অন্বেষণ
ENQUIRE

বছৰেকীয়া আলোচনী
An Annual Magazine

সংখ্যা ঃ ০৩ ঃঃ বছৰ ঃ ২০২২-২৩
VOLUME : III :: YEAR : 2022-23

ভূগোল বিজ্ঞান বিভাগ
Department of Geography
পাণ্ডু মহাবিদ্যালয় PANDU COLLEGE
Pandu, Guwahati-12

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Editorial Board

TRIBUTE

We have no control over nature but we do have control over minds. We extend our heartfelt respect and adoration to the departed soul of Eminent Artist of Assam Neel Pawan Baruah at the age of 84years. May his soul rest in eternal peace.

Office of the Principal

PANDU COLLEGE

PANDU, GUWAHATI-781012

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Dr. Sanchay Jyoti Bora, M.Sc. Ph. D
Principal

Date: 01.02.2024

No.....

Message from Principal

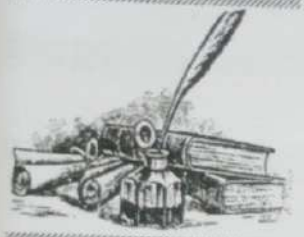
I am happy to know that an annual magazine "Enquire" is going to be published by the Department of Geography of Pandu College for the session 2021-22. I hope it will become a platform for expression of students' and teachers' creativity. The readers will certainly encourage the students and teachers by their sincere acceptance.

I wish long live of the " Enquire".

(Dr. Sanchay Jyoti Bora)
Principal
Pandu College, Pandu

Principal
PANDU COLLEGE, PAND
Guwahati-12, Assam

EDITORIAL DESK



The departmental magazines are the face of the department and displays the personality of the department in the institution in many ways. Its plays a vital role in fostering new talent in writing for students. The magazine is a historical document of the growth of the department. It informs the future generation of students built up in their school. This valuable publication is the opportunity that students require to show their creative talents.

The magazine named 'Enquire' is prepared by the students of the Department of Geography, Pandu College with the guidance of the professors of Geography Department, which focus on various problems and prospects of the physical and cultural environment. It is mostly prepared in the form of a report that aims to provide information about various which may help the future students and researchers to attain information about the happening issues of the earth surface.

Due to lack of time and availability of appropriate data the magazine couldn't be updated in precise time although we have tried our best to provide all the required information in the magazine in limited time and space.

Rica Bhowmick

Mrinal Sharma

১) যিয়ে তোমাৰ অন্যায় কৰে, তাৰ বিনিময়ত তেওঁৰ উপকাৰ কৰাটোৱে তেওঁক শা
দিয়াৰ উত্তম পন্থা।

—কাল

২) আমি যিমানেই বেছিকৈ পঢ়ো সিমানেই আমি জানো আচলতে আমি কিম
নাজানো।

—শ্বে

৩) আনৰ দোষ-গুণ বা আনে কি কৰিলে কি নকৰিলে তাক তালৈ চকু নিদি নিজে
কৰিছে বা কৰা নাই তালৈহে চকু দিয়া উচিত।

—বুদ্ধদে

৪) গাধই জিৰণী নোলোৱাকৈ বোজা বয়, জাৰ-জাহ অনুভৱ নকৰে, সদায় সন্তোষে
থাকে। এই তিনিটা গুণ গাধৰ পৰা শিকিব লাগে।

—চানক

৫) মানুহৰ আটাইতকৈ ডাঙৰ শক্তি আত্মবিশ্বাস আৰু নিজৰ কামৰ প্রতি শ্রদ্ধা।

— স্বামী বিবেকান

CONTENT

Tourism in Meghalaya

PG 3rd Semester (2021-2023)

Abstract

The purpose of this article is to understand the geographical background and tourism sector of the state Meghalaya. This article gives a well-defined details and facts about numerous tourist places of Meghalaya that are well-known all over the world as it boasts some of the most spectacular destination like Shillong which also acts as the gateway to Meghalaya, the state famous for Waterfalls, National parks, Museums and Lakes etc. The findings of this research consists information about various tourist places of Meghalaya and its centre of attraction. The biological cum synthetic diverse nature of this state uplifts the physical, cultural and social phenomena at various regional, national and international levels of the world. Some of the sites of Meghalaya has also been included in the UNESCO world heritage sites tentative list. Meghalaya as a state is an attractive and heavenly setting for the tourists.The state is endowed with gift of nature such as lofty mountain ranges with interplay of lush green valley, cascading rivers, sprawling water bodies, waterfalls, caves, and living root bridges. Therefore, one must visit this place once in a lifetime to cherish all its magnificent beauties

Key Words: Wetland, Geo-ecological, Tectonic Lane, Biological, Diversity, Endemic.

Introduction

Meghalaya meaning "abode of clouds"; comes from Sanskrit word Megha, which means "Cloud" and 'a-laya' which means "home" is a state in North-East of India. It lies between latitudes 25° 02′ Nand 26°07′ N and longitudes 89°49′ E and 92°50′ E with a geographical area of 22,429 sq. km. Meghalaya was formed by carving out two districts from the state of Assam: (a) the United Khasi Hills and Jaintia Hills and (b) the Garo Hills on 21 January 1972. Meghalaya was previously part of Assam, but on 21st January 1972, the districts of Khasi, Garo and Jaintia Hills became the new districts of Meghalaya. The state is bound to the south by the Bangladeshi divisions of Mymensingh and Sylhet, to the west by the Bangladeshi division of Rangpur, and to the north and east by India's State of Assam. The capital of

Meghalaya is Shillong. During the British rule of India, the British imperial authorities nicknamed it the "Scotland of the East. It is compared to Scotland for its highlands, fog, and scenery.

Meghalaya has great tourism potentialities. The Meghalaya subtropical forests support a vast variety of flora and fauna. Meghalaya also offers many adventure tourism opportunities in the form of mountaineering, rock climbing, trekking, and hiking, caving (spelunking) and water sports. The state offers several trekking routes, some of which also afford an opportunity to encounter rare animals.

Objectives

* To identify the tourist places of Meghalaya.

* To know the tourist potentiality of Meghalaya.

Data Source and Methodology

The study is carried out using mainly secondary data which are collected from different online sources (websites, research papers, journals etc.). Few data are also collected from local people of Meghalaya during departmental excursion.

Findings and Analysis

Tourism is a social, cultural and economic phenomenon which entails the movement of people to countries or places outside their usual environment for personal or business/professional purposes.

Meghalaya as a state is prominently known for its numerous tourist places all over the world as it boasts some spectacular places like Mawsyram, Shillong, Cherrapunji, Dawki, Mawlynnong etc. These place are describe a follows:-

i) Shillong : Scotland of the East, Shillong i one of the most popular Meghalaya touri places in the Northeast. It has forested hill pleasant climate, scenic beauty which attrac many tourists from around the globe. Shillon is also considered as the gateway t Meghalaya.

Some of the well-known tourist spo in Shillong include Shillong Peak, Elephant Fall Lady Hydari Park, Wards Lake and Do Bosco Museum. The local tribes in Shillon are Khyrim, Mylliem, Maharam, Mallaisohma Bhowal, and Langrim.

ii) Cherrapunji : Cherrapunji is regarded one of the wettest places on earth as the highe rainfall is foreseen during the year. Touris from around the world come here to see th Dain-Thlen, Kynrem, and Nohkalikai waterfal that are known as the popular waterfal ofCherrapunji. The town encompasses som of the best waterfalls in Meghalaya. Maj attractions here are Mawsmai cave, seve sisters fall, Eco- Park and a garden of cave

iii) Mawsynram : Of all the Meghalaya touri places, Mawsynram is the rainiest landscap Encompassing lush green hills, this villa witness humongous amounts of rainfa throughout the year. The village is adorned wi prepossessing landscapes, low-flying cloud misty weather, and refreshing waterfall Mawsynram experiences an average rainf of almost 11,872 millimetres annually, there making it one of the most distinctive tour places in Meghalaya.

iv) The cleanest village in India, Mawlynnong village is also known as God's Own Garden. In 2003, Mawlynnong was awarded a title of cleanest village in Asia by Discover India. The weather in Mawlynnong is pleasant all throughout the year. All the houses have functional toilets since 2007, there are bamboo dustbins all over the village, even the dry leaves fallen from the trees go straight into the dustbin, plastic bags are banned and smoking is prohibited. Mawlynnong gets its own manure which is converted from the garbage dug into a pit. The cleanest village is mainly inhabited by Khasi tribe, the famous tribe which has left behind the patriarchal rule of the society.

v) Dawki : Dawki is a picturesque small town of Meghalaya, situated in north-eastern part of India. Dawki is located in the West Jaintia Hill district. Dawki is known for its pristine lush green surroundings, and it is truly a blessing in disguise! The town is not just a tourist attraction but also one of the nearest 'Gateways to Bangladesh'. The border crossing point is known as Tamabila and is about 2 km from Dawki. It is a major transport point for imports and exports between India and Bangladesh. It is one of the most popular tourist places inMeghalaya which is known for its clear water in India with sustainable tourism. Dawki is one of the most beautiful places on earth.

vi) Laitlum Canyon : Perched on the East Khasi Hills, Laitlum Canyons is a less explored but one of the most picturesque tourist and trekking destinations in Shillong. The canyons are located about 21 Kms south of Shillong. The term Laitlum literally translates to 'end of hills' and does poetic justice to its name. The hills on which the canyon lies, end right here, leaving a jaw dropping drop over the edge which presents an exhilaration and dangerous trekking experience. The dangerous positioning of the canyon makes it all the more alluring as a destination. With low-flying clouds, sprawling green landscapes, and spectacular views, this dreamland is one of the most wondrous tourist places in Meghalaya.

vii) Elephant Falls : As one of the popular waterfalls in Meghalaya, Elephant Falls is a three-tier spectacular cascade. It is located close to Shillong Peak, this fall is referred as 'Ka Kshaid Lai PatengKhohsiew' by the local people, which means 'three step waterfalls. Nestled amid thick forests, Elephant falls in Shillong looks gorgeous and torrential, after the monsoon season, specifically from October to December. The Britishers named it so due to the mammoth rock lying at the foot of the waterfall, that has resemblances with that of an elephant.

Viii) Seven Sister Waterfalls : Nohsngithiang Falls is a picturesque waterfall located at Mawsmai village in East Khasi Hills district of Meghalaya. Also known as Seven Sister Falls and Mawsmai Falls, it is one of the tallest waterfalls in India and among the major places to visit in Cherrapunji. Located in the wettest place on Earth, Nohsngithiang Falls is a seven segmented waterfall that cascades down from a height of 315 m (1,033 feet) and has an average width of 70 m (230 feet). The falls plunges over the top of limestone cliffs of the Khasi Hills only during the rainy season. The

seven segments of the waterfalls symbolize the seven sister states in northeast namely Assam, Arunachal Pradesh, Manipur, Nagaland, Tripura, Mizoram and Meghalaya. During monsoon, when the streams are flooded with water and flow down rapidly forming a perennial rainbow, which gives a spectacular view.

ix) Nohkalikai Falls : Nohkalikai Falls is also amongst the beautiful waterfalls in Meghalaya, located at a distance of 7 kms from Cherrapunji. It is the highest plunge waterfall in India. The water cascades down from a lofty height and falls forcefully, forming a deep plunge pool, where the water remains green in summer months and turns blue in winter. There is a viewing gallery at the top and one can climb up the stairs to enjoy the bird's eye view of the waterfall and the stunning plunge pool. Nohkalikai falls also known as the Spectacular Plunge Pool.

xi) Homestay: Homestay is a form of hospitality and lodging whereby visitor share a residence with a local of the area (host) to which they are traveling. Homestay are used by travelers or tourists or the students who study abroad. The idea of the Homestay program is to accommodate tourists with a local family, thus enabling the tourist to learn about local life style, culture, nature etc. The inhabitants of Meghalaya also provide the facility of Homestay and are dependent on it for their source of income which helps them to live a better life. Some of homestays of Meghalaya are found in various region like Shillong, Mawlynnong, Dawki etc, which provides good hospitality to the tourists or travelers.

xii) Mawphlang Sacred Forest : A tropic rainforest located amid the Nongrum regio of Meghalaya, Mawphlang Sacred Fore houses is rich in flora and fauna. Towerin trees, which are said to be 1000 years old encompasses this forest. The eye-pleasin greenery of this forest reflects the natur grandeur of Meghalaya. The forest also hold mythological significance to the loc community hence it is considered sacred b them. Undoubtedly, the forest offers a astounding escape to nature lovers and is o of the prominent attractions amongst all t Meghalaya tourist places.

xiii) Double Decker Living Root Bridge The Living Root Bridges are aerial bridges bui by weaving and manipulating the roots Indian Rubber trees also known as Ficu elastica tree. It is found in the vicinity of o of the wettest places on earth - Cherrapun (also known as Sohra), Meghalaya and famous for these roots which last for as lo as 500 years. They are locally known "JingkiengJri". The bridge is 3 km long a height of 2400 feet. The most scen experience is when the Umshiang river flo beneath the bridge. It is the oldest natu bridge made around 200 years ago. The r bridge serves as connectors, to cross strea and rivers. These structures have a capac to hold more than 50 people over the bridg has been included in the UNESCO wo heritage site tentative list. There are about known living root bridges spread across villages in the state at present. Each li

structure constitutes a unique site- specific response where form and function have evolved through sustained human interaction with environment.

xiv) Umiam Lake : Umiam lake is a lake located in Shillong, the capital of Meghalaya state in India. The lake is a popular tourist destination in Shillong, which is often referred to as the "Switzerland of the East". The lake is about 22 kilometres from Shillong, and is surrounded by hills. It is a natural freshwater lake, and is home to a number of fish species. It is also a popular spot for picnic and boating. The lake was created by damming the Umiam river in the early 1960s. The lake is fed by the rainwater that falls on the surrounding hills, and has a catchment area of 220 square kilometres. The lake is about 16 kilometres long, and has a maximum depth of 21 metres. It is a popular tourist destination, and is also used for irrigation and power generation.

xv) Don Bosco Museums : Don Bosco Museum welcomes all art enthusiasts and history buffs with open arms. Having a large collection of handicrafts, artifacts, attires, ornaments and weapons, it is one of the most famous museums in Shillong as well as in entire Meghalaya. It is a seven-story building with various art galleries that represent the art and culture of 8 states of northeast India. It displays the cultural side of the entire north-eastern region.

xvi) Rhino Heritage Museum : Rhino Heritage Museum is dedicated to the army personnel. It is the only war museums in North East India that houses military weapons, medals and photographs of army soldiers and other personnel. The museum was built in the year 1928 and later renovated and inaugurated by Lt. Gen Shokin Chauhan, director general, Assam Rifles.

xvii) Air Force Museum : Air Force Museum is another prominent tourist spot which is located in the complex of Eastern Air Command. The museum houses consist various aircraft models including rockets, missiles, miniatures and fighter planes. It also exhibits pictures of Indo-China and Indo-Pakistan war.

xviii) Butterfly Museum (Wankhar Entomology Museum): It is one of the most preferred museums which has an array of various varieties of butterflies, gruesome Rhinoceros beetles and incredible stick insects from all over the country, which have all been displayed in a room, for those who are travelling with their kids.

xix) Balpakram National Parks : The literal meaning of Balpakram is the "land of perpetual winds". Balpakram is famous for its forest covered canyon-cum-gorge and numerous geo-physical formations, all of which makes the place a land of mystery. It is often compared to the Grand Canyon National Park of the United States of America, to the local Garo inhabitants, Balpakram is the abode of the spirits of the dead. It is believed that here, the spirits of the dead dwell temporarily before embarking on the final journey. The park consists of a succession of hills and valley with

constant abrupt variation in altitude, aspect and gradient. The deepest gorge is the Mahadeo gorge, locally known as Kundulop with drop of over 600 meters. The most prominent physical feature of the park is the bullock hump shaped Chitmang peak or Kailash, rising to a height of about 1023 meters.

Mehgalaya have somewildlife sanctuaries also. They are-Nongkhyllem, Narpuh, Siju, Baghmara Pitcher Plant, etc.

Conclusion

Meghalaya, the abode of clouds, is one of the most beautiful states in North-East India offering a variety of sights, activities, food and festivals to the tourists. Well known for Cherapunjji, the place which receives one of the maximum rainfalls in the world, its hills, valleys, lakes, caves and waterfalls which when combined with the beautiful clouds, give it a very serene, beautiful look. The state is endowed with gift of nature such as lofty mountain ranges with interplay of lush green valley, cascading rivers, sprawling water bodies, waterfalls, caves, and living root bridges. Not only is the state having national parks and wildlife sanctuaries it is an ideal habitat for flora and fauna with a pleasant and bracing climate. The state has over 100 tourist spots. Because of her natural assets, ethnic diversity and the societal ethos, tourism holds high potential in the state. The state government though has taken a number of steps to improve the tourism sector.

In Meghalaya it has hard and soft adventure tourism activities which are attract people from different places. In hard tourism activities that have been undertaken or can be undertaken in the future in the state involve rock climbing, caving, trekking in wilderness areas. On the other hand, soft adventure tourism activities are comprised of backpacking exploring bio reserves, bird watching, camping canoeing, cruising, eco-tour, educational programs, boating, fishing, hiking, kayaking orienteering, rafting, sky walk, side walk by the cliff side, sightseeing, swimming, angling mountain cycling and car or bike racing parachuting etc. Another tourism of Meghalaya is Cultural tourism. In Meghalaya cultural tourism include of homestay, homely stay in local resorts, exploring legendary attractions tasting local cuisines, attending religious festivals, visiting cultural heritage sites museums, monuments and churches pilgrimage to some sacred sites in Jaintia and Garo hills, visiting sacred groves, attending cultural events, shopping for local souvenirs attending music festivals, talent shows, story telling, etc.

A statistical report on tourist arrival in North East showed that in 1996, Meghalaya received about 1,36,183 domestic tourists and 1573 foreign tourists, In the year 2000 Meghalaya received about 1,69,929 domestic and 2,327 foreign tourists. There were only 3,75,911 domestic and 5,099 foreign visitors in Meghalaya in 2007. To compare the other state

of North-East, Meghalaya stands second position after Assam in terms of tourist arrival. The state also witnessed a steady increase inboth domestic and foreign tourist arrival since the year 2011 onwards. Meghalaya have great potentialities in tourism sector. Many people economic activities are dependent on tourism sector. This region is developed day by day, but due to hills and uplands it creates barrier to proper development.

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N.B.- *PG 3rd sem students (Geoinformatics Specialization): Banashri Das, Dhruv Boro, Dimpi Dutta, Mrinal Sarmah, Mandira Pradhan, Nishanta Saikia.*

Socio-economic Background of Cherrapunjee wit special reference to Mawlynnong, Meghalaya

PG 3rd Semester (2021-202

Abstract

The purpose of this article is to understand the socio-economic backgrou ofCherrapunjee with special reference to Mawlynnong in the state of Meghalaya. this study the Mawlynnongvillege is undertaken as a study region. The study is conduc on the basis of both primary and secondary data source and empirical observation survey, experiments, personal interrogation, questionnaire and books, journals a websites.

Key Words : Cherrapunjee, Mawlynnong, Meghalaya, Primary and Secondary Data.

Introduction

Our educational tour started on 15th of April 2022, around 11 am in the morning. We were travelling to Shillong, on our way to Shillong we saw many fascinated views that of hills, plateaus several vegetations etc. We reached our destination around 1.30 pm in the afternoon and explored the local market that day.

On the very next day we travelled to Cherrapunji, which was totally foggy and cold there. On our way to Cherrapunjee we witnessed many fault and Fold Mountains covered with lush greenery. We then visited the Mawsmai cave which is famous for its karst topography (stalactite and stalagmite).

On the third day of our trip, we w to Mawlynnong village, for survey of our fi report,

Mawlynnong is a village in East Kh Hills district of Meghalaya state in North E India. It is notable for its cleanliness and a was chosen by Discover India Magazine Asia's cleanest village. Mawlynnong is loca 90km from Shillong, along the Ind Bangladesh border, as of 2019 Mawlynn had 900 residents. As of 2014, there are ab 95 households in Mawlynnong. The liter rate is 90%.

Tourist & Agriculture is the m occupation of the local population with b

nut being the main crop. Other than these, hog farming and poultry farming is also done in the village. Almost every household have their own plot of land for agriculture. During summers one can find pineapples and lychees which are then exported to the nearby regions as well. The people residing in the community are Khasi people.

This field trip and the experience of travelling in group taught us some lessons of a lifetime.

Fig 1. Rural Life of Mawlynnong

Statement of the Problem

Mawlynnong village is one of the most beautiful and cleanest villages of Asia. Each and every household there has taken the responsibility to keep the village neat and clean, cleanliness is their way of life.

But when it comes to medical facilities the village lacks behind, There is not a single hospital for emergency situation that is no healthcare facilities can be found there, in case of ill health people need to travel far to take treatment. Furthermore, the village has preliminary school level for further studies or higher studies, students move to other states. The village is still very backward in terms of socio-economic development.

Objective of the study

* to find out challenges faced by the people living in Mawlynnong.

* to understand the main source of livelihood of the villagers of Mawlynnong.

* to understand the geographical background of Cherrapunjee.

Methodology

The study is carried out using mainly secondary data which are collected from different online sources (websites, research papers, journals etc.). Few data are also collected from local people of Meghalaya during departmental excursion like personal interview, survey and field study.

Significance of the Study

Agriculture is the mainstay of the people living in Northeast India, therefore the people ofMawlynnong village has chosen agriculture as their main occupation and source of income. They are engaged in agricultural practices, poultry farming and also hog farming.

Fig: 1.1 Mawlynnong Village

Methodology

The field report entitled 'study of Cherrapunji with special reference to Mawlynnong has been carried out after complete detailed study and primary data collection that is, by conducting surveys. We visited the village went door to door and interacted with the households, collected first hand data after conducting the socio-economic survey.

After observing intensive study, the data are processed, compiled and arranged presented and interpreted of the study area. Finally, the information and analysis are summarized in the form of field report. As it is the tradition of the Khasi people, in Mawlynnong property and wealth are passed from the mother to the youngest of her daughters, who also keeps the mother's surname.

Location

Cherrapunji or Sohra is a subdivisional town (Proposed District) East Khasi Hills district in the Indian state of Meghalaya. It is the traditional capital of ka Hima Sohra (Khasi tribal kingdom). It is located on the Shillong Plateau about 35 miles (55 km) southwest of Shillong, the state capital. Latitude and longitude coordinates are: 25.2702° N, 91.7323° E

Cherrapunji is noted for having one of the world's highest average annual precipitation levels, about 450 inches (11,430 mm).Cherrapunji is a large historic town in northeastern India, in its small state of Meghalaya. Situated high in the mountains, the town has the population close to 34 thousa people and is an interesting example traditional local settlement.

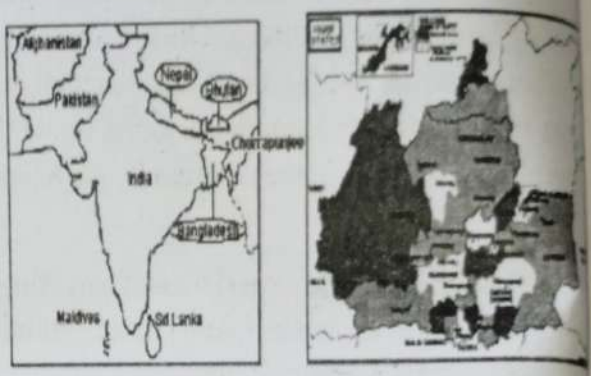


Fig 1.2 Location of Cherrapunjee.

Physiography

The Jaintia hills of Meghalaya form the entire part of Cherrapunjee and also t Meghalaya or Shillong plateau.

The state of Meghalaya is situated the northeast region of India, and exten latitude 20°1'N to 26°5'N and longitude 85°49 to 92°52'E. It extends for about 300 km length and about 100 km in width. It is bound on the north and east by the state of Assa and on the south and west by Bangladesh.

A compact and isolated state in t north-eastern region of India, Meghala extends to 22,429 sq. km of land. T landscape of Meghalaya is mostly rolli plateau with south-facing slopes bei extremely steep. With the hill rising to 2,0 m, the state is cool despite its proximity tropics. The state abounds in lakes a waterfalls.

Vegetation

Excessive rain in the region has rendered t condition of the soil poor by washing away t

topsoil. Soil condition is also hampered due to deforestation which in return causes drought in winter. The vegetation is xerophytic. Valleys around the place are covered with diverse vegetation. There are several endemic species of plants in the valleys. Cherrapunjee receives rains from the Bay of Bengal arm of the Indian summer monsoon.

Climate

Cherrapunjee has a mild subtropical highland climate,with monsoonal influences typical of India. Although Sohra has very wet, warm summers, it has dry, mild winters. The city's annual rainfall average stands at 11,777 millimeters (463.7 in). This figure places it behind only nearby Mawsynram,Meghalaya, whose average is 11,873 millimeters (467.4 in). Sohra receives both the southwest and northeast monsoonal winds, giving it a single monsoon season. It lies on the windward side of the Khasi Hills, so the resulting orographic lift enhances precipitation. In the winter months it receives the northeast monsoon showers that travel down the Brahmaputra valley. The driest months are November, December, January and February.

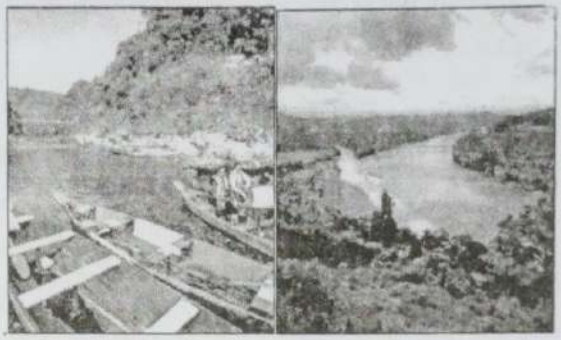
Temperatures average 11.5 °C (52.7 °F) in January and 20.6 °C (69.1 °F) in August, and the annual mean is 17.3 °C (63.1 °F).

Sohra holds two Guinnessworld record for receiving the maximum amount of rainfall in a single year: 26,471 millimeters (1,042.2 in) of rainfall between August 1860 and July 1861 and for receiving the maximum amount of rainfall in a single month: 9,300 millimeters (370 in) in July 1861

Rivers and Water Bodies

1. UmngotRiverPopularly known as Dawki River

2. Simsang River - It is the largest river of Meghalaya



3. Myntdu River-People of Meghalaya consider this river to be a blessing as it has water throughout the year and helps in irrigation as well as enriching the surrounding flora and fauna.

Fig. 1.3 Rivers and Water Bodies

Introduction

Mawlynnong is well known for its cleanliness . the waste is collected in the dustbin made of bamboo directed to pit and then used as manure. A community initiative mandate that all residents should participate in cleaning up the village. Smoking and use of polythene is banned while rainwater harvesting is encouraged. Mawlynnong is a small village based on matriarchy.. Almost all parts of meghalaya follows matriarchy where female dominates the workplace and men are mostly

engaged in household chores. On 17th April, we went to the village for our conducting our survey and report preparation , on our way we came across many fascinating views of hills and plateus covered with fog and clouds all around, before reaching mawlynnong there is root bridge where we stopped by to enjoy the beauty there and pleasant cool weather there. The village has a panchayat Samiti - Darbarshnong and the name of the Pradhan is Moral.

*** Religion :** Religion is usually defined as a socio- cultural system of designated behaviours and practices,moralsand beliefs, worldviews, texts etc. After performing the survey on socio economic background of Mawlynnong village, it is concluded that the majority of the village population comprises of Christian religion, that is most of the people here follow Christianity. Whereas Hindus(khasi) are a minority here. Out of 15 houses we surveyed it has been found that 11 houses are following Christianity as their religion and the rest four belongs to hindu religion. That is 73.3% of people are Christian while Hindus are 26.6%.

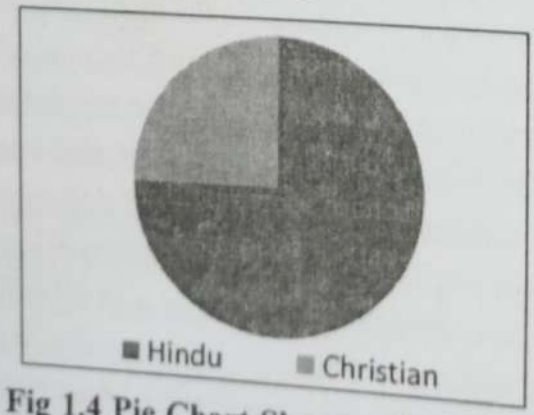


Fig 1.4 Pie Chart Showing Religion Of the Village

*** Employement:-** The villagers of Mawlynnon are mainly engaged in primary and secondar sectors. Majority of them earn their living fro agriculture and farming, while some are engage in business and few are daily wage labourer Beetle nuts, beetle leaf, are mainly cultivated her Apart from poultry farming hog farming is al done in the village.

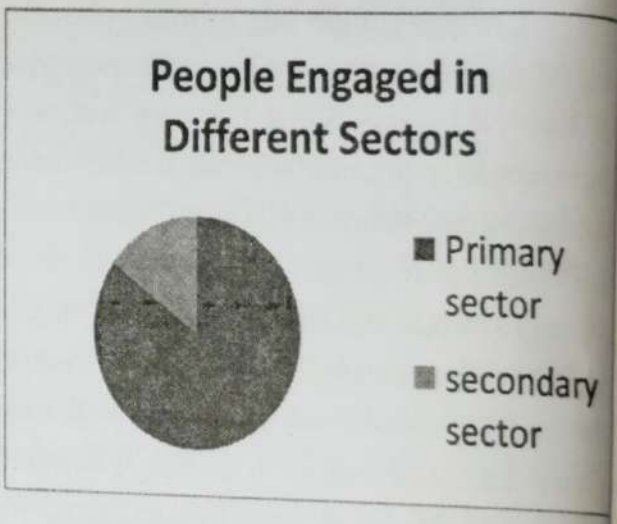


Fig.1.5. Pie Chart Showing People Employed in Different Sectors

***Land Ownership:-** The people here are most local and belongs to the village itself, having pl less than 1 bigha, the houses are kacha hou with very minimal infrastucture facilities.

***Age Group:-**The village is comprised mixed age group of populations, starting fro 3 years to 80 years. But most of the peop comes in the age group of 30 to 45 and t maximum number of populations belong to t below 10 age group.

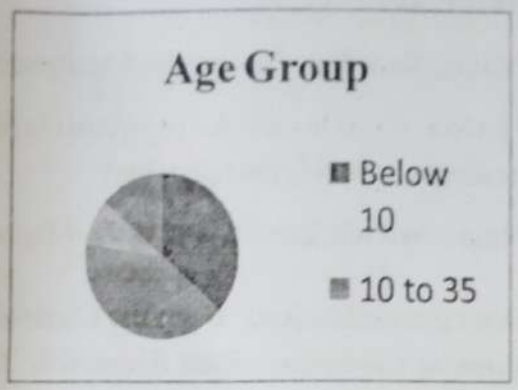


Fig. 1.6.Age Group in the Village

*** Infrastucture and Functions:-** Mawlynnong being a very remote village of Meghalaya lacks in infrastuctural facilities, although few houses have facilities of Drinking water, tank, tap, Irrigational facilities, electricity connections, communication , post office.

Fig 1.7. Members at the Site

Conclusion

Educational tour or excursions are short trips by students, under the supervision of the College management, the main of the educational tour is to impart knowledge and learn things from the tour. Educational tour makes study interesting, and makes learning easier. We acquired a lot from this excursion.

The demographic study of the village showed a female dominated population. The village follows Matriarchy where female populations handle all the works and most of the male populations stays home and look after all the household chores. The village is situated in the interiors and remote areas of the East Khasi Hills where even basic infrastructure is not there. For e.g.there is no medical or health care facilities for emergencies, No hospitals for the treatment purpose and not even Banks. Although the villagers admit that they don't face any difficulties, they are living without these facilities since forever but emergencies can occur anytime.

Also, there is a problem of language barrier most of the people of the village speaks Khasi and very few of them knows other language like English, therefore it was quite difficult for us to conduct the survey, since they find it very irritating and also interaction becomes difficult due to language barrier. Apart these, the village are a very beautiful and clean because of the villagers' cooperation amongst themselves. From this field study we learned that socio cultural economic activity depends on various social- economic and

demographic factors. Development is multi-faceted is different to a different class of people it may be social, political, economic, personal, psychological etc.

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A Study on Infrastructural Development of Pandu College Campus

UG 5th Semester (2020-23)

Abstract

Guwahati being one of the fastest growing cities, with literacy rate of 91.47% need more technologically advanced and modernized gadget to improve its infrastructural sector. Infrastructure development is an important aspect that needs to be taken into account. When development will take place in infrastructure, then the individuals will be able to carry out their duties in an appropriate manner and lead to progression of educational institutions. This study gives importance on the present infrastructural condition of Pandu College Campus and its development. Since, establishment and highlight the problems faced and improvement necessary to be made.

Key Words : Pandu College, Development, Environment.

Introduction

With the believe in imparting life oriented and value-based education, an education that aims to strengthen the body, purify the mind and sharping the intellect, Pandu College came a long way from 1962, and a long way to go.

A glance from the history says a lot about its much relevance in the educational ecosystem functioning in the Western Guwahati area. Prominent freedom fighter and social worker Sri DebanShama, the President and secretary of Vidya Mandir High School, Sri S.K Roy, Sri B. K Mitra and Sri Satya Kinkar Sen attempt to develop institution of higher education, to fill up the lacuna as population was increasing in the area but no higher education facilities were available.

If development is recorded, we could analyse verifies its vision, to transform the college to a center of excellence and value-based education for all round development of the students. As its faculties with different clubs to explore once's own self, with canteen provided with great hygiene, NCC, Library to study, different rooms prescribed for rich variety of purposes. A very healthy environment to live in, accommodation of girls' and boys' hostel and common rooms with

facilities and very minimal complaints. More development is taking place in respect to students will and health. In broader perspective it also develops the market economy in its surrounding, communication sector is made strong, foodsectors provided overall development in the environment is experienced.

Statement of the Problem

Pandu college is one of the premier institutes in the region ofPalashbariKamrup district Assam but with the passage of time and running generation towards the more technological advanced society some system and development are required to made. In the infrastructuresector technology advancement are required broadly incorporating new computers for the growing student population in Pandu college. With the span of time and an era ofyoutube digital study would be more interesting to pursue today. Proper hygienic washroom with basin and dustbin should be a must think in today's date as we just came across a very deadly virus. At the same time the central administrative functions have expanded faculty are expected to have done more than a decade previously. New infrastructural developments are taken in consideration in recent dates keeping in mind the development and comfort of the students. Writing many more grant proposals in order to maintain funding for research and scholarship, serving on university committees, participating in expanding outreach effort and planning are necessary for college's systematic development.

Objectives

The aim of this study is to demonstrate t development and study environmental condi of Pandu college campus. The specif objective are-

* To understand the infrastructu development.

* To study the environment condition of Pan college.

* The economic development of t neighbouring area.

Analysis

The Pandu College campus's coordinates a latitude of 26.1655766 and longitude 91.6917199 can be analysed by viewing t following plot starting from the 1st College ga parking plot, Department of Science at t beginning, followed by old building along wi resting space towards left and gardens towar right, and then 1st Canteen beside the 2 College gate, and at the end the Administrati Block.

Certain data have been analysed below

*** Administrative Block**

The building is located approximately at t direction of north-west. The building contai total three floors, in which the Ground flo occupies three Departments i.e., Educatio English, and Assamese. The First floor contai Offices, and occupies two departments i Political science, and Economic. The secon floor contains Organizing rooms, and tw departments i.e., Geography, and Philosoph

Here, the department of Education contains 7 room along with staffroom towards left. The department of English contains 8 room along with staffroom towards right, and the department of Assamese contains 1 common room and staffroom towards right, with washrooms for girls and boys. The 1st floor contains the Principal Office, IQAC, Conference Hall, and cash counter towards left. Also, the department of Political science contains 8 rooms towards the right, and the Department of Economic contains 1 room towards right. The 2nd floor contains 1 Digital room, 1 Meditation room towards left and with 1 room of NSS, along with Geography department with 1 room of computer lab, 1 seminar hall, 5 classrooms along with four staffrooms, with department's library, along with girls and boys washrooms. Geography department also contain 1 instrument occupied room and, 1 documentary room. The third floor is occupied by the Commerce department, with 7 classrooms and multiple subjects.

Fig. 1.8. Old Building (Source: Internet)

The Old building is located towards the North direction surpassing Science department. The building contains three floors, at the ground floor the main library is located towards west of the building along with departments of Bengali, Hindi, Sanskrit, Bodo, and Mathematics. Auditorium at the 1stfloor beside the History department along with Bio-tech, Botany, and Zoology departments, the 2nd floor is occupied by the Computer Science lab and Bio informatics Lab, and at the top floor the 2nd Canteen is located along with 3 rooms of Tailoring Centre.

*** Library**

With the finest arrangements of each room comes the library providing efficient service to the reader.Library is located approximately to the North at the ground floor of Old building. There is 1 Digital library for Staffs, It is well stocked with more than 46,306 texts and reference books, more than a dozen of local and national newspapers, journals and other information sources like maps, globes, floppy discs, CD.ROMs etc. The library has a reading room for students and a space is kept exclusively to teachers, Property counter, along with CCTV, and Metal detector. It also follows a record maintenance according to which approx. Minimal of 30 students visits day to day. There are in total 10 desks for students containing book shelves of 21 subjects.

*** Canteen :**

There is mainly one canteen inside the college campus, the canteen is located to the nearer

to the 2nd College gate, accommodation of tables and chairs along with CCTV cameras in the canteen. There are in total 4 cooks, 2 cooks for the canteen. Food quality is average but in a most affordable price, and certain machines such as coffee maker and refrigerator are present.

*** Hostel**

i) Girl's Hostel

Pandu College Girls' Hostel was established on 30th December 2000. The Girl's Hostel is located nearer to the old building. There are in total 54 students, containing 26 rooms with 56 beds, also 6 bathrooms; 8 toilets and 2 common rooms.

ii) Women's Hostel

Due to the increasing demands from the students, another block of the hostel, named as the Women's Hostel was started and was completed in the year 2017.The Women's Hostel is located beside the Girl's Hostel with 48 students, 24 rooms with48 beds , 1 meditation room , also visitors room , with washrooms and toilets.

In each and every hostel there is 24x7 availability of water, and electricity along with kitchen. Students from Higher Secondary to Post Graduate persist in these Hostels. Each hostel follows certain rules and regulations which are further be maintained by the students.

iii) Boy's Hostel

Pandu College Boys' Hostel started its journey since 5th September, 2000 for providing backpackers a base to stay. It is located the campus towards the Northern direc There are total 15 rooms along with 1 room, 45 students in total, and 60 beds washrooms, 1 library, and dining hall.

*** Common room**

There are two common rooms for both and boys. The girl's common room is loca nearer to the 2nd College gate under Administrative Block. Indoor games provided along with availability of sits washrooms. Though it is maintained enough yet alteration of washrooms is requi

The Boy's common room is located outside campus nearer to the 2nd College gate at two floors building containing two rooms each floor in which one room is used for cult activities.

*** Gym**

Gym is regarded as the core part of campus, since it benefits student for maintain good health and enthusiasm. As per the d students of 100 above along with 3 train and 3 instructors joined the gym. The gy occupied by various equipment. The fee the students is 100 per month. It is a ne added zone within the campus. Andtherefo improvements are needed for unavailability washroom, toilets, basins, and changing ro

*** Parking Zone**

Vehicle plot is located nearer to the 1st colle gate towards right direction, despiteof bu area, only 20-25 vehicles approximately

be occupied since it is covered by various wild plants, and drainage . Though every vehicle is parked systematically with no issues yet facilities need to be improved for cleanliness, security and protectable boundary for the betterment of the campus.

The above analysis gathers the information of the structure and surroundings within the college campus. With these informations it is easier to identify the campus and objectify the same.

As the study emphasis's more on the development sector, to start from its establishment throughout the decade it made up to present 22 full - fledged departments spread over arts,commerce, science disciplines. IQAC (Internal Quality Assurance Cell) was established in 2003.

The Career Guidance & Placement Cell (CGPC), previously known as the Information & Career Guidance Cell (ICGC) came into being on 5th September 2001 with a group of teachers. Mr. K. K. Bora. President of the College GB formally inaugurated the cell on the occasion of College foundation day. GYM is newly established in 20th June 2022.

Overall Analysis

Over the last 50 years Pandu College transformed itself in various fields. Starting from education, cultural, environmental, and infrastructural. When all aspects are analyzed its found to be putting forward its steps towards the right path of development. Coming from a youth of today which needs huge amount of upgraded facilities it could be seen to improve a lot in the recent years.

The step of adopting the culture of self-financing courses is the most important improvement made as it prepares a student in ever changing demand of the market with industry required skill.

Infrastructure wise the college have fairly adequate infrastructure for its present needs. The inclusion of auditorium which is double a classroom, Digitization room for small but necessary, programs and event and new schemes/ project launches is made. Newly installation of water supplier is a very important and necessary improvement as the area personally faces a water shortage.

Only installation of computers for department of computer application was not considered rather departments and subject need wise computers are installed. And encouraging new studying methods through projectors are greatly appreciated. In 20 June2022 college GYM is introduced, on most student's perspective it was a much needed development as it helps in physical fitness of students with stress less time management. as most youth prefer gym but

travelling from college to GYM that to on time scheduled was a stressful situation. and the hole arrangement is provided within a much affordable range.

Other development are taking place every now and then, starting from constructing new buildings, improvement in floor structure, new ideas and technologies etc.

Environmental condition:Pandu College is beautifully designed with natural beauty, with 1 garden with ornamental trees and shrubs, permanent and seasonal flowering plants. The garden is maintained by a gardener, these large no. of trees reduce the level of pollution and keeps the air clean. The college has sweeper to keep the campus clean. NSS and NCC activities form the core of extension work but all students are actively involved in keeping the campus clean and green and creating a pleasant ambience.

Economy of surrounding area: If traced back to before establishment of the college there no such marketing could be seen as it is considered to be a residential place (through interview of a past student of Pandu College). After the establishment of the college new markets are bought up, slowly seeing the requirements of printing, medical, other computer works new shops are opened. Being an area with students newly restaurants are opened. At present most of the necessities are found in hands.

Except the economic development of the surrounding area, the surrounding air is quite decent as well, as no bus terminals plotted so less noise of vehicles, and being the e Pandu link route lessmotor-vehicles pas

Considering all aspects of the performa the College, to assist in identifying the ave of further improvement, some li recommendations are made.

Recommendation

More self-financing enrichment course preferred to be introduced according to reg needs, preferences and facilities avail Courses on Interior Decoration, F processing, Maintenance of Electr Equipment like radio and TV sets, Mush Cultivation, Sericulture, Tourism etc. may e students with the expertise needed for employment. On the other hand, cours spoken English, General Knowledge Current Affairs, Numerical Skills etc. outside class hours may help the studen face interviews and prepare them competitive examinations.

The College does not make any attem publicize the expertise of its teache consultancy. The college needs more s of acknowledgements and more ser internet information's to describ infrastructure and services in a more elab manner. In all, college doesn't have publications of its developmen achievements,so leaving people wh engaged in the work non other knows ab and due to lack of information circul directly to student, students are least awa the services provided or schemes launc

Or it could be stated as due to least information sighted outsider doesn't get a 1st hand information, rather get to learn about the college through other people view point.

There is no such accommodated place for outdoor games.

Few washrooms are lacking with necessities like, basin, proper water facilities and tissue paper. Other most important is sanitary arrangement and noticing students of its availability.

Conclusion

Pandu College is located in unique and most beautiful area in assam that is near Brahmaputra River.If we talk about canteen or department or hostel or any other infrastructure, the infrastructure development in Pandu college since the date of establishment till now has been a great progress. And we can notice from the data that the motive of development is still going on. We can see the development progress going from good to better and the better to the best. So, we hope some more development in the upcoming technologies. As we can see nothing is perfect. we can see there are few things to be modified and changed and few things that need to be improved will be taken seriously and surely be improved and modified that in upcoming days. The college had three consecutive cycles of NAAC visits have been completed. College has been accredited with CGPA 2.38 in the Third Cycle visited by NAAC held in 2019.

So, we conclude that Pandu college is a perfect educational institution with all kinds of facilities and considers everything seriously whether it be in case of education or in case of infrastructure. The environment in the college is so good for studying and the motive of continuous development and growth of infrastructure in the college gives it an extra bonus.

Educational tour or excursions are short trips by students, under the supervision of the College management, the main of the educational tour is to impart knowledge and learn things from the tour. Educational tour makes study interesting, and makes learning easier. We acquired a lot from this excursion.

The demographic study of the village showed a female dominated population. The village follows Matriarchy where female populations handle all the works and most of the male populations stays home and look after all the household chores. The village is situated in the interiors and remote areas of the East Khasi Hills where even basic infrastructure is not there. For e.g. - there is no medical or health care facilities for emergencies, No hospitals for the treatment purpose and not even Banks. Although the villagers admit that they don't face any difficulties, they are living without these facilities since forever but emergencies can occur anytime.

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References

In this project we have collected thedata:- By observing the area of one own.

GPS has been used to measure the
and longitude

Interview of few ex-students and the
students are done to understand
necessities and experience.

Analysis is done primarily with the help
own field survey of observing and
examining the particular area that is our
campus.

https://www.punjabcolleges.com/
indiacolleges-Pandu-College-Guw
(Gauhati)/

NB:- *UG 5th Semester Students: Debolina Paul, Deepshikha Deb Roy, Hiyamoni Krishangi Kandali, Praggyan Pratyush Baruah, Preeti Basumatary, Ruprekha Bha Snigdha Dey Tarafder, Sudipa Mandal.*

Geographical Analysis of Recent Flood in Assam

PG 1st Semester (2022-2024)

Abstract

Floods are one of the disasters that affect people all over the world. Floods are also one of the biggest natural disasters in Assam. It occurs in Assam every year due to heavy rains and this has affected the people every year. Heavy rains and man-made activities like deforestation affect Assam every year and also cause floods in the two main rivers of Assam, Brahmaputra and Barak. It is flooded during the rainy season and it affects people's lives. Although floods have been a phenomenon in the riverine areas of the state for centuries, the damage caused by floods has increased significantly in the last few years. This has caused huge destruction and irreparable damage to the economy of the state. This is because the economy of Assam is largely agricultural. Every year, floods in Assam leave thousands of people homeless and damage biodiversity zones, damage agricultural crops, and cause many losses to human lives and property, including infrastructure, property and communications..

Key Words : Flood, Disaster, Assam.

Introduction

Undoubtedly, flooding is the weather-related disaster that affects the greatest number of people worldwide. Almost anywhere can experience it. Water spilling over into normally dry terrain is what is referred to as a flood. Floods can develop in a variety of ways that are not directly tied to current meteorological events, despite the fact that flooding is frequently thought of as the result of excessive rainfall. The term "flood" comes from the old English word "flod," which is related to the German word "flut" and the Dutch word "vloed," which refers to the inflow and float of water. Flooding is defined by the Oxford Reference Dictionary (ORD) as the overflowing or influx of water outside of its usual boundaries.

According to Gogoi, 2008; Flood is a complicated phenomenon with complicated results. In India, the word "flood" typically refers to river floods caused by specific

fluviogeo-morphological conditions combined with localized rainfall. He added that during the rainy seasons, floods are a common occurrence in this nation. These floods can sometimes be dangerous.

According to Mirza, 2003; Different effects of flood disaster can be seen among people, homes, and communities. Coping mechanisms include moving away from flood-affected areas, anticipating floods, insuring livestock and crops against flood damage, storing food, offering emergency medical care, and constructing flood shelters.

According to Manuta and Lebel 2005; the most frequent and severe natural disaster in Asia is flooding, and like all disasters, its effects have gotten worse despite our better ability to track and explain it.

According to Vaghani2005; Floods are a frequent natural disaster that can happen anywhere in the world. These cause harm to human life and environmental degradation.

According to Nott 2006; one of the main reasons for tangible loss in floods is physical damage to property. This covers the price of cleaning up after the floods, loss of income or services, and the expense of repairing damaged items and assets.

According to Jimoh and Iroye 2011; Flooding incidents, which are frequently brought on by changes in land use, are becoming common in Ilorin and most other metropolitan areas, causing enormous hardships and occasionally fatalities.

Types of Flood

Coastal flooding: Coastal flooding is th up of water on land brought on by wave storm surges, or significant rainfall. Due proximity to the ocean, coastal comm are vulnerable to flooding, and the da predicted to increase as a result of c change.

River flooding: A flood in a river happens water rises above the riverbanks. Every and stream, especially larger ones that every two years, has the potential to flo

Flash Flooding:-which usually results severe thunderstorms, hurricanes, tro storms, or other weather patterns, starts w six hours of the beginning of heavy rainf mudslide, a dam or levee breaching, or an occurrence can also cause flash floods.

Groundwater Flooding:-Groundwater fl typically occur when heavy rains overwh drainage systems, causing water to over onto neighbouring streets and properties. urban and rural locations are equally liab experience them.

Sewage Flooding:- Unexpectedly high r can overload sewage systems or treat facilities, leading them to malfunction and untreated sewage into bodies of water. Th what causes sewage floods.

The primary natural disaster that decim Assam every year is flooding. Flo frequently occur along the great ri Brahmaputra when the southwest monsoo present.

Statement of the problem

The Assam floods have been in the news for the past several years. Assam is reeling under floods, with heavy rainfall and landslides affecting lives in many districts. The flood situation in the state deteriorated with the number of affected increasing to over 7 lakhs in 27 districts and the toll rising to 10 in recent flood. Altogether 390 villages in 18 revenue circles continued to be under water. Lack of effort to reach a long term solution through construction of dams and embankments are the major issues contributing to the aggravation of the flood hit Assam.

Objectives

*To create awareness about artificial flood due to rainfall, its causes, affect and related issues.
* To develop a comprehensive learning recovery plan at state level.
* To sought the government for more support and planned construction in flood prone area.

Data Source

The data has been collected from both primary and secondary source which includes interaction with people affected by flood, observation, information from journals, newspapers, websites and so on.

Findings and Analysis

Population

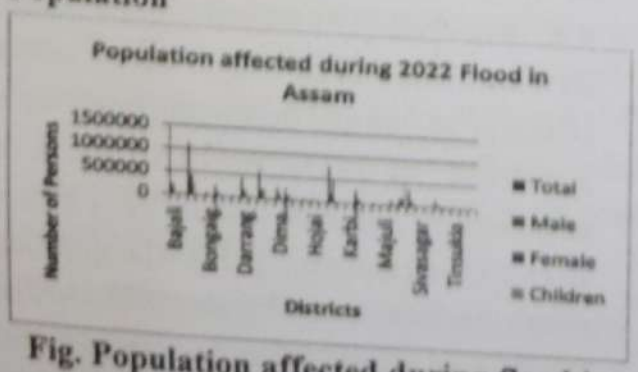

Fig. Population affected during flood in Assam (2022)

Infrastructure Damaged

The state of Assam was hit by massive floods, as heavy rains flooded large parts of the region inflicting massive suffering on the population. The death toll from the floods this year has reached 172 according to official sources. Around 30 lakh people were affected in 30 districts of the state by the disaster. Among the worst hit districts were Nagaon followed by Cachar and Hojai.

Many important infrastructure units were also damaged by the floods including water resources, power plants, mobile towers, bridges and many other such, thus crippling the population in accessing support. According to official sources 193 bridges, 3611 roads were partially or fully damaged due to floods.

* Embankment breached:-Districts in which embankments were breached include Baksa and Barpeta. On 18/06/22 a total of seven embankments were breached in Baksa district which include 1 No KatigaonLoihabari Embankment, Golding River Embankment, BennabariBarband Embankment, JorthanNizarabandh Embankment, Dangar Dong Embankment. In Barpeta the Morachowlkhua embankment.

* Affected embankment:-The affected embankment include the north Guwahati-1.R/B embankment of river BarnadiofKamrup district.

* Damaged bridge:-Damaged bridge were found in Bajali, Dhemaji, Kamrup, Nalbari and Udalguri districts. In Bajali district 12 bridges, 2 bridge in Dhemaji, 2 bridge in Kamrup, 3

bridge in Nalbari and 1 bridge in Udalguri.

* Wildlife:- Golaghat and Morigaon were the two district where wildlife was affected . In Golaghat Kaziranga range and Agoratali range were affected. In MoriagonPobitora Wildlife Sanctuary ofMayong was affected.

Roads:-

Bajali, Baksa, Barpeta, Bongaigaon, Dhemaji, Dhubri, Hailakandi, Kamrup, Karimganj, Kokhrajhar, Lakhimpur, Morigaon, Nagaon, Nalbari,Tamulpur,Udalguri district had damaged roads. A total of 218 roads were damaged in the whole of Assam.

* Other infrastructure:- Among other infrastructure damaged were ponds, fisheries, elementary schools, Anganwadi centres, irrigation canals, etc.

Historical Record of Assam Flood

Flood is not new and unprecedented but rather a more reoccurrence of the same disaster in Assam. Devastating floods and earthquakes were some of the watershed events in the history of erstwhile undivided Assam that wreaked havoc in the region. During post-independence period Assam faced major floods in 1954, 1962, 1972, 1977, 1984, 1988, 1998, 2002, 2004, 2012, 2020, 2019, 2022. Almost every year three to four waves of floods ravage the flood prone areas of Assam. The flood in 1977 that resulted in 11361 deaths was the worst ever. In 1988 two hill districts Karbi-Anglong and North Cachar are excluded to get approximation of the extent of flood in the plain area of Assam, about 70% or near three-four of the plains Assam were under water. In the year of 2002, 6560 vi million populations were affected. I of 2004, 23 out of 28 districts affected by floods. 2794 villages and populations were affecting in this flo the year 2004 and 2014 the so tributaries of Brahmaputra in lower experienced flash floods of high magn to cloud burst in the catchment a Meghalaya. In 2012 flooding com across many districts in Assam. 124 have lost their lives due to these floods i a large number of children. There is sixteen people losing their lives in a la caused by heavy rain. A least 2.2 millio have been affected by this flooding. S onset of flooding, 43 brunches of emb have been reported on the Brahmaput and 14 brunches have been reported bank of its tributaries that spread ac districts. 2019 Brahmaputra floods aff total of 52,59,142 people, 1,63,962.02 h of crop area, in 30 districts in the s Assam. 2020 Assam flood to the sig flood events of the Brahmaputra River north eastern state of Assam and coi with the COVID-19 pandemic. Initial fl started in May 2020 due to heavy affecting 30,000 and destroying crops 5 districts. As of October2020, the affected over 5 million people. 5474 were affected and over 150,000 people refuge in relief camps. This year 2022 has affected around 5.5 million people 32 out of 35 districtsof Assam.

Present situation of flood

After floods in Assam present situation is very bad. Embankments, road, bridge and other infrastructure have been damaged in Baksa, Kamrup and Tamulpur district etc. Official statement says a total of 17 embankments were breached - Cachar (12), Udalguri (4), and Baksa (1). While 486 roads and 14 bridges has been damaged. A crop area of 63314.75 hectares has been indundated while 795 animals were washed away and 9,55,089 were affected. Cases of large soil erosion was reported form Barpeta, Bongaigaon, Chirang, Dhubri, Jorhat, Kamrup, Lakhimpur, Majuli, Morigaon, Nalbari, Sonitpur, Tinsukia and Udalguri. Also, urban flooding was reported from Cachar, Dibrugrah, Udalguri and Tinsukia. The bulletin said,at present no river is flowing above the danger level in the state and peoples are save now.

Flood Copping

Assam with its vast network of rivers is prone to natural disasters like flood, which has a negative impact on overall development of the state. The Brahmaputra and Barak River with more than 50 numbers of tributaries feeding them, causes the flood devastation in the monsoon period each year. The flood problem of Assam is singularly different from other states so far as extent and duration of flooding and magnitude of erosion is concerned and is probably the most acute and unique in the country.

The indigenous tribal communities like deori and mising across Assam have developed a particular way of life in which they coexist harmoniously with the local demography and climatic conditions.

These houses are built on raised bamboo stilts, and unlike concrete houses, they are resilient even to floodwaters. Members of these communities also keep boats next to the house, so that the family can move to a safer place in case of extreme flooding. These types of traditional houses are known as changghar, which basically means a tall house on a platform. They are easy to construct, because they are built using bamboo, a material that is sourced locally.

As another traditional method to mitigate flood damage,known as kasopithiya, are used to solve the problem of water logging. These mounds are generally built in the shape of a semi-circle, like the shell of a turtle rising above the floodwater.

During a flood, land that is temporarily immersed in water can become waterlogged, which is when the soil becomes completely saturated with water that is unable to drain away. Building houses on top ofkasopithiya avoids floodwater weakening foundations, as they are raised above the water and will not get waterlogged. It also solves the problem of dirt and silt that is left behind when floods recede. Many communities even build these "highlands" to protect wildlife, as animals can take refuge on the soil mounds that rise above the water level during floods.

Precaution to control Flood

1. Construction of embankments of flood walls

2. River training and bank protection wok
3. Anti erosion and town protection works
4. River channelization with pro siltation device
5. Drainage improvement/sluices
6. Raised platform
7. Flood forecasting and warning
8. Flood zoning

Conclusion

Assam is one of the most flood prone states in India and it has almost become an annual calamity which has a negative impact on the overall development of the state. The flood of Assam is different from other states so far as extend and duration of flooding and magnitude of erosion is concerned and is probably the most acute and unique in the country. The flood of Assam is flash flood caused by flowing rivers from neighboring states. These flash floods cause large scale devastation in vast areas including loss of human lives, live stocks and properties.

*The Brahmaputra and Barak Riv... main reasons of flood in Assam.
*Assam also receives river wa... neighboring states like Arunachal Pra... Meghalaya.
*Annual excessive rainfall is the mos... causes of flood each year.
* Floods are also caused by ... intervention-like encroachment of rive... and wetlands, lack of drainage, unplann... growth, hill cutting and deforestation.

* The dams that are being built are ... aggravating these disasters, releasing ... from dams situated on hills are one ... reasons.

* Topography of the region is like bowl ... it susceptible to water logging.

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Population Growth in Guwahati city : A Geographical Analysis

UG 5th Semester (2020-2023)

Abstract

Population typically refers to the number of people in a single area, whether it be a city or town, region, country, continent, or the world. With a population of over a million people, Guwahati is the largest city in all of the eight North-Eastern states. The population density of 2695.43 per sq. Km. It has a population growth of 18.21% during 2001-2011. The study gives importance on the present population of Guwahati and its problem and effect as well as, the highlight of age sex composition, literacy rate and religious composition in Guwahati. And Arc GIS helped us to prepare various maps and give us the overview of the problem.

Key Words : Population; Growth; Density; ArcGIS

Introduction

Population growth is the change in number of people living in particular area between two given point of time. The population growth is one of the major concernsof the modern world as the human population is not a static factor. Rather it is growing at a very alarming rate, knowing the growth of population is important for predicting, managing, monitoring and eradicating pest and diseases outbreaks and more over for equal distribution of resources. One of the major factors behind population growth is migration and urbanisation with this regards the study area. Guwahati is one of the largest and fastest growing citiesof the North East India with the population of 9,51,352 the population has increased from 2001-2011 by 17.64% because of favourable geo-political factor. Guwahati has also been the centre of attraction for various commercial and industrial activities due to its favourable geographic location.

With the above background an attempt has been made to analyse the population growth in Guwahati city.

Statement of the Problem

Rapid population growth is one of the major contributing factors. Several factors are responsible for the rapid growth a drop in

mortality rates, a young population improved standards of living and attitudes practices which favours high fertility. Even though it often engenders opposition, family planning is more crucial then even, as the rapid population growth continues to create and explosive situation. Rapid growth has led to uncontrolled urbanization, which has produced overcrowding, crime, pollution and political turmoil. Rapid growth has increases in food production, it also hampered economic development and caused massive unemployment.

The aim is to study the problems of social composition in terms of religion and language in the districts Assam in Guwahati city. The analysis is based on the census data of Guwahati during 1990 to 2011. The growth of various language speaking population is also analysis and it is observed that the spread proportion of Assamese language is widely spread in Guwahati city thus because of ither person visit one region to another and they faced problems to understand the language.

Demographic and economic migration is related to labour standard, unemployment and the overall health of a country's economy. Migration from one region to another take place because of higher wages, better employment opportunities, a higher standard of living and educational opportunities.

Objective

The main objectives of the study are as follows;

* To understand the reasons be... population growth in Guwahati city.

* To find out the population density ... ward in the study area;

* To observe the literacy rate in Guwa...

* To understand the social composition ... area;

Methodology

This study is based primarily on secondar... collected from e-resources and books. A... spatial data are analysed in ArcGIS soft... to assess the population growth in Guw... Population data is collected from Census ... website

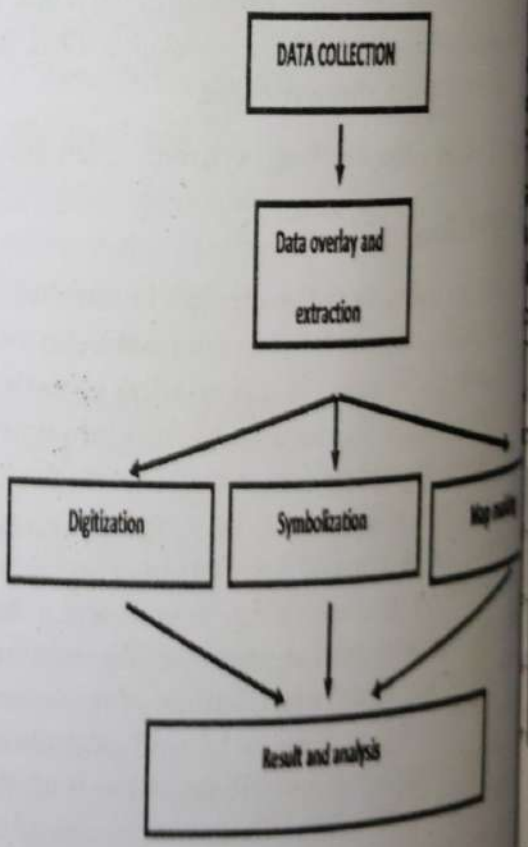


Fig.1 Flow Chart

Study Area

Guwahati is a large city located in the state of Assam, Northeast-India. The latitude of Guwahati city is 26.1158° N and the longitude is 91.7086° E. Guwahati is a major river part as well as the commercial centre of the Indian state Assam. The city is home to Guwahati University the oldest university in Northeast-India. There are a lot of educational institutes in Guwahati such as the Indian Institute of Technology(IITG), Cotton University, Pandu College and many more. Many ancient Hindu temples such as Kamakhya Temple, Basistha Temple, Umananda Temple located at Umananda Island (Peacock Island),Umananda Island is also known as smallest inhabitaed riverine island in the world. Manikarneswar Temple, Aswaklanta Temple, Shree Panchayatana Temple, Noonmati, and the like, are situated in the city, giving it the title of "The City of Temples".

Guwahati lies between the banks of the Brahmaputra River and the foothills of the Shillong plateau, with LGB International Airport to the west and the town of Narengito the east. The North Guwahati area, to the northern bank of the Brahmaputra, is being gradually incorporated into the city limits.

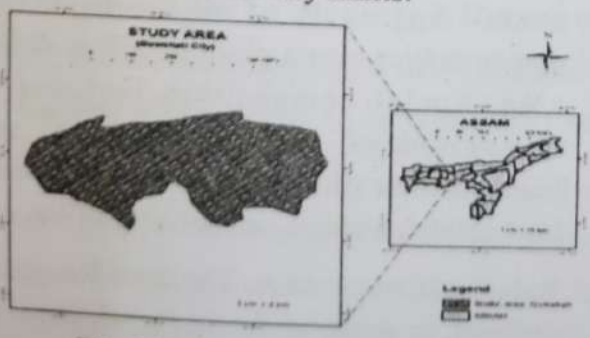


Fig.2 Location of Study Area.

Data Source

The article on 'Population Growth in Guwahati City: A Geographical Analysis' is done with two types of data source, Primary and Secondary. The primary source of this article used is surveying based on personal experience and questionnaire regarding the research topic.

The secondary source that are used for this article are books that provide us with vital and major source of information, websites also provided us with previous year data, census, journals and magazines were also used for collecting information. Administrative records, research reports and current census are some essential sources of information for this research topic.

Findings and analysis

On the basis of the survey, we conducted through online mode the following data has been found:

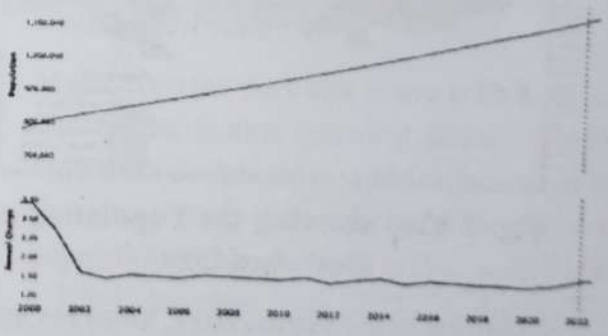


Fig.3 Graph Showing the Trend of Population Growth

Population Growth

The total population of Guwahati city in 2000 was 801,000 which increased to 823,000 in 2001, 837,000 in 2002, 850,000 in 2003 and the

trend of population growth can be seen increasing and the present population of the city is 1,155,000 in 2022 whereas the growth rate is not constant it can be seen decreasing or increasing 3.49% in 2000, 2.75% in 2001 ,1.70% in 2002,

1.55% in 2003, 1.65% in 2004 and the present growth rate of the city is 1.76% in 2022 which increased from 1.61% in 2021.

Reason : The main reason behind population growth of the city is the pull factors that attracts people for good medical facilities, better infrastructure, better schooling and employmentoppurtunities, high standardsof living etc are the factors which leads toin-migration people from rural areas.

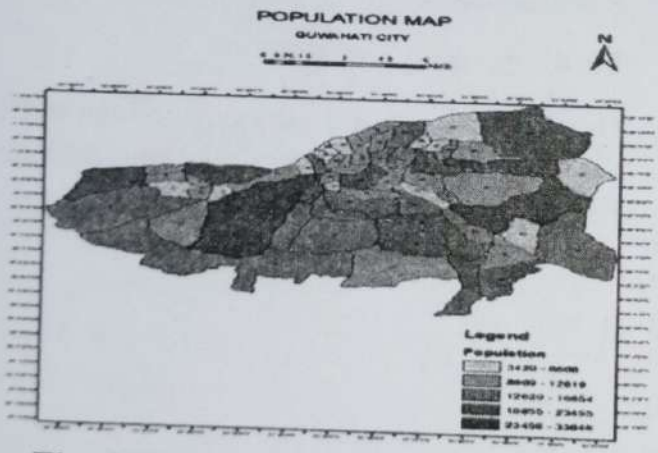
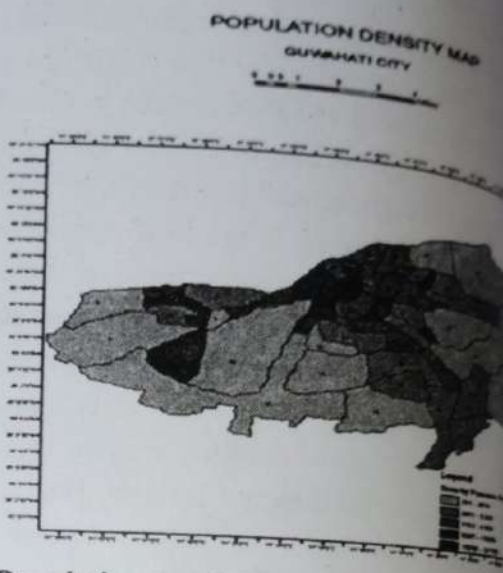


Fig. 4 Map showing the Population of Guwahati City

According to the census 2011, Ward No.49 in Guwahati City has the highest population of 26,314 followed by Ward No.51 with 25,359 and Ward No.46 with population of 23,455. Ward No.40 has the lowest population of 3420 followed by Ward No.43 with population of 5400 and Ward No.31 with population of 5616.

Population Density



Population density means total no. of pop living in per unit area of land. From the map we can analysed that ward havi highest population density. In Ward No. 2 21705.12 followed by Ward No.19 population density of 21442 and Ward N with population density of 21343.75. Acc to the census 2011 lowest population d can be seen in Ward No.17 with popula 891.02 followed by Ward No.13 with popu density of 1043 and Ward No.2 with popu density of 1334.18.

Social composition: Social composition overall aggregate of all the popul demographics over a given sample or da area. Social composition include demographics of age brackets, identification of faith, gender and ra background, income, and political affilia

Religious Composition: The word 'Religi defined as a set of fundamental ideas

practices that bind people together in a cosmos, an ordered world, and that link them in community (Eck, 2012). Religious compositions is the structure of a population in terms of religions.

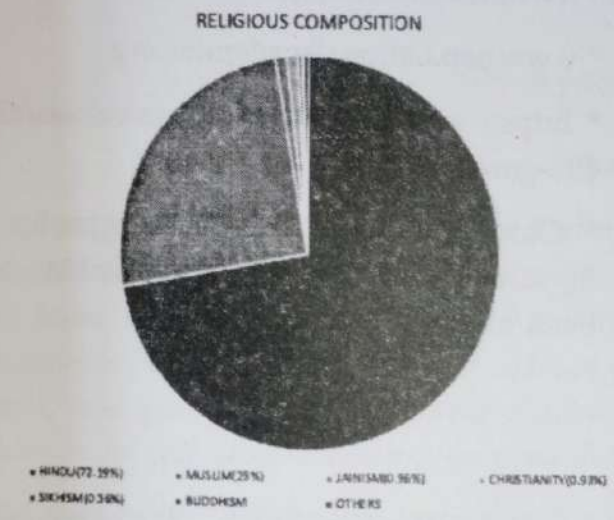


Fig.5 Pie Graph Showing Religious Compositions.

From the above Pie Chart of religion composition in Guwahati we came to known that Hindu religion has the majority with population percentage of 72.19% followed by Muslim with population percentage of 25%. Minority religion in Guwahati is Buddhism with population percentage of 0.16% followed by Sikhism with population percentage of 0.36%.

Age-sex Composition : The age and sex composition is the structure of a population in terms of age, sex and other properties such as marital status and education. It is also a key indicators of population composition.

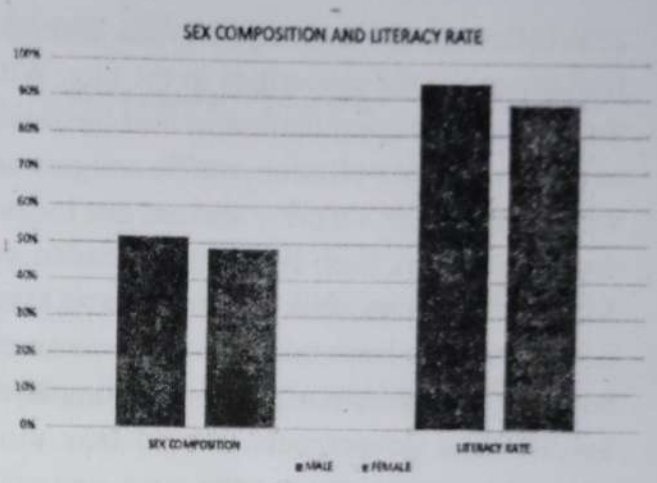


Fig.6 Graph Showing Sex-Composition and Literacy Rate of Guwahati City, Census 2011

The average literacy rate of Guwahati city as per Census 2011 was 91.4%. If things are looked out at gender wise, male and female literacy was 94.24% and 88.50% respectively. Total literate in Guwahati city is 7,93,360 of which 4,23,122 are males while 3,70,238 are females.

Conclusion

Major riverine port city along with hills and one of the fastest growing cities in India, Guwahati is situated on the south bank of the Brahmaputra. The current metro area population of Guwahati city in 2022 is 1,155,000 a 1.76% increase from 2021. On the basis of above study, it may conclude that the average literacy rate of the city is 91.47% if things are looked out of gender wise male and female literacy stood at 94.24% and 88.50%. In religious composition Hinduism is majority in the city with 72.19% followers, Islam is the second most religion followed in the city with

25% followers. Christianity, Jainism, Sikhism, Buddhism are the minorities in the city. With the increasing of populations in the city basket of problems like pollution, traffic congestion, water logging during rainy seasons due to poor drainage system, flash flood, overcrowded, etc are arising. From 2001 till the present many initiatives have been taken by the government but still the problems are not being completely solved. The government should take more steps to sensitize people and generate awareness of the need for population control by implementing various schemes not only that they should also focus on constructing better roads, bridges, improving the drainage facilities throughout the city and to improve the quality of life in the area.

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Change Detection in and around Kaziranga National Park

Bijoya Saha, PG 4th Semester (2020-2022)

Abstract

Kaziranga National Park is a protected area in the northeast Indian state of Assam. Spread across the floodplains of Brahmaputra River, its forests, wetlands and grasslands are home to tigers, elephants and the worlds largest population of Indian one-horned rhinoceroes.Ganges River Dolphins swim in the parks wates. It is visited by many migratory birds, and gray pelicansroost near Kaziranga village. Although there have been many changes in and around Kaziranga area detected in the recent years.

The data in this article has been acquired by both primary and secondary source with the help of field visit, interviews, journals etc.

Key Words : Population; Growth; Density; ArcGIS

Introduction

The declining per capita land availability in India availabilty in India in posing serious pressure on environment , food and socio-economic security. But physical and socio-economic development of a region is mainly related with this component of nature. Unplanned and over exploiting activities of human being on land results change in land use pattern, degradation of forest cover and other related problems. Therefore changing pattern of landuse should be studied carefully to prepare plan for prevent it from further destroying mode. Such study also helps in sustainable management planning of a particular area. The use of technology of Geoinformatics has played a crucial rule in Land Use Land Cover (LULC) studies. The data derived through this technique may help the planners and decision makers useful and cost effective in evaluating the data of the study area.

Land use describes how a parcel of land is used such as for agriculture, settlement or industry, where as land cover refers to material such as vegetation, rocks or water as land cover refers to the material such as vegetation,

rocks, or waterbodies that are present on the earth's surface (Anderson et al, 1976). Hence, land use refers to man's activities and various uses, which are carried on land and land cover refers to natural vegetation, water bodies, rock or soil, artificial cover and other resulting due to land transformations. The nature of land use/ land cover in an area reflects not only the environment conditions and land resource base of the area , but also it projects the level of development of the people under different physical, cultural and economic conditions.

The study area is classified into six major LULC classes which is mentioned in the Table. The classes shown in the table are water bodies, grassland, agriculture, hills and mountains, forest and vegetations. The results are shown in table.

Objective

*To study about the trend of change in and around Kaziranga area

*To learn about its impact on the natural environment

*To study about the forest cover, landuse patteren and landcover of Kaziranga.

Data Source and Methodology

The study is carried out using mainly secondary data which are collected from different online sources (websites, research papers, journals etc.). Few data are also collected from local people around Kaziranga National Park during departmental excursion.

Table no. 1: Landuse Pattern 19

Land use/ Land cover	1990	
	Area (in hectare)	
Water bodies	942	
Grassland	4879	
Agriculture	4972	
Hills and mountains	7301	
Forest	4300	
Vegetation	4530	

In the year 1990 water bodies constitu area of 942 hectare and a percenta 3.49% , grassland covers an area of hectare and in percentage 18.12. On the hand agriculture dominates the area of hectare and 18.46 in percentage, hills mountains costitues an area of 7301 he in the year 1990 and a percentage of 2 Forest covers an area of 4300 hectare 15.97%, while vegetation covers 4530 hec and 16.82% of land in and around Kazir

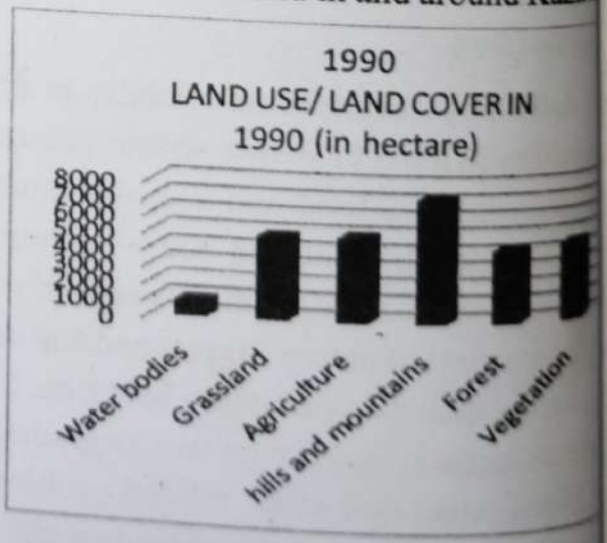

Fig 1: Bar Graph Showing The La Use/ Land Cover Of 1990 (In Hecta

Fig 2: Pie Diagram Showing The Land Use/ Land Cover Of 1990 (In %)

Land use/ Land cover	2021	
	Area (in hectare)	In %
Water bodies	2078	10.06
Grassland	4174	20.21
Agriculture	4170	20.19
Hills and mountains	3667	17.75
Forest	3470	16.80
Vegetation	3091	14.96

Table no. 2: Landuse Pattern in 2021

In the year 2021 water bodies constitues an area of 2078 hectare and a percentage of 10.06% , grassland covers an area of 4174 hectare and in percentage 20.21. On the other hand agriculture dominates the area of 4170 hectare and 20.19 in percentage, hills and mountains costitues an area of 3667 hectare in the year 2021 and a percentage of 17.75. Forest covers an area of 3470 hectare and 16.80%, while 3091 hectares and 14.96% of land in and around Kaziranga falls under vegetation.

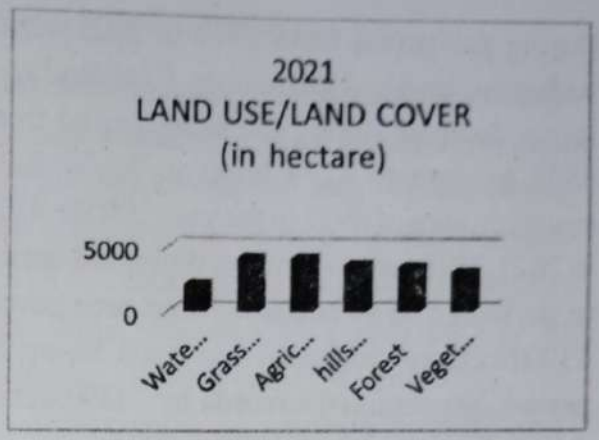

Fig 3: Bar Graph Showing The Land Use/ Land Cover Of 2021(In Hectare)

Fig 4: Pie chart showing the land use/ land cover of 2021(in hectare).

Table no. 3: Change Detection

Land use/ Land cover	1990		2021	
	Area (in hectare)	In %	Area (in hectare)	In %
Water bodies	942	3.49	2078	10.06
Grassland	4879	18.12	4174	20.21
Agriculture	4972	18.46	4170	20.19
Hills and mountains	7301	27.11	3667	17.75
Forest	4300	15.97	3470	16.80
Vegetation	4530	16.82	3091	14.96
Total	26924		20652	

During the period from 1990 to 2021 water bodies incresed by 1136 hectare. Grassland area saw a decrease during the same period from 4872 hectare to 4174 hectare. Agriculture covers an area of 4972 in the year 1990 to 4170 in 2021. Hills and mountains decreased during to period i.e 3634 hectare. Forest area covers 4300 hectares which also decreased during the period. Vegetation decreased by 1439 hectare during the period from 1990 to 2021.

In the charts below the land use/ land cover of 1990 and 2021((in %).

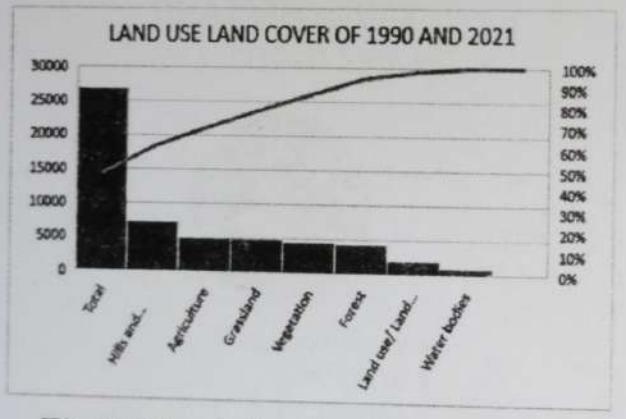

Fig 5: Chart showing land use land cover of 1990 and 2021

The land cover land use maps of the year 1990 and 2021 are shown in Figure 1 and 2 respectively.

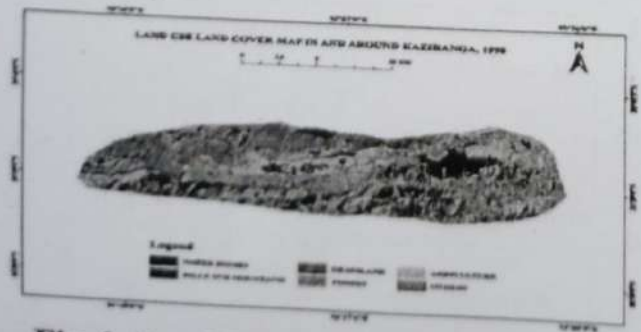

Fig 6: Land Use Land Cover Map In And Around Kaziranga 1990

From the present study we get to know that in 1990 3.9% is covered by waterbodies and in 942 hectare on the other hand grassland covers an area of 4879 hectare and 18.12% of land ofKaziranga. Agriculture covers 4972 hectare and 18.46 % of land. Hills and mountains covers an area of 7301 hectare and 27.11 %. Forest has an area of 4300 hectare and 15.97%. The vegetation covers a land area 4530 hectare.

Fig 7: Land Use Land Cover Map In And Around Kaziranga 2021

From the map of Kaziranga above we get to know that in the year 2021 waterbodies covers an area of 2078 hectare and 10.06 in percent. On the other hand grassland covers an area of 4174 in hectare and 20.21%. Agriculture covers an area of 4170 hectare and 20.19% of land area of Kaziranga.Vegetation dominates an area of 3667 hectare and 17.75%. Hills and mountains covers an area of 3470 hectare and 16.80 in percent. At last forest covers an area of 3091 hectare and 14.96% of land cover of Kaziranga.

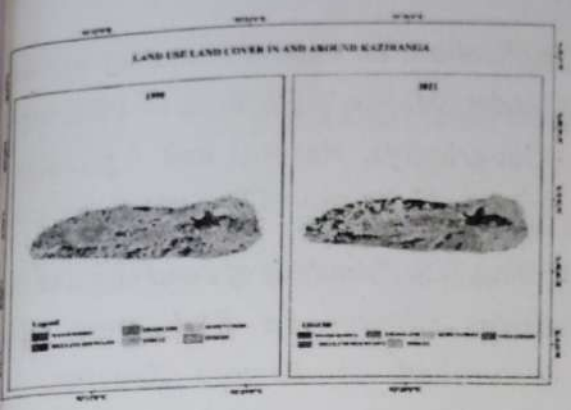

Fig 8: Land Use Land Cover Change Detection Map of 1990 And 2021.

rom the present study we got to know that egetation and forest area covers most of the ea that comprises of 4530 hectre and 4300 ectares respectively in 1990 and 2021. Water odies covers an area of 942 hectares in the year 990 and in the year 2021 it covers 2078 hectares.

ills and mountains covers an area of 7071 ectares in the year 1990 and 3667 in 2021.

able no. 4 Area (ha) and area (%) difference etween land use/ land cover categories in fferent years.

d use/ Land er	1990		2021		Difference	
	Area (in hectare)	Area (in %)	Area (in hectare)	Area (in %)	Area (in hectare)	Area (in %)
r bodies	942	3.49	2078	10.06	1136	6.57
sland	4879	18.12	4174	20.21	-705	1.75
culture	4972	18.46	4170	20.19	-802	1.73
and mountains	7301	27.11	3667	17.75	-3,634	-9.36
t	4300	15.97	3470	16.80	-830	0.83
tation	4530	16.82	3091	14.96	-1,439	-1.86

Findings and Conclusion

This research study demonstrates the ability of GIS and Remote Sensing in retrieving and analysing spatio-temporal data. An attempt was made in this study to develop a spatial data base of LULC ofKaziranga and its surrounding area. This research was carried out in Kaziranga in the year 1990 and 2021.The objectives were to demonstrate the usefulness of using satellite digital image processing coupled with GIS technology to map land use/ cover and detect changes in land use/cover. A comprehensive LULC map was developed for two distinct years i.e 1990 and 2021 in Kaziranga and its surrounding areas. The main objectives of the study are to understand the different types of land use in the study area and and to analyse the change detection of land use land cover The study showed that:

* Between the year 1990 and 2021 forest covers an land area of 3.49% and 10.06% respectively.

* Grassland covers 18.12% and 20.21% of land area in both the year 1990 and 2021 which reduced by 1.75%.

* Agriculture dominates an area of 18.46% of land in the year 1990 and 20.19% in the year 2021.

* Forest covers an area of 15.97% of the land in 1990 and 16.80% in 2021.

* Vegetation has area of 16.82% and 14.98 % in the year 1990 and 2021 respectively and reduced by -1.86%.

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Tourist Amenities in Kaziranga

Himshikha Deka, PG 4th semester (2020-2022)

Abstract

Kaziranga has five ranges namely Eastern Range at Agaratoli (which is about 4 km north east of Bokakhat), Central Range at Kohora (which is about 20 km west ofBokakhat), Western Range at Bagori (which is about 12 km further west ofKohora), Burapahar Range at Ghorakati (which is about 25 km further west ofBagori on the NH 37) and Northern Range at Biswanath (which is aerially about 44 km north west of Bokakhat, and by road 168 km).

Introduction

Kaziranga National Orchid and Diversity Park :

The Kaziranga National Orchid and Biodiversity Park is located at the distance of 2 km from the Central Range ofKaziranga, KohoraChariali. The park is sprawling in the area of around 6 acres in the Durgapur village and is considered as the largest orchid park in the Northeast belt of India. The Kaziranga's glory has been magnified many times by the park. More than 500 kinds of wild orchids, 132 types of sour fruits and green vegetables, 46 species of bamboo, 12 species of cane, and many other plants, as well as several species of local fish, can be found at the Orchid Park. A medicinal plant garden, a rice museum, a product distribution centre, a separate garden for local fruits and flowers, and a specific place for native fish species are among the other attractions in the park. Apart from its cultural sites, there is a dense woodland region with many local tree species growing.

Hathikuli Tea Estate

Hathikuli Tea Estate, owned by James Finley of Scotland, is a one-stop shop for anyone seeking peace and quiet while listening to nature's melodies. If you explore this tea estate on a Kaziranga Tour, you will have one of the best travel experiences in Assam. Hathikuli refers to a location frequented by elephants. As a result, seeing majestic elephants in the wild would be a beautiful sight. To entice your taste buds, try a variety of teas such as black pepper, organic green tea, and others. The tea

estates ofBochapari, Behora, and Methoni, in addition to Hathikuli, are the best spots to visit in Kaziranga. If you want to experience the best of Assam tourism, stay at one of the tea farms around Kaziranga.

Analysis And Map of The Tourism Sites:

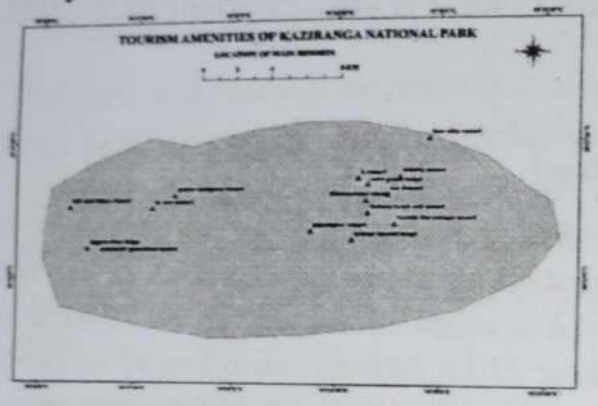

Fig 7: Location of Resorts

Table 1: Expenses of Resorts

RESORTS	PER NIGHT
JUPURIGHAR RESORT	3400
K RESORT	1600
DHANASHREE RESORT	3700
MANDU THE ESCAPE RESORT	5000
ARRANAYA RESORT	2400
THE PARK	1800
KAZIRANGA GUEST HOUSE	2250
BORGOS RESORT	5600
GREEN RED RESORT	2000
GREEN ASHIYANA RESORT	2799
KOHORA HOTEL AND RESORT	1700
WILDGRASS LODGE	2500
INFINITY RESORT	5500
SARMAS LODGE	1284
EKORA RESORT	1085
NAMDANG HOUSE	1167
SHANTI LODGE	2674
LORA RESORT	2000
SNEHA BHAVAN	1938
BAGORI RERORT	2828
LA VUE RESORT	2892

found in Kaziranga National Park. A pre-booked stay hotel or resort near the Kaziranga National Park is also recommended to further improve travelers' experience amid the unrivalled splendorof the forest. Tourists will be able to discover the best places to stay near the Kohora and Bagori zones of the Kaziranga National Park, including government-run lodges and private accommodations and camps. Even on the edges ofKaziranga National Park, in places like Bokakhat and Nagaon, there are a plethora of jungle lodges, campgrounds, and luxury hotels, all of which are equipped with cutting-edge amenities. Even here, many inexpensive hotels offer amenities such as attached washrooms, well-ventilated rooms, valet service, Wi-Fi connectivity, and more.

* **JUPURI GARH :** Jupuri Garh is situated just off to the main road, in the Kohora Tourist range, opposite to the Central Zone entrance within an easy access to the booking office. The resort is surrounded by woodland at the foot of a hill and close to the Kaziranga National Park, local tea estates and the Mikir Hills. The village town will within 10minute walk. The accommodation in jupuriGarh is standard but very clean and the whole property is set out in beautifully landscaped and maintained gardens.JupuriGarh is comprised of eight charming individual air-conditioned cottages with attached bathroom, and each cottage has an outside porch facing a central courtyard. The rooms are large, very clean and comfortable.The facilities at JupuriGarh consist of the arrangements of Jeep Safari, Elephant safari, bon fire, village visits, tea garden visit and airport / railway station pick up.

* **IORA RESORT :** Nestled amidst rolling hills of lush green tea and conveniently located just off National Highway 37 on the Guwahati Dibrugarh Sector IORA is the newest luxury resort at Kaziranga. IORA is a perfect blend of the tranquilityof Assam and the comforts of a modern Luxury resort. IORA offers a serene, rejuvenating experience with liberal doses of warm Assamese hospitality and supported by the best in state-of-the-art amenities. This 20 acre resort with 4 star amenities, landscaped gardens, a small tea garden for the tea experience and lush forest views, is the perfect place to stay in Kaziranga National Park. Whether you are sipping a cocktail on the private balcony of one of the 42 spacious rooms or chilling out in our beautiful swimming pool with a water cascade.

* **WILD GRASS LODGE :** The Wild Grass Lodge is a jungle lodge located outside ofKaziranga National Park, 200 kms from Guwahati, Assam. It is built in an attractive rural style kind of architecture, with grounds having more than 40 species of trees over 200 species of shrubs, creepers and climbers. You will feel here perfect harmony of nature. Wild Grass Jungle Lodge offers 18 double rooms in 2 jungle lodges. In addition, Wild Grass Tented Camp offers three tents pegged under a high thatched roof amidst an ambience of ruins. Lodge's all rooms and tented camp is attached with bathroom and showers running with hot and cold water facilities.

Their Facilities and Services

* Tour Visit to tribal village.
* Village visit, Tea-garden visit with prior permission
* Jeep Safari for see wild animals in national park
* Trekking in the nearest forest

* **BONHABI RESORT :** Bonhabi Resort is very nearest ofkaziranga national park's main entry gate. It is only 1 minute away from the park entry gate. Resort is located at Bagarijuri in kaziranga, which is an exotic tourist destination of India. The resort is a perfect blend of tradition & modernity. The resort offers 12 cottages with tropical rainforest and paddy fields views. All cottages provides all modern facilities-attached toilet and bathroom including showers running cold and hot water facilities.

Distance: Nearest airport is Jorhat, which is approximately 98 kms from park.

Regular a/c facility trains to guwahati from metro cities.

230 kms (5:30 hrs) from guwahati.

* **LANDMARK WOODS:** Landmark Woods is a world-class resort set in 15 acres of undulating landscape surrounded by stunning nature. Thirty luxurious rooms with amenities and room service, a fusion cuisine restaurant, and a well-stocked bar are available. To beat the crowds, we have our own jungle safari and elephant ride, as well as escorted trekking and bird watching with our naturalist guide. The fun doesn't end when you leave the resort. Simply unwind by swimming, riding, or fishing in our pool. Billiards, snooker, movie, open-air

Amphitheatre, barbecue, and other activities are available to keep you occupied in the evenings.

* **DIPHLU RIVER LODGES :** Diphlu River Lodge is situated in an excellent location in Kaziranga National Park. The river in its boundary separates the Lodge from the National Park. The comfortable bungalow overlooking the river and jungle makes the stay very exceptional in Kaziranga. Diphlu River Lodge is ideally placed for easy access, on National Highway 37, only 3 km from the Bagori Forest range office and elephant ride point ofKaziranga National Park. The facilities consist at the lodge are arrangements of Jeep Safari, Elephant safari, the services of resident trained naturalists, village visits, river walks, tea garden visit and airport / railway station pick up. The lodge consists of, 8 private bungalows, and 4 semi-private bungalows, raised on stilts above the ground. Made of bamboo and thatch, they are all air-conditioned. All the cottages accommodate 02 people and have been beautifully designed to make full use of local materials and artifacts and blend in with the stunning natural surroundings. All are well-appointed and charmingly furnished with individual interiors. Each has a seating area with comfortable cane furniture, a writing desk, mini-bar, safe, small fridge and tea & coffee machine as well as top-quality beds and mattresses. The very spacious separate cottages have a wide folding glass door opening onto a thatched verandah with cane day bed and inviting chairs, and overlook the Diphlu River and National Park.

o INFINITY RESORT: Its architectural design is reminiscent of old Assamese houses which were in the past, set atop bamboo stilts. This exquisite resort is further enhanced by a beautiful lake which spans an area of almost 20,000 sq ft. All our 18 guest rooms are lake-facing. Guests will find their rooms comfortable and luxurious with a combination of peace oftranquility. The Main building, called the "Long House", this double-storied building with a two-tiered roof, is the main activities area. It houses a Restaurant, Reception, Spa, Swimming Pool, Library and Internet Cafe. The conference room where evening wildlife film shows are screened, is also located in this building. The large and airy bedrooms which are 380 sq ft in area, have large glass sliding doors and windows providing guests with a wonderful view of the tree tops and thick green canopy. Each has an en suite bathroom and distinctive triangular private balcony which is a picture of space and luxury. Guests have a choice of any of our 18 twin-bedded or double-bedded rooms.

* **DHANASHREE RESORT:** Located within Kohora range ofKazirangaNational park, the resort providing its finest facility and service, which it's located within Kohora range ofKazirangaNational park, the resort providing its finest facility and service, which its guests both deserve and except. The resort is located just in face of a teak plantation and tea garden. The resort is having clean and spacious accommodation with the excellent ambience. Within the resort, you will find a small water body's both deserve and except. The resort is located just in face of a teak plantation and tea

garden. The resort is having clean and spacious accommodation with the excellent ambience. Within the resort, you will find a small water body. The Resort is comprised ofwell furnished A/c rooms and cottages, among them are 02 Dlx cottages. All the accommodation are having quite specious, comfortable and attached bathroom.

Facilities

* Satellite TV
* Guided Tours/Trekking
* Travel Desk Assistance
* Tea garden visit
* Bird watching point
* Adventure trekking
* Traditional village's tour
* Elephant safari assistance
* Jeep safari assistance
* Doctor on call
* 24 hr room service
* Airport pick-up and drop facility
* In house laundry and dry cleaning
* Conference room with secretarial service

*** KAZIRANGA RESORT KAZIRANGA:** Kaziranga is home to the one-horned rhino, uncommon migratory birds, and exotic flora and fauna. Explore the lush vegetation of 32 bighas surrounded by hazy mountains. At Kaziranga Resort, surrender to nature's magic. Kaziranga Resort provides relaxing elegance, exquisite dining, prompt service, and all of the latest conveniences to assure your comfort.

Facilities:

Cluster Cottages: These types cottages have accommodation for a family of 4 to 6. Each cottage is equipped with all modern amenities like europian bathroom, with hot and cold water etc.

Kabri Cottage : Kabri cottage are decorate with mezzanine floor with balcony. These types' cottages are perfect for 2 to 4 family member. All cottages are attached with europianbathroom running with hot and cold water.

Assam Type Cottage : Assam type A/C cottages are perfect for two to three persons. Each cottage is equipped with attached bathroom and modern amenities.

Food Services : Resort has multi-cuisine restaurant, where you enjoy with each types cuisine

*** UNITED-21 RESORT :** This resort was located near Bagori range in Harmoti; Kaziranga is an eco-tourism wildlife resort. Set amidst natural landscapes of babbling brooks and beckoning hills, the resort is a retreat of peace with an enchanting atmosphere. The resort is in easy approach from Guwahati & Jorhat. The Resort has first-class living quarters and ethnic tented cottages all are well furnished, and made of eco-friendly material and offer simple luxury & privacy. The ethnic interiors remind of the exotic and royal style of living, equipped with ultra modern facilities for the convenience of guests.

Facilities

* Boating
* Swimming pool

* Gymnasium
* Satellite TV
* Guided Tours/Trekking
* Travel Desk Assistance
* Spa
* Fishing
* Doctor on call
* Internet Access
* 24 hr room service
* Airport pick-up and drop facility
* In house laundry and dry cleaning
* Conference Room with Secretarial Service.

Bank

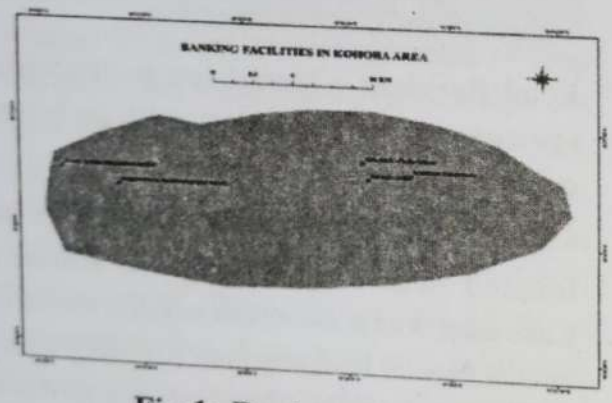

Fig 1: Banks and ATM

There are few banks and ATMs located in the area of Kaziranga. Customers can use an ATM to access their bank deposit or credit accounts and perform a variety of financial operations, including cash withdrawals, balance checks, and credit transfers to and from mobile phones. In a foreign country, ATMs can also be used to withdraw cash. Because banks favorcurrent clients, particularly those who manage their money effectively, banks and credit unions can assist you in obtaining credit for a home, a car, a college loan, or a personal loan. Further more, resorting to small loan lenders who offer you money quickly can be costly due to lending costs and high interest rates. There are few banks and ATM is available in the area ofkohora, kaziranga. This can use the local people and tourist. Some banks and ATM are mention below:

Distance between SBI Kohora BR and Kaziranga Laxmi Bank is 3.6 kilometers and takes 5 minutes. KazirangaLashmi bank to langpidehangi rural bank, Bagori branch 16 km 22 min.

Langpidehangi rural bank, Bagori branch to Assam Gramin Vikash Bank, kuthari 4km 6 min

Hospitals

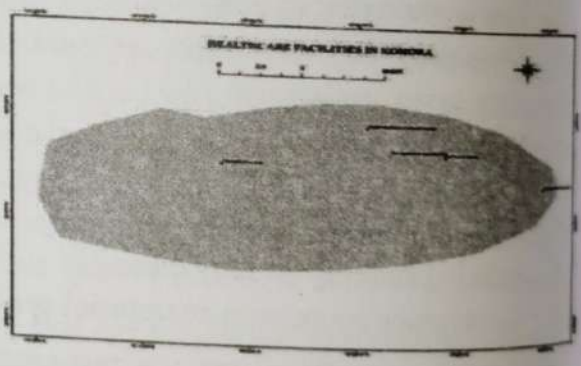

Fig 2: Health Sectors

Hospitals are necessary for the treatment of a wide range of minor and serious diseases, illnesses, and bodily function abnormalities. Hospitals also promote health, provide information on disease prevention, and provide treatment. Clinics, doctor's offices, urgent care facilities, and ambulatory surgery centers are examples of healthcare centers that provide outpatient medical, nursing, dental, and other forms of care. The distance between Deering

Dispensary, Hathikuli T.E and Kohora Dispensary is 3.9 kilometers and takes 7 to 10 minutes, while the distance between Kohora Dispensary and MalasiPathar Hospital is 26 kilometers and 41 minutes. In Kohora Kaziranga, an important tourist hub, world heritage site, and home to one-horned rhinoceros, the Kohora Model Hospital was inaugurated on November 28, 2018 with a 30-bed Model Hospital. MLAs and Minister Sri ATUL BORA are in attendance. It will have 5 doctors, 7 staff nurses, 2 pharmacists, 1 lab tech & radiographer, and 6 ward boys/girls for a total cost of 4.98 crore. Swahid Beja Baishnab Model Hospital, Kohora, District Golaghat, Assam has been renamed by the Governor of Assam. On Friday, Health Minister Dr. Himanta Biswa Sarma inaugurated the Kohora Model Hospital in Kohora, Kaziranga, which is named after liberation warrior Beja Baishnab. In the name of liberation warrior Kamala Miri, he also laid the foundation stone for the Bokakhat Kushal Konwar hospital. He was the first to open the model hospital.

The main gate of Kaziranga National Park is at Kohora, on the NH-37. Assam Road Transport Corporation buses bound to and from Guwahati, Tezpur, Jorhat, Furkating and Upper Assam pass through Kohora. These buses stop at Kohora. Long distance night coaches run by private operators from Guwahati and Jorhat also stop here on request. Kaziranga is in opposite direction from Guwahati. Road condition till Kaziranga is very good.Seasonal flooding and climate change impacts, unplanned tourism infrastructure, highway traffic of the World Heritage site.The general speed limit is 40 km per hour through the Park, with approximately 37 km of NH running through it. Roads made up of mud and gravel which is generally found in the rural areas is unmetalled roads the usage will be limited during rainy season for people or vehicles. Metalled roads are suitable for every weather.

Roads

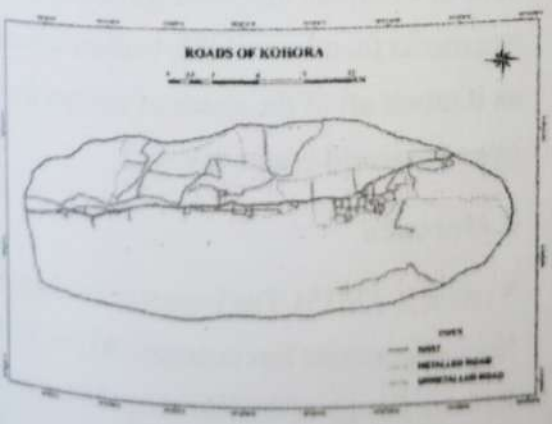

Fig 3: Road Map

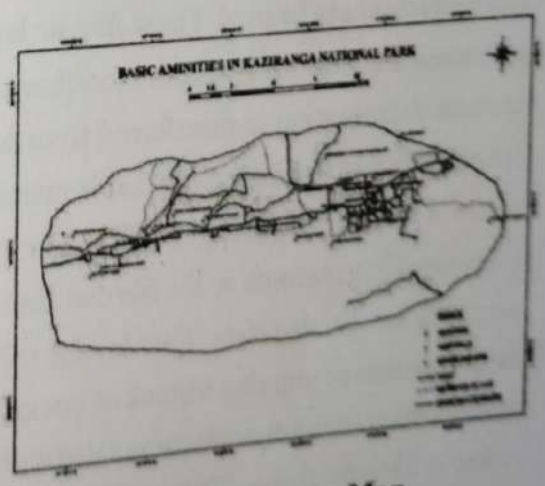

Fig 4: Overlay Map

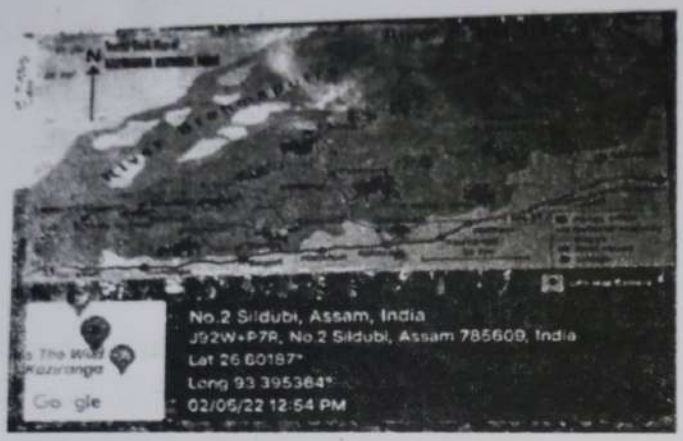

Fig 5 : Study Area

In this map showing the amenities of Kaziranga and its surrounding area using overlap process including road, hospitals, resorts, banks and ATM etc. Overlay is a GIS procedure that combines many data sets (representing various themes) to detect correlations between them. The geometry and properties of the incoming data sets are combined in an overlay to create a composite map. To view and exchange Google Earth information, Keyhole Markup Language files can be used. These files include information about Google Earth's location and content. Information is transferred from one list owner's file to another file that is missing some data by matching records on the receiving file to records on the file that already contains the needed data. Overlaying refers to the process of copying a block of computer code or other data into main memory to replace what is already there. It's a good idea to do some overlaying.

Findings and Conclusion

Tourism sites are typically located far from the madding crowds of the urban and suburban population, with minimal tourist amenities and services. Having infrastructure in place in a venue that gives tourists with a one-stop solution upon arrival makes for a pleasant and memorable experience. The Tourist Complex at Kaziranga is an example of a facility that caters to the needs of visitors by offering a variety of amenities and services. The services are divided into reception and information on the location, accommodation for low and medium-budget as well as high-end tourists, completion of requirements to enter the park, and advance reservation for elephant rides. The Tourism Department, Assam Tourism Development Corporation, Forest Department, and local Jeep Safari Association are primarily responsible for the foregoing services. The Tourist Complex in Kaziranga certainly serves as a model for other wildlife tourism attractions, as it meets all of the needs of visitors from all over the world under one roof.

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River Erosion and Accretion in the Brahmaputra River near Kaziranga National Park

Jayakrishna Bhuyan, PG 4th Semester (2020-2022)

Abstract

The Brahmaputra is a trans-boundary river which flows through Tibet, north-eastern India, and Bangladesh. It is also known as Yarlung Tsangpo in Tibetian, Siang/Dihang river in Arunachali, Luit and Brahmaputra in Assamese and Jamuna river in Bangla. Kaziranga National Park's landscape is the creation of natural forces of silt deposition and erosion that has been effected by the river Brahmaputra over hundreds of years. This ongoing processs of erosion and deposition becomes more severe during the floods which occur at regular intervals during the monsoon season.

Introduction

To conduct the analyses, Landsat satellite images are collected from USGS earth explorer website covering the whole of Brahmaputra River in Kaziranga area from the year 1989 to 2022. All the images were collected during the month of October to march except the year 2022 which was acquired in early May. As we know Brahmaputra River is consider as one of the main sources of water in the northeast especially in Assam as it flows in between the state, therefore it is also an important source of water in the Kaziranga area for both animals, peoples, environment. But as also know that the river Brahmaputra is also known for its floods, channel shifting and bank erosion. To get an overall picture of the erosion and accretion patterns of Brahmaputra River over time periods, 1989-2000 (11 years), 2000-2015 (15 years), 2015-2022(7 years), the maps of the riverbank erosion and accretion are overlapped in Arc Gis. Next the river from each year is extracted from satellite imagery and calculated the eroded unchanged and accretion area of each year river.

Objective

* To study about the erosion and deposion caused by the river Brahmaputra in Kaziranga area.
* To know about the changing in river course due to erosion and accretion.
* To study about the impact of bank erosion on land and people.

Data Source and Methodology

The study is carried out using mainly secondary data which are collected from different online sources (websites, research papers, journals etc.). Few data are also collected though primary data with field study, experiment, survey and personal observation.

Findings and Analysis

From the above fig; we can analyse that in the year 1989 the river was broad which can be concluded that the erosion was more in 1989, again in the year 2000 the river turn to narrow form as due to heavy sediment deposition causing sandbars to form which restrict the river flow, in 2015 the river has almost changed to a narrow line form which also indicated more deposition on the river, coming to the present year 2022 the river broaden its area and can conclude of having high flow of water which result in lot of erosion.

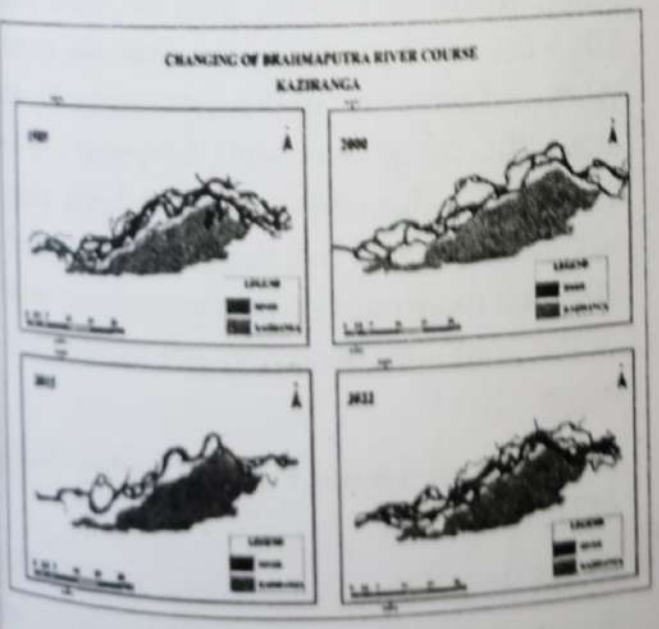
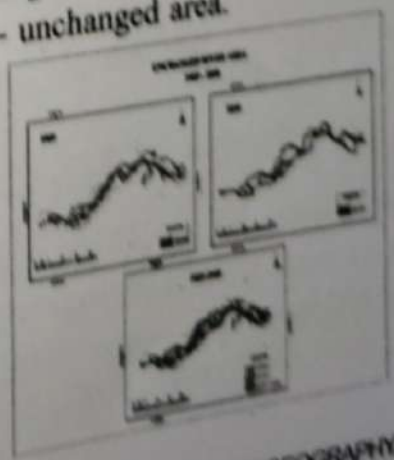


Fig. Changing Course of River Brahmaputra

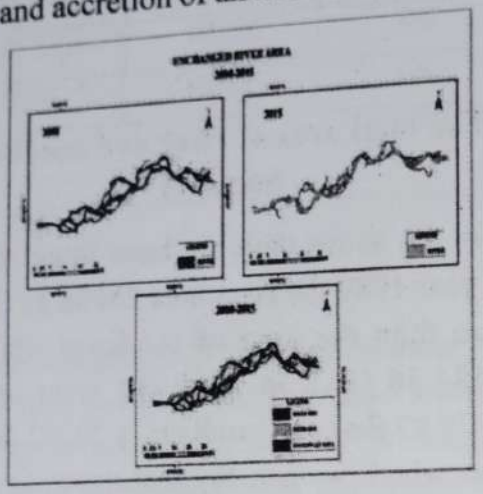
YEAR	AREA (in ha)	AREA (in ha)
	RIVER	SANDBARS
1989	28686.32	20484.36
2000	14770.09	20062.20
2015	11374.43	38153.11
2022	26594.64	7273.85

(The total area of river and sandbars hectare)

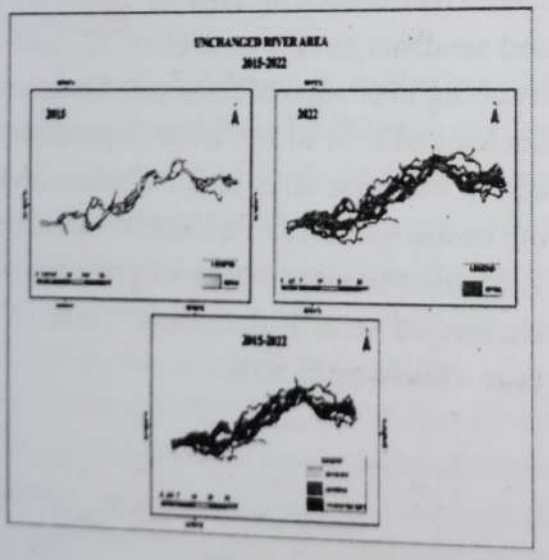
From the above table we have found that in the year 1989 the river area 28686.32 (ha) is more than the area of sandbars which is 20484.36 (ha), in 2000 the river area is 14770.09 (ha) and sandbars is 20062.20 (ha) from which we can say that deposition was more in the year 2000, in 2015 the river area is 11374.43 (ha) while sandbars covers an area of 38153.11 (ha) resulting in deposition work of river more, and coming to the present year 2022 river covers an area of 26594.64 (ha) and sandbars covers an area of 7273.85 (ha) resulting in erosion of the river. Also next the unchanged area of the river is presented by taking two year river data. Also to calculate the unchanged area of a river, to calculate the 1. Erosion of river = area of previous year - unchanged area. 2. Accretion = area of next year - unchanged area.



In the year from 1989-2000 the unchanged covers an area of 7556.47 (ha) where the erosion has took place of an area of 21129.85 (ha) and accretion of an area of 7213.62 (ha).

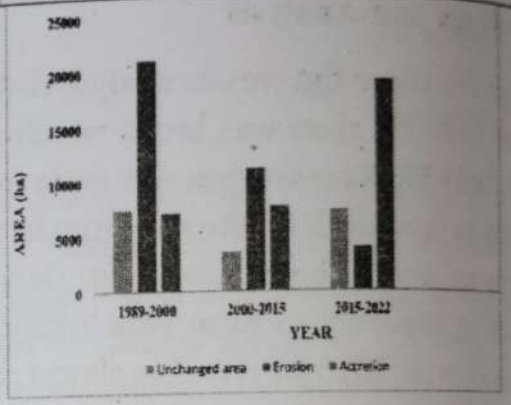


In the year from 2000-2015 the unchanged covers an area of 3599.33 (ha) where the erosion took place of an area of 11170.76 (ha) and accretion of an area of 7775.09 (ha).



In the year from 2015-2022 the unchanged covers an area of 7374.96 (ha) where the erosion has place of an area of 4000.47 (ha) and accretion of an area of 19221.68 (ha).

Year	Previous year	Next year	Unchanged area	Erosion	Accretion
1989-2000	28686	14770	7556	21130	7214
2000-2015	14770	11374	3599	11171	7775
2015-2022	26595	11374	7374	4000	19221



From the above bar diagram, it depict the nature of the river through the selected year show that between the year 1989-2000 the river shows more erosion and the area changes is more, where else in the year between 2000-2015 the river gradually decrease its erosion work and accretion of the river gradually rises again the changes is high, between the year 2015-2022 the river shows a high rise in accretion resulting that the river between 2015-2022 has more depositional work done, erosion of the gradually decreases but the changes is more.

Causes and Impact of Changing Nature of Bramaputra

From the above analysis of the river Brahmaputra, it is found that the river dynamic in nature. And due to its dynamic nature, it is also known for its erosion and depositional work

which in case affect the nearby areas. Kaziranga national park which is 1055 sq. km is sandwiched between the Brahmaputra River and the Karbi anglong hills where among expert's flood is necessary for Kaziranga by virtue of its ecosystem. "It is a riverine ecosystem, not a solid landmass- based ecosystem," said P Sivakumar, Director, Kaziranga national park. "The system won't survive without water". While due to floods Kaziranga national park floodwaters submerged over 90 percent of the park areas and 166 anti-poaching camps of the total 223 camps. Due to the erosion and depositional work of river in a frequent pace, flood and river bank loss occur therefore creating a loss of human life, damage to property, destruction of crops, loss of livestock, and deterioration of health condition owing to health borne diseases.

Causes : The following are the main reason for changing nature of the river

- Rainfall
- Topography
- Soil
- Deforestation in the upper reach of Brahmaputra
- Earthquake

Impact : Due to river erosion and disposition, the following has affected the wildlife, and its habitat

- Loss of KNP area
- Loss of habitat
- Flood
- Poaching
- Animals submerged

Finding

This research work is mainly devoted in the study of the erosion and accretion, issues in Brahmaputra River using geo-spatial tools. The first chapter of the introduction part of this work consists of statement of the problem, literature review, objectives, data source, methodology, significance of the study, limitation of the study area. River changes are dynamic. Erosion and deposition area active work of a river. The second chapter includes the geographical background of the study area both physical and socioeconomic. This chapter also put light on the history as well as present status of the Kazirangaarea.The third chapter is based on my objective that is finding out river erosion and accretion of Brahmaputra river. Here with the help of satellite image and Arc GIS we extracted the river from different year and analysed the changes. The fourth chapter is based on the second objectives that is to analysis the causes and impact of changes.

Conclusion

The study clarifies that the formation of sandbars in the Brahmaputra River channel leading to braided pattern and resulted erosion along the banks. Development of intervening braid bars in the river with multiple channels caused oblique flow and intensive bank erosion, which ultimately leading to the frequent bank line migration. Erosion more specifically along the eastern and northern edge of Kaziranga national park during the period of 1989-2022. Although the land area gain in particular section of the study area is maintained by

accretion process. However, the positive relationship through the entire study period evidencing the rising trend of channel area with sandbar area. Though negative relationship between channel area with the area of Kaziranga national park confirms the reduction of Kaziranga due to expanding channel area of Brahmaputra River.

SUGGESTION: How to reduced river erosion (explain)

* Afforestation
* Embankment
* Awareness programme

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* V.B. Mathur1 , Ashok Verma1 , Nigel Dudley2 , Sue Stolton2 , Marc Hockings3 And Robyn James3 UNF-UNESCO Enhancing Our Heritage Project Team "OPPORTUNITIES AND CHALLENGES FOR KAZIRANGA NATIONAL PARK, ASSAM OVER THE NEXT FIFTY YEARS"
* RiturajNeog, Biman Lahkar"A GIS BASEDAPPROACH TO EVALUATE BANK EROSION, ACCRETION AND BANK LINE MIGRATION ALONG THE KAZIRANGA NATIONAL PARK"
* Enow.In/North-East-News/Assam/Bank-Erosion-In-The-Brahmaputra-Valley-Impact-And-Causes.Html
* P. Kotoky, D. Bezbaruah , J. Baruah And J. N. Sarma , "Nature Of Bank Erosion Along The Brahmaputra River Channel, Assam, India" (2005)

Images of the Study Area

Fundamental Analysis of Landuse Pattern of Kaziranga National Park and its Impact on Wildlife

Nijara Pathak, PG 4th Semester (2020-2022)

Abstract

"Land use" is the term used to describe the human use of land. It represents the economic and cultural activities (e.g., agricultural, residential, industrial, mining, and recreational uses) that are practiced at a given place. Public and private lands frequently represent very different uses. Land use pattern is the arrangement for the uses of land for different purposes. The most important types of land use patterns in KazirangaNational Park are Forests area, Land available for cultivation, wetlands, Beels, the usage of land depends on two factors:Humans and physical and land use means the utilisation of land in a correct manner. In this analysis both primary and secondary method has been used for the collection of data.

Keywords: Landuse, Kaziranga National Park, Wildlife

Introduction

Land use pattern is the way how we utilise a piece of land. It is very important to study land use because if we do not use a land properly then the land will get eroded and all the fertility of the land will decrease. we should not cut forest more than 50% of land. and we must plant as much trees as possible on the land. Also, it is very important to not use the largest for making industries and urbanisation. land use study is very important because change detection of land use pattern impact on wildlife and also identification of land use establishes the baseline information for activities like thematic mapping and change detection analysis. Land use refers to the purpose the land serves, for example, recreation, wildlife habitat, or agriculture. "Land use pattern" is the layout or arrangement the uses of land. Land use may be determined by many factors like relief features, climate, soil, density of population, technical and social economic factors.

Land use mapping is carried out to study the land utilization and future planning and management of land resource. In my study area of Kaziranga National Park the seven type of land use pattern are Beels area, Water bodies area, Grassland area, Wetland area, Agricultural area, Forest area and Sandbars area.

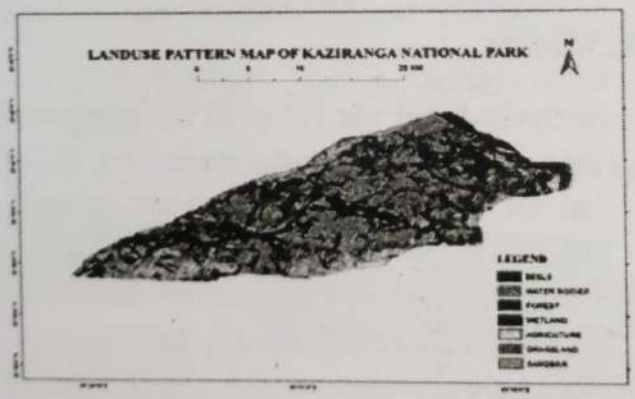
Objective

* To study the land use pattern of Kaziranga National Park
* The impact of laduse of Kaziranga National Park on Wildlife.
* The changing trend of landcover and landuse of Kaziranga National Park.

Data Source and Methodology

The study is carried out using mainly secondary data which are collected from different online sources (websites, research papers, journals etc.). Few data are also collected though primary sources like personal interview, field survey, experiment etc. during departmental excursion.

Findings and Analysis



LANDUSE FEATURES	1990(AREA IN HECTARE)	PERCENTAGE (%) 1990
BEELS	1476	3.72%
WATER BODIES	2579	6.50%
FOREST	7945	20.04%
WETLAND	11598	29.29%
AGRICULTURE	4858	12.25%
GRASSLAND	10598	26.73%
SANDBARS	584	1.47%
TOTAL	39638	

Fig 1.Land Use Pattern of Study Area

Table No. 1- Land Use Pattern of Study Area

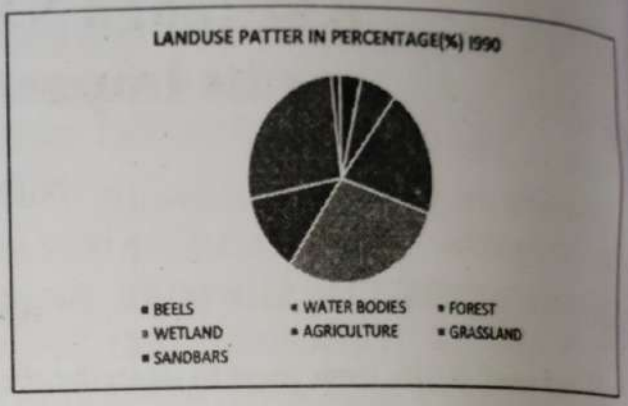


Fig 2.Land Use Pattern of Study Area In (1990)

As evident in the table no 1 and diagram no 1.1 in the year 1990 beel 3.72%. Waterbodies occupied 6.50%. Forest occupied 20.04% of land, Wetland area was 29.29%. according to table 1 in 1990 agricultural land occupied 12.25%, grassland occupied 26.73%, and sandbars occupied 1.47%.

LANDUSE FEATURES	2020(AREA IN HECTORE)	PERCENTAGE (%) 2020
BEELS	2628	6.62%
WATER BODIES	2630	6.63%
FOREST	6107	15.41%
WETLAND	10329	26.07%
AGRICULTURE	700	17.68%
GRASSLAND	10308	26.01%
SANDBARS	608	1.53%
TOTAL	39617	

Table no 2. Land use pattern of study area in (2020)

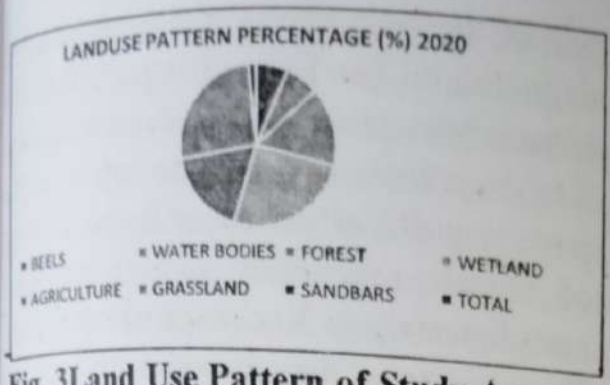


Fig. 3Land Use Pattern of Study Area In (2020)

Now, as the second land use pattern in the year of 2020 beel area is 6.63%, water bodies occupied 6.63%, forest area occupied 15.41%, wetlands occupied 26.07%, agricultural land occupied 17.68%, grassland occupied 26.01%, and sandbars occupied 10.53%.

1.1 Changing Pattern of land Use

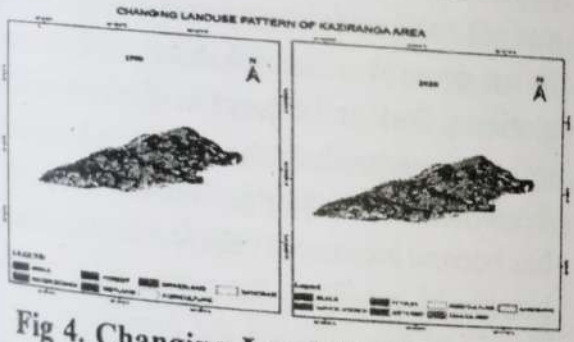


Fig 4. Changing Land Use Pattern of Study Area

Landuse Features	1990(Area in Hectare)	Percentage (%) 1990	2020(Area in Hectare)	Percentage (%) 2020
Beels	1476	3.72%	2628	6.63%
Water Bodies	2579	6.50%	2630	6.63%
Forest	7945	20.04%	6107	15.41%
Wetland	11598	29.29%	10329	26.07%
Agriculture	4858	12.25%	700	17.68%
Grassland	10598	26.73%	10308	26.01%
Sandbars	584	1.47%	608	1.53%
Total	39638		39617	

Table 3. Changing Land Use Pattern of Study Area In (1990-2020)

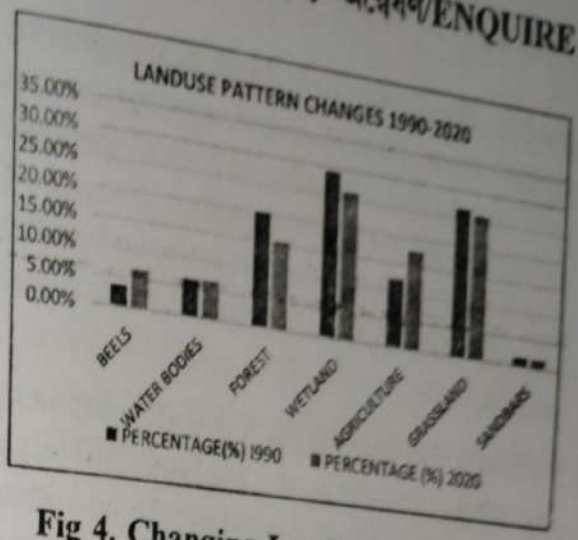


Fig 4. Changing Land Use Pattern of Study Area (1990-2020)

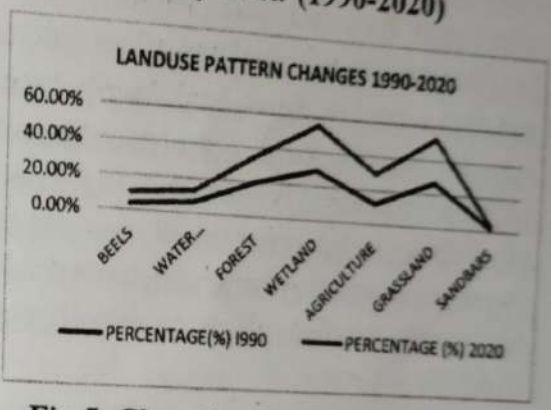


Fig 5. Changing Land Use Pattern of Study Area (1990-2020)

Hence from the above discussion on changing land use pattern of 1990 and 2020 land use changes during the span of this 30 years the beel area increased 3.72% to 6.63%, waterbodies area increased 6.50% to 6.63%, forest decreased 20.04% to 15.41%, wetland area decreased 29.29% to 26.07%, agricultural area increased 12.25% to 17.68%, grassland decreased 26.73% to 26.01% and sandbars increased 1.47% to 10.53%.

*** Factors of changing land use pattern :**

The change of land use patterns in my study area ofKazirangaNational Park at many

scales, the factors are land development, degradation of forest, increases of agriculture and others. The changing pattern of land use effect on air and water quality, watershed function, generation of waste, extent and quality of wildlife habitat and climate. Factors of land use changes:

*** Land development:** Land development creates impervious surface through construction of roads, parking lots, and other structures. The impervious surface means affect peak flow and water volume, which heighten erosion potential and affect habitat and water quality. Some land development patterns, in particular dispersed growth such as "suburbanization," can contribute to a variety of environmental concerns. For example: increased air pollution due to vehicle use results higher concentrations of certain air pollutants in developed areas.

***Agricultural Uses:** agricultural uses can affect the water and watersheds, including livestock grazing in riparian zones change landscape conditions by reducing stream bank vegetation and increasing water temperatures, sedimentation. Runoff from pesticides, fertilizers, and nutrients from wildlife manure also degrade water quality. Agricultural land use also results in loss of native habitats or increased wind erosion and dust, exposing humans to particulate matter and various chemicals.

Impact On Wildlife Changing Land Use Pattern ofKazirangaNational Park:

As the human population continues to increases, demand for more agriculture land is one of the main divers of habitat loss and degradation. Land use changes affect the balance between domesticated and wildlife of Kaziranga National Park. Also impact on the size and quality of habitats, on the partitioning of abiotic resources, and on possible complimentary in Kaziranga national park. Humans interact directly with native species through exploitation and inadvertent disturbance. Illegal poaching greatly reduces particular species of wildlife. These activities, which can lead to "empty forests" and cascading effects on trophic structure, depend on human population densities as well as cultural characteristics, food preferences, and economic opportunities for the local human populations. Outdoor recreation such as hiking and off-road vehicle use is increasingly popular in an around natural habitat of Kaziranga National Park and can act to displace wildlife, influencing reproduction, survival, and population dynamics. In Kaziranga National Park, there has been an increase in vehicle miles travelled per household, escalating the potential for road kill. Road kill has affected the demographics and migrations of birds, snakes, invertebrates, and amphibians, and is a major cause of mortality for seven hog deer, one python and one capped langur.

The expansion and intensification of human land use in recent decades is resulting in major changes in biodiversity in Kaziranga National Park. Biodiversity, a term that has entered into common usage only in the last 30 years, refers to the diversity of life at all levels of organization, from genetic to species to ecosystem. Although refer throughout this

chapter most commonly to species diversity, land use change alters biodiversity at all of these levels. For example, reduced habitat from land use change decreases population sizes and reduces genetic diversity within a species. At the other extreme, land use change commonly leads to more homogenous landscapes reducing ecosystem diversity in Kaziranga National Park. The advent of remotely sensed data from satellites has provided a basis for quantifying rates of land use change around the Kaziranga National Park and consequences on biodiversity. Global satellite-based data sets, useful for analyses of rates of land use change since the 1990s, are now becoming available. These analyses reveal that in these recent decades, land use continues to intensify in formerly occupied areas and expand into what were formerly natural habitats. This paper aims to summarize what I have learned about interactions between land use and biodiversity, especially during the period of satellite data availability.

*** Using Remote Sensing and GIS For Assessmen t:**

Kaziranga National Park in Assam is a habitat for the highest population of one- horned Rhino in the world. The present study investigates land use pattern changes within Kaziranga National Park during the last three decades (1990-2020) using remote sensing GIS techniques and analysis habitat suitability for rhino to understand possible effect of land use change on rhino habitat. The change detection analysis has shown considerable reduction of grassland areas forest areas small water bodies. The result shows decline in the suitable habitat change indicates that any change in the land use trigger substantial change in the suitable habitats for Rhino. Wildlife numbers of KazirangaNational Park have drastically declined due to land use changes over the three decades. This has affected wildlife habitats by converting them into farm lands and human settlements.

This study used remote sensing data from the Landsat satellite to analyse the changing land use pattern between 1990-2020 and their impact on wild life in the national park. The result shows the noticeable increases of agricultural area, settlement, and other land and decline the forest land and grassland. The main effect of land use pattern changes on wildlife in the KazirangaNational Park are include a decline in wildlife numbers, habitat destruction, increase human-wildlife conflict, land degradation, and displacement of wild ungulates by livestock, Land use mapping is carried out to study the land utilization and future planning and management of land resource. In my study area of Kaziranga National Park the seven type of land use pattern are Beels area, Water bodies area, Grassland area, Wetland area, Agricultural area, Forest area and Sandbars area. With the help of Remote sensing and GIS techniques are view, interpret, and analyse data from a geographic perspective. Remote sensing and GIS benefit for study land use pattern mapping and their planning. Land use pattern is dynamic in nature and provide a comprehensive understanding of the interaction and

relationship of anthropogenic activities with the environment. Remote sensing provides synoptic view and multi-temporal data for land use mapping. Remote sensing and GIS help us by giving a quicker and cost-effective analysis for various applications with the accuracy for planning and management. The remote sensing data combined with field survey data can provide a unique and hybrid database for optional mapping of land use.

Conclusion

The result of the multidate satellite data analysis carried out to map and land use pattern on various types are presented in the table 1.and figures1.1.

* Beels: As mentioned earlier, the beel area was 2.34% in the 1990 and 6.63% area occupied in the year 2020. Shohola is the major beelof Kaziranga national park. It is a collection of 16 water bodies that from this giant freshwater lake in Kaziranga.

* Forest: Tropical semi-evergreen forest is present near baguri, bimali, and haldibari. Common trees and shrubs are albizzia procera, Duabanga grandiflora, lagerstroemia speciose, Crateva unilocularis, mallotus philippensis, bridelia retusa, aphania rubra, leea indica, and forest area are occupied 20.05% and 15.41% area occupied by forest in the year 2020.

* **Water Bodies** : The KazirangaNational Parks main four rivers are Brahmaputra, Dhuplu, Mora Diphlu and Mora Dhansiri. The Kaziranga National Park is replete with water bodies and gets inundated by flood waters every year. Due to the increases of rains and up willing of the water streams. Soil erosion is the serious problem during every year" during the three decades the water bodies are increases 6.50% to 6.63%.

* **Wet Land :** More than half the bird species were recorded in Agrtoli range, kohora range. This is because Sohola, the largest Kaziranga wetland. Wetland area 29.29% to 26.07%.

* **Grass Land :** the grassland around Kaziranga national park are the complex of succession in this region. The rich greenbelt of the Kaziranga consists of the tall grasses like elephant grass, sugarcanes, and spear grass along with the different small grasses with the toppings of scattered presence of tree like kumbha, cotton tree, Indian gooseberry and elephant apple. Grassland area 26.29% occupied in the year 1990 and 26.01% in the year 2020.

* **Sandbars :** Sandbars are offshore bars that are either partly submerged or completely submerged and formed by the deposition of sand, silt, and other such sedimentary particle. Due to the changing land use pattern, river bank erosion and flood sandbars are increases from 1.47% to 10.53%.

* **Agriculture :** Agriculture is the prime source of livelihood in Kaziranga national park. The increases agriculture impacts on habitat changes, increased depredation problem, disease transmission, competition, loss of wildlife habitat to large scale agriculture development in study area. Agriculture is increases 12.25 to 17.63%.

The human population continues to increases, demand for more agriculture land is one of the main divers of habitat loss and degradation. Land use changes affect the balance between domesticated and wildlife of Kaziranga national park. Also impact on the size and quality of habitats, on the partitioning of abiotic resources, and on possible complimentary in Kaziranga national park. The problem of the national park. due to its closed proximity to human settlement, Kaziranga is facing various problems. Examples of problems that occur due to human interference: illegal livestock grazing, illegal fishing, unplanned tourism infrastructure, highway traffic, tourism pressure, crop raiding, etc. The problem of growth of settlement is despread in the area. Poaching is a major problem in Kaziranga. The rare One horned rino population of Kaziranga is the main target of poachers. The park managers and guards are at continuous battle with the poachers. Unplanned settlement is a worldwide which result in agricultural; expansion at the cost of forest depletion. Population growth affect biodiversity in the national park. They create pressure to convert wildlife habitat into agricultural land and produce wastes that pollute habitat and poison wildlife. Land use changes of the Kaziranga national park have significant fragmentation to vegetation and animal biodiversity loss, human-wildlife conflicts, habitat connectivity loss, species isolation and scaring, basic resources scarcity for the community's livelihood. This study used remote sensing data from the Landsat satellite to analyse the changing land use pattern between 1990-2020 and their impact on wild life in the national park. The result shows the noticeable increases of agricultural area, settlement, and other land and decline the forest land and grassland.

Fig 7. Forest Area of Study Area KazirangaNational Park

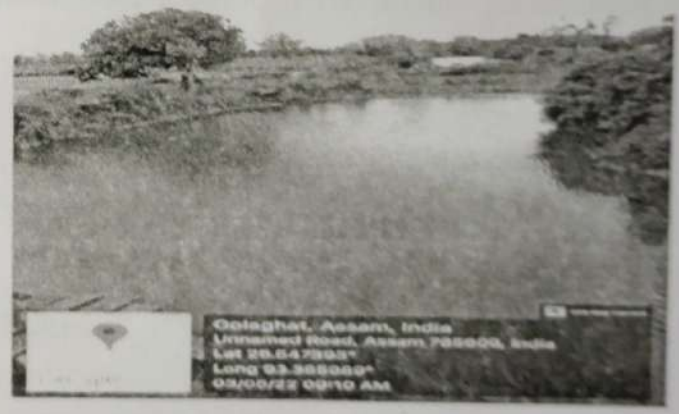


Fig 8. Beel of Study Area inKazirangaNational Park

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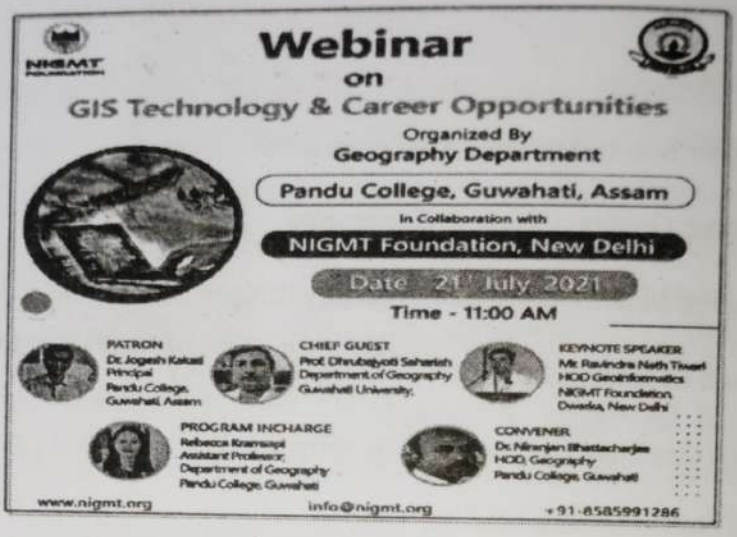
GEOGRAPHY DEPARTMENT AT A GLANCE

Date of Establishment	:	1st August 1982
Introduction of Higher Secondary Course in Geography	:	1982-83
Introduction of Degree General Course in Geography	:	1985-86
Introduction of Degree Major Course in Geography	:	1996-97
Obtained recognition of Research LAB by Gauhati University	:	2011-12
Introduction of Post Graduate Course in Geography	:	August 2017
Introduction of Certificate/Diploma in Geoinformatics-DGPS Aided Land Survey course	:	2013-14 and 2022
Certificate Course on (Six Months Add-on Course) Remote Sensing, GIS and GPS Application for Micro Level Land Survey	:	2023

(From Left: Mr. Sahil Choudhury, Ms. Ambika Rabha, Mrs. Rebecca Kramsapi, Dr. Niranjan Bhattacharjee, Ms. Swagata Chowdhury and Ms. Mauchumi Sarma)

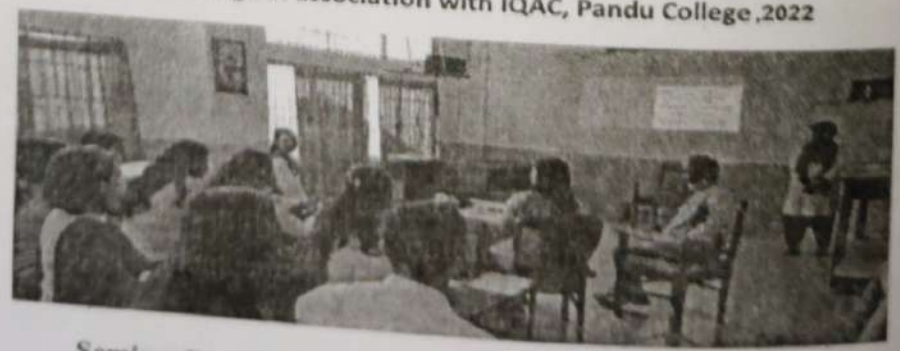
Faculty Members, 2022

DEPARTMENTAL ACADEMIC CONVERSE.....

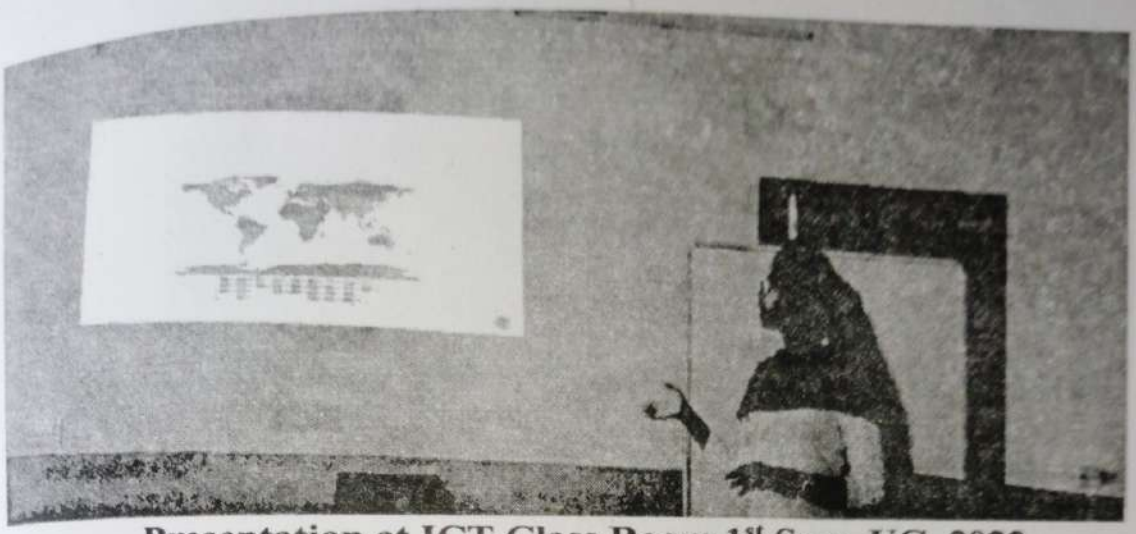


Two Days Workshop, 21-22 January, 2022
Online workshop on GIS, Remote Sensing and it's career opportunities, organized by Dept. of Geography in collaboration with GIS vision, Guwahati

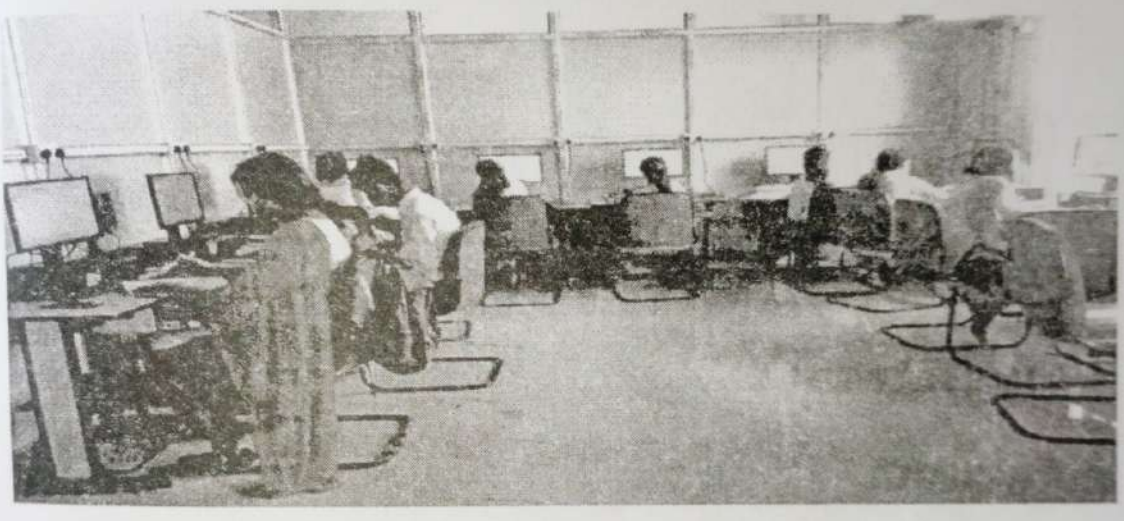
UGC NET coaching organised by Department of Geography, Pandu College in association with IQAC, Pandu College ,2022



SeminarPresentation by the PG 4th Sem. Students, 2022



Presentation at ICT Class Room 1st Sem. UG, 2022



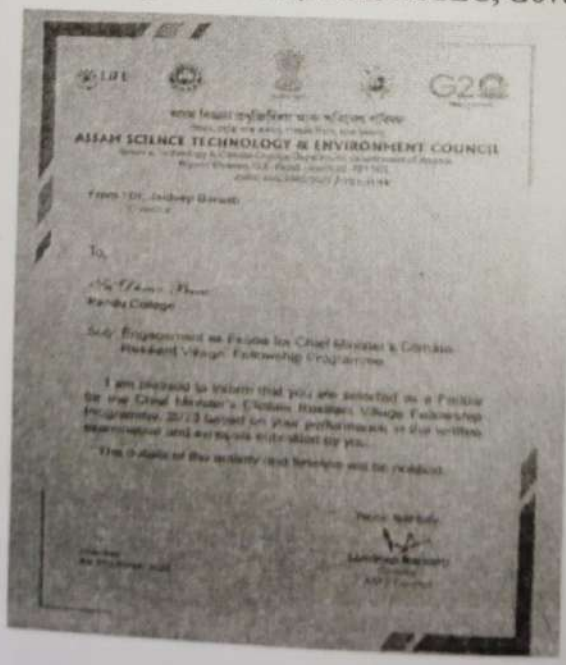
Students at GIS lab, 2022

Freshman Social Program at dept. Of Geography, Pandu College, 2022

Achievements and Extension Activities.....

Mr. Dhruv Baro (PG 3rd Sem Student, Pandu College) 1st Position Winner of Best Cartography Award Organized by Dept. of Geography Gauhati Unviversty, and Qualified UGC NET, 2022

Ms. Banashri Das and Mr. Dhruv Baro (PG 3rd Sem Student, Pandu College) Received Chief Minister Climate Resilient Village Fellowship from ASTEC, Govt of Assam, 2022


ASSAM SCIENCE TECHNOLOGY & ENVIRONMENT COUNCIL

Mr. Manjeet Choudhury Received Best Graduate Award,at Pandu College, 2021 and Qualified UGC-NET JRF and currently pursuing Ph.D. Program from Gauhati University

Our UG 3rd Sem. Students at the time of Field Visit at Sivsagar District, 2022

1) "Be the change that you wish to see in the world."

—Mahatma Gandhi

2) "The greatest glory] in living lies not in never falling, but in rising every time we fall."

—Nelson Mendela

3) The only way to do great work is love what you do.

— Steve Jobs

4) "It always seems imposible until it is done'

—Nelson Mendela

5) The only true wisdom is in Knowing you know nothing."

— Socrates