

Class - VIII

ASSAM SILK



Fig: Silk moth of A) Muga; B) Eri; C) Tasar; D) Pat

Silk culture is a traditional cottage industry rooted in the life and culture of Assam. Sericulture in Assam comprises of mulberry (Pat) and non mulberry silk (endi, muga, oak tasar) worm culture. Endi and muga silks are considered to be of indigenous origin and found only in Assam and the foot hills of Meghalaya. The main centre of Assam silk industry is **Sualkuchi**, a town in Kamrup district of Assam.

Silk types: Assam silk denotes the four major types of indigenous wild silks produced in Assam-golden Muga, white Pat, warm Eri silk and copperish Tasar. Assam is the only state in the country producing all the four varieties of silk.

Muga silk: It is obtained from semi-domesticated silkworm, *Antheraea assamensis* and is endemic to Assam. Muga silk is known for its golden brown and glossy texture. The larvae of these moths feed on Som (*Machilus bombycina*) and Sualu (*Litsaea polyantha*) leaves. The silk produced is known for its glossy fine texture and durability. The muga silk, a high value product is used in products like sarees, mekhalas, chaddars, etc. Along with the Eri and Pat silk, Muga silk is sometimes referred to as Assam silk, as fabrics produced from these silkworms were reserved for the exclusive use of royal families in Assam, India, for 600 years!

Eri or Endi silk: It is derived from the domesticated silkworm *Philosamia rinini*. Eri silk worm derives its name from the castor oil plant *Ricinus communis*, called era in assamese, on which it usually feeds. It is a fine silk that is almost as white in colour as the *Bombyx mori*. Endi cocoon is open at one end for which the silk does not form a continuous filament. Hence the cocoon is spun, not reeled. It is a “peace silk” because the silk caterpillars are not destroyed in the cocoon but are allowed to emerge as moths and live a full lifecycle. It usually has the matt appearance of wool or cotton.

Tasar silk: This silk is produced by the silkworm *Antheraea pernyi*. Unlike other silks, this one has a distinct light golden to dark brown color to copperish color. This is a result of the tannin-rich leaves the food plants of Asan and Arjun that tasar silkworms mainly thrive on. The rearing is conducted in nature on the trees in the open. It is said to be one of the strongest fibers around – and it's certainly the case with these thicker tussahs and makes it an ideal material for couches, jackets, shawl, quilts and sweaters. It is less lustrous than mulberry silk. Oak Tasar is a finer variety of tasar generated by the silkworm, *Antheraea proylei*. which feed on natural food plants of oak, found in abundance in the sub-Himalayan belt of India including Assam.

Pat or mulberry silk: Pat silk is produced by *Bombyx textor* silkworms which feed on mulberry (*Morus spp.*) leaves. It is usually brilliant white or off-white in colour. These silkworms are completely domesticated and reared indoors. It also is often obtained in an unethical way, by killing the silkworms in their cocoons to extract the long fibers.

Life cycle of silkworm:

The Silkworm produces the silk of commercial importance. It is the caterpillar of a moth whose cocoon is used to make silk. This insect is also called the silkworm-moth. The life cycle of silkworm demonstrates the most advanced form of metamorphosis. The serial progressions of four distinct stages of development complete one generation of the species; egg (ova), larvae, pupa and imago (adult).



Ova:

Egg is the first stage of a silkworm's life cycle. The female moth lays an egg about the size of an ink dot during summer or the early fall. The egg shell provides a protective covering for embryonic development.

Larva:

The larva is the vegetative stage where growth takes place. During growth, the larva molts 4 times. The period between successive molts is called an instar. The silk worm, upon hatching, is about 1/8th of an inch and extremely hairy. Young silkworms can only feed on tender leaves. The larval stage lasts for about 27 days and the silkworm goes through five growth stages called instars, during this time. During the first molting, the silkworm sheds all its hair and gains a smooth skin.

Pupa:

As the silkworm prepares to pupate, it spins a protective cocoon. About the size and color of a cotton ball, the cocoon is constructed from one continuous strand of silk, perhaps 1.5 km long (nearly a mile). The silk cocoon serves as protection for the pupa. Cocoons are shades of white, cream and yellow depending on silkworm genetics. After a final molt inside the cocoon, the larva develops into the brown, chitin covered structure called the pupa. Metamorphic changes of the pupa result in an emerging moth.

**Cocoon:**

Cocoon is the stage in which the larva spins silk threads around it, to protect itself from its predators. The larva traps itself inside the cocoon in order to pupate. The color of the cocoon varies, depending upon what the silkworm eats. It can range from white to golden yellow. The second molting occurs inside the cocoon, when the larva turns into a brown pupa. It takes about 2-3 weeks for the pupa to metamorphose into an adult moth.

Imago/ Adult:

The imago is the last stage an insect attains during its metamorphosis. The adult stage completes the life cycle of Silkworm. It is the reproductive stage where adults mate and females lay eggs. Moths are flightless and lack functional mouth parts, so are unable to consume the food. Once the adult moth comes out of its cocoon, its only purpose is to find a member of the opposite sex, and mate. Males are smaller than females and more active. They flap their wings rapidly to attract the females. Within 24 hours of mating, the male moth dies, while the female lays abundant eggs, after which it dies as well. There on, a new silkworm life cycle begins.

**Peace silk:**

Commercial silk is made by boiling the intact cocoons and unwinding the single silk strand onto reels. Only a few moths are allowed to emerge to continue the population of silkworms. The rest are killed by being boiled in their cocoons. "Peace silk", also known as "vegetarian silk" is raised and processed differently. The moths are allowed to emerge from their cocoons to live out their full life cycle. The silk is degummed and spun like other fiber, instead of being reeled. The resulting yarn is soft, fluffy, and light like a cloud. This is the best silk for warmth and therapeutic use.

ENDANGERED ANIMALS AND PLANTS OF ASSAM



The biodiversity of Assam, makes it a biological hotspot with many rare and endemic plant and animal species. The rhinoceros, tiger, deer or chital / futuki horina, swampdeer or dolhorina ,Clouded leopard, hoolock gibbon, pygmyhog or nol-gahori, hispidhare, golden langur, golden cat, giant civet, hog-badger and porcupine, are found in Assam. Moreover, there are Gangeticdolphins, mongooses, giantsquirrels and pythons. The largest population of wild water buffalo is found in Assam.

The major birds in Assam include the blue-throated barbet or hetuluka, white-winged-woodduck or deuhnah, ring-tailed fishing eagle or kuruwa, great pied hornbill or rajd-honesh, Himalayan golden-backedthree-toedwood-pecker or barhoituka and migratory pelican.

Assam is also known for orchids, bamboo, cane, tea and for valuable forest products.

ONE HORNED RHINO OF ASSAM

Scientific Name: *Rhinoceros unicornis*

The one horned rhino or Indian rhino is surviving in the north-east corner of India, Assam. Kaziranga National Park, Pobitora in Morigaon district and Orang National Park in Darrang district of Assam account almost 95% of the total wild One horned rhino in the world. These rhinos are inhabited in most of the floodplain of the Indogangetic and Brahmaputra riverine tracts and the neighboring foothills.

The greater one-horned rhino is identified by a single black horn about 8-25 inches long and a grey-brown hide with skin folds, which gives it an armor-plated appearance. The black horn is pure keratin, like human fingernails, and starts to show after about six years of age. Rhinos are solitary, except when they gather to graze. They primarily graze, with a diet consisting almost entirely of grasses as well as leaves, branches of shrubs and trees, fruit, and aquatic plants. The Indian Rhinoceros can run at speeds of up to 25 mph (40 km/h) for short periods of time and is also an excellent swimmer. It has excellent senses of hearing and smell, but relatively poor eyesight.



Conservation Challenges :

Rhino poaching in Assam is one of the major environmental issues in India which continues in the region of Kaziranga National Park, Manas National Park and some other grasslands of Assam. For years, rhinos have been widely slaughtered for their horn, a prized ingredient in traditional Asian medicines. Destruction of their habitat due to conversion of grassland into agricultural fields and other human pressures, over the years has brought the rhinos to the brink of extinction.



One horned Rhinoceros



Pygmy-hog

PYGMY HOG

Scientific Name: *Porcula salvania*

The smallest member of the pig family, the pygmy hog, endemic to India, is a critically endangered species and there may be as few as 200 individuals left in the wild.

They are restricted to very few locations around Manas National Park in north-western Assam. They are effectively very small pigs, standing at 20-30cm in height. This species inhabits dense, tall grasslands. They feed on roots, tubers, insects, rodents and small reptiles. Once thought to be extinct, the Pygmy Hog was accidentally rediscovered in 1971 by a tea planter in Bornadi forests, which border Bhutan.

The main threats pygmy hogs face are loss and degradation of habitat due to human settlements, agricultural encroachments, dry-season burning, livestock grazing, commercial forestry and flood control schemes.

Successful reintroduction programmes have seen a number of captive-bred pygmy hogs return to the wild. They are bred in captivity at the Pygmy Hog Conservation Centre in Guwahati.

GANGETIC DOLPHIN

Scientific name: *Platanista gangetica*

Ganges River dolphins occur in the Ganges-Brahmaputra River system primarily in India and Bangladesh. River Dolphins are declared as Endangered by the International Union for Conservation of Nature (IUCN) due to probable population decline of at least 50% over the last 50 years and expecting future population declines.

To save dolphins from extinction, the Government of India has declared them as the National Aquatic Animal. Since the river Dolphin is at the apex of the aquatic food chain, its presence in adequate numbers symbolizes greater bio-diversity in the river system. So, it becomes an alarming factor to protect this species to protect the biodiversity.

They hunt by emitting ultrasonic sounds, which bounces off of fish and other prey, enabling them to “see” an image in their mind. Being a mammal, the Ganges River dolphin cannot breathe in the water and must surface every 30-120 seconds. Because of the sound it produces when breathing, the animal is popularly referred to as the 'Susu'. Locally it is also called as 'hihu'.

Major Threats :Hunting and Pollution

River Dolphins are killed by tribal people in the upper Brahmaputra for their meat and by fishermen in the middle reaches of the Ganges for their oil, which is used as a fish attractant. Industries discharging pollutants to water of Brahmaputra River pollutes the Dolphin habitats. Since Dolphins prefer deeper water, therefore, low water depth through siltation has resulted into habitat loss.

Assam's Guwahati became the first city in the country to have its own city animal with the district administration declaring the Gangetic river dolphin as the mascot.



River dolphin



Greater Adjutant Stork

Greater Adjutant Stork :

Scientific Name : *Leptoptilos dubius*

The endangered Greater Adjutant is currently known to breed only in Assam, India, and Cambodia. Out of its total estimated global population of 1,000 about 600-700 birds are found in Assam. Dadara Pacharia and Hingimari villages of Kamrup district have about 150 pairs of this bird.

This large stork has a massive wedge-shaped bill, a bare head and a distinctive neck pouch. During the day, they soar along with vultures with whom they share the habit of scavenging.

They feed mainly on decaying flesh of dead animals; however, they are opportunistic and will sometimes prey on vertebrates. Known locally as hargila meaning "bone-swallower" in Assamese and considered to be unclean birds. They are sometimes hunted for the use of their meat in folk medicine.

Assam's environmentalist Purnima Devi Barman has won the prestigious Whitley Awards, also known as the Green Oscars, for her efforts in conserving greater adjutant storks.

ORCHIDS

Assam is a rich store house of Indian orchid species. High humidity and low temperature accompanied by good rainfall makes entire Northeastern region of the country a hot spot of orchids. This region has about 876 orchid species which constitutes nearly 70% of total orchid flora of our country. A large number of ornamental, rare, endangered and threatened orchid species are available in this region.

In Assam as many as 293 species of Orchids are reported. Especially from Tropical wet evergreen forests of Lakhimpur district and its adjoining foot hills of Arunachal Pradesh.

In Assam, the kopouphool, or the foxtail orchid, the mauve-ish flower that blooms in April and resembles a fox's tail, was accorded the status of state flower in 2003. It has been, since time immemorial, linked to Assamese culture (as a symbol of fertility, merriment, love and affection) and is most conspicuous during Bohag Bihu (the festival that heralds spring in Assam) — not just on trees, but also neatly adorning the head of a Bihu dancer.

Each orchid life stage is dependent on specific fungi, but very few of these fungi have been identified because they rarely form fruiting bodies (mushroom). Orchid needs are very tiny (dust seeds) and contain little nutrition for germination and growth. So, they form symbiotic relationship with fungi, in their early stages. Wild orchid species are also used as food by the local people of Northeastern region. The local people of Northeastern region use many orchids for a variety of folk medicines and cures, as orchids are rich in alkaloids, flavonoids, glycosides, carbohydrates and other phytochemical contents which have great importance in medicinal fields.



"KopouPhul"



Cymbidium



Aerides

GEOGRAPHY

AGRICULTURE OF ASSAM

Agriculture forms the backbone of the economy of Assam. About 65 % of the total working force is engaged in agriculture and allied activities. It is observed that about half of the total income of the state of Assam comes from the agricultural sector.



Fig 2.1: Pictures showing agricultural practices in Assam

MAIN FEATURES OF AGRICULTURE

Assam has a mere 2.4 % of the land area of India, yet supports more than 2.6 % of the population of India. The physical features including soil, rainfall and temperature in Assam in general are suitable for cultivation of paddy crops which occupies 65 % of the total cropped area. The other crops are wheat, pulses and oil seeds. Major cash crops are tea, jute, sugarcane, mesta and horticulture crops. Some of the crops like rice, wheat, oil seeds, tea, fruits etc provide raw material for some local industries such as rice milling, flour milling, oil pressing, tea manufacturing, jute industry and fruit preservation and canning industries.. Thus agriculture provides livelihood to a large population of Assam.

AGRICULTURE AND LAND USE

For the purpose of land utilization, the areas of Assam are divided under ten headings namely forest, land put to non-agricultural uses, barren and uncultivable land, permanent pastures and other grazing land, cultivable waste land, current fallow, other than current fallow net sown area and area sown more than once.

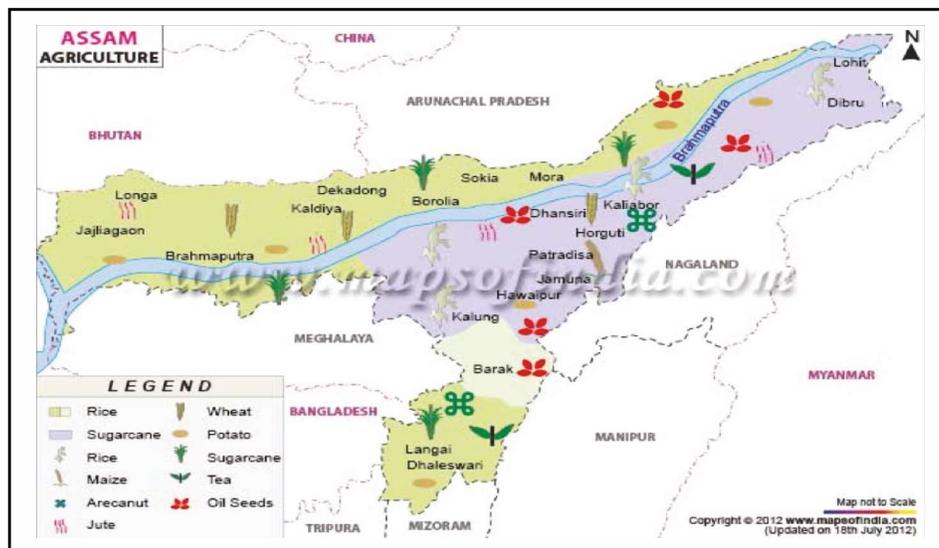


Fig 2.2: Major crops and their distribution

The state is delineated into six broad agro-climatic regions namely upper north bank Brahmaputra valley, upper south bank Brahmaputra valley, Central Assam valley, Lower Assam valley, Barak plain and the hilly region. These regions are mainly based on rainfall pattern, moisture regime, temperature conditions, cropping pattern & cropping intensity. The important kharif crops are rice, maize, jute, sugar cane, pulses (arhar, blackgram), oil seeds (sesame, castor and groundnut).

RICE:

Rice is the leading crop of Assam and it occupies 65 % of the total gross cropped area of the state and more than 90 % of the total area under food crops. Rice is grown in all the districts of Assam including the hill districts of Karbi-Anglong and Dima Hasao (N.C Hills). It is often said that Assam along with Southern China and South East Asia is the original homeland of rice.



Fig 2.3 (a) Rice



Fig 2.3 (b) Wheat

It is a dominant crop where rainfall exceeds 150 cm and under 100 cm it is grown only with irrigation. Generally unirrigated crop is mostly grown in the two hill district under the method of Jhumming.

WHEAT:

Wheat has recently been introduced to Assam. In Assam wheat started only in the early 1960s. At present Kamrup, Nalbari, Barpeta and Dhubri are the leading districts in wheat production.

MAIZE : Maize is produced in Assam in the districts of Karbi-Anglong and Dima Hasao(N.C. Hills).The crop is not used as staple by the plain dwellers.

OILSEEDS : Sesame, castor, soyabean, groundnut, coconut, rape, mustard, linseed etc are grown in Assam. Of these sesame, castor, soyabean, and groundnut are the main Kharif oil seeds while rapeseeds, mustered, linseed, and sunflower are grown as Rabi crops.

JUTE : It is an important fibre crop grown in the low lying plains under monsoon climate. This crop contributes largely to the economy of the state along with tea, oil and timber. Assam is now second most important grower in the country after West Bengal.

MESTA : Mesta is a dominant fibre crop of Darrang and Sonitpur districts of Assam.



Fig 2.4(a): Mesta Crop



Fig 2.4(b): Sugarcane

SUGARCANE : In Assam, sugarcane is produced in the districts of Golaghat, Jorhat, Sivasagar, Nagaon, Kamrup, Nalbari and Barpeta.

TEA : Tea cultivation may be placed both under agriculture as well as industry. Tea cultivation is an industry because it is processed and manufactured commodity, subject to excise duty.

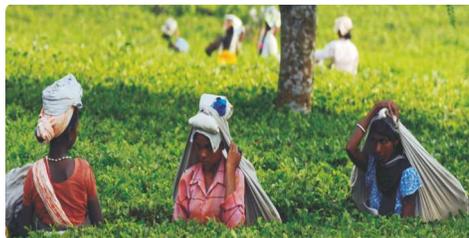


Fig 2.5(a): Tea Plantation



Fig 2.5(b): Rubber Plantation

RUBBER : The physical conditions of Assam are suitable for rubber plantation. The crop requires over 200 cm of rainfall, constant humidity, high temperature and well drained soil. In Assam the private sector has also come forward to grow rubber in small amount. There are at present 15 important rubber plantations in Assam.

COFFEE : Most of the coffee gardens of Assam are located in Karbi Anglong and Dima Hasao(N.C hills) district especially in their lower hills.

POTATO : Assam produces the highest quantity of potato in north east India.The districts of Dhubri , Goalpara, Bongaigaon, Barpeta, Kamrup, Darrang , Morigaon and Nagaon produce the bulk of potato of the state.

BANANA : It is grown as an orchard crop in the compound of almost every house in the state. Almost all the plains districts of the state produces banana. Goalpara and Kamrup district are leading producers of good varieties of banana. The area west of chhaygaon in the south bank of Kamrup district upto Agia of goalpara is traditionally famous for variety of banana called Malbhog which is highly priced. In fact, Dhupdhara, Rangjuli and Daranggiri are very important centres of banana collection and distribution.

RAMIE : Ramie is one of the hardest natural fibres in South East Asian countries. It is generally grown in the fallow lands of Assam. Recently a ramie research station was set up in the Barpeta district for better production of the crop.

ARECA NUT : Areca nut is a traditional crop of Assam and it is grown everywhere in Assam. It is observed that the area under areca nut, betel vine including their productivity has marginally increased.

Besides orange, jack fruit, guava, lichi, mango, papaya, pineapple, ginger, onion and garlic chilly etc. are grown in different parts of Assam.



Fig 2.6 (a): Ramie Fibre Crop



Fig 2.6 (b): Areca Nut

INFRASTRUCTURE FOR DEVELOPMENT OF AGRICULTURE

At the end of the 20th century the government of Assam took up an ambitious scheme called Assam Rural Infrastructure and Agricultural Services Project (ARIASP) with the assistance of World Bank. This project had been started in September 1995 with a total amount of Rs. 567.65 crore and the scheme envisaged strengthening agricultural infrastructure, training facilities and research component in Assam Agriculture University.

ASSAM SEED CORPORATION LIMITED (ASCL)

Assam Seeds Corporation Ltd. was incorporated in 1967 as Government Company under the Companies Act, 1956. The corporation is governed by the Board of Directors constituted by the Govt. of Assam from time to time. Managing Director is the Chief Executive Officer.

The corporation produces different kinds of seeds in its farms and through Registered Growers Programme. But, all the seeds required by the farmers of Assam can not be so produced due to climatic conditions. Therefore, to cater to the need of the farmers it procures recommended varieties of seeds from the Registered Growers of other States like U.P., Uttaranchal, Delhi. Retail sale of seeds is also made at Branches/ Sub-units. To meet the demand of the farmers, Assam Seeds Corporation Ltd. has made tie-up arrangement for production of recommended varieties of different seeds. The Central Godown of the corporation is at Khanapara, Guwahati. Another Godown has been constructed in the same campus under the Scheme of Seed Bank of Govt. of India.

Initially the corporation had 5 nurseries. Recently two big nurseries have been established at Moran and Bamunigaon under the Scheme of Technology Mission on Horticulture. Of these nurseries, the Ulubari Nursery has been giving a good amount of profit every year.

The corporation produces various plants & grafts in the nurseries and has expanded the business to neighbouring Mizoram, & Meghalaya. In respect of seeds, the corporation has taken steps for expansion of business to other States.

Sources:

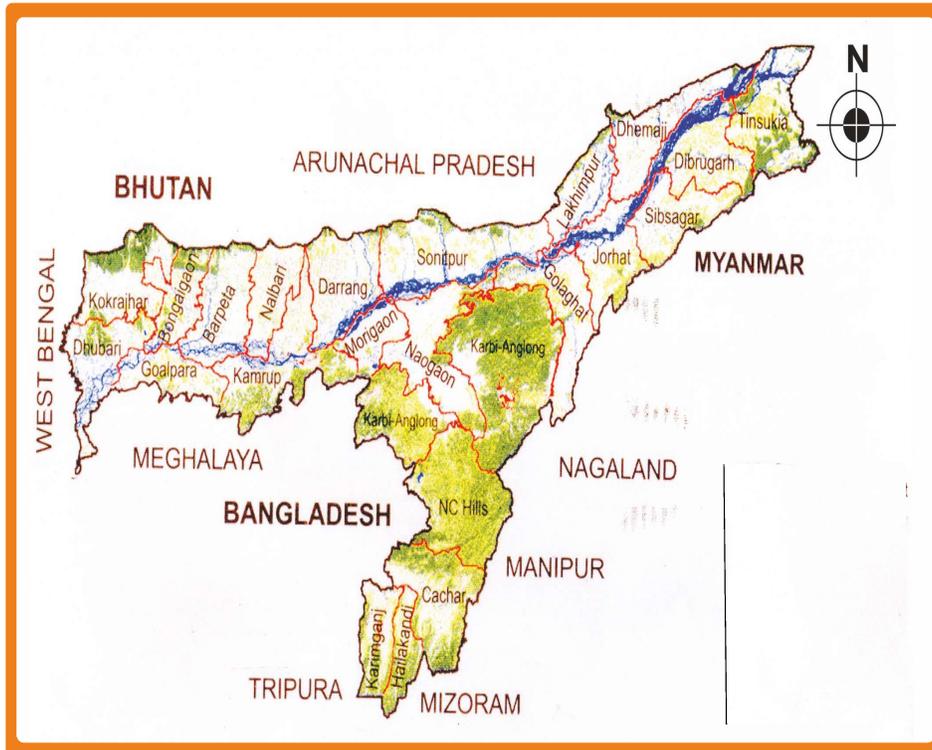
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- 6. Atlas of Assam*

ASSAM: FORESTS

Introduction

Forests are important renewable natural resources. Nature has endowed Assam with a rich potential for the development of forests. The luxuriant evergreen and deciduous forests of the state abound in variety of valuable timber species. In certain parts of the states, extensive bamboo forests also exist.

According to the state of forest report 2011, released by the forest survey of India (FSI), Assam has a total forest cover of 27673 sq. km that is 35.28% of the geographical area of the state.



Forest types

Forests in Assam can be classified into three types: evergreen and semi-evergreen, deciduous and degraded scrub.

(a) Evergreen Forests: These forests occur in the tracts of higher rainfall. The important trees found here are Hollong, Nahar, Makai, Gurjan, etc.



Fig.1.1: Evergreen Forests

The evergreen and semi-evergreen forests are found in the districts of Lakhimpur, Dibrugarh, Karbi Anglong, Dima Hasao (N.C.Hills), Nagaon etc. In Cachar and Karimganj districts also, there are areas of semi evergreen forests with various kinds of bamboos.

(b) Deciduous Forests: These forests are found in the districts of Barpeta, Dhubri, Kokrajhar, Kamrup, Goalpara etc .The important trees found are sal, teak, gamari, titasapa etc.



Fig.1.2: Deciduous Forests

(c) Degraded Forests: Apart from Barpeta and Dhubri districts, all the districts have degraded scrub.

Besides the varieties of trees, there are a large no. of orchids in the forests of Assam. Depending upon the nature and habit of the orchids, they grow on the branches of trees, on rocks and also on the ground. Various types of bamboo, cane groves, tall grasses and shrubby vegetation are found in the forests of Assam.

Benefits from Forests and Biodiversity

Forests provide a variety of products for both commercial as well as household consumption that include industrial wood, fuel, bamboo, thatch and thatching material, cane, traditional medicines, edible fruits, bark, gum and resin, fiber and floss etc. A large proportion of the forest products of the state is processed by a number of forest based industries located in various parts of the states. There are plywood factories, match factories, timber treatment and seasoning plants, hard board factories, paper mills and saw mills, etc.

Forest Degradation

This magnificent array of plant and animals products is however, facing high incidence of biotic and extractive pressure affecting their physical and ecological integrity, bringing serious repercussion to the State's biodiversity, wildlife and overall ecology.

Conservation of forests in Assam

Various steps have been taken to protect the plant and animal species in the state.

‡ “The 'Chief Minister's Seuji Assam Achoni' was launched on 12.05.2008 for Massive Afforestation and Greening Assam Programme.

‡ Kaziranga National Park and Manas National Park have been included in the Tiger Project.

‡ A Vulture Conservation Breeding Centre has been established at Rani.

‡ 5th & 6th Elephant Festivals at Kaziranga National Park were celebrated to create Mass Awareness for protection and conservation of Wildlife in the State.

Fauna

Assam is endowed with wide ranging flora & fauna. It is one of the best destinations where tourists can encounter a great variety of wildlife. The state of Assam famous worldwide as the home of great one horn Rhinoceros which is largely concentrated in the Kaziranga National Park. Other notable speices found here are Hoolock Gibbon, Stump tailed Macaque, Capped Langur & Golden Langur, Pigmy Hog, Clouded Leopard, Golden Cat & White Winged Wood Duck. Elephants are found in all parts of Assam.

ASSAM: MINERAL RESOURCES

Assam is one of the most vibrant states in the North Eastern region of India. The state is full of most of the important natural resources that attract the attention of many investors to set up their production and manufacturing units in the state. Besides crude oil and coal, Assam possesses vast quantities of mineral resources, viz. limestone, Sillimanite, base metals, beryl, building and road metals, mica, quartz etc. The exploitation of minerals in the State mainly comprises of petroleum (crude), natural gas (utilized), coal, limestone and minor minerals.

DISTRIBUTION OF MINERALS

a. Coal : Assam coal belongs to two distinct rock series of Tertiary and Gondwana formations. In upper Assam, two important tertiary coal fields are:

- (1) Makum coal field
- (2) Dilli- Jaipur coal field.



Makum is the oldest coal field in the state.

Fig.2.1 Coal field in Assam

b. Oil and Natural Gas : Assam is well blessed by nature in respect of oil and natural gas, which is termed as 'liquid gold'. The important oil fields are Digboi, Moran, Naharkatia-Hugrijan, Lakwa etc. The oil refineries are located at Digboi, Guwahati, Bongaigaon and Numaligarh. India (and Asia) obtained its first refinery in Digboi in the year **1901**. Assam Oil Company was formed in 1899 to look after the running of the oil business in this area. The Digboi oil field produced close to 7,000 barrels per day (1,100 m³/d) of crude oil at its peak, which was during World War II.

In almost all the petroleum producing areas of Assam, natural gas is found. Barak valley also contains natural gas at a place 60 km away from Silchar.

c. Limestone : Limestone deposits of Assam are located in Karbi Anglong and Dima Hasao (N.C.Hills) districts,

d. Sillimanite : It is a valuable mineral that is used in the manufacture of refractory materials, sparking plugs for automobiles and in glass industry. The important areas are concentrated in Karbi Anglong and Nagaon districts.

e. Mica : It is mainly found in Goalpara, Karbi plateau and some parts of Kamrup districts.

f. Quartz and feldspar : A good quantity of these minerals are found in Hahim in Kamrup and Rangali and Silbheta in Karbi Anglong. Quartz is also found at Pancharatna hills of Goalpara districts.



Impact of Mineral exploration

The extraction of minerals has helped in the development of the state. But the environmental impact of mineral resources development needs a comprehensive assessment and serious consideration for proper planning due to pollution impact on the surrounding environment. Coal is a major source of pollution. When it is burnt in crude state, huge quantity of sulphur di oxide is released into the air which damages the atmospheric condition. The environmental degradation due to oil based industry is also severe. Release of mine water from Laokhowa and Geleki locally known as 'gaspani' has damaged thousands of acres of crop fields rendering unsuitable for cultivation.

Conservation of minerals

1. State Geological Programming Board (SGPB) Meeting of Assam is held regularly once in a year to review progress of the geological investigation works done by the Directorate of Geology & Mining, Assam.
2. Stress is being given to encourage private entrepreneurs for investment in mineral industry by granting prospecting license for exploration of various minerals in the State to establish economically exploitable mineral deposits.
3. The State Govt. facilitates exploration of minerals and hydrocarbons by private sector.
4. The State Govt. encourages scientific and sustainable mining.

Sources:

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HISTORY

ANNEXATION OF ASSAM INTO THE BRITISH TERRITORY

Towards the end of the eighteenth century, due to incompetence and inefficiency of the monarchs and mutual rivalry among the nobles, the Ahom dynasty fell into decadence. So the Burmese invaded the country accepting the invitation of the evil Ahom minister Badan Chandra Barphukan. After four invasions of Assam (1817-1826) they conquered it and launched an era of devastation (Mamor Akraman). Ahom King, Raja Gaurinath Singha sought British help to drive out the Burmese from Assam. After their second invasion the Burmese became greedier and started creating disturbance in British territory. Finally the British declared war against the Burmese.

The First Anglo Burmese War (1824) ended with Burmese defeat and the British occupied Rangoon. By the Treaty of Yandaboo (26th December, 1826) the Burmese gave up all claims upon Assam and its neighbouring territories. It marked the end of the Ahom rule and the establishment of the British rule in Assam.

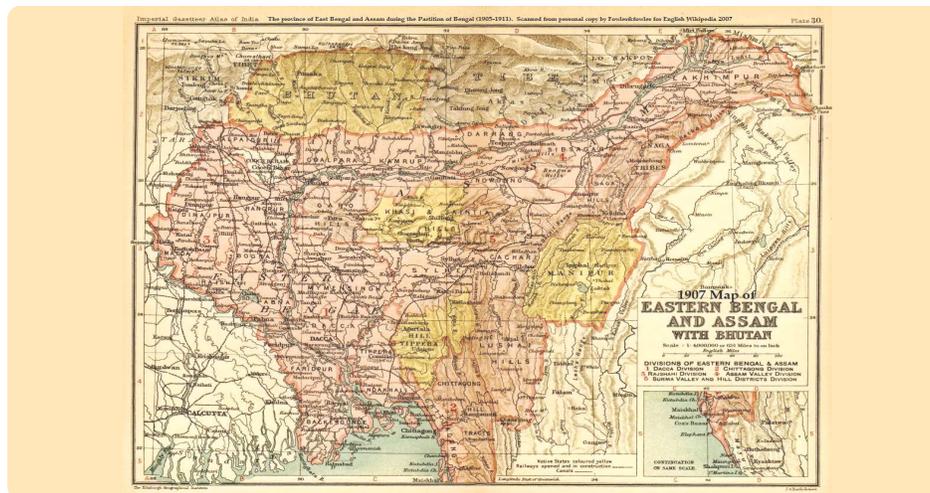


Fig.1 Map of Assam and East Bengal (1907)

After the occupation of Assam, the British divided Assam into two parts- Lower Assam under direct British rule and Upper Assam was restored to an Ahom prince, Purander Singha. He had to promise to pay the British East India Company Rs. 50,000/- as tribute along with other terms and conditions. But, in 1838 even Upper Assam was also annexed into the British dominion on the charge of Purander's failure to fulfil the terms of the agreement. This final annexation marked the beginning of quick political, economic, social and cultural transformation of Assam.

REVOLT OF 1857 IN ASSAM



Fig.2 Maniram Dewan



Fig. 3 Assamese film-Maniram Dewan

Maniram Dutta Barbhandari Baruah, popularly known as Maniram Dewan, was born on 17th April, 1806. Earlier he was a loyal to the British East India Company under David Scott, (agent of the Governor General in North East India) At the age of 22 years he became a Tehsildar and then a Sheristadar of Rangpur (Sivasagar). Later, he was made Prime Minister of Purandar Singha (a titular Ahom ruler of Assam). In 1839, he became the Dewan of the Assam Tea Company at Nazira but left it due to differences with the company officers and established his own tea garden at Chinamara (Jorhat).

By the 1850s, Maniram had become hostile to the British as he had faced many administrative problems in establishing private tea plantations. He wanted to restore the Ahom rule and submitted a petition to the British govt. on behalf of the Ahom ruler Kandarpeswar Singha on May 6, 1857.

When the Indian Sepoy Mutiny started on 10th May, Maniram saw it as an opportunity to restore the Ahom rule. So he made a plot against the British along with Kandarpeswar Singha, Piyoli Baruah, Farmud Ali, Bahadur Gaonburah and some local leaders to overthrow the British rule in Assam. However, the plot was uncovered before it could be executed. Kandarpeswar, Maniram and other leaders were arrested.

Maniram was arrested in Calcutta, detained in Alipur jail and then brought to Jorhat. In the trial, Maniram was identified as the kingpin of the plot. He and Piyoli Baruah were publicly hanged on 26th February, 1858 at the Jorhat jail. Thus he became a martyr and is remembered as one of the leading freedom fighters of Assam.



Fig. 4 The Chinamara Tea Estate founded by Maniram Dewan

Aftermath:

The British East India Company's rule ended in 1858. By the Queen's Proclamation of 1858, Empress Victoria of England directly assumed the responsibility of Indian administration. The British government introduced socio-economic and political changes in every sphere. In Assam there was no tradition of land-revenue. But the British introduced it which was payable in cash. This put the peasantry of Assam in severe strain. Continuous increase in the revenue-demand, vigorous system of its collection, imposition of additional taxes on the peasantry, etc. was some of the causes which virtually forced the peasant communities of Assam to revolt. One such incident took place in Phulaguri (near Nowgaon), inhabited by the Kachari and Lalung tribes, where they protested against high revenue. A rumour spread that the British would soon impose taxes on all their other income sources. Initially the peasants met in Raji-mel (local gathering) to lodge protest against economic oppression of the British. But when the British police tried to disperse them, a clash followed between them and the British resulting in the killing of Mr. Singer, the Assistant Police Commissioner. Though the Phulaguri uprising was a failure yet it had much significance. The middle class intelligentsia for the first time came out openly to support the cause of the peasantry.

Similar peasants' rebellion took place at Patharughat (Darrang district) in 1894, Rangia, Nalbari, Lachima (Kamrup) and so on. The tribal people of the Naga, Garo and Lushai Hills were also discontented with the British for curtailment of certain rights which they had been enjoying during the pre-colonial period.

The peasants' uprisings in Assam had immense significance as it intimately forced the British to revise the rate of taxes on the peasants of Assam.

REVIVAL OF ASSAMESE LANGUAGE

Assamese or **Asamiya** is an Eastern Indo-Aryan language used mainly in the state of Assam. It is the official language of Assam, spoken by over 13 million natives and other northeast Indian states. Nagamese, an Assamese-based Creole language is widely used in Nagaland and parts of Assam. Nefamese is an Assamese-based pidgin used in Arunachal Pradesh.

DO YOU KNOW?

Assam had its own system of writing on the bark of the *saanchi* tree in which religious texts and chronicles were written.

Along with other Eastern Indo-Aryan languages, Assamese evolved atleast before 7th century A.D. from the Magadhi Prakrit, which developed from a dialect or group of dialects that were close to, but different from, Vedic and Classical Sanskrit. Its sister languages include Bengali, Oriya, Maithili, Chittagonian, Sylheti and Angika languages. It is written in the Assamese script. It is based on the English word Assam by which the tract consisting of the Brahmaputra Valley and its adjoining areas are known.

The neo-vaishnavite religious revival in Assam propagated by Sri Sankaradeva and his disciples in the fifteenth and sixteenth centuries resulted in a literary renaissance which firmly built the foundations of modern Assamese language and literature. In the wake of this movement came to be composed various 'Charit-Puthis' (biographies of religious leaders) and later on accounts of religious institutions like the Suttras.

The Assamese language entered the Ahom court and co-existed with the Tai language for some time in the 17th century before finally replacing it with Assamese. This is a period of the prose chronicles (Buranji) of the Ahom court.

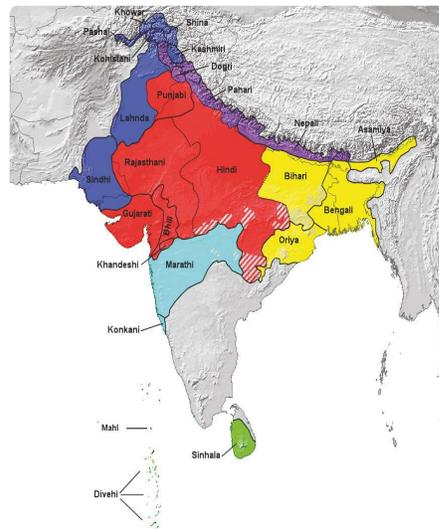


Fig 5. Areas of Eastern Indo-Aryan Languages (Marked in Yellow)



Fig.6 Acopy of the Arunodoi

After the British annexed Assam, they brought some Bengali speakers from Bengal for clerical jobs in the company. Some influential people convinced the British that Assamese language originated from Bengali (Upa bhasha). Hence in 1836 the British Company made Bengali language the official language of Assam. Thereupon prominent Assamese scholars like Anandaram Dhekialphukan, Hemchandra Baruah, GunabiRam Baruah and the like objected to it and demanded official status for Assamese language.

During that period, some American Baptist missionaries arrived to spread Christianity in Assam. As they begun to interact with the natives they realised that spoken language (Assamese) was different from that of official language (Bengali). Along with some renowned Assamese intellectuals, they pledged to convince this fact to the British authority. Finally between 1871-1872 the British declared Assamese as the official language to be used as medium of instruction in educational institutions and in government courts.



Do you know?

The American Baptist missionaries introduced printing press in Assam. They published the first Assamese journal 'Arunodoi' (Sunrise) from Sivasagar in January, 1846 till 1879. Its tag line was, "The Arunodoi, monthly paper, devoted to religion, science and general intelligence".

Hemchandra Baruah compiled the first exhaustive Assamese dictionary 'Hemkosh' where spellings based on Sanskrit was first introduced. It was published in 1900 after his death.



Do you know?



Fig.7 Hemchandra Baruah

SOME PROMINENT CULTURAL REVIVALISTS:

Nalini Bala Devi: She was born in Guwahati on March 23, 1898. Her father was Karmaveer Nabin Chandra Bordoloi (freedom fighter and politician). She wrote her first poem, Pita (Father) at age of 10. She became a widow at 19 years but



Fig. 7 Nalini Bala Devi

continued to write poems full of emotion, tragedy, devotion and patriotism which are still highly acclaimed. In 1950, she established the Sadou Asom Parijat Kanan which later became famous as Moina Parijat, a children organisation in Assam.

Her first book of poems was Sandhiyar Sur (Evening Melody) which was later adopted by Calcutta University and Guwahati University as text book. Her other works include Alakananda, Sopunar Sur (Melody of Dreams), Shesh Puja (The last worship), Parijator Abhishek, Prahlad, Meghdut, Suravi, Rooprekha, Shantipath (Essay anthology), Sheshor Sur (The last Melody) etc.

Lakshminath Bezbaruah: Lakshminath Bezbaruah (1864–1938) was a great Assamese personality and celebrated pioneer of modern Assamese literature. As a sensitive artist, he responded to the prevailing social environment through his beautifully timed satirical works to bring about the age of romanticism in Assamese literature.

Lakshminath Bezbaruah is honoured by a unique title of 'Rasaraj' (King of Humour) by the Asam Sahitya Sabha in 1931 at its Sivasagar session. He wrote many plays, historical works, one-act drama, biographies and autobiographies. He also collected and compiled folk tales of Assam (Xadhukotha) for children.

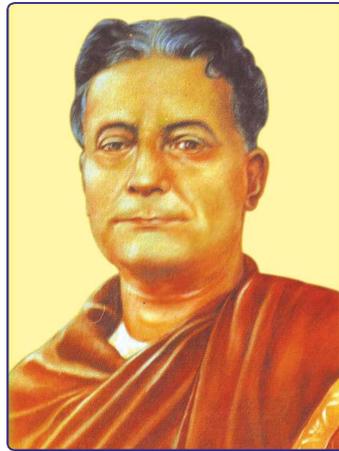


Fig. 8 Lakshminath Bezbaruah

O Mur Apunar Dex, a patriotic song composed by him is the state anthem of Assam. It was tuned by Kamala Prasad Agarwala. It was officially adopted as Assam's state song in 1927.

Assamese	Transliteration	English
অ' মোৰ আপোনাৰ দেশ	<i>O mûr apûnar dex</i>	O my endearing motherland
অ' মোৰ চিকুণী দেশ	<i>O mûr sikuni dex</i>	O my enchanting motherland
এনেখন সুৰলা, এনেখন সুফলা	<i>Ênêkhôn xuwôla, ênêkhôn xuphôla</i>	So euphonious, so bounteous
এনেখন মৰমৰ দেশ।	<i>Ênêkhôn môrômôr dex</i>	So near and dear a motherland
অ' মোৰ সুৰীয়া মাত	<i>O mûr xuriya mat</i>	O my euphonious voice
অসমৰ সুৰদি মাত	<i>Ôxômôr xuwodi mat</i>	The melodic voice of Assam
পৃথিৱীৰ ক'ত বিচাৰি জনমটো	<i>Prithiwir kotû, bisari jônômôtû</i>	Nowhere in the world, you can ever find
নোপোৱা কৰিলিও পাত।	<i>Nûpûwa korileo pat</i>	even if you scour through life.
অ' মোৰ ওপজা ঠাই	<i>O mûr ûpôja thai</i>	O my land of birth
অ' মোৰ অসমী আই	<i>O mûr ôxômi ai</i>	O my mother Assam
চাই লওঁ এবাৰ মুখনি তোমাৰ	<i>Sai lôõ êbar, mukhônî tûmar</i>	Let me have one, look at your face
হেপাহ মোৰ পনোৱা নাই।	<i>Hêpah mûr pôlûwa nai.</i>	My heart hasn't been sated.



Lakshminath Bezbaroa married Pragyasundari Devi (niece of Rabindranath Tagore). She was the second daughter of Maharshi Debendranath Tagore's third son Hemendranath Tagore. Their granddaughter is the famous Odishi dancer, Rita Devi.

Some of his famous literary works:-

- i) Children's literature:-*Junuka* ,*Burhi aair xadhu* (Folk tales, 1911).
Kokadeuta aaru natilora
- ii) Collection of satire essays: *Kripabor Barbaruar Kaakotor Topola*
- iii) Comic Plays-*Litikai* ,*Nomal* ,*Paachani* ,*Chikarpati Nikarpati*
- iv) Plays-*Joymoti Konwari* (1915),*Chakradhwaj Singha* ,*Litikai*
- v) Biographies-*Sri Sri Shankardev* .*Mahapurush Sri Sankardev* *Aru Madhabdev*
- vi) Autobiographical-*Mor Jiban Sowaran* .*Patralekha* ,*Dinalekha*
- vii) English Books-*History of Vaishnavism in India* .*Rasalila of Sri Krishna*

Lakshminath Bezbaroa died in Dibrugarh on March 26 at the age of seventy. The Asom Sahitya Sabha annually observes this day as **Sahitya Divas**.

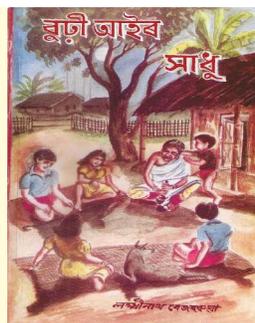


Fig.10 Bishnu Prasad Rabha

Bishnu Prasad Rabha:

He was a renowned music composer, painter, dramatist revolutionary singer, actor, writer and poet. He was an active freedom fighter and communist revolutionary who later became a member of the Assam Legislative Assembly. His lyrics and writings inspired the people to rise up against injustice perpetrated by the British. He also acted in Jyoti Prasad Agarwala's film 'Joymati'.

This multifaceted artist is called the 'Kalaguru'(Teacher of Art) of Assam. This genius is also called the Leonardo da Vinci of Assam for his extraordinarily talents.

Jyoti Prasad Agarwala: He was a noted playwright, songwriter, poet, writer and film maker from Assam. He is regarded as the founder of Assamese cinema and is popularly called the *Rupkonwar* of Assamese culture.

Jyoti Prasad Agarwala was born on 17 June 1903 to Paramananda Agarwala and Kiranmoyee Agarwala in Tamulbari Tea Estate. His uncles were renowned Assamese poets Chandra Kumar Agarwala and Ananda Chandra Agarwala. His forefather, Nabrangram Agarwala, had come to Assam in 1811 from the Marwar region in Rajasthan. After completing his studies in various schools in Assam and Calcutta. He went to Edinburgh in 1926 to study economics, but returned in 1930 before completing his course. On his way back, he spent seven months at the UFA studio in Germany learning film-making.



Fig. 11 Jyoti Prasad Agarwala

As a close associate of the Asom Chatra Sanmilen (youth organisation), he composed lyrics, set them to music and send them from Edinburgh to Tezpur to be sung at its Tezpur session in 1929. Amongst them was the immortal song- '*Luitar parore ami deka lora..*'

At the call of Gandhiji, Jyoti Prasad got actively involved in the non-cooperation, preaching Gandhian philosophy, not in large rallies but in the huts of poor peasants, travelling from village to village on a rickety bicycle along with a small group of youthful volunteers..He patriotic songs like – '*Moriboloi bhoi nai...*' soon echoed the entire Darrang district: later it resonated in other parts of Assam. In January 1932, Jyoti was to organise a protest march and rally under the Tezpur unit of Congress but when the British came to know about it, Jyoti was arrested and finally jailed for 15 months of forced labour and imprisonment.

After his release , he continued his literary voyage. Jyoti Prasad Agarwala had written around 300 songs, many of which he had set to music himself. Collectively, these songs are called ***Jyoti Sangit***. Some of his famous plays are-*Sonit Kunwori* , *Karengar Ligiri*, *Rupalim*, *Nimati Konya* ,*Lobhita*, *Sonpakhilee*, *Khanikar*, etc.

Despite his ill health, he lead groups of Satyagrahis during the Quit India Movement (1942) ,organising peaceful processions, rallies and demonstrations, and propagation the message of freedom. During this period he composed the lyric- '*Haju howa, haju howa Nabajowan..* His death anniversary (January 17) is celebrated as ***Silpi divas*** (Artists' Day).



Jyoti was the first film from Assam released in 1935. It was based on a play by Lakshminath Bezbaruah on the heroic Ahom princess Sati Jyoti. His second feature-film was '*Indramalati*' (1938) which featured Rajeswari Baruah Hazarika, Phani Sharma Manobiram Baruah, and others.

THE NATIONAL MOVEMENT AND ASSAM

Mahatma Gandhi and Assam

His maiden visit to Assam was in 1921 at the invitation of the Assam Pradesh Congress Committee to propagate the message of non-cooperation in Assam. The Ali brothers also accompanied him. People of all walks of life came to hear the Mahatma. He appealed to the masses to boycott foreign goods, to be self sufficient and to give up opium. He also visited Tezpur accompanied by Tarunram Phukan and Omeo Kumar Das, and stayed for two days at the residence of Jyoti Prasad Agarwala. Thousands of youths including Jyoti Prasad were moved by the Mahatma's objective of liberating the country through 'Ahimsa' or non-violence from British imperialism as well as the message of social equality.

His next visit to Assam was in 1926 to attend the 41st Congress session held at Pandu, Guwahati.

Gandhiji again visited Assam in 1934.

His last visit was in 1946, during which he inaugurated the Assam branch of the Kasturba Gandhi National Memorial Trust and a Gram Sevikas Vidyalaya at Sarania Hill, Ulubari, Guwahati.

Kanaklata Barua and Mukunda Kakoti

Kanaklata was born in the Borangabari village in **Darrang district** of Assam as the daughter of Krishna Kanta and Karneshwari Barua.

During the Quit India Movement, Kanaklata along with Mukunda Kakoti and other satyagrahis planned to hoist the Indian National Flag at the Gohpur police station. In September, 1942 she marched in the front line, holding a national flag in her hands. The police tried to prevent them by pointing guns towards her and the other volunteers. But she continued to march ahead with the slogan- "Vande Mataram". During the encounter the police fired at the satyagrahis. Thus she laid down her life for the freedom of the country. She was only 17 years of age at the time of her martyrdom.



Fig. 10 Kanaklata Baruah

Kushal Konwar: He was a **Tai-Ahom** freedom fighter from **Assam** and he perhaps happened to be the only martyr in the country who was hanged during last phase of the **Quit India Movement** of 1942-43.

Kushal Konwar was accused as the chief conspirator of a train sabotage. So the British police arrested him. He was innocent. In the Court of Mr. C.M. Humphrey, Kushal Konwar was declared guilty, though there was not a single proof against him. At dawn on June 15, 1943 at 4.30 am, Kushal Konwar was hanged at the Jorhat Jail.

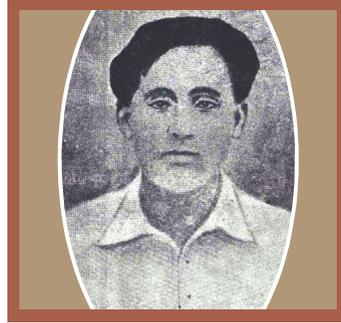


Fig. 11 Kushal Konwar

Gopinath Bordoloi: He was the first **Chief Minister** of **Assam**, and also a leading **Indian independence activist**. He was a follower of the **Gandhian** principle of non-violence. Due to his unselfish dedication towards Assam and its people, the then Governor of Assam Jayram Das Doulatram conferred him with the title "Lokapriya" (loved by all).

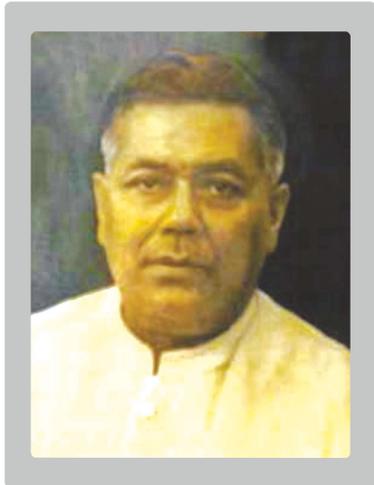


Fig. Gopinath Bordoloi

Born: June 1890 (Raha).

Graduation: **Scottish Church College, Calcutta .**

Post Graduation: **Calcutta University.**

Occupation: Headmaster of Sonaram High School. Later became lawyer in Guwahati court.

Political life: He joined the **Assam Congress** (branch of the **Indian National Congress**) and took active part in the **Non Co-operation Movement** but arrested in 1922 and jailed for a year. When **Quit India movement** was launched in August 1942, the Congress party was declared outlawed and all leaders including Gopinath were arrested. He played a

major role in securing the future of Assam which would have been included in East Pakistan otherwise.

After **India's Independence**, he worked closely with **Sardar Vallabhbhai Patel** to secure the sovereignty of **Assam** against **China** on one hand and **East Pakistan** on the other. He also organised rehabilitation of millions of **Hindu** refugees who had fled **East Pakistan** due to violence after **partition** of 1947. He worked for communal harmony, democracy and stability which kept Assam secured and progressive. He was instrumental in establishing Gauhati University, **High Court of Assam, Assam Medical College**, Assam Veterinary College, etc. He wrote several books like **Annasaktiyog, Shreeramachandra, Hajrat Mohammad, and Budhhadeb** while in jail. He led a simple life in spite of being a **Chief Minister**. He died on 5 August 1950.

Tarun Ram Phukan: Tarun Ram Phukan was a prominent leader of Assam. He was popularly known as Deshbhakta. He was educated in Cotton Collegiate School, Guwahati and Presidency College, Calcutta.

He was very active in the national freedom movement of India.



Fig. Postal Stamp issued in honour of Tarun Ram Phukan



All India Congress Committee session was hosted by the APCC in 1926, at Pandu, Guwahati which was presided over by S. Srinivasa Iyengar and national leaders like Motilal Nehru, Sardar Ballav Bhai Patel, Dr. Rajendra Prasad, Madan Mohan Malaviya, Muhammad Ali, Shaukat Ali, Sarojini Naidu, S. Satyamurti, Abul Kalam Azad, etc. attended the session.

TIMELINE OF THE HISTORY OF ASSAM

Year AD	Ancient Assam
350	Pushya Varman establishes the Varman dynasty in Kamarupa
636	Xuanzang visits the court of Bhaskarvarman in Kamarupa.
650	Bhaskarvarman dies. End of Varman dynasty
655	Salasthamba establishes Mlechchha dynasty in Kamarupa
900	Brahmapala establishes Pala dynasty in Kamarupa
1100	Jayapala, the last Pala king removed by Ramapala of Pala empire
Year AD	Medieval Assam
1185	Prithu establishes the Khen dynasty and the Kamata kingdom
1187	Birpal establishes Sutiya kingdom at Swarnagiri
1228	Sukaphaa enters Assam
1224	Ratnadhvajpal, the second Sutiya king annexes the Kingdoms of Bhadrasena and Nyayapal
1235	Gaurinarayan establishes his capital at Sadiya
1252	Sukaphaa establishes capital at Charaideo
1449	Srimanta Sankardev is born
1490	First Ahom-Kachari battle. Ahoms defeated under Konkhra and pursued for peace.
1498	Alauddin Hussain Shah of Gaur removes the last Khen ruler of Kamata kingdom
1515	Viswa Singha establishes Koch political power and Koch dynasty
1520	Ahoms defeated under the Sutiya king Dhirmarayan
1523	Sutiya kingdom partially annexed to Ahom Kingdom under Suhungmung, and placed under the rule of <i>Sadiyakhowa Gohain</i> .
1527	Nusrat Shah's invasion, the first Muslim invasion of the Ahom kingdom, ends in failure.

1532	Turbak attacks Ahom Kingdom, the first commander to enjoy some success.
1533	Turbak defeated and killed. Ahoms pursue Gaur army to Karatoya river.
1536	Ahoms destroy Dimapur, the capital of the Kachari kingdom
1540	Nara Narayan succeeds his father to the throne of Kamata kingdom
1563	Chilarai occupies Ahom capital Garhgaon, end with Treaty of Majuli.
1568	Srimanta Sankardev dies
1581	Nara Narayana divides Kamata kingdom into Koch Bihar and Koch Hajo (to be governed by Raghudev).
1587	Naranarayana of Koch dynasty dies.
1588	Raghudev, son of Chilarai and ruler of Koch Hajo declares independence.
1609	Momai Tamuli Borbarua restructures Paik system in Ahom kingdom.
1609	Koch Bihar becomes a Mughal vassal
1613	Koch Hajo is annexed by the Mughal Empire
1615	Ahom-Mughal conflicts begin