight different aspects of Anthropological research in Assam and adjoining areas the present volume contains papers presented in the National Seminar on 'Converging Spectrum of Anthropology with emphasis on Assam and Adjoining Areas' organized by the Department of Anthropology, Gauhati University and sponsored by University Grants Commission (UGC) under SAP-DRS I on March 14 and 15, 2019. With an interdisciplinary perspective the book contains nineteen papers on different aspects of Anthropology by different scholars and would be relevant to anthropologists, sociologists, historians, health studies and related areas of research.



## The Editor

Dwipen Bezbaruah (M.Sc. Ph.D.) is currently the Professor and Head of the Department of Anthropology, Gauhati University. For a brief period he also served as a faculty member in the department of the Anthropology, Dibrugarh University. He is also the coordinator of UGC-SAP-DRS I of the Department of Anthropology, Gauhati University. He has published several research based article in journals and books of national and international level and also edited a book. He also served as the coordinator for North East in project titled Rock Art and its allied subjects in North East India sponsored by the Indira Gandhi National Centre for the Arts (IGNCA), New Delhi. He was also a member of the Programme Advisory Committee of Rock Art Unit of IGNCA, New Delhi. He is also lifelong member of several national and international academic bodies like Indian National Confederation and Academy of Anthropologist (INCAA), Indian National Science Congress Association (INSCA) and International Union of Ethnological and Anthropological Studies. Currently he is the Joint Secretary of INCAA. Besides mainland India and North East India he has made intensive field studies in different territories of SE Asia like Malaysia, Burma and Thailand. He has visited different universities of United Kingdom like Brunel University, Institute of Archaeology (London University), Cranfield University and Oxford University on academic Exchange programme.

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## A Study on Maternal health among the Ahom Women of Lakhimpur District, Assam

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*Avijit Boruah*

### **Abstract**

The health status of women not only reflects their own health, but their child, their family, society as well as the nation. The health status of Indian women is under many challenges. The major challenges are seen regarding reproductive and child health, nutrition, anaemia, imbalance diet so on and so forth. In view of this, the present paper aims to highlight the health status of Ahom mothers of Lakhimpur district, Assam from Anthropological perspective. A total of 336 number of ever married Ahom women have been included in the study. Demographic survey, anthropometric measurement, estimation of haemoglobin level with haemoglobin colours scale method, dietary survey was used for data collection. It was seen that prevalence of anaemia (77.39%) and obesity (29.47%) were higher among them. Food and nutrient intakes were also not adequate according to the RDA.

### **Introduction**

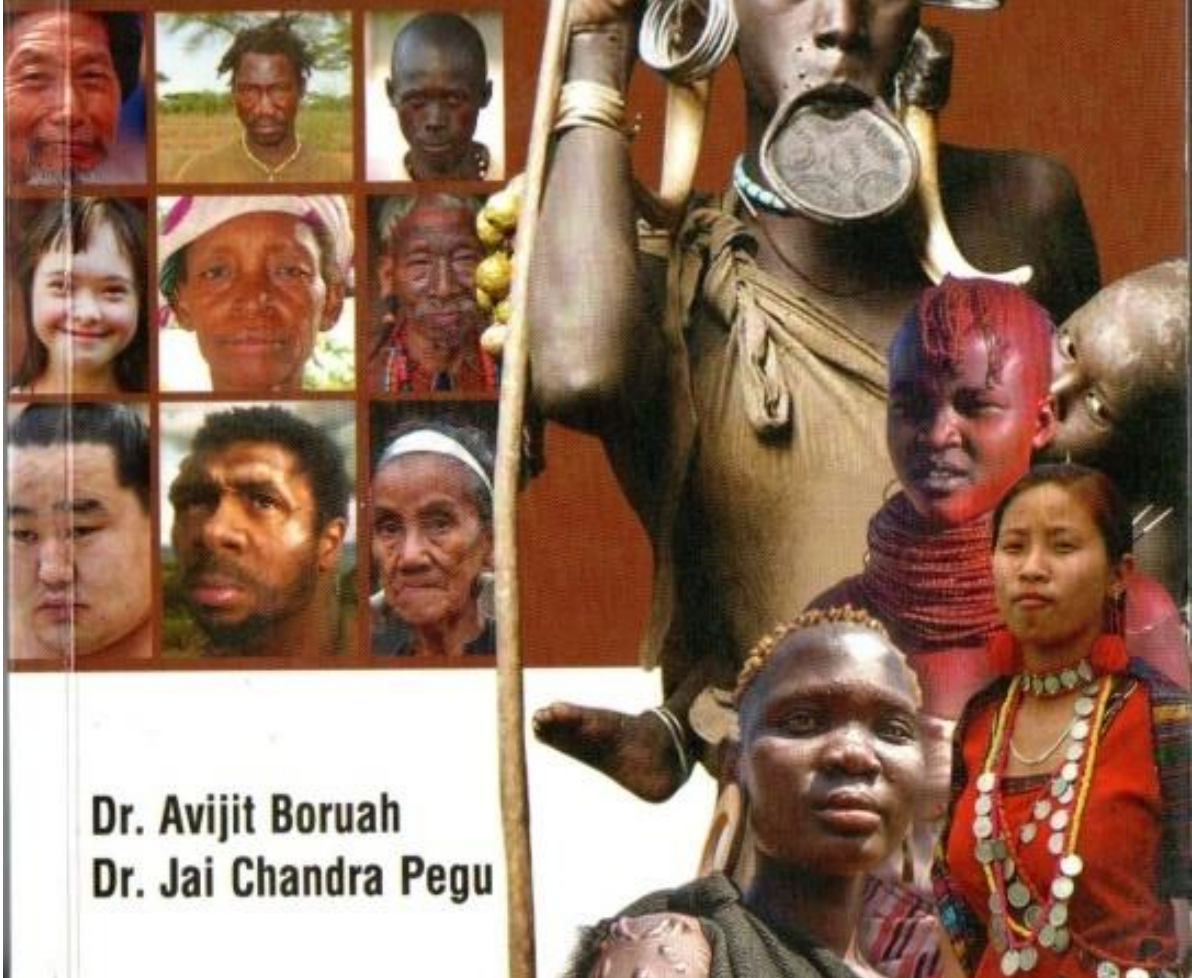
Health is a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity (WHO, 1948). Good health is congruous with the ability to perform normal functions, the achieving of a dynamic stability, and homeostatic control. Ill health, on the otherside, corresponds to a state of instability, loss of function and failure of self-regulation (Fasu, 1981).

In India, the health status of woman is not satisfactory even after 72 years

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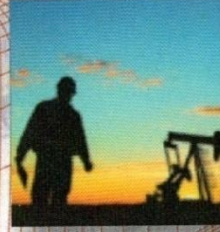
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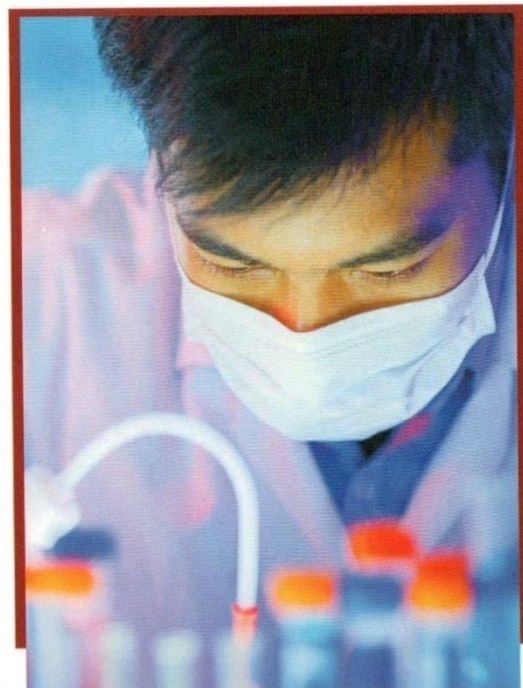


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# ROLE OF SELF HELP GROUPS (SHGs) TOWARDS EMPOWERING OF RURAL WOMEN: A Case Study

DR. ANUP HAZARIKA

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## INTRODUCTION

Empowerment of women is a holistic concept. Empowerment means to enable a person to reach his/her own best possible potentiality. Women's empowerment means the equality between man and women in the circumstance of opportunity and sharing of command. It is multi-dimensional in its approach and envelops social, political and economic aspects (Gaonkar, 2004). Of all these aspect of women's progress, economic empowerment is of topmost importance in order to achieve a lasting and sustainable development of society. Self-Help Groups (SHGs) are the voluntary organizations which disburse micro-credit to the members and facilitate them to enter into entrepreneurial activities (Jain, 2010). Self-Help Groups or in short SHGs is now-a-days a well-known concept. It is now almost two decade old. Self-help groups (SHGs) play today a key role in poverty alleviation in rural area. It is reported that the SHGs have a role in speeding up country's economic Development. SHGs have now evolved as a movement. Mainly, members of the SHGs are women. Accordingly, involvement of women in the country's

## CHANNEL DIVERSION AND MANAGEMENT OF FLOOD IN THE NOA-MANGALDOI RIVER BASIN, ASSAM

DR. PURABI HAZARIKA

---

### INTRODUCTION

Diversion channels are generally constructed for diverting the waters from the main channel for reducing the water pressure leading to management of floods. It is a means of diverting flood water across the neck of a meander or across a series of meanders. Diversion channel may be of bypass channel or diversion channel. In the former the diverted waters can be discharged back to the same river whereas in the later the diverted water is discharged into another channel. Among various structural measures adopted for flood management like construction of embankments, channel improvement, construction of bank, revetment, construction of spurs, etc. perhaps, the most effective and economic structural measure is the construction of diversion channel (Rathod, 2014). It also helps in irrigation and water supply. Such structural measure is commonly applied in urban areas where there is less scope of widening the existing channel for intensive land uses.

## CHANGING THE ROLE OF TEACHERS IN PRESENT EDUCATION SYSTEM:

From Teacher Centric to  
Learner Centric

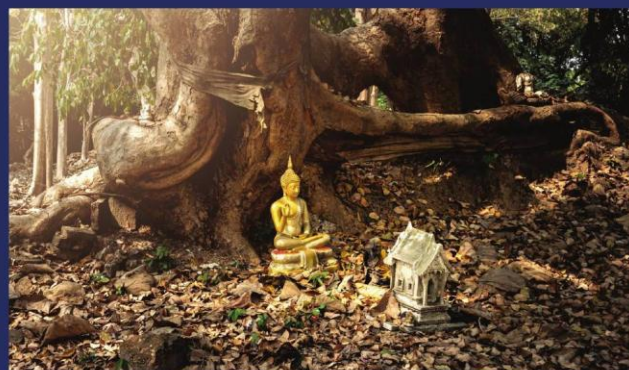
DR. SANJOY PATHARI

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### INTRODUCTION

All over the world there have been a great number of changes in the education system in recent years. In this age of rapid changes in the present education system, the adoption of technology, new curriculum, new student assessments, government rules, school/college participation in the reform programmes, etc. have also changed the role of teachers in modern era. In the past, teachers used to be the major source of knowledge, the leader and educator of their students school or college life. Now-a-days, apart from imparting knowledge, teachers provide information and show their students how to tackle them. Although teachers are still considered to be a kind of leader in the class, now a day they can be thought of as facilitators in the teaching learning process. In this paper an attempt has been made to highlight the key roles required for a teacher to make an *Effective Teaching Learning Process (ETLP)* in the digital era.

The Tai Khamyangs, a subgroup of the great Tai people, are numerically a small Tai Buddhist tribe of Assam. They are the followers of Theravada Buddhism. Based on oral history, formerly they resided in the Khamyang valley, along the Nongyang Lake in the Patkai Mountains in present day Myanmar. In the beginning of the 19th century they left their settlement in the Patkai and immigrated to Assam. The Tai Khamyangs possess a rich socio-cultural heritage and an enormous amount of indigenous knowledge (IK) traditions. In this book, an attempt has been made to briefly study the social and cultural life of the people as well as document their traditional health care system. Living a synchronized life and maintaining a constant interaction with nature has enabled them to meticulously observe, scrutinize and exploit the rich plant resources around them. As a result, they have developed important IK of utilizing the vast available plant resources. Amongst them the knowledge and mode of utilizing different medicinal plants in their traditional health care system is the most important. There is an urgent need for in-depth scientific studies and proper documentation of their IK traditions.



Ripunjy Sonowal

Dr. Ripunjy Sonowal M.Sc., Ph.D. (Dibrugarh University) is an Assistant Professor in the Dept. of Anthropology, North Gauhati College, Guwahati, Assam. He has published several research papers in reputed national & international journals, chapters in edited volumes, 1 eBook & co-edited 2 books. He is a life member of INCAA, Assam Science Society.

## The Tai Khamyangs

Socio-Cultural and Health Care Profile of a Tai Buddhist Tribe of Assam, Northeast India



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#### About the Book:

Creativity and innovations are the spirit of teaching learning process and development in the horizon of social sciences. Creativity and innovation convey about attention, concentration, consciousness and inspiration to learners as well as teacher-trainees, which ultimately guide to learning. The present volume titled "Developing Creativity and Innovation in Education" is a collection of thirty two research papers in different aspects on creativity and innovation in education.



**Guptajit Pathak**, IQAC Co-ordinator and Assistant Professor, Department of History, Kanya Mahavidyalaya (Affiliated to Gauhati University), Guwahati, Assam, India, is an academician, trilingual contemporary poet, story writer, script writer, author, translator, reviewer resource person as well as a prominent editor. His poems, stories, articles, reviews and research papers are published in many regional, national and international journals of repute & e-zines and translated into different languages. Mr. Pathak has been honoured with "Outstanding Researcher in History" Award for his contribution in historical research conferred by Global Outreach Research & Education Association in the 3rd Global Outreach Research and Education Summit & Awards on 31st July, 2019 at Bengaluru. Recently he has acted as a resource person in Online National Seminar titled "Literary Emperor Anna Bhau Sahe" on 1st & 2nd May, 2020 at Arts & Commerce College (Affiliated to University of Mumbai) Phondaghat, Maharashtra, India. At present, he is a Doctoral Research Scholar in the Department of History, Assam University (Central), Silchar, India and the convener of National and International workshops, seminars & conferences.



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# 6

## Health and Health Care in Tribal Society: An Anthropological Perspective

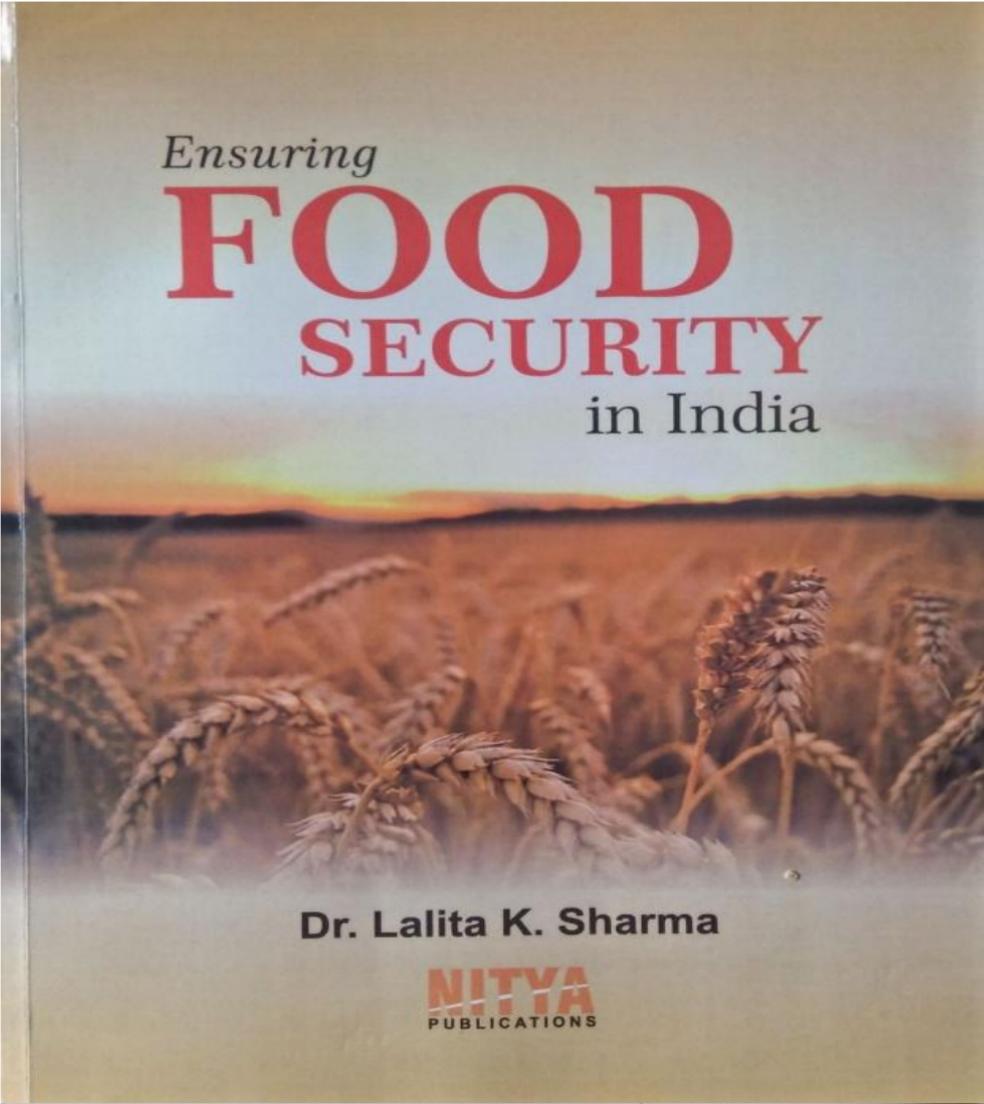
*Dr. Ripunjoy Sonowal*

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### I

According to the World Health Organization (WHO), health is defined “a state of complete physical, mental and social well-being and not merely the absence of diseases and infirmity”. Health is a holistic concept; it is one of the most important aspects of family welfare in particular; and community development in general. As a matter of fact, it is the starting point of all welfare activities (cultural, economic, educational, social, political, etc.). The health of a nation depends on the health of its inhabitants. Because of its overriding bearing on every aspect of people’s life, health is, probably very rightly considered to be one of the most sensitive indicators of human welfare. One of the primary responsibilities of any Government is therefore, to provide adequate health services to the people. Health, as a matter of fact, is a holistic concept. It is as much societal as a biological and medical issue. As a social issue it depends on a society’s technology and distribution of resources. The marked variation in health from nation to nation; and from society to society provides a strong evidence of the link between health and society in terms of its level of development (Kar & Dutta, 2001). In present times, infectious disease like influenza and pneumonia are no longer fatal as were earlier. But, as outcomes of development, now-a-days, the presence of some new diseases viz. cardiac problems, cancer, cardiovascular diseases, HIV/AIDS, TB, diabetes, etc. are the new additions in the morbidity list.

A state of health refers to a condition that permits an individual to adapt to its environmental situation with relatively minimal pain and discomfort, achieve at least some physical and psychic gratification and possess a reasonable probability of survival. A state of disease, on the other hand, is a condition that seriously obstructs against these adaptive requirements; and causes partial or complete disablement and physical and behavioral function. However, these are necessarily relative terms, because as stated by Landy (1977) that “no individual human is ever completely healthy”. Health, as a matter of fact is not only the result of interaction between an individual’s hereditary contribution with his or her natural and cultural environment, but it is also



*Ensuring*  
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**SECURITY**  
in India

**Dr. Lalita K. Sharma**

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### FOOD AND NUTRITIONAL SECURITY CONTRIBUTIONS OF WILD EDIBLE PLANTS: SOME ANTHROPOLOGICAL OBSERVATIONS FROM UPPER ASSAM

**Dr. Ripunjoy Sonowal**

Assistant Professor, Department of Anthropology  
North Gauhati College, Guwahati - 781031, Assam

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#### ABSTRACT

*Wild edible plants (WEPs) available in the surrounding natural environment are integral to the traditional food systems of the tribal people. The present paper documents 23 nutrient rich important WEPs used by the different tribal communities of Dibrugarh and Tinsukia districts in Upper Assam. The WEPs play a significant role in supplying food and nutritional requirements and increasing the health status of the tribal communities; besides, provide opportunity to generate household income. To improve food and nutrition security, it is imperative to promote sustainable utilization, conservation as well as limited commercial production of WEPs.*

*Keywords: Wild edible plants, Nutrition, Food security, Tribes, Upper Assam.*

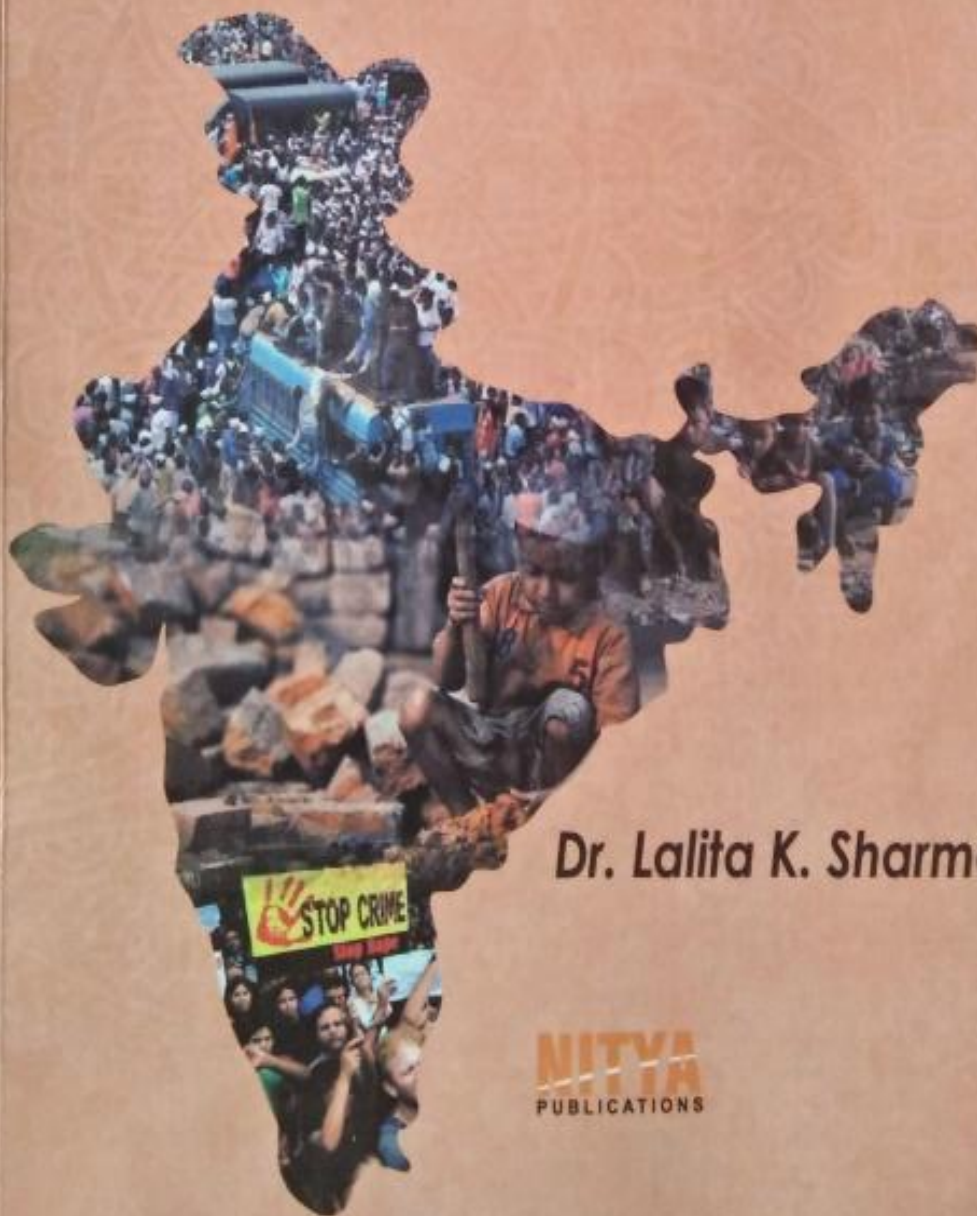
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#### 1.0 INTRODUCTION

Food security, as defined by the United Nations' Committee on World Food Security, means that all people, at all times, have physical, social, and economic access to sufficient, safe, and nutritious food that meets their food preferences and dietary needs for an active and healthy life. Many human populations around the world depend on wild edible or wild food plants on a daily basis for their subsistence, particularly for food security and medicines. Wild edible plants (WEPs) are of crucial importance in all parts of the world in supporting the global food basket (Chakravarty *et al.*, 2016). WEPs complement the diet of 1 billion people of the world (Burlingame, 2000) as a supplementary source of protein and vitamins, to improve the palatability of staple foods

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Causes and Measures



Dr. Lalita K. Sharma

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### SOCIOECONOMIC AND HEALTH ISSUES OF THE TEA GARDEN POPULATION OF ASSAM: AN ANTHROPOLOGICAL ANALYSIS

**Dr. Ripunjoy Sonowal**

Assistant Professor

Department of Anthropology

North Gauhati College, Guwahati - 781031, Assam

---

#### **ABSTRACT**

*The tea garden population of Assam is one of the most marginalized sections of the Indian society. Workers are dependent on tea estates for a range of basic services and have been subject to human rights violations. Poverty, illiteracy, rising population, extensive alcohol use among the males, substandard housing, poor living conditions and sanitation, low social position of women, hazardous working conditions, high disease prevalence, limited health facilities - all hamper their daily living. Accelerated socioeconomic development and committed implementation of preventive, promotive and curative public health services are required for the sustainable development of the tea garden population of Assam.*

*Keywords: Socio-economic, Health, Tea garden, Laborers', Assam*

---

#### **1.0 INTRODUCTION**

The tea industry in Assam is about 172 years old. It occupies an important place and plays an extremely valuable part in the national economy. Assam alone produces about 55% of India's total tea production. The tea garden (TG hereafter) population of Assam, an ethno-linguistic minority comprising 17% of the state's population, is spread over in 800 registered tea gardens plus several small gardens. They are the backbone of the tea industry of Assam. Their forefathers were brought by the British East India Company as indentured laborers from the regions of present day Jharkhand, Odisha, Chhattisgarh, West Bengal and Andhra Pradesh into colonial Assam from the 1830s through 1920s in multiple phases for the purpose of being employed in the tea estates. An estimated 4 million TG workers reside in residential quarters in labour colonies built inside the tea estates located in districts of Upper Assam and Northern Brahmaputra belt like Dibrugarh, Tinsukia, Charaideo, Sivasagar, Jorhat, Golaghat,

# MICROBES - FERMENTED FOODS AND HUMAN HEALTH



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## TRADITIONAL FERMENTED FOODS OF THE TAI KHAMYANG TRIBE OF ASSAM

**Dr. Ripunjoy Sonowal**

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### **Abstract**

*The paper documents the popular traditional fermented foods of the Tai-Khamyang tribe of Assam, including the consumption and processing methods. Fermentation process for preparing fish items Plasoum and Pla-nou; meat product - Noe-soum; and vegetable items No heib, Pa-kat soum and Phaman soum are carried out at room temperature and the end products are consumed along with regular meals. The fermented foods provide taste, nutritional enhancement and food preservation options. Scientific studies on the nutritive and medicinal value of these products can provide valuable information.*

**Keywords :** Fermentation, Pla-soum, Khamyang, Assam

\*\*\*\*\*

### **Introduction**

Food fermentation can be defined as “a controlled microbial growth and enzymatic conversions of major and minor food components” (Marco *et al.*, 2017). Each fermented food is associated with a unique group of micro-flora which increases the levels of protein, vitamins, essential amino acids and fatty acids. Traditional fermented foods are palatable and wholesome foods prepared from raw or heated raw materials by microbial actions. Through trial and error, traditional skills have been developed for controlling technical parameters during fermentation processes (Holzapfel, 2002). Fermented foods in various forms are essential items in the traditional food systems of different cultures of the world. In Northeast (NE) India, fermented food and beverages, prepared using local edible plants and other biological resources have been going on since time immemorial and is a common practice. Fermented food products are produced traditionally at home by the different tribal communities guided by the wisdoms of the elderly knowledge holders. They know how to obtain desirable products for

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## DEATH CUSTOMS AND RITUALS OF THE TANGSA TRIBE: A BRIEF ANTHROPOLOGICAL NOTE

**Ripunjoy Sonowal**

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*North Gauhati College, Guwahati - 781031, Assam*

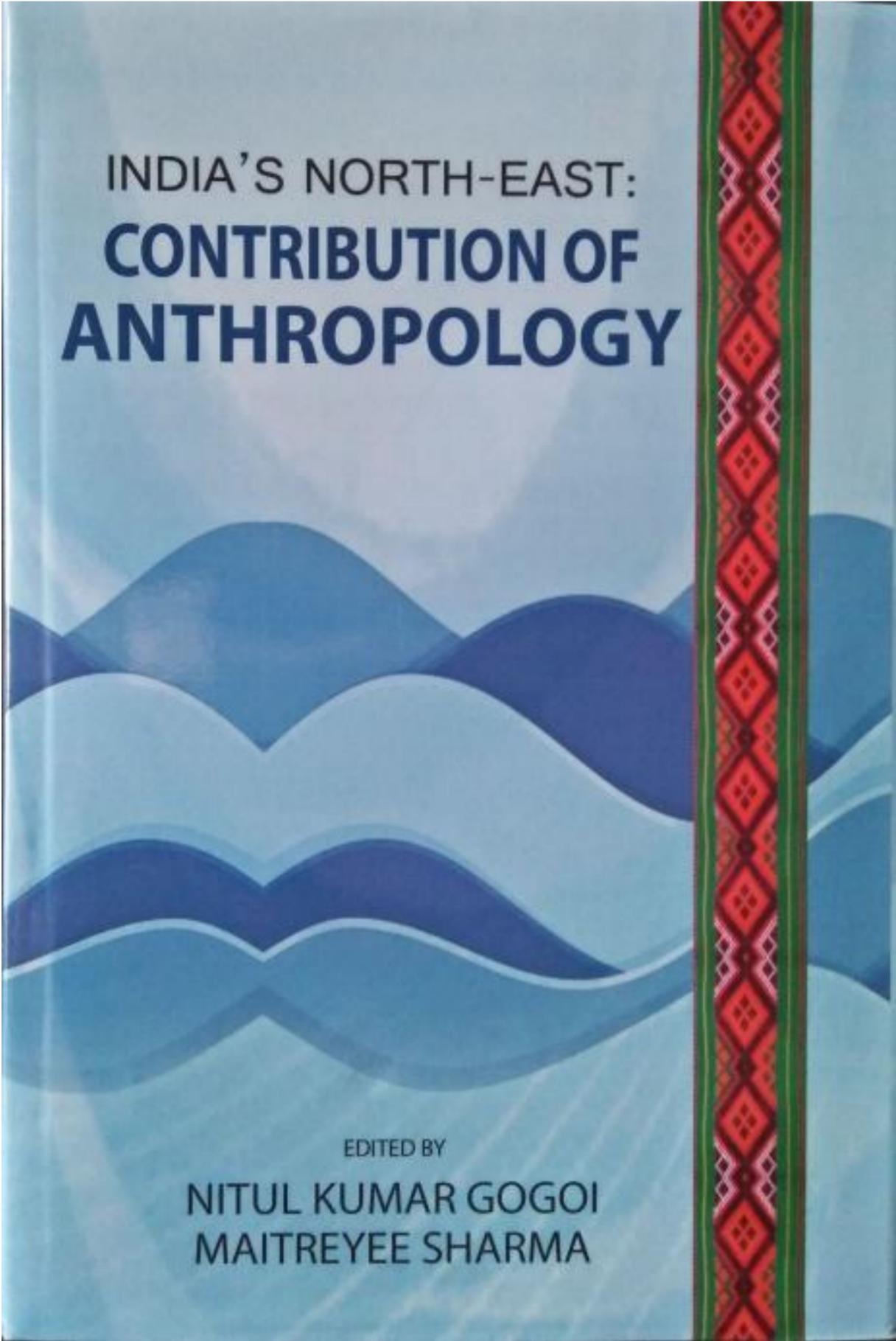
### **Abstract**

Death rituals and funeral practices among tribal communities encompass a wide range of traditional beliefs, and are one of the most visible cultural features. They are deeply rooted in the cultures and histories of the tribal societies; they are never written down, only passed on from generation to generation and repeatedly performed. A common aspect is the idea that the soul or spirit of a person lives on after their physical death and journeys into the afterlife. Tribal death rituals are therefore significant because they deal not only with the afterlife of the dead, but also with the well being of the surviving family members, relatives, friends and the villagers as well. This brief paper is an attempt to explore and document the death customs and rituals of the Tangsa tribe.

**Keywords:** Death ritual, Funeral feast, Mortuary pole, Tangsa, Northeast India.

### **INTRODUCTION**

Death customs and rituals of the tribal communities living in different parts of the world are one of the most visible cultural features. Death rituals and practices are expressions of cultural blueprint, of attitudes, values and ideals passed down by each successive generation, which an individual learns as a member of society. The analysis of mortuary practices provides rich data on the behavior of kin and community. It leads to people's notions of gods, souls, witches, spirits and afterworlds. It promises access to their belief and value systems, to their conceptions of the social and moral worlds. It informs that ritual has consequences for both the individual and society (Cohen, 2002). According to Van Gennep (1966), rituals performed at death resemble those



INDIA'S NORTH-EAST:  
**CONTRIBUTION OF  
ANTHROPOLOGY**

EDITED BY  
NITUL KUMAR GOGOI  
MAITREYEE SHARMA

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# **SOUL LOSS AND ITS RETRIEVAL: AN ANTHROPOLOGICAL STUDY OF THE *AIYUH TULA* RITUAL OF THE SONOWAL KACHARI TRIBE OF ASSAM**

**Ripunjoy Sonowal**

### **I**

The soul or soul-substance is the intangible essence of a living being. It comprises the mental abilities of a living being: reason, character, feeling, consciousness, memory, perception, thinking, etc. Plato believed the soul to be an entity that was fundamentally distinct from the body although it could be and often was affected by its association with the body, being dragged down by what he called in one passage *the leaden weights of becoming*. Ideally the soul should rule and guide the body, and it could ensure that this situation persisted by seeing that the bodily appetites were indulged to the minimum extent necessary for the continuance of life. This soul or soul-substance, however, in its personal manifestations, can separate itself temporarily from the body during life (Rivers 1920), thus leading to soul loss. Achterberg (1985) characterizes soul loss as an injury to the core or essence of one's being; reflecting concerns with the essence of crucial aspects of the self, involving the loss of, or injury to, fundamental aspects of personal identity. This injury to one's essence is manifested in

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**Dr. Sweety Singh**

**First Edition 2021**

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# Indigenous Knowledge, Traditional Agriculture and Environmental Sustainability: Perspectives from Northeast India

**Dr. Ripunjoy Sonowal**

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*Abstract: The indigenous agricultural practices exhibit excellent environmental sustainability and conservation aspects. They are designed to preserve biodiversity, provide dietary variety and healthy food, and promote food security. This paper attempts to explore and examine the sustainable agricultural practices: use of plants as traditional agricultural indicators by the Sonowal Kachari tribe of Assam, the rice-cum-fish cultivation system of the Apatani tribe of Arunachal Pradesh, alder based agroforestry system of Nagaland, and the indigenous irrigation systems - Zabo of the Chakhesang Nagas of Nagaland and Dong (Doisa) of the Bodos of Assam, which are remarkable examples of indigenous knowledge. The findings underscore the need to collaborate the highly effective traditional agricultural practices with modern science to promote sustainable agricultural technology and biodiversity conservation.*

**Keywords:** Agriculture, Apatani, Doisa, Indigenous knowledge, Phenology

## Introduction

Indigenous Knowledge (IK) refers to the systematic body of knowledge (skills, technologies, know-how, beliefs and practices) of the indigenous or local communities around the world about relationships between people, habitat and nature. This knowledge is the holistic sum of facts that are known or learned from experiences or acquired through careful observations, and trial-and-error experiments and handed down from generation to generation usually by word of mouth and cultural practices. IK is adapted to the local culture and environment; it encompasses knowledge commonly known within a community as well as knowledge that may be known only to a single person or to the tribal elders, a lineage group or a gender group, applied to maintain or improve the livelihood of the community. According to Warren (1991), IK is the local knowledge – knowledge that is unique to a given culture or society. It is the basis for local-decision making in agriculture, health care, food preparation, education, ecological resource management, and a multitude of other activities that support rural communities around the world.

Evidences around the world indicate a strong relationship between IK, environmental sustainability and development. In that respect, traditional agricultural practices presents a

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Editor  
Hemen Chandra Majumdar

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**Hemen Chandra Majumdar**

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## Carotenoid Contents of Four Selected Microalgae Isolated from Deepor Beel Ramsar Site (India)

Hunmily Teronpi  
Jyotishmita Dutta  
P.P. Baruah

### Abstract

Carotenoids are recognized as one of the efficient antioxidants for quenching singlet oxygen which can trap peroxy radicals and are widely used as colorants in natural foods such as egg yolk, chicken and fish, and thus enter into human food webs. Their roles in nutraceutical, pharmaceutical and cosmetic industries, as well as in aquaculture are now well understood. Carotenoids such as  $\beta$ -carotene,  $\beta$ -cryptoxanthin, lycopene, lutein and zeaxanthin are known to have beneficial health effects. Microalgae are one of the most efficient organisms at transforming solar energy, carbon dioxide and inorganic elements into nutrient rich biomass. Some of them are very efficient producers and accumulator of various carotenoids. Although the diversity of microalgae is enormous, only a few species have been widely studied and used for the production of carotenoids. In the present study, some microalgal isolates of Deepor beel Ramsar site were assessed for carotenoid production. The result revealed that among the four selected isolates, *Chlorella fusca* showed the highest carotenoid content and therefore, could be considered a feasible alternative for the production of carotenoids to meet the emerging demands.

**Keywords:** Carotenoids, Deepor beel, Ramsar site, Microalgae.

## Microbial Degradation of Monoaromatic Hydrocarbon Toluene through *Nocardioopsis alba*

Ruby Doley  
Mahendra Barman  
Jayashree Talukdar  
Manoj Barthakur

### Abstract

Toluene, a methyl substitution on the aromatic benzene ring is a polycyclic aromatic hydrocarbon (PAH), is persistent in the environment and is carcinogenic, mutagenic and toxigenic. The aim of present study was to isolate and characterize a bacterial strain capable for degradation of toluene hydrocarbon from oil contaminated soil sample of Guwahati Refinery. Altogether 25 isolates were obtained from soil sample of which, isolate designated as R<sub>1</sub> was found more efficient to grow in minimal salt medium (MSM), supplemented with toluene. The strain was finally identified as *Nocardioopsis alba* through 16S rDNA sequence analysis and molecular phylogeny. GC-MS analysis in the toluene supplemented culture broth detected the metabolites such as cyclobutanecarboxylic acid, 1,2,4-benzenecarboxylic acid, cyclopropenecarboxylic acid, propionic acid and 1,2-benzenediol strongly suggested the degradation of toluene through *Nocardioopsis alba* RD3.

**Keywords:** Toluene, biodegradation, polycyclic aromatic hydrocarbon (PAH), *Nocardioopsis alba*, FT-IR and GC-MS.

## Microbial Transformation of Aromatic Hydrocarbon Naphthalene to Medium and Long Chain Hydrocarbons through *Staphylococcus pasteurii*

Ruby Doley

Apurba Kalita

Manoj Barthakur

### Abstract

Aliphatic Hydrocarbons having single bond with longchain carbon and hydrogen atoms are leaser toxic and also accumulate more energy than double bonded aromatic hydrocarbons. More potential energy is associated in a linear molecule having more carbon and hydrogen atoms than the compounds with branch and double bonded compounds. A bacterial strain have been isolated from oil contaminated soil of Guwahati Refinery, Assam was identified as *Staphylococcus pasteurii* RD2 through biochemical tests, 16SrDNA sequence analysis and molecular phylogeny. The bacterial strain able to transform polycyclic aromatic hydrocarbon naphthalene to a number of single bonded long chain hydrocarbons. GC-MS analysis reveals the biotransformation of naphthalene to its aliphatic derivatives having medium and long chain hydrocarbon with linear and single bonded aliphatic compounds. Detection of certain metabolites such as Nonane, Decane, Dodecane, tetradecane, Hexadecane and Eicosane suggested that naphthalene has been transformed to such medium and long chain aliphatic hydrocarbons by *Staphylococcus pasteurii*RD2. However the detection of



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## Chapter - 10

### A Review on Microbial Degradation of Xylene

Ruby Doley and Manoj Barthakur

#### Abstract

Monoaromatic pollutants such as mixture of xylenes are now known to be widespread contaminants of several environments. Xylene, an organic compound is a hazardous, noxious substance, that has been major concerns regarding to heterogeneity and eco-toxicity towards living organisms. Bioremediation by using microorganisms, in treating such pollutants is showing a promising technology as it is considered safe and cost-effective option among various other technologies. The use of bacteria in biodegradation of various natural and synthetic compounds in reducing the level of environmental hazards, is increasingly drawing attention. This review is focused to explore the various mechanisms of biodegradation of xylene through bacterial diversity.

**Keywords:** Xylene, biodegradation, bacteria

#### Introduction

Xylene, also known as dimethylbenzene or xylol is an organic chemical compound with molecular formula  $C_8H_{10}$ . It has a central benzene ring with two methyl group attached as substituents. Its molecular weight is 106.16 g/mol, density 0.864 g/mL, boiling point  $138.5^{\circ}C$  and melting point  $-47.4^{\circ}C$ . Xylene is a colourless, flammable, sweet smelling, non-viscous and toxic liquid. It is soluble with various organic solvents but insoluble in water. Xylene are found as ortho-xylene, meta-xylene and para-xylene specifying the position to which carbon atom the two methyl groups are attached. Commercially obtained xylene or laboratory grade xylene contains a mixture of isomers [ortho-(o-), meta-(m-), and para-(p-)] containing variable proportions of ethylbenzene <sup>[1]</sup>.

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## A Weak Galerkin Mixed Finite Element Method Based on Crank-Nicolson Scheme for the Parabolic Problems

Jogen Dutta<sup>1, 2, a)</sup> and Bandita Roy<sup>1, b)</sup>

<sup>1)</sup>Department of Mathematics, Indian Institute of Technology Guwahati, North Guwahati- 781039, India.

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**Abstract.** In this paper, we propose a weak Galerkin mixed finite element method (WG-MFEM) based on Crank-Nicolson discretization to solve parabolic problems. The basic idea to WG-MFEM is to apply discrete weak divergence operator which is locally defined on each element. Optimal order error estimates in  $H^1$ -norm and  $L^2$ -norm are derived. Finally, we discuss some numerical results to verify our theoretical findings.

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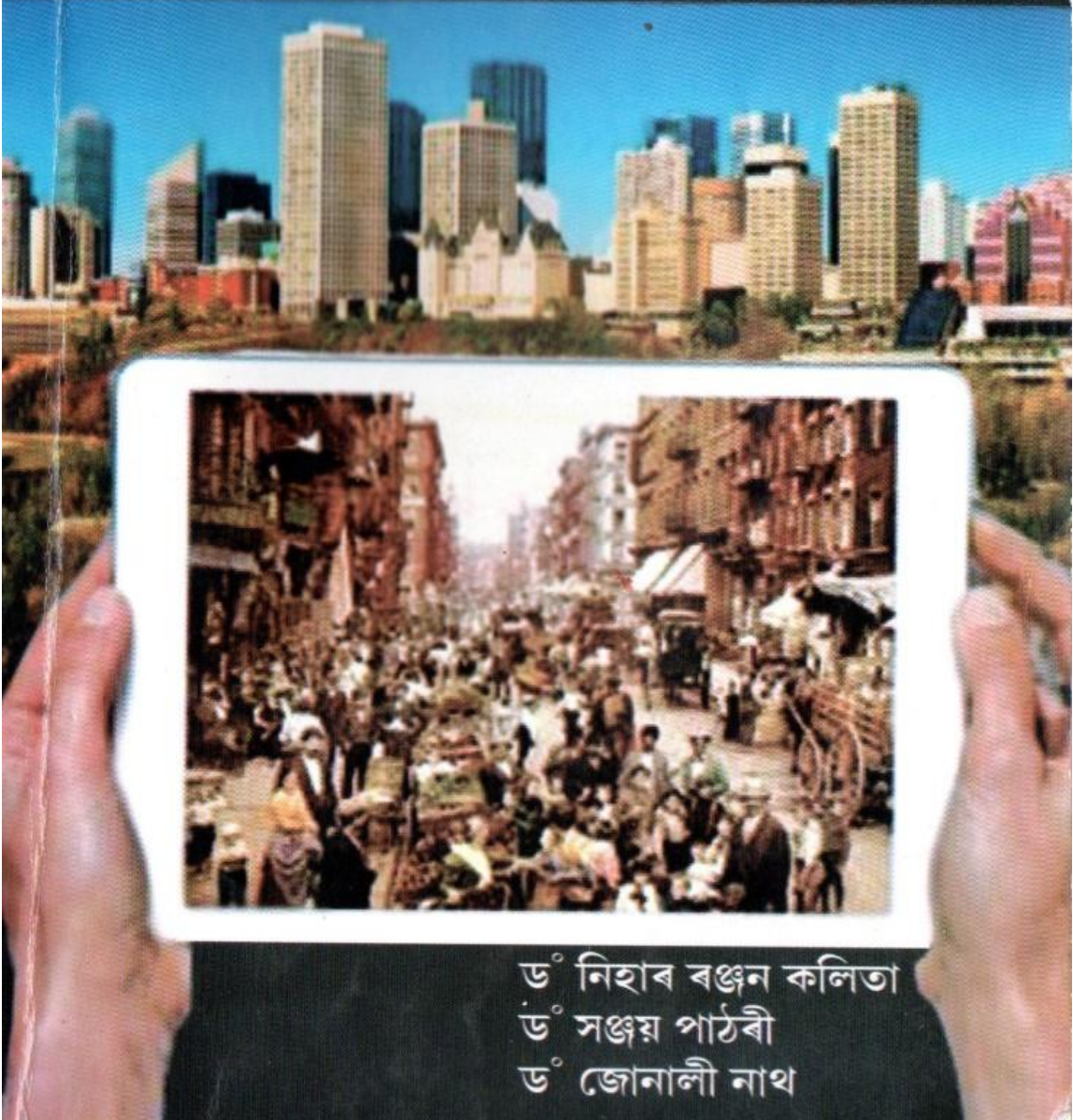
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## ALGAE: A POTENTIAL TOOL FOR ENVIRONMENTAL MONITORING

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Algae are a large group of diverse photosynthetic organism. They are autotrophic and ubiquitous in distribution. It includes unicellular microalgae to large multicellular algae such as giant kelp. The appearance of any algae in a niche is affected both by biotic and abiotic factors. The trophic status of any ecosystem can be determined by the composition of algae, their temporal variation and abundance. Algal communities are sensitive to their changing habitat for which their biomass can be used as an indicator to assess the water quality. Algae are microscopic organism living in both soil and water bodies. They are autotrophic component of the aquatic ecosystem serving the base of many aquatic food webs. The health of an aquatic ecosystem, can be measured by the presence of algae. Some algae influence the presence of other organisms in water bodies and some are evidence of poor water quality.

Besides being a health indicator, algae also serve as a food for many larger organisms in the aquatic ecosystem. Thus, it plays the

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# CLIMATE CHANGE AND THE POTENTIAL IMPACTS ON INDIGENOUS PEOPLES HEALTH: A BRIEF OVERVIEW

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## INTRODUCTION

Climate change is the variation in global or regional climates over time. It describes changes in the state of the atmosphere over time scales ranging from decades to millions of years. These changes can be caused by processes inside the earth, external forces (like variations in sunlight intensity) or, more recently, anthropogenic activities. In recent usage, the term "climate change" often refers only to changes in modern climate, including global warming. With regard to human health, especially the health of the indigenous populations inhabiting various geographical regions around the world, climate change is a major concern and an emerging threat. There are an estimated 370 million *indigenous people* living in more than 70 countries worldwide. The Intergovernmental Panel on Climate Change (IPCC) Fourth Assessment Report has noted that the global population at risk from vector-borne diseases will increase between 220 million and 400 million in the next century (Parry *et al.*, 2007). Tropical and

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সম্পাদক

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শ্বিলং-বিষ্ণুপুৰৰ শ্ৰীমন্ত শঙ্কৰদেৱ কৃষ্টিকেন্দ্ৰত এভূমুকি ৬ হৰেন্দ্ৰ তালুকদাৰ ♦ ১৪৭  
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নামঘৰ সমাৰোহ উদ্যাপন সমিতি আৰু উপ-সমিতিসমূহৰ আলোকচিত্ৰ

# উত্তৰ গুৱাহাটী অঞ্চলত বৈষ্ণৱ ধৰ্মৰ পৰম্পৰা : এক অৱলোকন

অনামিকা বৰা

## আৰম্ভণি :

উত্তৰ-পূব ভাৰতৰ দুৱাৰমুখ গুৱাহাটী মহানগৰৰ উত্তৰ পাৰে অৱস্থিত অঞ্চলটোৱেই উত্তৰ গুৱাহাটী। এই অঞ্চলৰ ভৌগোলিক অৱস্থান  $26.20^{\circ}$  উঃ/ $91.98^{\circ}$  পূঃ। সমগ্ৰ অঞ্চলটোৰ ভূমিকালি প্ৰায় ২০ বৰ্গ কিলোমিটাৰ। ৩৫ হাজাৰৰ অধিক লোকৰ বসতি স্থান এই অঞ্চলত প্ৰায় ৩৮ খন গাঁও আছে। প্ৰতিখন গাঁৱৰে নিজস্ব বৈশিষ্ট্য আছে।

উত্তৰ গুৱাহাটী ইতিহাস প্ৰসিদ্ধ অঞ্চল। পাল বংশৰ দিনৰ পৰা আহোম বজাৰ দিনলৈকে এই অঞ্চলৰ ইতিহাস জড়িত আছে। ওখ ওখ পাহাৰ আৰু গড়েৰে আবৃত এই অঞ্চলটো শৰাইঘাট যুদ্ধৰ স্মৃতি বিজড়িত অঞ্চল, কামৰূপৰ বুৰঞ্জীমতে পাল বংশৰ শক্তিশালী বজা ধৰ্মপালে ইয়াত ৰাজধানী পাতিছিল। পাল বংশৰ আন এজন ৰজা ৰত্নপালৰ দিনত ৰাজধানী উত্তৰ গুৱাহাটীৰ নাম আছিল 'দুৰ্জয় নগৰ'। অৰ্থাৎ শত্ৰুৱে পৰাজিত কৰিব নোৱৰা চাৰিওফালে গড়েৰে আবৃত এখন নগৰ। প্ৰাগ্‌ঐতিহাসিক কালৰে পৰা অসমৰ সামাজিক, অৰ্থনৈতিক, ৰাজনৈতিক, ধৰ্মীয় তথা সাংস্কৃতিক দিশত উত্তৰ গুৱাহাটীৰ অৱদান অনস্বীকাৰ্য। প্ৰথমজন কলাৰ স্নাতক আনন্দৰাম, প্ৰথমজন অভিযান্ত্ৰিক স্নাতক বলী নাৰায়ণ বৰা, প্ৰথমজন আইনৰ স্নাতক মাধৱ চন্দ্ৰ বৰদলৈ আৰু প্ৰথমজন চিকিৎসা বিজ্ঞানৰ স্নাতক কৰ্ণেল শিৱৰাম বৰাৰ জন্মস্থান উত্তৰ গুৱাহাটী। সদৰামীন গৰ্গৰাম বৰুৱা, বুৰঞ্জীবিদ সদৰামীন হৰকান্ত বৰুৱা, প্ৰত্নতত্ত্ববিদ সোণাৰাম চৌধাৰী, শংকৰী গৱেষক উপেন লেখাৰু, ৰাজনীতিবিদ সাহিত্যিক-শিল্পী লক্ষ্মণৰ সৌধুৰী, সঙ্গীতাচাৰ্য লক্ষীৰাম বৰুৱা, কৰ্মযোগী প্ৰফুল্ল চন্দ্ৰ বৰুৱা, কৰ্মীৰ নবীন চন্দ্ৰ বৰদলৈ তেখেতৰ কন্যা পদ্মশ্ৰী নলিনীবালা দেৱীৰো জন্মস্থান উত্তৰ গুৱাহাটী। এই উত্তৰ গুৱাহাটীৰেই জোঁৱাই তিনিজন হ'ল— স্বাধীন অসমৰ মুখ্যমন্ত্ৰী লোকপ্ৰিয় গোপীনাথ

# আধুনিক অসমীয়া কবিতাত এভুমুকি

সম্পাদনা  
নিশামণি দাস



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(কববী ডেকা হাজৰকী, নিৰ্মলপ্ৰভা বৰদলৈ, তোষপ্ৰভা  
কলিতাৰ কবিতাৰ উল্লিখনসহ)

অনামিকা বৰা\*

কবিতা মানৱ মনৰ সুকুমাৰ প্ৰকাশ। মানুহৰ এক সহজাত প্ৰবণতা হ'ল পোনপটীয়াকৈ কোৱা কথাৰ বিপৰীতে সুৰীয়া কথাৰ প্ৰতি মানৱমনে সহজেই আকৰ্ষিত হয়। এই আকৰ্ষণৰ নীতিৰ ফলতেই সৃষ্টি হৈছিল কবিতাৰ। পৃথিৱীৰ প্ৰতিটো সভা জাতিৰে সাহিত্যৰ আৰম্ভণি ঘটিছিল সম্ভৱতঃ কাব্যৰ মাজেৰেই। অসমীয়া সাহিত্যৰ ইতিহাসো কাব্যতে আৰম্ভ হৈছে।

অসমীয়া কাব্য সাহিত্যৰ এক গৰিমাময় ইতিহাস আছে। অসমীয়া কবিতাৰ প্ৰাচীনতন গীত লোকগীতসমূহৰ মাজতেই বিচাৰি পোৱা যায়। হাজাৰ বছৰীয়া পৰিক্ৰমা অতিক্ৰম কৰি অসমীয়া কবিতাই সাম্প্ৰতিক কালত এক বিশিষ্ট ৰূপ লাভ কৰিছে। সাম্প্ৰতিক অসমীয়া কবিতাক নব্বৈ দশকৰ পৰা বৰ্তমানলৈকে ধৰা হয়। এই কালৰ কবিসকলে অধ্যয়নৰ জ্ঞানতকৈ অভিজ্ঞতালব্ধ অনুভূতিক বিশেষ গুৰুত্ব দিয়ে। সাম্প্ৰতিক অসমীয়া প্ৰায়বোৰ কবিতাতে ঐতিহ্য চেতনা প্ৰতিভাত হোৱা দেখা যায়। ঐতিহ্যবোধ আৰু ঐতিহ্য চেতনা সাম্প্ৰতিক কবিতাৰ উল্লেখযোগ্য বৈশিষ্ট্য। সেয়েহে, মহাকাব্যিক সমল গ্ৰহণ কৰিও সাম্প্ৰতিক অসমীয়া কবিসকলে কবিতা ৰচনা কৰা দেখা যায়।

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\* সহকাৰী অধ্যাপিকা, অসমীয়া বিভাগ, উত্তৰ গুৱাহাটী মহাবিদ্যালয়

# নারী আর চিন্তন



সম্পাদনা

আরতি বসুমতাবী ।। ড° বর্ণালী কাকতি

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# অসমীয়া মহিলাৰ সাজপাৰ, অলংকাৰ, আচাৰ-ৰীতি, গীত-মাত, পূজা-পাতল : এটি চমু আলোকপাত

অনামিকা বৰা

আৰম্ভণি : সংস্কৃতি বুলিলে সভ্যতা বুলি যদিও বুজা যায়, তথাপি সংস্কৃতি সভ্যতাতকৈ কিছু অংশত বেলেগ। সাধাৰণতে প্ৰায়ে দেখা যায় যে, সভ্যতাৰ প্ৰকাশত সংস্কৃতিৰ বিকাশ হয়। পৰস্পৰে পৰস্পৰৰ ওপৰত প্ৰভাৱ বিস্তাৰ কৰে। সংস্কৃতি হ'ল জীৱন যাত্ৰাৰ আদৰ্শ আৰু পথ। এই আদৰ্শই সমাজক এটা নিৰ্দিষ্ট বাটেদি লৈ যায়। সেই আদৰ্শ সমাজৰ প্ৰত্যেক কৰ্ম প্ৰচেষ্টাৰ লগত আমি উপজিছোঁ আৰু যিখন সমাজত আমি ডাঙৰ দীঘল হৈ জীয়াই আছোঁ, সেই সমাজৰ সংস্কৃতিয়েই আমাৰো সংস্কৃতি। সেই সংস্কৃতিৰ প্ৰভাৱ আমাৰ কথাত, আচৰণত আৰু কামত প্ৰতিফলিত হয়। জীয়াই থকা কালছোৱাত সেই সংস্কৃতিয়েই আমাক জীয়াই ৰাখে।

সভ্যতা সংস্কৃতিৰ অন্যতম পথ নিৰ্দেশক হ'ল সাজপাৰ আৰু অলংকাৰ পাতি। জাতি এটাৰ সাজপাৰ আৰু তাৰ উপকৰণৰ ওপৰত ভৌগোলিক প্ৰভাৱ আৰু ব্যৱহাৰিক প্ৰয়োজন অস্বীকাৰ কৰিব নোৱাৰি। তথাপি সাজ-পোছাকৰ পৰা বৰ্ণ, শ্ৰেণী, বিবাহিত, অবিবাহিত, বয়স, লিঙ্গ — এই প্ৰভেদ সমূহৰো সংকেত পায়। পুৰোহিত-ব্ৰাহ্মণ, মহন্ত-সত্ৰাধিকাৰ, বৈৰাগী-সন্যাসীৰ লগত সাধাৰণ সাজপাৰৰ আজিও পাৰ্থক্য আছে। বিধৱা-

# **TOWARDS GENDER EQUALITY: THE ROLE OF WOMEN IN THE SOCIAL PARADIGM SHIFT**



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## DOISINGARI'S DAUNTLESS DAUGHTER'S LEGACY

**Dr. Maloshi Choudhury**

Associate Professor, Department of English,  
North Gauhati College

The world in 2022, stands upchanting the mantra of *gender equality for a sustainable tomorrow* (theme of International Women's Day, 2022) and here in Assam we join the movement by taking pride in and offering our obeisance to Chandraprava Saikiani, a prolific author, a freedom fighter, a social reformer and the pioneer activist of feminist movement of Assam and also a household name in pre-independent Assam. The mission undertaken by her, the quest nurtured by her and her search of hope and faith amidst turmoil and confusion in colonial Assam (India) is relatable even today. The Indian diverse cultural suppositions along with the influence of Eurocentric assumptions have been instrumental in silencing of women's voices since ages. This age-old saga remains true even today and the main stream discourse debating on women's muted, marginalized, invisible position in all spheres of public and private life continues.



# নিৰুপমা বৰগোহাঞি



ড° মালতী চৌধুৰী



ড° মালতী চৌধুৰী উত্তৰ গুৱাহাটী মহাবিদ্যালয়ত সহযোগী অধ্যাপিকা তথা ইংৰাজী বিভাগৰ মুৰব্বী অধ্যাপিকা হিচাবে কামনিৰ্বাহ কৰি আছে। সাহিত্য চৰ্চাত জড়িত হৈ থকা লেখিকাৰ বিভিন্ন কবিতা, গল্প, প্ৰবন্ধ আদি আলোচনী আৰু সংকলত প্ৰকাশ পাইছে।

ইংৰাজী ভাষা শিক্ষন পদ্ধতি শীৰ্ষক সভা/বেঠকত সমল ব্যক্তি হিচাবে অৰিহণা আগবঢ়োৱাৰ লগতে সমান্তৰালভাৱে দেশ-বিদেশত অনুষ্ঠিত গৱেষণা চক্ৰ, সন্মিলনত গৱেষণা পত্ৰ পাঠ আৰু প্ৰকাশ কৰি সুখ্যাতিৰে যোগদান কৰি আহিছে।

— প্ৰকাশক

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# Bioactives and Pharmacology of *Punica granatum* L.

RUNA RAHMAN and HRISHIKESH UPADHYAYA

Department of Botany, Cotton University, Guwahati-781001, Assam, India, E-mail: hkupbl\_au@rediffmail.com (H. Upadhyaya)

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## 54.1 INTRODUCTION

*Punica granatum* L. (Pomegranate) is a large deciduous shrub or small tree and belongs to the family Punicaceae. Pomegranate is native from Iran to Northern India and is widely cultivated in the Mediterranean, in tropical and in subtropics (Doostkam et al., 2020). Pomegranate is well known for its highly nutritious and delicious fruit, but the different parts of the plant are used in folk medicine of different cultures. Pomegranate is known by different names in different languages such as Rumman (Arabic), Dalim (Assamese), Dalimgachh (Bengali), Anar (Hindi), Melogrante (Italian), Dadiman (Malayalam), Dalimba (Marathi), Granda (Philippine), Granate (Russian), Grando (Spanish), Granatrad (Swedish), Kalumal madalai (Tamil), Danimma (Telugu) and Anarmitha (Urdu). It is also known as Chinese apple, Carthage Apple, and Seeds Apple (Kumar et al., 2018; Haque et al., 2015).

Since ancient times, pomegranate flowers, leaves, bark of young shoots and roots, fruit peel have been traditionally used. Pomegranate has been used as astringent and anti-inflammatory medications in traditional Chinese medicine (TCM) (Rahimi et al., 2019). In traditional Ayurvedic medicine, it has been used in the treatment of diarrhea, dysentery, and intestinal parasites, nose, and gum bleeding, skin toning, and hemorrhoids (Alshammari et al., 2017).

**GEO-SPATIAL TECHNOLOGIES  
IN RURAL DEVELOPMENT**

*Editors*  
**Dr. A. Simhachalam  
Dr. R. Murugesan**

# **GEO-SPATIAL TECHNOLOGIES IN RURAL DEVELOPMENT**



*Editors*  
**Dr. A. Simhachalam  
Dr. R. Murugesan**



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## ASSESSING FOREST CHANGE TRAJECTORIES ALONG THE ASSAM- ARUNACHAL PRADESH BORDER USING OPEN-SOURCE DATA

Dr. Chandra Kant Pawe<sup>1</sup>, Dr. Lekha Borah<sup>2</sup> and  
Mr. Deepankar Medhi<sup>3</sup>

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### Abstract:

The Northeastern part of India represents a part of the Eastern Himalayan Biodiversity Region and has a flourishing biodiversity of Indo-Malayan and Indo-Chinese characteristics offering diverse ecosystems with different forest types. Notably, Arunachal Pradesh and Assam are the two largest states in the region sharing a land border of 749 kms approximately. The knowledge of changing landscape due to diverse factors, regulated by natural and human processes, and their concomitant implications play a critical role in sustainable governance. More particularly, understanding the implication of human actions on the biodiversity rich forested areas along the remote border of Assam-Arunachal is important for maintaining ecological integrity of the region. In recent years, several open data platforms have facilitated the prospects to access geo-spatial data which can be used to perform various remote sensing analyses. The present paper demonstrates the application of open access data to analyse the forest cover change in the study area with a buffer cover of 25 km on either side of the border. The assessment was carried for the period between 2000 and 2020.

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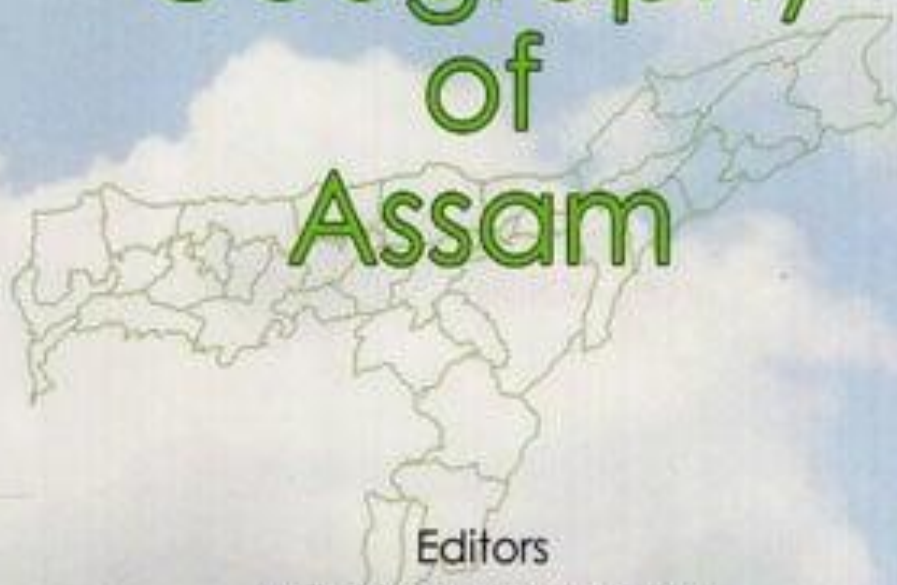
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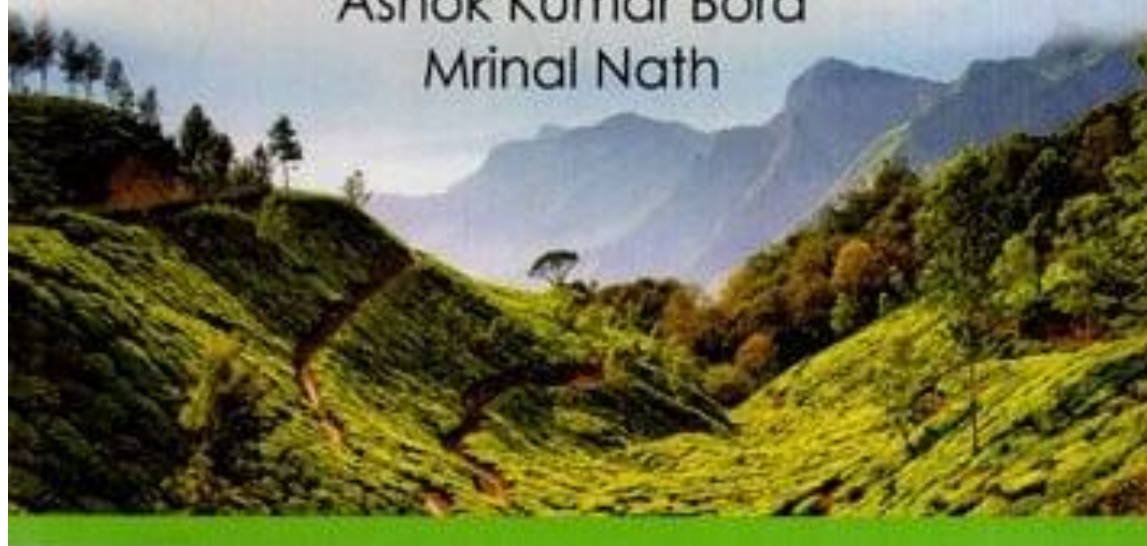
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# An Illustrated Geography of Assam

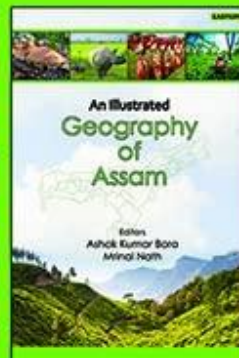


Editors  
Ashok Kumar Bora  
Mrinal Nath



### The Book

This book entitled 'An Illustrated Geography of Assam' contains a collection of twenty articles contributed by a group of authors across different disciplines. The articles address the varied themes covering the land and people of Assam, viz. Assam in chronological perspectives, topography and physiography, geology and minerals, soils, climate, rivers, wetlands, water resources, forest resources and biodiversity, land use land cover, natural disasters, ethnic groups and ethnicities, population growth and demographic changes, rural and urban settlements, agriculture, industries, transport, tourism, geopolitics and health sector and health status. Covering a wide spectrum of topics devoted to almost all aspects of the state of Assam, this book is expected to be very useful, informative and interesting to the students, research scholars, teachers and academicians of different backgrounds, the aspirants of different competitive examinations besides fulfilling the needs of various agencies engaged in planning and development of the state.



### The Editors



**Ashok Kumar Bora, M.Sc. Ph.D.**, is a Professor and former Head, Department of Geography, Gauhati University. His fields of research interest include Geomorphology, Fluvial Geomorphology, Wetland Studies, Environmental Geography and Application of Remote Sensing in Resource Management. He has more than 30 years of P.G. teaching and also research experience till date and produced as many as 20 Ph.D. and 14 M.Phil. degree holders so far under his supervision. He to his credit, has so far published more than 90 research papers in national and international journals besides a good number of popular articles and some books. He is the member of a number of national and international academic bodies.



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## Land Use and Land Cover

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*Chandra Kant Pawe  
Lekha Borah  
Deepankar Medhi*

### **Introduction**

Since the beginning of the last century, the world population quadrupled from 1.5 to 7.7 billion, adding the last billion in only 12 years (Roser, Ritchie, and Ortiz-Ospina, 2019). According to UN projection, in the next three decades, India will share the highest proportion of the projected population growth, overtaking China as the world's most populous country by 2027 (UN DESA, 2019). Such accelerated growth of population exerts substantial pressure on the natural resources (Garg, 2016). Landscape transformation is the manifestation of environmental alteration forced by human operations. Today, at global scale the reverberations of landscape transformations are considered as systematic processes (Singh, 2013). One such process is the land use land cover change (LULCC), probably the most generic transformational outcome of the landscape. Land cover is characterized by the bio-physical entity covering the earth's surface, on the other hand, land use refers to the causal result developed on a particular land cover due to human activities (Gregorio and Jansen, 2000). In general, LULCC describes the human-induced alteration of the terrestrial earth (Erle, 2006). It has caused varied undesirable physical effects impacting the ecological health of the environment, thus, it is globally regarded as one of the chief factors of environmental change. The knowledge of changing landscape due to diverse factors regulated by natural and human processes, and their concomitant implications play a critical role in sustainable governance. A prior understanding

# **Librarianship in Changing Environment**

*Festschrift volume in honour of  
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*Edited by*  
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**Bibhuti Chaudhury**  
**Prasanta Kumar Deka**  
**Gajendra Ballav Devchoudhury**

*With a foreword by*  
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**Assam College Librarians' Association**  
**Guwahati, Assam**

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# Information Search Strategy

Gajendra Ballav Devchoudhury <sup>1</sup>

## Introduction:

The information searching in a store of knowledge is a very complex interactive process, several factors interacting with the information system and the process of searching, the success is dependent on the tools and techniques to be employed. Information searching is a problem solving process. The process involves with the recognition of the problem, interoretation of the information need, establishment of a plan of search, conduction the search, evaluation of search resulta and if necessary repeating the process again. The objective of the information search is to select an appropriate to the problem of the user at a particular time. The information item may be a word, a document, a reference to a document, or some data extracted from a document. Different arises due to the structure and format of the information source or the database. Different database have different structure and format, which need some particular strategy.

## 2. Definition:

Search strategy is the plan to conduct the whole process of the search for information. **Morchioaini (1989)** has defined "information-seeking strategy" as "the execution (run) an individual's information-seeking system for a particular information problem is considered as information search strategy. The behavioural manifestation of search strategy is actions taken in the search process. **Bates (1992)** in the context of the information

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**Devastuti Sharma**

## Unpacking Implications: The Mother Goddess, The Supermom, And The Domestic

**Devastuti Sharma**

Assistant Professor of English  
North Gauhati College, Assam.

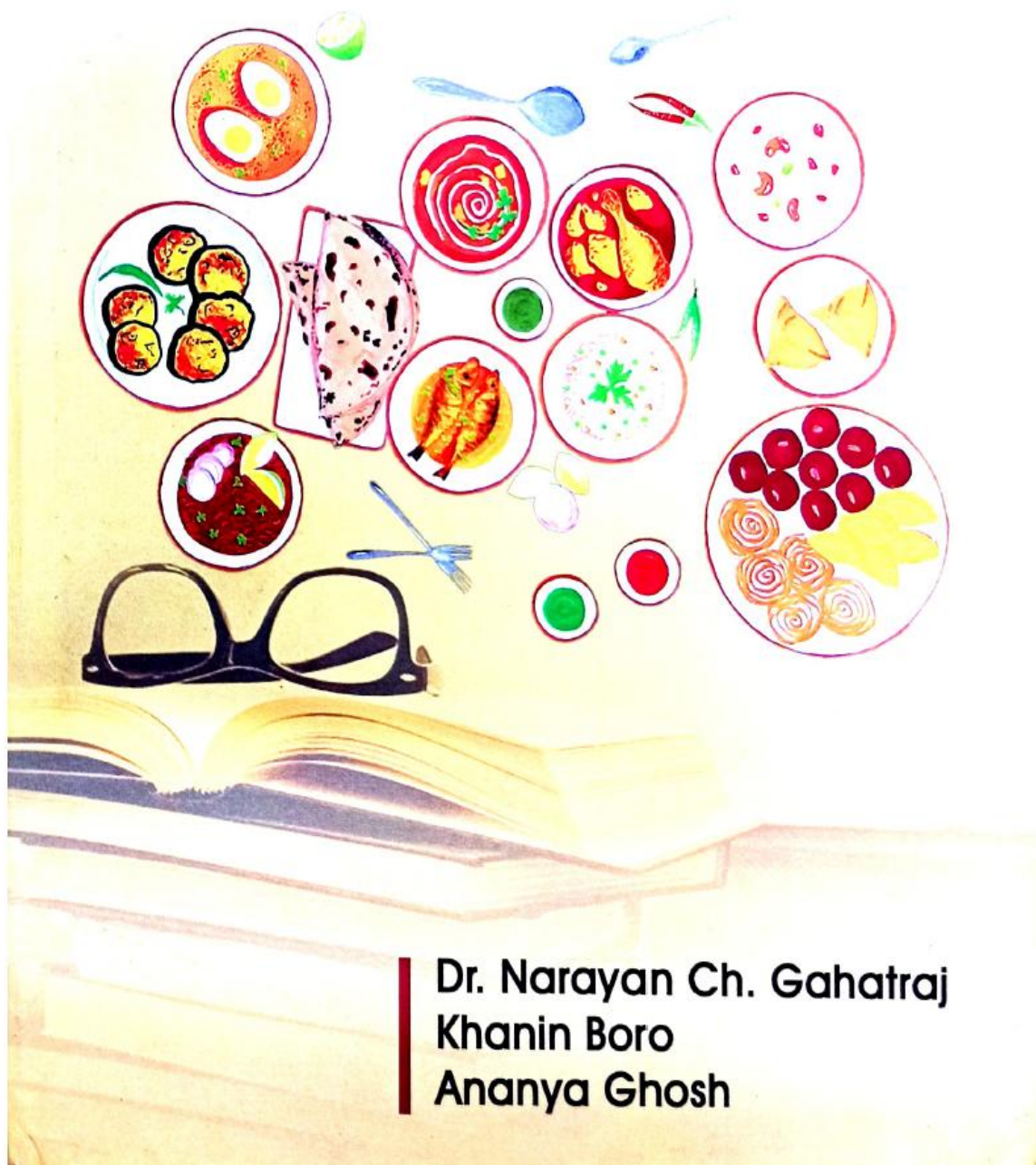
The very words “mother” and “motherhood” are nuanced terms that are packed with various connotations. The entitlement of being called a mother is not just limited to the ones who give birth physiologically. Besides the traditional birth mother, there are the biological mother and the surrogate mother, the adoptive mother, the stepmother, the ones who are elevated to being mother-equivalents by virtue of being a protector, mentor, guide, or a caregiver to someone, and so on and so forth. With the GenZ, today, we even have terms like “paw-mommy”, and plant-mommy”- who are people (irrespective of their sex and gender) that look after their pets and plants with as much care and adoration as they would do to their human child. All of them are mothers in their own right. Yet, this write-up will limit its understanding of “mother” in its most rudimentary and traditional senses alone.

Even though motherhood is a pre-social reality, the way we understand motherhood today is derived from our socio-cultural landscapes. The ideologies that go into the construction of

# Concoction

A Collection of Interdisciplinary Perspectives  
on Food and Literature

An Endeavour of the Department of English  
and Research & Publication Cell, IQAC  
Tangla College, Tangla



Dr. Narayan Ch. Gahatraj  
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# **The Interplay of Food and Power in *The Hunger Games* Trilogy**

**Devastuti Sharma**

## **Abstract**

*The Hunger Games* trilogy has become a cult favourite amongst the readers of contemporary Young Adult Literature. The series revolves around Katniss Everdeen, a teenage girl, lives in the Dystopian nation of Panem where the totalitarian government prevents its citizens from having access to sufficient food, and force teenage children to participate in a nationally televised event called the Hunger Games where the participants have to ultimately kill each other to survive. In this paper, an attempt has been made to explore how food, in the context of *The Hunger Games* series is employed as a political weapon to maintain or subvert the existing power structures in Panem.

**Keywords:** *Dystopia, YA Literature, Power, Agency, Capitalism*

The present paper is based on a study of Susan Collin's *The Hunger Games* trilogy (2008-2010), a series of young-adult novels, set in a post-apocalyptic world, which secured much popularity amongst its readers, and was subsequently adapted into movies. The first instalment is called *The Hunger Games* (2008), the second instalment is called *Catching Fire* (2009), and the third is called *Mockingjay* (2010). *The Hunger Games* series soon percolated into popular culture and became a raging sensation amongst youth worldwide.

The series is set in the North-American dystopian nation of Panem. Panem has twelve districts which are controlled by the Capitol.

# South China Sea

## Contesting Narratives and Global Realities



*Editor*  
Pankaj K Jha

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### Exploring Energy, Fisheries and Seabed Minerals Potential

*Sanghamitra Sarma*

Being one of the richest areas in terms of resources, the SCS (SCS) is also one of the most complex and intractable maritime areas of the world. Arguably, the SCS has become a hotly contested zone too, with China and other coastal states wrangling after ownership of the waters and territories. With more and more countries reiterating their commitment to maintain a rules-based order and an international open passage in the sea, the stakeholders must ensure that the peaceful solution of the dispute and sustainable development of the region happen side by side. Besides halting militarization and putting a stop to unilateral actions, advancing scientific collaboration and joint development agreements, regulation of exploitation, maintenance of ecological safeguards and honouring sovereign rights and jurisdiction of the coastal states are the vital elements for peaceful development of a shared space of resources.

Being a part of the Western Pacific Ocean, the SCS borders major parts of Southeast Asia and China. It happens to be one of the richest areas in the world with regard to resources and also a major trade route for commercial and business grounds. The SCS is at the nucleus of economic activities; the robust growth and development of the territories that bound it is dependent on the maintenance of a stable environment. The constant friction amongst the biggest claimant China and the coastal states who have altercated over territory, the Chinese unilateral actions and military aggression, which has accompanied it, has been fuelling tension across countries. The strategic and political significance of the region and the fact that it contains highly valuable assets like hydrocarbons, oil, gas and other minerals propel countries to strengthen their geopolitical stance on it. This standpoint acknowledges the need for a peaceful solution of the maritime dispute and address the possibility of joint sustainable development of the region, besides addressing environmental and ecological concerns promoting summum bonum. In addition to the aforesaid objective, this paper primarily focuses on the various potentialities of the SCS,



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SOUNDINGS ON AREA STUDIES

# INDIA-CENTRAL ASIA RELATIONS THE ROAD AHEAD

*Edited by*

**ATHAR ZAFAR**

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## 8. Redesigning Relations through Formation of Trilateral: EU-Central Asia-India

*Sanghamitra Sarma*

---

The end of the Cold War which led to distinct changes in the global strategic environment created the five independent countries—Kazakhstan, Kyrgyzstan, Uzbekistan, Turkmenistan and Tajikistan which came to be known as Central Asian Republics. Richly endowed with natural resources, the region is strategically located between China, Russia and India. However, international engagement in Central Asia has mostly been from the geopolitical viewpoint, rather than from the developmental perspective. The region faces several challenges like destabilisation, instability, poverty, Islamic extremism and water scarcity which call for greater attention towards supporting the region's development. In this connection, the role of the European Union (EU) has been considered to be vital especially for fulfilling development goals and promoting good governance. Within an emerging multipolar world, the formation of a trilateral between EU-Central Asia and India can be increasingly vital to expand the role of emerging powers in regional and global governance. The article in this backdrop sets out to examine the trend of EU-Central Asia relationship over the years and also tries to draw attention to the fact that formation of a trilateral with India can make a strong case for creating a comprehensive strategic partnership. Given the fact that China has become more aggressive in the recent years with its militarisation and infrastructural overhauls and India being more assertive in its foreign policy with its growing financial and political weight, an EU-Central Asia-India cooperative venture seems all the more significantly potent to strengthen regional economy and infrastructure.



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**TO WHOMSOEVER IT MAY CONCERN**

Dear Dr. Sanghamitra Sarma,

We are pleased to inform you that your paper titled "ASEAN-Japan Technological Cooperation: Towards realising new and ambitious goals" has been accepted for the edited book titled "Japan and ASEAN-Fifty years of partnership which is being published by Shipra Publications and the ISBN is being allotted.

*Pankaj Kumar Jha*

(Professor Pankaj K Jha)  
Professor and Associate Dean (Research), JSIA  
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# Nanobiotechnology for Plant Protection

## Fungal Cell Factories for Sustainable Nanomaterials Production and Agricultural Applications



Edited by  
Kamel A. Abd-El Salam

### Fungal Cell Factories for Sustainable Nanomaterials Production and Agricultural Applications

Edited by Kamel A. Abd-El Salam

*Explore the uses of myconanoparticles, including risks and opportunities*

*Fungal Cell Factories for Sustainable Nanomaterials Production and Agricultural Applications*, published as part of Elsevier's series *Nanobiotechnology for Plant Protection*, provides information on the uses of myconanoparticles in the agri-food community and evaluates the environmental threats connected with these nanoparticles.

Mycofabrication is the synthesis of various metal nanoparticles via fungal species. Several fungal species are eco-friendly, clean, non-toxic agents for the synthesis of metal nanoparticles, using both intracellular and extracellular methods. This volume addresses these topics, dividing them into two main sections.

Part 1 explores the mycogenic synthesis of many metal nanoparticles: processing processes, environmental protection, and future perspectives. Nanomaterials, including silver, gold, palladium, copper, zinc, selenium, titanium dioxide, metal sulphide, cellulose, have been formed by major fungal species, such as mushrooms, *Fusarium*, *Trichoderma*, endophytic fungi, and yeast, in addition to lichens. Understanding the exact process involved in the synthesis of nanoparticles and the effects of various factors on the reduction of metal ions can help to improve low-cost strategies for the synthesis and extraction of nanoparticles. Mycogenic nanoparticles, risk evaluation, protection and control are also addressed in this Part.

Part 2 depicts a new framework for the production of nano-antimicrobials. This section focuses on the use of myconanoparticles against plant diseases, post-harvest antibiotics, mycotoxin control and plant pests in addition to certain animal pathogens. Myconanomaterials are well developed with great potential and promise for advanced diagnostics, biosensors, precision farming and targeted smart delivery systems. These achievements have rapidly increased new opportunities for innovation in agriculture and the food industry, as well as providing options for environmentally friendly formulations to protect cultivated crops from insects and pathogen-causing diseases.

#### Key Features

- Assesses the impact of a variety of copper-based nanostructures on agri-food sectors
- Explores the opportunities that myconanotechnology can provide for agricultural applications
- Explains the major challenges of applying myconanotechnology

#### About the Editor

**Kamel A. Abd-El Salam** is a Research Professor at the Plant Pathology Research Institute, Agricultural Research Center, Giza, Egypt. Dr Kamel's research interests include developing, improving and deploying plant biosecurity diagnostic tools, understanding and exploiting fungal pathogen genomes and developing eco-friendly hybrid nanomaterials for controlling toxicogenic fungi and plant diseases. His research focuses on the areas of nanomaterials for plant sciences.



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### Chapter

## Myconanoparticles for management of various biotic and abiotic stresses in plants

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#### Abstract

Myconanotechnology has opened up new opportunities for the synthesis of nanomaterials. Fungi are a great source of various secondary metabolites which can be utilized for the synthesis of myconanoparticles of different shapes and sizes. Presently, myconanoparticles have gained importance to researchers because myconanoparticles are green, nontoxic, ecofriendly, and cost-effective and have a wide range of applications. The content of the chapter contributes to our understanding of mycosynthesis and the role of nanoparticles in reducing stress in plants. However, extensive research must be needed prior to the introduction of nanoparticles into the agricultural system to avoid any threat to living beings.

Nanotechnology in the Life Sciences

Kamel A. Abd-Elsalam  
Mousa A. Alghuthaymi *Editors*

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# Plant Nanonutrients for Sustainable Agriculture

[Runa Rahman](#), [Zesmin Khan](#) & [Hrishikesh Upadhyaya](#)

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## Abstract

As the world's population is increasing day by day, there is clear demand to increase crop productivity immensely for global food security. So, for sustainable agriculture, nanotechnological intervention is needed. The quality of agricultural lands is depleting due to excessive use of chemical fertilizers and dumping of hazardous industrial wastes into the environment. Nanomaterials or nanoparticles (NPs) have emerged as excellent agricultural amendments for nutrition management in crop plants. The application of nanoparticles improves the growth of plants through the release of nutrients slowly and steadily. Besides this, NPs can also be used as pesticides, herbicides, bactericides, fungicides, and nematicides, and for improving abiotic stress tolerance in plants. However, nanoparticles also have negative impacts on life-forms. The toxicity of nanomaterials depends on their structure and dose. Due to their high reactivity and variability, biological, chemical, and physical transformations occur in the environment, thus inducing nanotoxicity in agroecosystems. Therefore, the impact of nanomaterials on the environment and human health should be carefully studied before use in agriculture.

## Keywords

[Agroecosystem](#)

[Bactericides](#)

[Environment](#)

[Nanotechnology](#)

[Nanotoxicity](#)



উত্তৰ গুৱাহাটী মহাবিদ্যালয়ৰ অসমীয়া বিভাগৰ মুৰব্বী  
তথা সহযোগী অধ্যাপক ড॰ তাৰিণীকান্ত হালৈ  
শৈশৱৰে পৰা সাহিত্য, সংগীত, নাট্যাভিনয় আদিৰ  
লগত জড়িত। তেখেতৰ ছাৰা ৰচিত কবিতা, চুটিগল্প

আৰু প্ৰবন্ধ অসমৰ বিভিন্ন কাকত, আলোচনী তথা মূল্যবান গ্ৰন্থত প্ৰকাশ হৈ  
আহিছে। শিক্ষকতাৰ সমান্তৰালকৈ সামাজিকভাৱেও সক্ৰিয় ড॰ হালৈৰ  
এতিয়ালৈকে ৭খন গৱেষণা পত্ৰ আৰু ৫০তকৈও অধিক অন্যান্য মূল্যবান প্ৰবন্ধ  
অসমৰ বিভিন্ন গ্ৰন্থ, আলোচনী আৰু বাতৰি কাকতত প্ৰকাশ পাইছে। অসমীয়া পঢ়ুৱৈ  
সমাজত ইতিমধ্যেই এক পৰিচিতি লাভ কৰা ড॰ তাৰিণীকান্ত হালৈ ২০১৮ চনৰ  
পৰা 'কলম' নামৰ এখন সাহিত্য-কলা-সংস্কৃতি বিষয়ক আলোচনীৰ সম্পাদনাৰ  
লগতে শিক্ষা বিষয়ক সাপ্তাহিক বাতৰীলোচনী 'জিজ্ঞাসা'ৰো সহযোগী সম্পাদকৰূপে  
২০২১ চনৰ পৰা দায়িত্ব পালন কৰি আহিছে। তিনিখন ভিন্ন বিষয়ৰ প্ৰবন্ধ সংকলনৰ  
সম্পাদকৰূপে দায়িত্ব পালন কৰা ড॰ হালৈ অসম সাহিত্য সভাৰ বিশেষ আমন্ত্ৰিত  
ৰাষ্ট্ৰীয় কাৰ্যনিৰ্বাহক সদস্যৰূপেও ২০১৩-২৪ বৰ্ষৰ বাবে নিৰ্বাচিত হৈছে।

'সাহিত্য আৰু সংস্কৃতি' তেখেতৰ সাহিত্য-সংস্কৃতি বিষয়ক গৱেষণামূলী  
প্ৰবন্ধৰ এক মূল্যবান সংকলন। অসমীয়া সাহিত্যৰ উৰাললৈ লেখকৰ এয়া বহুমূলীয়া  
অৱদান। আমাৰ দৃঢ় বিশ্বাস পঢ়ুৱৈয়ে এই গ্ৰন্থখনৰ পৰা উপকৃত হ'ব।

— প্ৰকাশক

সাহিত্য  
আৰু  
সংস্কৃতি



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ড॰ তাৰিণীকান্ত হালৈ



# সাহিত্য আৰু সংস্কৃতি

ড॰ তাৰিণীকান্ত হালৈ



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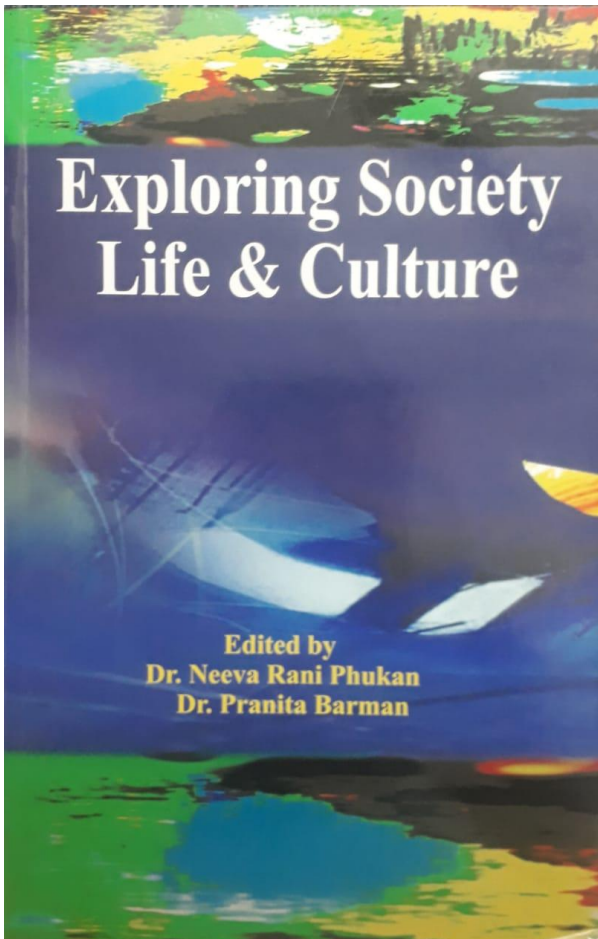
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# **Kamrupiya Dhuliya- the Ancient folk performing art of Lower Assam : A Discussion**

**Dr. Tarinikanta Haloi**  
**(Translated by Gitanjali Medhi)**

## **Introduction:**

The folk performing art carries an ancient heritage. Such art Forms are an integrated part of a folk culture. Elements of folk culture like the folk dance, folk songs and folk drama performances are commonly rebred as 'folk drama' - Ancient Assamese indigenious performing arts like Ojapali, Dhuliya, Bhaoria and Putala Nach etc. are based on some particular stories and they are represented with the help of dialogues, songs, music as well as bodily gestures. So, they have the Characteristics of drama too. Besides, the uniqueness of performing art is also inherent within them. The study regarding the tradition of folk performing art shows that the lower Assam, especially areas belong to undivided Kamrup, Darrang and Goalpara districts, has a rich and

ৰূপালী জয়ন্তী স্মৃতিগ্রন্থ



# ৰাগশ্ৰী



সম্পাদনা  
ড° হুপেশ চৌধুরী  
ড° তাৰিণীকান্ত হালৈ

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## সম্পাদনা সমিতি

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অক্ষয় চন্দ্ৰ কলিতা, যতীন্দ্ৰ চৌধুৰী, সীমান্ত ডেকা, পিংকুমণি চৌধুৰী

সভাপতি

বাণীকান্ত চক্ৰৱৰ্তী

সম্পাদক

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সদস্য/সদস্যা

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ডিটিপি : দুৰ্লুমণি দাস

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প্ৰকাশন সহযোগী : চিন্তামণি প্ৰকাশন

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## অসমীয়া সংগীতৰ গতিপথ

ড° তাৰিণীকান্ত হালৈ

সংগীত মানুহৰ হৃদয়ত অন্তঃসলিলা ৰূপত বৈ থকা এক মধুময় অনুভৱ। সভ্যতাৰ বিকাশৰ পূৰ্বৰে পৰা মানৱক সংগীতৰ সুৰ-তাল-লয়ে আকৰ্ষণ কৰি আহিছে। বনৰীয়া চৰাই-চিৰিকটিৰ কাকলি, জীৱ-জন্তুৰ চিঞৰ, গছৰ পাতত বতাহৰ বা লাগি সৃষ্টি হোৱা ঝৰঝৰণি, ওখ পাহাৰ-পৰ্বতৰ পৰা তীব্ৰ সোঁতেৰে বৈ অহা উচ্ছল জলৰাশি শিলত ঠেকা খাই সৃষ্টি কৰা জিৰিজিৰি শব্দ, খৰস্ৰোতা নৈৰ কুলুকুলু সুৰ, ঘৰৰ পানীপচাত বৰষুণৰ টোপালবোৰ পৰি সৃষ্টি হোৱা শব্দ আদিৰ মাজত আদিম মানৱে সাংগীতিক মাধুৰ্য অনুভৱ কৰিছিল। তেনেবোৰ শব্দ আৰু সুৰৰ অনুকৰণ কৰিয়েই মানুহে নিজ কণ্ঠেৰে সুৰ সৃষ্টিৰ প্ৰয়াস কৰিছিল। সভ্যতাৰ বিকাশৰ পৰৱৰ্তী কালত তেনেদৰেই সৃষ্টি হৈছিল সংগীত; সৃষ্টি হৈছিল সংগীতৰ সুৰ লহৰ।

মন কৰিবলগীয়া কথা এই যে ভাৰতীয় মনে সংগীতক আধ্যাত্মিক দৃষ্টিৰে চায়। সৃষ্টিৰ পৰম বহস্যময় বিবিধ ৰং-ৰূপ-বৈচিত্ৰ্যৰ মাজত সংগীতো এক অতিলৌকিক আনন্দময় উপাদান। সেয়েহে ঈশ্বৰৰ প্ৰতি শ্ৰদ্ধা নিবেদন, দেৱ-দেৱীৰ পূজা-অৰ্চনা আদি প্ৰতিটো মাংগলিক অনুষ্ঠানৰ লগত সংগীত পৰিৱেশন

# একবিংশৰ চিন্তনত নাৰী লেখক



সংকলক, সম্পাদক  
ড° সাবিত্ৰী শইকীয়া

পূব গুৱাহাটী শাখা  
লেখিকা সংস্থা, অসম

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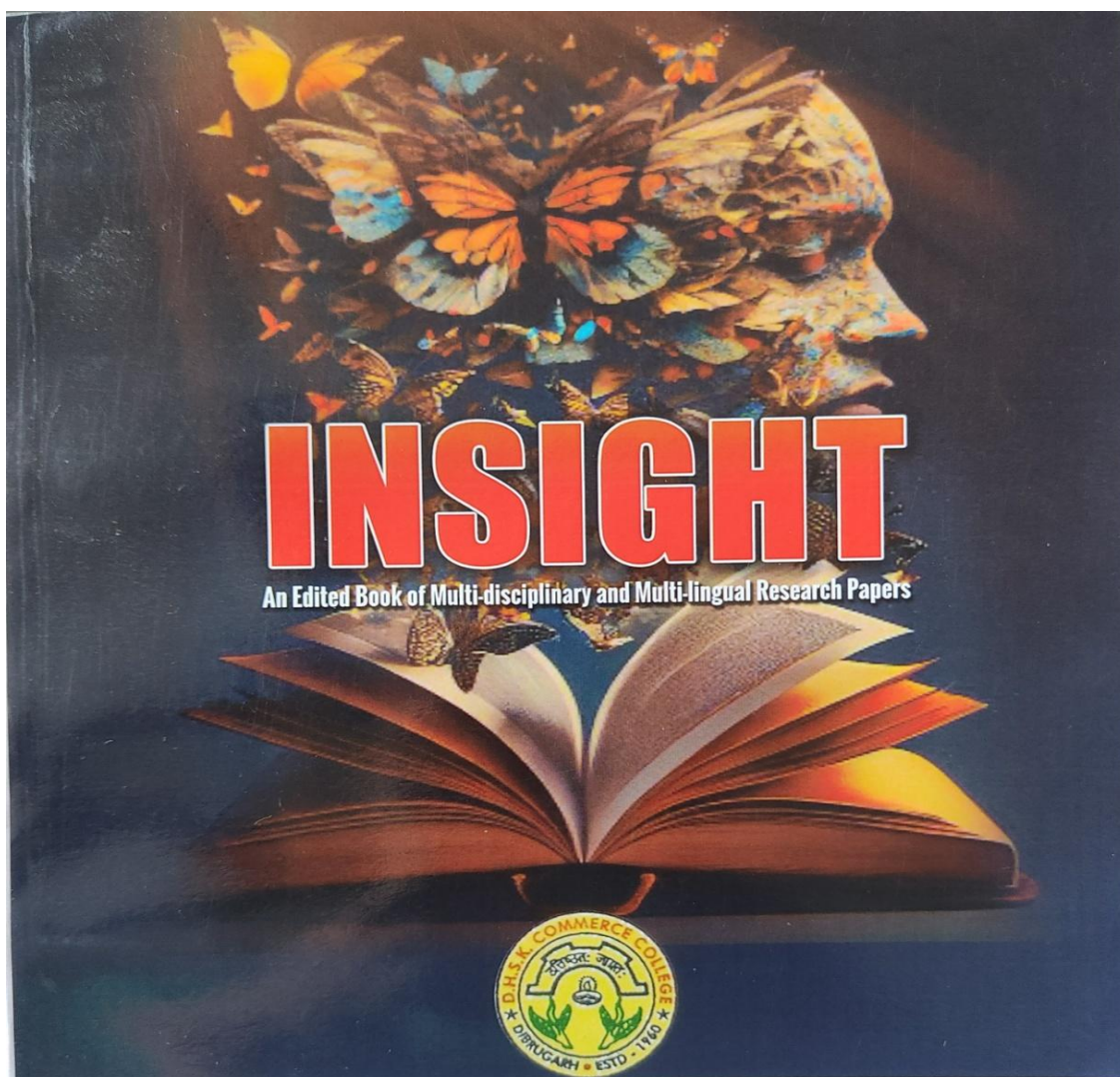
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# অসমৰ সশস্ত্ৰ সংগ্ৰামত মহিলা

ড° বনিমা তালুকদাৰ

উত্তৰ-পূৰ্বাঞ্চলৰ এখন অন্যতম ৰাজ্য হ'ল অসম। বিভিন্ন জাতি-জনগোষ্ঠী মিলনভূমি হিচাবে পৰিচিত অসমখন যোৱা কেইটামান দশকত এক অশান্ত অঞ্চল পৰিণত হৈছে। নৃগোষ্ঠীয় সংঘৰ্ষ, বিচ্ছিন্নতাবাদী আন্দোলন, সাম্প্ৰদায়িক সংঘৰ্ষ, সাম্প্ৰদায়িক অসমত্ব আদিৰে অসমখন ধৰাশায়ী হৈ পৰিছে। ফলস্বৰূপে বিভিন্ন জাতি-জনজাতিৰ মিলনভূমি হিচাবে পৰিচিত বিশাল অসমখন খণ্ড-বিখণ্ড হোৱাৰ উপক্ৰম হৈছে।

অসম এনে এখন ৰাজ্য, যি বিভিন্ন সমস্যাৰে জৰ্জৰিত। অৰ্থনীতি, উদ্যোগ-যোগাযোগ ব্যৱস্থা আদি কৰি বিভিন্ন ক্ষেত্ৰত অসম পিছপৰা। দুৰ্নীতি, নিৰক্ষৰতা, দৰিদ্ৰতা আদিৰে ভাৰাক্ৰান্ত ৰাজ্য হ'ল অসম। এই সমস্যাবোৰৰ প্ৰতি চৰকাৰৰ সময়ত সচেতন নোহোৱাৰ বাবে চৰকাৰী ব্যৱস্থাৰ বিৰুদ্ধে বিভিন্ন গোটৰে বিভিন্ন আন্দোলনমূখী কাৰ্যসূচী হাতত লোৱা দেখা যায়। প্ৰতিটো গোটৰ মনত এটা কৰ্ম ক্ৰিয়া কৰিছিল যে ভাৰতৰ এমূৰত অৱস্থিত অসমখন হ'ল এখন কেন্দ্ৰৰ দ্বাৰা আশ্ৰিত ৰাজ্য, যাক কেন্দ্ৰই এক বেলেগ দৃষ্টিৰে চাই আহিছে। সঠিক বাটেৰে সমস্যাসমূহ সমাধান আশা কম দেখি বহু জাতি-জনগোষ্ঠী সশস্ত্ৰ সংগ্ৰামৰ পথ লোৱাও দেখা গৈছিল। ভিতৰত উল্লেখনীয় এটা গোট আছিল সংযুক্ত মুক্তি বাহিনী চমুকৈ আলফা (ULFA) শিৱসাগৰৰ ৰংঘৰ বাকৰিত ১৯৭৯ চনৰ ৭ এপ্ৰিলত জন্ম হোৱা অনুষ্ঠান। আলফাৰ প্ৰধান উদ্দেশ্য আছিল অসমত সাৰ্বভৌম, সমাজবাদী ৰাষ্ট্ৰ প্ৰতিষ্ঠা কৰা। অসমত সাৰ্বভৌমত্বৰ ওপৰত ই বিশেষভাৱে গুৰুত্ব দিছিল। এনে ৰাষ্ট্ৰ এখন প্ৰতিষ্ঠা হ'লে অসমৰ পৰা শোষণ, দুৰ্নীতি, অৰ্থনৈতিক দূৰৱস্থা আদি নাইকীয়া হৈ যাব বুলি এই সংগঠনটোৱে ভাবিছিল। এই লক্ষ্যত উপনীত হ'বৰ বাবে সশস্ত্ৰ সংগ্ৰামৰ বটো সংগঠনে বাচি লৈছিল। ইয়াক মৰীমূৰ কৰিবৰ বাবে চৰকাৰে বিভিন্ন কঠোৰ পদক্ষেপ লৈছিল। অপাৰেশ্যন বজৰং, অপাৰেশ্যন ৰাইনো, অপাৰেশ্যন অল ক্ৰীয়াৰ আদি কৰি বিভিন্ন সামৰিক অভিযান চৰকাৰে চলাইছিল। সশস্ত্ৰ বাহিনীৰ (বিশেষ) ক্ষমতা হ'ল



# INSIGHT

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**D.H.S.K COMMERCE COLLEGE**

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**TANKA PRASAD UPADHYAYA**

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# HILL CULTIVATION AMONG THE TRIBES OF NORTHEAST INDIA: TRADITIONAL KNOWLEDGE AND ECOLOGICAL SUSTAINABILITY PERSPECTIVES

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## ABSTRACT

The traditional hill cultivation practices exhibit excellent ecological sustainability and conservation aspects. They are designed to preserve biodiversity, provide dietary variety and healthy food, and promote food security. This paper attempts to explore and examine the hill cultivation practices: *jhum* cultivation among the Ao and Rengma Nagas, and alder based agroforestry system of Nagaland, which are remarkable examples of traditional knowledge. The findings underscore the need to collaborate the highly effective traditional hill cultivation practices with modern science to promote sustainable agricultural technology and biodiversity conservation.

**Keywords:** Hill cultivation, *Jhum*, Alder, Traditional knowledge, Ao Naga

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## Introduction

Hill cultivation, commonly termed as shifting cultivation, slash-and-burn cultivation, nomadic agriculture, primitive horticulture, swidden agriculture and so on, is a seasonally regulated sequence of procedures designed to open up and bring under cultivation a patch of forest land. After one or two seasons of staple cropping the plot is left fallow for years together with a view to restoring fertility of the soil through forest growth, following which the plot is again cleared and burnt and another cycle of cultivation begins (Vidyarthi & Rai, 1976). In Northeast (NE) India, the practice of hill cultivation is widespread among the tribal people inhabiting the hilly tracts of the region. Here, hill cultivation is locally known as *jhum kheti* and the cultivators are known as *jhumias* across the region. Major hill cultivator tribes of NE India are represented by the Garos, Khasis and Jaintias of Meghalaya, the Karbis of Assam, the Konyak, Ao, Lotha, Rengma, Angami, Chakhesang, Chang, Yimchunger and Sema Nagas of Nagaland, the Adis, Galos, Nishis, Idu-Mishmis, Noctes and Wanchos of Arunachal Pradesh, the Kukis, Maos, Monsangs, Marings,

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## Health and Gender based issues of Women Workers in Tea Gardens of Assam

*Dr. Ripunjoy Sonowal*

*Dr. Ajit Goswami*

### **Abstract**

*The women tea garden workers of Assam are one of the most marginalized sections of the Indian society. They are dependent on the tea estates for a range of basic services, and for a long time have been facing various health and gender based issues. Poverty, illiteracy, rising population, extensive alcohol use, substandard housing, poor living conditions and sanitation, low social position, hazardous working conditions, low wage, high disease frequency including anemia, limited health facilities -all hamper their daily living. They are also vulnerable to sexual abuse and domestic violence. Early marriages are still prevalent among them. Accelerated socio-economic development and committed implementation of preventive, promotive and curative public health services are required for the sustainable development of the women tea garden population of Assam.*

**Keywords:** *Health, Women workers, Anemia, MMR, Tea garden, Assam*

### **Introduction**

Around one million women work in the tea gardens of Assam, producing about 55% of India's total tea production. The life of the women workers is laden with countless challenges. Poverty, illiteracy, rising population, addiction to alcohol, poor standards of living, limited health facilities, etc. are part and parcel of their life. The tea industry in Assam is about 172 years old. It occupies



# Biophotonic Coloration in Naturally Occurring Bio-Materials

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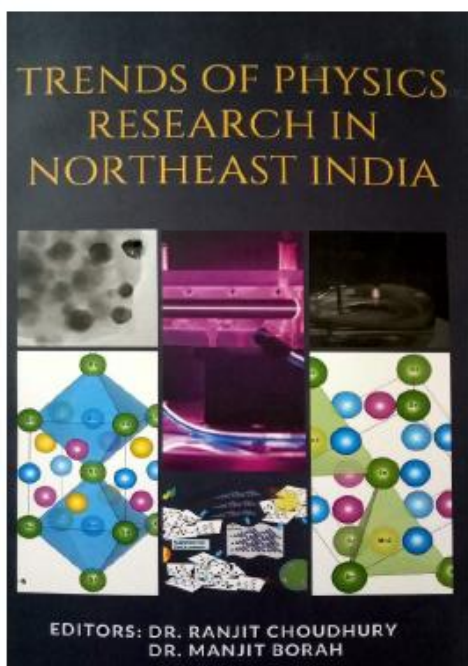
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## Abstract

Mighty nature is astonishingly beautiful as it is gifted with striking color-producing ability greatly abundant in plentiful species all around us. From beetles to butterflies to birds and animals of tropical and sub-tropical regions, all fortified with distinctly different colors and are on display in their scales, body cover, skin, hair, feather, etc. In nature, the color-producing phenomenon has also been extended to aquatic species, mostly in fresh-water fishes and sea creatures. Also, there exist creatures, from mice to geckos, where concealing color is used as an act of self-defense strategy, to distract predators. It will be unanimously agreed that, an optimal display variety of colors and hues can be perceived in plant kingdoms, in the form of floral and fruit-bearing attributes. In this article, numerous qualitative aspects of various colored species belonging to the kingdoms of insects, avians, birds, plants, and the aquatic world have been reviewed highlighting their natural habitats, color-producing agents, and also optical effects responsible for the iridescent as well as non-iridescent biophotonic coloration. Biophotonic structural coloration and association of pigmentary contributions would find scope in strengthening our perception on species as regards their evolutionary basis and function in the ecosystem.



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## 10

### Recent progress on 2D nanomaterials for application in lubrication and mechatronics

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#### Abstract

In this chapter, we have discussed two dimensional materials including graphene and transition metal dichalcogenide systems (TMDCs), their properties and several practical applications. 2D materials have significant applications in the field of electronics, optoelectronics, catalysis, energy storage, mechatronics etc. Here, we will discuss regarding about the lubrication and wetting-dewetting properties of TMDCs.

**Keywords:** Nanomaterials, dichalcogenide systems, Wetting-dewetting

# সোণপাহি

অনামিকা বৰা



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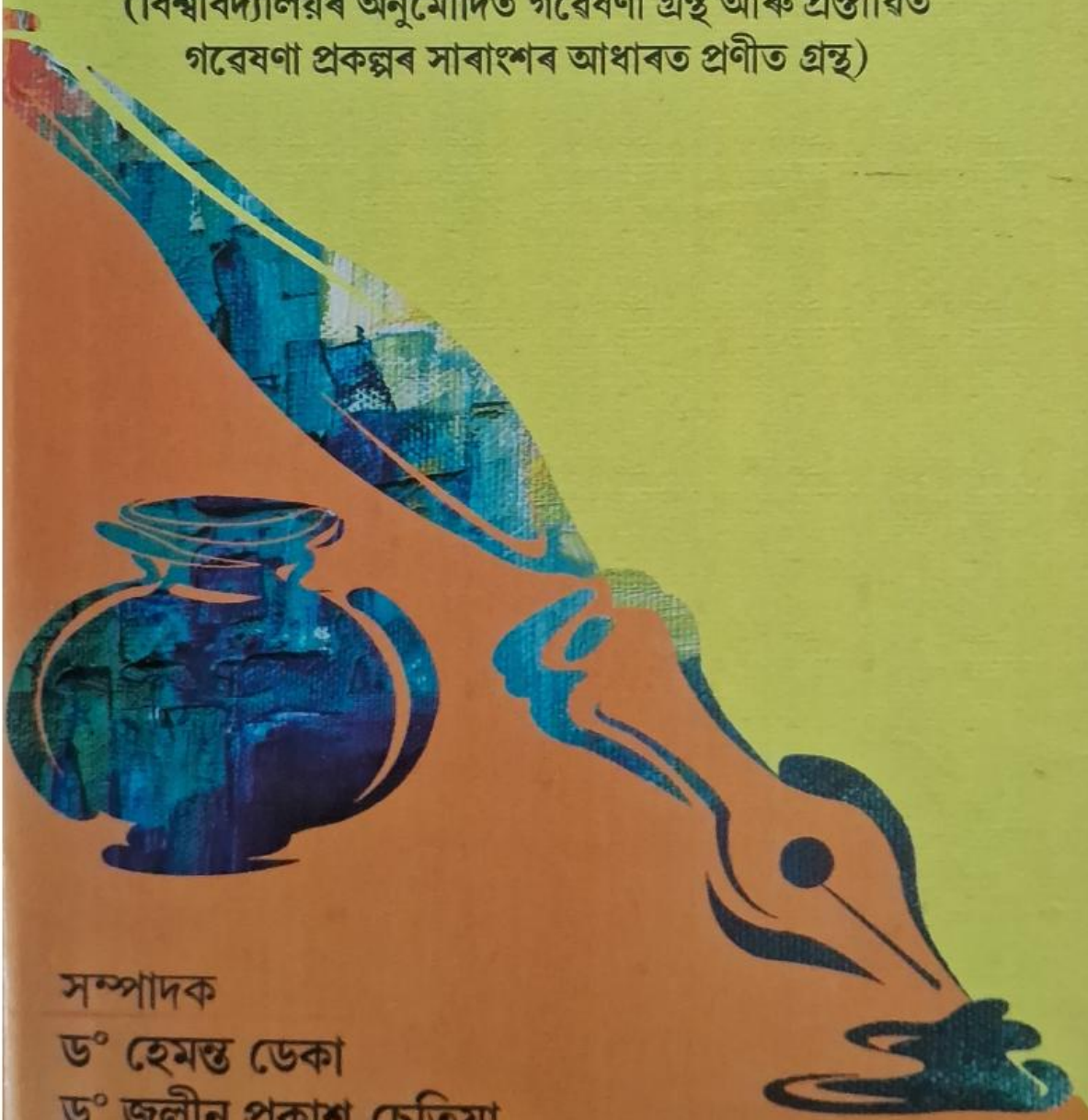
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পৃথিৱীত বাস কৰা প্ৰতিটো জাতি-জনজাতিৰে নিজস্ব পৰিচয় থাকে। একোটা জাতিৰ পৰিচয় নিজৰ ভাষা আৰু সংস্কৃতি। অসমৰ পৰিচয় অসমীয়া ভাষা আৰু অসমীয়া সংস্কৃতি। সাধাৰণতে দেখিবলৈ পোৱা যায় সাম্প্ৰতিক সময়ছোৱা সমগ্ৰ বিশ্ব বিশ্বায়নৰ কবলত। অসমীয়া ভাষা-সংস্কৃতিও ইয়াৰ পৰা মুক্ত নহয়। সংস্কৃতি মাধ্যম যিহেতু ভাষাৰ আদান-প্ৰদানৰে হয় গতিকে বিশ্বায়নৰ কবলত সমান্তৰালভাৱে ভাষা-সংস্কৃতি দুয়োটাই।

সংস্কৃতি মানৱসৃষ্ট। ই মানুহৰ মাজত পৰিৱৰ্তিত তথা পৰিৱৰ্ত্তিত ৰূপত জীয়াই থাকে। সামাজিক জীৱ হিচাপে মানুহে কিছুমান ৰীতি-নীতি, আচাৰ-ব্যৱহাৰ, বিশ্বাস-অবিশ্বাস, ধৰ্ম-অধৰ্ম, উৎসৱঅনুষ্ঠান আদিৰ মাজেৰে জীৱন নিৰ্বাহ কৰে আৰু এই জীৱন নিৰ্বাহ প্ৰণালীৰ সামগ্ৰিক যৌগিক ৰূপটোৱেই সংস্কৃতি। সহজ ভাষাত ক'বলৈ হ'লে, জনসাধাৰণৰ জীৱন পদ্ধতিয়ে সংস্কৃতি। অৱশ্যে সময়ৰ পৰিৱৰ্ত্তনৰ লগে লগে জনসাধাৰণৰ জীৱন ধাৰণ প্ৰণালীৰ পৰিৱৰ্ত্তন হোৱাটো অস্বাভাৱিক নহয়। মানুহ পৰিস্থিতিৰ দাস। বৰ্ত্তমান যুগ বিশ্বায়নৰ যুগ। এনে এটি যুগত এখন দেশৰ লগত আন এখন দেশৰ পাৰস্পৰিক সাংস্কৃতিক বিনিময় স্বাভাৱিক। বিশ্বায়নে গোটেই বিশ্বখনক একত্ৰিত কৰি তোলাৰ ফলত মানুহৰ মাজত ভাৱৰ আদান-প্ৰদান অতি সহজ হৈ পৰিছে বিশ্বায়নৰ ফলত খোৱাবোৱা, পিন্ধন-উৰণ, খেল-ধেমালি, আচাৰ

  
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