

+ MILK FACTS | SUSTAINABLE HOMES | SPOOF

# **gobar times**

ISSUE NO: 228, September 1-15, 2020

A DOWN TO EARTH SUPPLEMENT FOR THE YOUNG AND CURIOUS



## **MILKY WAY**

The white, fluid substance that  
has fulfilled the nutritious needs of  
humans since nomadic times



# Our Learning Journey With You So Far...

The Green Schools Programme (GSP) of the Centre for Science and Environment has taken several initiatives to ensure there is no disruption in environmental education due to the ongoing health crisis. GSP has positively impacted more than **50,000 students** and **500 teachers** across the country.

**LET'S CLEAR THE AIR ON AIR!**  
Online Seminar for Teachers of GSP Network on Air Pollution and its Health Impact on children  
2.30 pm to 4.30 pm – April 29 and 30, 2020  
For queries, please email [support@greenschoolsprogramme.org](mailto:support@greenschoolsprogramme.org)

Online Seminar for Teachers on Air Pollution, April 2020

Results of the GSP Survey on Air Pollution and Health for Schools  
Webinar  
Thursday, 28 May 2020  
11 am -12 pm

Webinar on Air Pollution Survey Results, May 2020

**JOIN THE GT ENVIRONMENT E-SUMMER CAMP!**  
From June 1 to June 5, attend online workshops on scriptwriting/ photography/ news writing as well as storytelling and quiz sessions! And many more fun sessions, especially for children!  
On completion of registration, you will receive the guidelines and the link for the sessions.

CLICK HERE TO REGISTER

GSP-GT Environment E-Summer Camp, June 2020

JOIN THE **GSP SKILL BUILDING E-CAMP**  
June 29-30, 2020  
Register by **June 23, 2020**  
Limited seats available!

GSP Skill Building E-Camp, June 2020

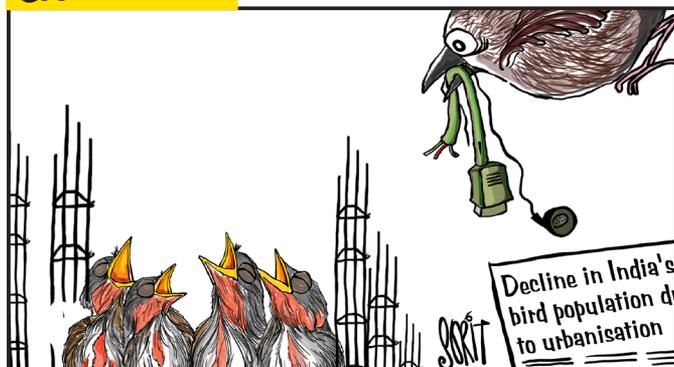
**GSP'S AUDIT@HOME**  
A FUN ENVIRONMENTAL SURVEY for young environmentalists and their families  
SURVEY IS NOW OPEN!  
Please visit [www.greenschoolsprogramme.org](http://www.greenschoolsprogramme.org)

GSP's Audit@Home, July 2020

**ONLINE COURSE ON ENVIRONMENT EDUCATION**  
STARTS ON AUGUST 17, 2020  
LAST DATE TO APPLY August 10, 2020  
DURATION Four weeks (six hours per week)

Online course on Environment Education, August 2020

## Green Strokes



## The story of milk

Milk is a strange substance. Elders love it and children hate it. For the family physician, it's a healthy drink and we should consume milk every day. And for the milk industry, it's the gateway to earning profits from the thousands of products associated with milk. In fact, there is a whole range of products just to make milk tastier!

However, humans are the only species to extract milk from other animals and manufacture a variety of products like cheese and butter from it.

The story of milk in our lives is traced to the early days of human civilisation. It begins with the domestication of milk-producing animals like sheep, goat, cows and water buffaloes. Therefore, its history is interwoven with the history of the mankind. In ancient times when our ancestors used to lead a nomadic life, they moved from one place to the other along with their herds of livestock. This meant that they were highly dependent on cattle and milk was one of most important products derived from them.

With humans learning the art of agriculture, requiring a settled society, milk production goes through a drastic change. The rest, as the proverb goes, is (in our) history (books)!

However, even today there are people who practice this pastoral/nomadic way of life. Located at different pockets of the world, these people are often branded by us as under-developed and sometimes even "un-civilised". After all, we are all part of the "smart" generation! From our homes to phones and TVs, everything is "smart" (even a toilet seat)!

Despite all this, there is a common thread between our ancient ancestors and us — milk and its importance in our lives. Now, what makes milk so indispensable, especially for us? Let's find out.

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I loved reading "Rhymes for future" in the July 2020 edition of *Gobar Times*. I could relate to the poems "School life" and "How often do you smile?" and hope that someday, I will be able to write poems too.

**Alo Sen, Kolkata, West Bengal**

We are waiting for your letters, responses and stories. Send them to Sorit Gupto, Editor, Gobar Times, 41, Tughlakabad Institutional Area, New Delhi-110062.

**Email:** sorit@cseindia.org

Freeze frame by Vikas Chaudhary



*School chale hum:* With no access to online classes due to internet connectivity issues, students attend classes of Satyendra Paul, who runs a free school for children from low-income families in Delhi's YK Jhuggi camp.

This space is for young and budding wildlife photographers who wish share their work with us!

Send your best clicks to [sorit@cseindia.org](mailto:sorit@cseindia.org)

## Digits speak

As many as 188 countries have imposed countrywide school closures due to the pandemic, according to latest estimates of the United Nations Children's Fund (UNICEF), a global agency committed to protecting the rights of children worldwide. Here's a look at how the COVID-19 pandemic has disrupted the functioning of schools across the globe.

**160 crore** children have been affected due to school closures around the world

**30%** of low-income countries have introduced a national distance learning platform

**33%** of the world's young people did not have access to digital platforms before the pandemic



Source: UNICEF

## Back to life from the deep blue sea

Microbes extracted from sediment, nearly 6,000 metres below the ocean's surface, were revived in a laboratory by researchers in the US and Japan. Part of an expedition to the South Pacific Gyre 10 years ago, the sediment sample, when analysed,



revealed the presence of bacteria that could grow in incubation conditions, despite being dormant for 100 million years. Genetic analysis revealed most of these microbes to be aerobic bacteria, which require oxygen to live.

Scientists have known about life in deep sediment near the continents where there's a lot of organic matter, but the latest discovery stands proof to the fact that life can exist in the deep ocean, where living conditions are usually harsh and nutrients required to support life are limited. The findings of the study have been published in the journal *Nature Communications*.

## COVID-19: A quiet period in human history

Around the world, seismometers don't just pick up loud echoes of earthquakes rumbling through the subsurface. The instruments also detect many subtle reverberations such as the ground vibrations generated by human activities like traffic, construction, parades and football games. In 2020, there has been a dramatic reduction in the seismic noise produced by humans, said a study published in the journal *Science*. Global lockdowns resulting from the



COVID-19 pandemic are behind the 2020 seismic noise quiet period, the longest and most prominent reduction of seismic waves from human activities in recorded history, say researchers. Sri Lanka's permanent seismic station, for example, recorded a 50 per cent reduction in the high frequency seismic waves related to human activities.

By moving to a low-carbon future, we can cut pollution, create new jobs and industries, and put our planet on a sustainable path.



**Kathy Calvin**  
Former President and CEO of United Nations Foundation

## Rocks from volcanoes: Who said it first?

Famous for his discovery of the volcanic origin of basalt, Nicolas Demarest was born on September 16, 1725 in Soulaines-Dhuys village/commune in the Aube department of France. The French geologist and cartographer based his theory on his study of the mountains in Auvergne region of central France, which contains most of that country's mountains. The mountains in this region were not at all like the Alps, but had the shapes and features like volcanoes, he noticed. The volcano-like characteristics were interesting because no active eruptions had ever been recorded in the region. Having traced the source of the basalt formations to volcano-like craters, Demarest went ahead and presented a geological map of the Auvergne region to the Paris Academy of Sciences. After locating all the craters and basalt formations, he argued that the mountains in the region were once volcanic.



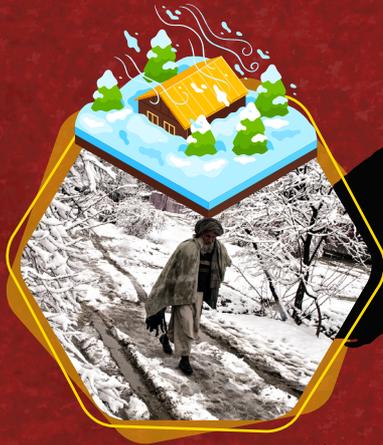
**Nicolas Desmarest (1725-1815)**

His detailed report on the Auvergne basalts, delivered before the Academy of Sciences in 1771, became the basis of a new theory, which was that basalt is an igneous rock. This was a major departure from the theory that all rocks are sedimentary. Demarest died at the age of 90 in Paris on September 28, 1815. Eight years after his demise, Anselme-Gaëtan Desmarest, his son, published a more detailed map, which is also larger than the 1771 version drawn by his father.

# Impact of extreme weather events on wildlife

Each year, thousands of animals perish due to floods, droughts, wildfires and storms. Here are a few instances from the past two decades

Pallavi Ghosh



## Afghanistan Blizzard, February 2008

Temperatures fell to a low of  $-30^{\circ}\text{C}$ , with up to 180 cm of snow in the more mountainous regions. More than 3 lakh animals— mostly goats, sheep and cattle — reportedly succumbed to the harsh weather conditions.

## East Africa Drought, 2011

Counted among the worst droughts in the history of East Africa, the 2011 drought left a quarter of a million people dead, while vast herds of livestock were completely wiped out. Somalia, Djibouti, Ethiopia, Kenya, Sudan and parts of Uganda suffered from the famine.



## Australian Bushfires 2019-2020

Nearly 30 crore mammals, reptiles, birds, and frogs were killed or displaced by the 2019-2020 Australian bushfires, stated an interim report by the World Wide Fund for Nature (WWF).

## Cyclone Amphan 2020

The strongest tropical storm in the Bay of Bengal since 1999, the super cyclone left 28 large animals, 9 small animals, and 3,680 poultry birds dead, said a damage assessment report of the Odisha government. However, an exact estimate of wildlife damage remains unknown.



**D**elhi received nearly 80 per cent of the season's rainfall in 11 days, according to the Union government. The rains were followed by floods and waterlogging in many parts of the city. The rainfall also brought down rain deficiency in the capital from 13 per cent to 11 per cent in just two days.

However, as of August 1, precipitation remained deficient in parts of north India, according to the Indian Meteorological Department (IMD). Strange, isn't it?

Erratic rainfall has become a rather curious phenomenon with reports of record single-day rainfall in regions that were rain deficit just a few days back. Such extreme weather

events have become a pan-India phenomenon and include severe drought spells, intense heat and powerful storms.

So, what is the reason for all this? For long, scientists have observed the changing patterns of seasonal weather and attributed the rise of extreme weather events to human-

induced climate change.

While humans are victims as well as perpetrators of climate change, animals are always its most vulnerable victims. Whenever a natural disaster strikes, wildlife gets wiped out. For example, the 2020 Assam floods submerged over 80 per cent of Guwahati's Kaziranga National Park, home to thousands of animals, birds and



marine organisms—many of them rare. As a result of the inundation, more than 100 animals died, including eight rare one-horned rhinos.

The condition of wildlife around the world is equally poor. In July 2020, a quarter of Bangladesh was inundated with floodwaters. On August 1, the

NASA Earth Observatory website posted an image dated July 25 showing inundation in the country's northeastern parts. It left thousands of humans and their cattle—cows, goats and buffaloes—stranded in regions marooned with floodwater.

Meanwhile in Australia, nearly 30 crore animals died or were displaced due to the

2019-2020 bushfires, said a recent World Wide Fund for Nature (WWF) report. Several reptiles were affected, including skinks, who live in densities of more than 1,500 individuals per hectare. The addition of greenhouse gases to the atmosphere increased the risk of bushfires, say scientists. And what's worse is that the risk of dry

conditions, which drove the fires, could increase to eight times more if global heating above pre-industry levels reached 2°C, according to an analysis conducted in March cited by *The Guardian*.

The equation is simple — humans act and animals pay the cost for it.

## Word stock

### UNFCCC

is an environmental treaty to prevent human interference from reaching a critical level by mitigating greenhouse gas emissions.

## Action

Nature Environment and Wildlife Society (NEWS) is a Kolkata-based non profit working to conserve wildlife, ecology and natural resources.

Visit: <https://naturewildlife.org/>

## Weather news

In the week of August 6 to August 12, rainfall in the country was 13 per cent above the Long Period Average (LPA) for the week, according to the IMD



# A Step Towards Sustainable Homes

Thousands of students around the country assessed and improved their household resource consumption with GSP's Audit@Home

Tushita Rawat



When was the last time you measured how much food is wasted in your house every day? Have you noticed how many categories the waste generated at home is segregated into? Do you think you are consuming more energy than usual while you're home? These are some of the questions that students all over the country found answers to and defined their own green journeys.

GSP's *Audit@Home* is an online environmental survey for households that gives students

an opportunity to assess the various aspects of their homes — air quality, energy efficiency, food consumption, biodiversity, water usage and waste management — and register improvements in each aspect. In July, students from all parts of India participated in the survey and took a step towards managing the household resources more efficiently.

Understanding the problem is the first step towards resolving it. And that's exactly what over 47,000 students

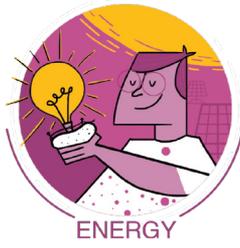
from government and private schools across all states did by benchmarking their resource consumption and adopting ways to optimise it. The survey encouraged students to move away from the screen, get to know their surroundings better by engaging actively and take concrete steps to adopt greener practices. A personalised scorecard shared with the participants after the successful submission of the survey provided a comprehensive assessment of their current

## SECTION-WISE SNIPPETS



AIR

Students were asked to find out about air quality in and around the house along with the fitness of vehicles. At least 79 per cent of the vehicle-owning households had Pollution Under Control (PUC) Certification.



ENERGY

Students were asked to take note of change in energy consumption patterns during the lockdown and the use of renewable energy. Interestingly, only 49 per cent of the participants said electricity consumption increased during lockdown.



FOOD

Students assessed the type of foods consumed in the household and how food waste is managed. At least 52 per cent of them said they look at the food label before consuming any packaged item.



LAND

Under this section, students were asked to observe the local environment. At least 95 per cent said they have indoor and/or outdoor plants around them. Of these, 80 per cent do not use any pesticides on plants.



WATER

Students measured their water consumption and thought of ways of reusing wastewater. At least 68 per cent said they have a dual flush system at home. Whereas 55 per cent of them said there were rainwater harvesting structures near their homes.



WASTE

Students were made aware of the ways to dispose different types of household waste, including biomedical waste generated during the COVID-19 crisis. At least 31 per cent students said they practice composting at home to dispose wet waste.

practices and way forward, including recommended green practices and hands-on project work.

### PROMISING RESULTS OF THE SURVEY

The pan-India picture of the survey results showed some promising figures:

- » 51 per cent participants use non-polluting modes of travel for their everyday activities
- » 63 per cent participants dispose COVID-19 waste (masks and gloves) separately

- » 42 per cent participants reuse wastewater at home
- » 67 per cent participants repurpose food leftovers or give away to the needy

However, areas that require immediate intervention were also highlighted through the survey. Around 64 per cent participants believe that there is no air pollution inside their homes (indoor air pollution) and 55 per cent of them don't use renewable energy in any form (not even toys, lights and heaters that make use of such energy)

GSP's *Audit@Home* survey brought to the forefront the most important aspect of staying indoors during the ongoing health crisis: our homes. With the audit, the students assessed their households and gained environmental awareness through the best method — learning by doing! We thank all the schools, teachers, and students who participated in the survey and made it a success. Here's to keeping environmental education going for a better tomorrow! ◀

**ON THE WALL**

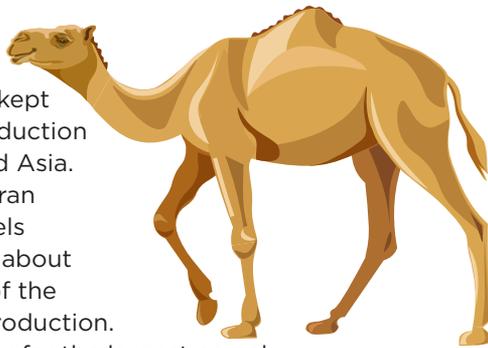
# WHERE DOES MILK COME FROM?

**Nearly 80 per cent of global milk production is dependent on cows. However, they are not the only milk providers humans have been dependent on. Here's a quick look at other animals that provide milk for our consumption:**

*Pallavi Ghosh*

## CAMEL

Camels are kept for milk production in Africa and Asia. In sub-Saharan Africa, camels account for about 5 per cent of the total milk production. Somalia is by far the largest camel milk producer in the world, followed by Kenya and Mali. In northern Kenya, camels produce more milk than cattle.



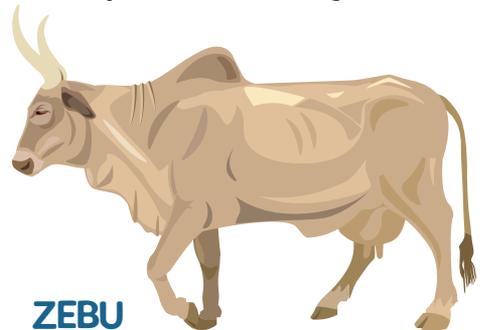
## GOAT

Goats have a higher milk yield than sheep. They are considered the “poor man’s cow” and are the major source of milk and meat for many subsistence farmers in tropical regions. Goat milk is widely produced in West Africa, Central Africa and the Caribbean region. Major goat milk producers are India, Bangladesh and Pakistan. In India, more than 90 per cent of small ruminants are owned by landless and marginal farmers.



## YAK

The yak is a bovid species that provides livelihoods for people in high mountain conditions of extreme harshness and deprivation. Yaks live predominantly on the “roof of the world”, as the Qinghai-Tibetan Plateau is often called, and provide milk, meat, hair and down fibre, hides, draught power and dung (principally used as fuel). Yaks are the major source of milk and milk products in Mongolia.

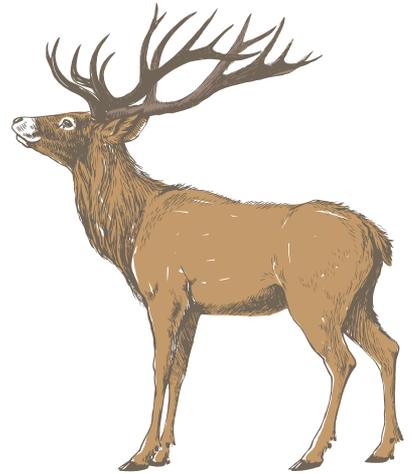


## ZEBU

Hailing from the same family as the cow, that is cattle, indigenous breeds of zebu are found in the region of Asia, West Africa and Latin America. Zebu milk production is common in India, Pakistan, Australia, Mali, Niger and Brazil.

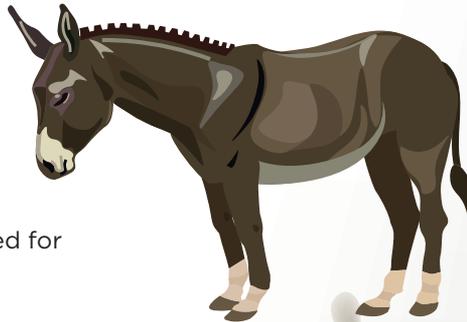
## BUFFALO

The world population of buffaloes is approximately 207 million head. The largest numbers of dairy buffaloes are in India, Pakistan, China, Egypt and Nepal. Water buffaloes are the principle source of milk in South Asia. There are more dairy buffaloes than dairy cows in Egypt, Nepal and Pakistan, where buffaloes produce more milk than cattle.



## HORSE AND DONKEY

In some developing countries, milk from horses (*Equus caballus*) and donkeys (*Equus asinus*) is a staple food for subsistence farmers. Generally, horses are more commonly used for dairy purposes in cool areas and donkeys in dry semi-arid regions. Horse milk is also an important source of animal protein for pastoralists in Mongolia. In some African communities, donkey milk is consumed for medicinal purposes.



## REINDEER

The protein content in reindeer milk can be four times as high as cow milk. The high energy and protein contents enable the calf to survive the harsh Arctic winter; the concentrated milk is particularly suited to the migratory lifestyle of the reindeer. Reindeer milk and dairy products are consumed in Finland, Norway, Sweden and Kola Peninsula in north-western Russia.

## SHEEP

More than half of the world's sheep population is in developing countries. Most sheep milk is produced in the Mediterranean region, and most dairy sheep breeds are found in this region and the Near East. China, Turkey and Greece are the major sheep milk producers. The countries with the most dairy sheep are China, the Syrian Arab Republic, the Islamic Republic of Iran, Turkey and Algeria.



# All about a glass of milk

The white-coloured drink has made an amazing journey in history to earn its place in our daily lives

Rituparna Patgiri

Some things never change with time. Think about a glass of milk, for instance. It is a part of the daily routine of a growing child. Every day you wake up, brush your teeth, and find a glass of milk waiting to be gulped down at the express order of your parents, isn't it? And no matter how this white solution makes us feel, it is considered to be a healthy drink and a must for every child. We are even encouraged to eat products made from milk like curd, butter and cheese.

Now, you must be thinking what makes milk such a healthy drink? The answer is that it's a nutrient-rich drink that contains many nutrients like calcium, protein, vitamin B2, vitamin B12, iodine, potassium and phosphorous. But surprisingly, it is not a compulsory drink for many children around the world.

Why? This is because there are countries where the daily consumption of milk is not the norm. Many Asian countries like Vietnam, Thailand and Malaysia rarely use milk in their diet even today. Similarly, in the northeastern parts of India drinking milk everyday is not a widely followed practice.

So, does this mean that children and adults in these regions lack nutrition? No, it just means that milk is not the preferred form of nutritional diet in these regions. In other words instead of drinking milk, people eat some other food item to derive the same nutrients.

Now, there are multiple reasons for this difference in eating habits. Firstly, countries and regions with a vast population of non-vegetarians often rely on eggs, meat and fish for calcium and protein, instead of milk.

Secondly, several scientific studies have said that a majority

of the population in these countries are lactose intolerant.

Now, what does this mean? Historically, people in the Eastern Asian countries have been less tolerant of lactose — a kind of sugar that milk contains. Lactose intolerance is a digestive disorder that can lead to bloating, diarrhoea and stomach pain. These symptoms vary according to the amount of lactose consumed, the degree of lactase deficiency and the form of food substance in which the lactose is ingested by the individual. However, the ingestion of lactose or lactose-containing food substances like milk or milk-based products like butter and cheese, usually cause these health problems. Therefore, people who are lactose intolerant prefer alternative forms of nutrition like non-vegetarian food, soy milk and almond milk. Now, nearly 75 per cent of humans on the planet are unable to digest lactose, according to global estimates. But what about India?

In India, the largest milk-producing country, the pattern of milk consumption varies from one region to the

## Vegetarians and non-vegetarians

The position of milk continues to be hotly debated among vegetarians and non-vegetarians till date. Whatever be their opinion, milk is consumed by vegetarians and non-vegetarians around the world. In India, milk is mostly seen as part of a vegetarian diet. The ones who do not drink milk due to digestion-related problems rely on alternatives like soy milk and almond milk. There are also a wide range of dairy-free products, including yoghurt, ice-creams and chocolates, for consumers looking for milk-free options in the food market.

The journey of milk in India began during the Indus valley civilisation and has continued across centuries to still be an important part of our modern lives today. Milk has not only acted as a cultural symbol of nutrition and economic self-sufficiency in the Indian context but also as a reflection of indigenous food habits and genetic structure. Lastly, the production and consumption of milk are higher in regions that follow a predominantly vegetarian diet. In regions where there is a high population of non-vegetarians and lactose-intolerant people, milk consumption tends to be low.

other. A 2011 study featured in the *Molecular Biology and Evolution* journal published by the Oxford University Press was able to throw some light on the subject. According to the study, a majority of the population in the northwestern parts of India are lactose tolerant, whereas, in eastern India, most are unable to digest lactose.

The difference was attributed to the genetic make-up of the northwestern population, whose ancestry has been linked the Indo-European speaking people who had moved into South Asia during the Bronze Age. This led to the theory that Europeans and Indians living in this region share the same genes, which help them with milk digestion.

Now in the northeastern parts of the country, milk consumption tends to be less as compared to the northwestern regions due to the high consumption of protein-rich non-vegetarian alternatives like meat, eggs and fish, said the study. Whereas the northwestern population is mostly vegetarian and rely on milk for protein. Milk consumption, therefore, is also dependent on one's food habits.

So how did milk become such a popular drink? Well, let's find out. The story of milk is linked to our past. When we talk of milk in the Indian context, we generally mean milk from domesticated animals like cows, buffaloes, goats and camels. Domestication of animals in this region dates back to the early Indus valley civilisation or the Harappan civilisation (3,300-1,300 BC). The zebu cattle and water buffalo were the first animals to be domesticated and milk was extracted from both species.

However, even after the decline of the Harappan civilisation, the domestication of animals only increased. Gradually, oxen and cows began to be domesticated and milk was being used to make butter, cheese, *ghee* and yoghurt. Kingdoms and rulers kept changing but milk continued to be a significant part of diet in India across centuries.

This was also true in the colonial period. Unlike many

other countries where cattle and milk were brought by colonial rulers, in India milk was already a part of indigenous culture before the arrival of the British colonisers. However, during the colonial period, milk began to be marketed or sold commercially. The pasteurisation of milk or heating milk to destroy germs and bacteria for safe



consumption became common. However, lack of adequate transportation and limited refrigeration capacities meant that the commercial sale of milk was mostly regional.

After independence, there was a sharp rise in milk consumption in the country. As history would have it, milk became one of the key ingredients for achieving economic growth and self-sufficiency. The focus on development led to a milk revolution, commonly known as the “Operation Flood” of the 1970s. It kicked off from Gujarat and up went the production of milk.

It made India one of the largest milk-producing countries from being a milk deficient one. The idea behind the policy was to make India self-sufficient in the production of milk and promote small dairy farmers instead of big corporations. It was drawn from the *Amul* model of cooperative milk manufacturing that had been an immense success in the country. Under this mechanism, farmers from nearby villages would supply milk to a cooperative, which will then process and package it under a brand name and sell it to the customers.

This policy led to a “White Revolution” and more and more people got to drink milk. The processed and packaged milk that we get easily today has its roots in this initiative called the “Operation Flood”. Today, we have a league of milk cooperatives like *Mother Dairy* in New Delhi, *Purabi* in Assam and *Milma* in Kerala that have grown to become major milk distributors.

Milk (the product) has become a multi-purpose drink that can be used to make several dairy products like curd, butter,

## A historical timeline of milk in India

**Harappan Civilisation (3300-1300 BC)** Individual farming and cattle breeding of zebu cattle and water buffalo took place in the the Indo-Gangetic plains and southern parts of India. it also marks the first record of milk consumption in India

**Indo-European roots (2000-1000 BC)** Prevalence of agro-pastoralism in the northwestern regions of India. People in this region are believed to have ancestral roots to the Indo-Europeans. Oxen were used for ploughing and cows for milk

**Mauryan rule to Mughal dynasty (321 BC to 1761)** Existence of both agriculture and milk farming

**1858-1947** Commercialisation of milk with the advent of processes like pasteurisation and refrigeration

**1947-1969** Post-independence, there was sharp rise in milk demand in India. Milk was viewed as a tool to achieve economic growth and self-sufficiency

**1970s** “Operation Flood” or the “White Revolution” years characterised by the largescale production of milk

**2010-2020** One of the largest producers and consumers of milk, India clocked nearly 7 per cent growth rate in milk production between 2015-16 and 2017-18. In 2019, it also became the highest consumer of milk worldwide. The per capita consumption of milk in India increased to 322 grams per day in 2014-15 from 176 grams in 1990-91



cheese, *ghee* and yoghurt. India, the largest producer of milk in the world, accounts for around 22 per cent of global milk production. Indians are also among the highest consumers of milk in the world, and this demand is only increasing every year. However, who gets to drink milk and how much of it depends on several factors specific to a particular society and culture. For example, milk consumption is higher among city-dwellers and men as against

village residents and women respectively, according to a 2015-16 government survey. Milk consumption, therefore, gets linked with one’s position in the society. So the next time you look a glass of milk, think about the amazing journey it has made in history to be a part of our daily lives. ◀

*The author is a PhD scholar at the Centre for the Study of Social Systems (CSSS) at Jawaharlal Nehru University, New Delhi.*

# Coconut: The lifeline of the coasts

Coconut flesh water, oil and milk are widely consumed across the tropical coasts of the world

Rajat Ghai

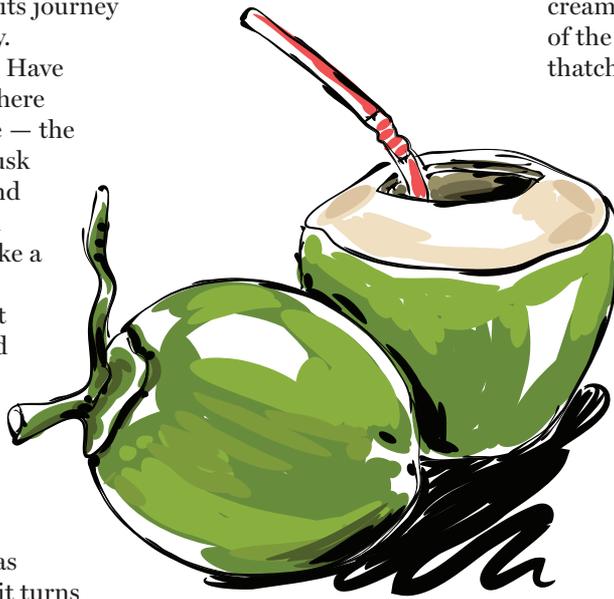
Every year September 2 has a special significance for all the coconut growing countries of the world. It is the day observed as the World Coconut Day in several countries in the Asia and Pacific region, including India. So let me narrate a story about this remarkable fruit and its journey across the globe today.

First, the naming. Have you ever wondered where this fruit got its name — the coconut? If you de-husk a coconut, you will find three indentations on the surface. Almost like a human face.

Now, it is said that when the Spanish and Portuguese saw these three indentations, they reminded them of the witch or the bogeyman from folklore. The mythical character was called “coco”. And so it turns out that “coconut” — the word in English — has its roots in ancient Iberian folklore.

But what were the Iberian sailors doing with coconuts? Well, they found them in islands like the Guam in the Pacific Ocean. Native to the tropics or the region of the Earth surrounding the Equator, the coconut has its origins in the coastal regions along the Indian and Pacific Oceans.

In the Pacific region, it is widely believed that the fruit originated in Melanesia, straddling the islands of modern-day Indonesia, the island of New Guinea and some other archipelagos like Fiji. Closer to home, researchers say that Southern India was the point of origin.



Coconut is said to have made its way to the coast of East Africa from India, thanks to the Arab and Persian sailors! Whereas in Southeast Asia, Austronesian sailors took it west to the Indian Ocean island of Madagascar as well as east to the islands of the Pacific.

Whatever its origins and history, the coconut tree provides us a varied range

of products. We are familiar with the tender white flesh of the coconut, usually used in cooking. However, its water, oil and milk are also widely used for cooking and non-cooking purposes.

Coconut sap, coir and copra are parts of the tree used to make coconut butter, coconut cream and doormats. The leaves of the trees are used to make roofs of thatched huts.

In India, the coconut palm grows in the coastal region stretching from Sir Creek to the Sundarbans.

Kerala, Karnataka, Tamil Nadu and Andhra Pradesh are the top coconut-producing states, where local consumption tends to be high. The coconut tree is often called the *Kalpavriksha*, the divine tree that fulfills wishes and is common to Hinduism, Jainism and Buddhism.

But coconuts also cause deaths by cracking the heads of people walking below! Therefore, the life giver becomes a life taker.

However, there's no doubt that the coconut is an indispensable part of life in the tropical coasts of the world. For them, it's simply “the tree of life”. ♣

# Curdling of milk: Explained

When the solution turns acidic, protein molecules react and form lumps. This simple process is the secret to making cheese

*Sorit Gupto*



In our chemistry class we are taught that a solution is mostly liquid in nature.

It is a homogeneous mixture composed of two or more substances, and invariably one of the main components is a liquid. In such a mixture, a solute is a substance that is dissolved in another substance, known as the solvent. Now, we usually think of milk as a white liquid. However, is this correct?

The answer to this question may not be that simple because unlike any other solution, we cannot be sure if we can separate the basic ingredients of milk. That's because milk is not just a solution but a colloidal solution or a mixture in which one substance is divided into minute particles, known as colloidal particles, and dispersed in a second substance, mainly liquid. Ink and solutions of soap and detergents are some common examples of a colloidal solution.

The colloidal form depends on the pH factor or the acidity of the substance. If the pH factor is disturbed, the colloid will lose its structure. Now, milk is composed of several compounds, primarily fat, protein, and sugar. The protein in milk is normally suspended in a colloidal (colloid) solution, which means that the small protein molecules float around freely and independently. Along with the suspended fats, these floating protein molecules refract light. This is why milk appears to be white.

Normally these protein molecules repel each other, allowing them to float about without clumping, but when

the pH of their solution changes, they can attract one another and form clumps. This is what happens when milk curdles. When pH levels drop in milk, it turns acidic and milk protein (casein and others) molecules attract one another to form "curdles" or lumps. These lumps then float on the surface of the solution. The lumps are formed faster at warmer temperatures.

When we add lime juice in boiling milk, the acid present

in the lime disturbs the pH level of the milk and the protein molecules begin to form large chains. These chains of protein molecules separate themselves from water molecules and form a sediment or what we call *chhena* or *paneer*. Cheese is also made through the same process and it usually involves making use of rennet, an enzyme in a cow's stomach, to thicken or coagulate milk. ⚡



# In defence of century-old jamun trees

Ecosystems, once destroyed, can never regain their former functioning

GT Staff

The Rs 20,000-crore Central Vista Project in New Delhi proposes to construct an iconic precinct consisting of new Parliament Building and 20 Central Secretariat buildings in a three-kilometre stretch from Rashtrapati Bhavan to India Gate.

Historically, the stretch consists of buildings, including the existing Parliament House, constructed in the 1920s and designed by architects Lutyens and Herbert Baker. Part of Lutyens's original design were *jamun* trees, planted along with several other species like banyan, *peepal* and ficus. But come 2020, there surfaced a proposal to remove hundreds of old *jamun* trees from the precinct. Why? According to the union government, the average life span of *jamun* tree being 100 years, replacing the matured ones with new ones is the obvious solution. A survey is also being conducted to determine the age of the trees so that appropriate measures can be taken.

But is this the complete story? Vallari Sheel, a PhD

candidate at the Department of Forestry and Environmental Resources at North Carolina State University, US, in a recent *The Wire Science* said that averages are estimates, and do not tell you anything about an individual, and must be treated as such. Trees, she says, can go on living for many more years than their "average" life span.



Therefore, the problem with the proposed move is that it will remove many mature trees several years before they actually die. Now, the *jamun* trees of Central Vista are an entire ecosystem on their own.

"Their large canopies provide nesting and roosting space for birds, squirrels, bats and monkeys. The fruits are relished not only by people, but also form an important part of

the diet of many animals," writes Sheel.

The removal of *jamun* trees is likely to leave a negative impact on temperature regulation, rain water percolation, air and noise pollution reduction, dust removal and so on. All of this, apart from the loss of habitat for urban wildlife including birds and squirrels.

"In cities, there are records of parakeets, *koels*, barbets, *mynahs* and squirrels feeding on the astringent fruit. There is no reason to believe that the *jamuns* of Central Vista support any smaller number of birds and other urban animals," states the PhD scholar in the report.

Moreover, the flowers of the tree attract pollinators like bees, who eventually disperse seeds and enable the production of many of our crops and garden plants, including flowers, fruits and vegetables, says Sheel.

It is for this reason that the replacing fully grown trees with saplings can never be a full proof solution. Ecosystems take several decades to grow and mature and once destroyed, they never regain their former functioning.

# How much do we know about milk?

Try this crossword puzzle and discover some fascinating facts about the liquid superfood that continues to be a crucial part of our daily lives

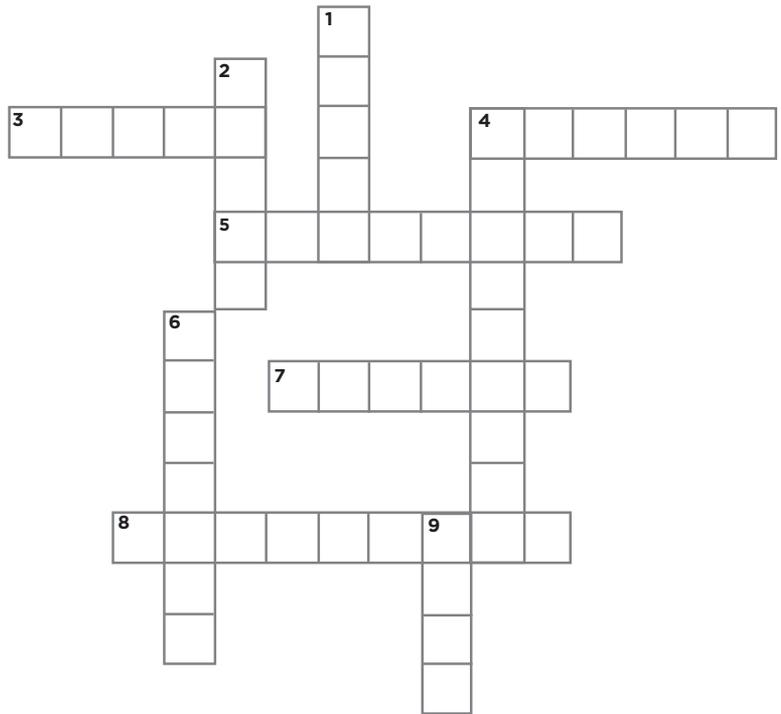
GT Staff

**Across**

- 3. World's largest milk producer.
- 4. Dairy product derived as a result of the coagulation of milk protein casein.
- 5. This animal's milk has a fat content of 22 per cent or six times more than cow milk
- 7. Females of this species of vertebrate animals have mammary glands and produce milk to feed their young ones.
- 8. What is ice-cream called in Turkey?

**Down**

- 1. A popular product in South Africa, it is essentially fermented milk that tastes like cottage cheese or plain yogurt. What is it called?
- 2. The branch of farming related to the production of milk and milk products like butter and cheese.
- 4. The name of the ancient Egyptian queen who used donkey milk for bathing.
- 6. What is sugar contained in the milk called?
- 9. The white, nutrient-rich liquid food produced by mammals.



8. dondurma	3. India
7. mammal	2. dairy
6. lactose	1. amasi
5. reindeer	9. milk
4. Cleopatra	8. dondurma
3. India	7. mammal
2. dairy	6. lactose
1. amasi	5. reindeer
<b>Down</b>	<b>Across</b>

**Giggles**

What kind of tree can fit in your hand?  
**Palm tree!**

How did Benjamin Franklin feel after discovering electricity?  
**Shocked!**

What did the baby corn ask mother corn?  
**Where is pop corn?**

The firefly got the best student award because...  
**It was very bright!**

# SCHOOL

2020 # **AAJ KAI** 2019



Ritika Bohra /GT

Thousands of students from low-income families don't have access to smartphones and internet. This means that they are unable to attend online classes. On the other hand, the reopening of schools poses a health risk since children not showing any symptoms of the COVID-19 disease may carry and spread the infection. So, should we reopen schools? Yes and No.