DHARITRI

Department of Geography
Aditi Mahavidyalaya

Tenth issue, 2023

Millets & Food Security

CONTENTS

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Anindita Datta
Professor & Head of the Department.

MESSAGE

I extend my best wishes to the students and faculty of the Department of Geography, Aditi Mahavidyalaya on the launch of their Annual Magazine **'Dharitri'** on the theme of *'Millets and Food Security'*.

Our millets, Ragi, Bajra, Jowar, Suan, Varagu and others have long been part of our traditional diets. Given their cultural significance, their role in sustainable agricultural practices, affordability and versatility, they have been rightly termed "Shree Anna" as India is poised to become a hub for millet production. The involvement of women in its production and revival is also of no less importance.

I congratulate the Department for picking a timely and important theme and wish them all success.

Anindita Datta

Professor
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Message from the Principal

Dear readers,

It gives me great pleasure to write a few words as prologue for the Annual Magazine of the Department of Geography – Dharitri. The theme for the magazine *'Millets and Food Security'* holds great significance in the contemporary times for providing food security, nutrition, cultural significance, livelihoods and environmental sustainability. With growing concerns of lifestyle diseases coupled with 'refined' diet culture, the modern consumers are looking for a suitable alternative.

I convey my warm wishes to the Editorial Board for bringing this theme in the spotlight.

Wishing them all the success.

Principal

Prof. Mamta Sharma

Message from Teacher-in-charge

It is hearting to inform you that Department of Geography is bringing out its 10th edition of annual magazine “Dharitri” on the focal theme “Millets and Food Security”.

In the recent years, our Dharitri society through its “Geo-fest” and Magazine provide an opportunity for budding geographers, writers and students to share their ideas and creativity through various ways with focus on international concerns and issues specially pertaining to UN initiatives.

The United Nations declared year 2023 as “International Year of Millets” in which Government of India played a crucial role. Millets often called ‘Nutri-Cereals’ due to its high nutritional value. It is also known as ‘Coarse – cereals’, ‘cereals of poor’ and ‘friends of farmers’. Millets has a vital attribute related to sustainability for cultivation in tough condition as well as requires low investment. There is an urgent need to raise awareness of the climate-resilient and nutritional benefits of millets’ at all the levels. In nutshell, the significance of Millets can be expressed as “Millets are essential for nutrients, economical for poor farmers and ecological viable in era of climate change”.

In Indian culture millet crops play an important role as it’s among the traditional crops of India. Moreover, India is a large-scale producer contributing around 41 percent (2021) in its global production.

I believe, the present volume will fulfill the objective of creating awareness among the students and readers about millets as a healthy option for food for individuals and food security for nation.

I would like to congratulate to the members of editorial board, faculties and dear students for the praiseworthy academic work.

So, Cheers!! With Super-food Millets

With Best Wishes

Dr. Anju Singh
Teacher-in-Charge
Department of Geography

Editor's corner

Dear Reader

As we sit down to compile the 10th edition of this Annual Magazine, it has been a literary observation that creating this magazine has been both, a pleasure and a challenge for us. The various sections of this magazine documents the utmost significance of the theme through various write ups.

For centuries, millets were the staples in India but gradually were relegated to the background and got marginalized post Green Revolution. To create domestic and global demand and to provide nutritional food to the people, Government of India proposed to the United Nations for declaring 2023 as International Year of Millets. The proposal of India was supported by 72 countries. Though Millets are a staple food, yet to gain the popularity they deserve raising awareness. 'Millet Mindfulness' is the need of the hour. Though there are multiple challenges, if they are addressed through concerted efforts by all stake holders, millets will have the potential to help achieve the relevant sustainable development goals (SDG).

This edition is a humble attempt to outline contribution to millet promotion and food security.

HAPPY READING!!

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ANALYSIS OF FOOD SECURITY& NUTRITION

by Simran Shail , 2nd Year

Millets for Food Security and Nutrition" edited by Vincent G. Maliekkal and K. Madhava Chetty, is a comprehensive book that discusses the role of millets in addressing food security and nutrition challenges. The book covers various dimensions of milletsuch as its nutritional value, cultivation, processing, and marketing.

The book also examines programs and policies related to millet, including government schemes to promote millet cultivation and the challenges faced by farmers in adopting millet cultivation. It emphasizes the need to revive traditional food systems and promote millets as a better option in the present era, given their high nutritional value and suitability for sustainable farming practices.

The health benefits of millets are also highlighted, with chapters on their potential to prevent and manage non-communicable diseases such as diabetes and obesity. The book concludes with a discussion of the future of the world we live in and the role that millet can play in promoting sustainable food systems.

Overall, "Millets for Food Security and Nutrition" is an informative and insightful read that highlights the importance of millets in promoting food security, nutrition, and sustainable agriculture. It provides valuable insights into the challenges and opportunities related to millet cultivation and highlights the need for collaborative efforts to promote millet as a better option for the future of food.

SLOGANS

Sab chehra dil Azeez hai dost ye bhook bahut buri cheez hai.

by Priyanshi Yadav, 3rd Year

Little millet the tiny wonder grain with big health benefits.

by Reena Sudarsan, 2nd Year

From farm to stable, Supporting millet farmers & promoting food security for all nutrition, Delicious & sustainable millets all the future of healthy eating.

by Koj Sumpa, 2nd Year

REVIVAL OF STAPLE FOOD

BY: NIKITA RANI, 2nd Year

Once a staple in traditional Indian cooking, millets fell out of favour over the years, and have been making a slow comeback in India and across the world. To keep this momentum going, the United Nations has declared 2023 the International Year of Millets. At the announcement ceremony in December 2022, Qu Dongyu, the Director-General of the UN's Food and Agriculture Organization, spoke about the nutritive value of millets and their invaluable role in empowering small farmers, tackling food security issues and achieving sustainable development. While this may be news for much of the Global North, millets have been a staple food in India (and parts of Africa) for several centuries, having come from China at least 5,000 years ago. There are nine kinds of millets cultivated across various regions in India, such as sorghum, finger millet, little millet, kodo millet, foxtail millet and barnyard millet. These vary in colour, size and texture, but share roughly the same nutritional profile. And all of them have local names in many Indianlanguages, attesting to their historical popularity across regions. Some major Millets
Sorghum (Jowar)
Pearl Millet (Bajra)
Finger Millet (Ragi/Mandua)
Some Minor Millets
Foxtail Millet (Kangani/Kakun)
Proso Millet (Cheena)
Kodo Millet (Kodo)
Barnyard Millet (Sawa/Sanwa)
Little Millet (Kutki)
Two Pseudo Millets (Buck-wheat (Kuttu) and Amaranthus (Chaulai).

MILLETS AND THEIR GLOBAL FACTS

By Priti Kumari, 2nd Year

Millets are a group of small-seeded glasses that have been grown and consumed for thousands of years, particularly in parts of Asia and Africa.
Millets are highly nutritious and have several health benefits, including Bing, high in protein, fibre and various vitamins and minerals.
Despite their nutritional value millets have been largely neglected in favour of other crops, leading to a decline in their cultivation and consumption programmers and policies have been developed to promote the cultivation and consumption of millets, particularly in countries with high levels of food security.
Millets are increasingly being recognised as a better option than other grains in the present era due to their resilience, sustainability and adaptability to climate change.

Reviving traditional food systems that incorporate millets can help promote food, security and sustainable agriculture as well as preserve, cultural heritage the future of the world we live in will depend on our ability to create more sustainable food systems that prioritise biodiversity in local knowledge and equitable access to nutritious food.
Two Pseudo Millets (Buck-wheat (Kuttu) and Amaranthus (Chaulai).

ERA AS THEY REIGN

By Priti Kumari , 2nd Year

Millet grains are so small,
yet mighty nutritious and all food security,
They bring to every person everything.

Programs and policies now in place,
to promote millet and give them space
the dimensions of fast and varied,
value cannot be hurried.

In the present era they reign,
has a better option is no need to explain
gluten-free high in fibre,
nutrients that never tire.
Of health benefits Aplenty,
from diabetes to obesity,
millets can cure and prevent a host of alignments,
quite evident.
In the future of the world, we live in;
The need is millet to survive, it's not a wimp.
Reviving traditional foods
will keep us healthy and in a good mood.
Let's celebrate the military and
make it a part of our daily reference for food, security, health and more
millets are the Grains we adore.
Two Pseudo Millets (Buck-wheat (Kuttu) and Amaranthus (Chaulai).

AMONG THE MILLET

BY PRIYANSHI YADAV, 3rd Year

The dew is gleaming in the grass
The morning hours are seven
And I am fair to watch you pass.

Ye soft while clouds of heaven
Ye stray and gather part and hold
The wild alone can leave you.

I think of what is twice of old
The poets lived to name you,
Your sweetest poets I will draw.

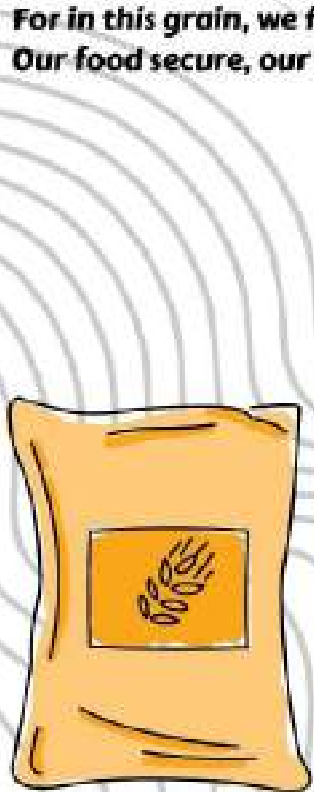
The men of old for moulding,
In simple beauty such as dreams,
And I could lie be holding.

Where daisies in the meadow toss,
The wind from odd till even
forever sphered you across the shining field of heaven.

MILLET: FOOD FOR FUTURE

BY SHWETA JOSHI, 2nd Year

In fields of gold, with waving heads,
Millet grows, and its promise spreads.
A grain of ancient lore and might,
It feeds us all, from morn till night.
In times of old, it ruled the land,
A crop so strong, so true and grand.
But then came new, with hybrid seeds,
And millet lost its place, its needs.
But now, with eyes on the future's hold,
We see anew this grain of gold.
For in a world of change and strife,
Millet stands strong, a source of life.
Its hardy roots, its drought-tough frame,
Are what we need, to beat the game.
To feed our people, rich and poor,
To end hunger's long, cruel war.
Food security is key,
To peace and growth, for you and me.
And millet, with its mighty heart,
Will play a role, right from the start.
So let us look to the future's day,
With millet by our side to stay.
For in this grain, we find our hope,
Our food secure, our future's scope.



MILLETS AND FOOD SECURITY

BY Ashutosh Kumar ,Gurukul Kangri Deemed to be University

In fields of gold, the millet grows
Tall and proud, against the glow of the setting sun, they stand so true.
A promise of food, for me and you
The ancient grain is so often overlooked.
In favour of others, more widely cooked
Yet millets are a treasure trove.
Of nutrients and flavours, we must behove
Food security is a pressing need.
As climate change takes its heed
Millets are our saving grace.
A resilient crop, that we must embrace.

From ragi to jowar, bajra to foxtail
Millets provide us with a bountiful trail.
Of dishes, both sweet and savoury
A versatile grain, that's truly extraordinary.

Let's support our farmers,
who sow the seeds of millets,
that meet our daily needs for a healthy future,
we must all strive and make millets a part of our food hive.

TINY WONDER GRAIN WITH BIG HEALTH BENEFITS

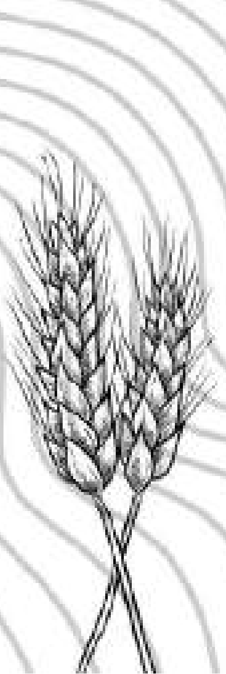
By Ishika Kajla , 2nd Year

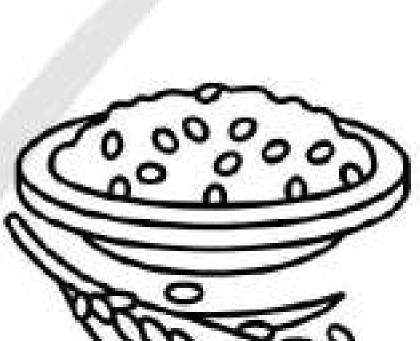
***Millets are Magical, they are super Healthy,
And makes your body internally wealthy.***

***Drought-resistant, Heat resistant,
They can grow in all situations.
Millets are high in Protein, iron and calcium,
They are wholesome.***

***Millets can substitute wheat and rice,
And it can keep your body wise.
Rivers are depleting, Monsoons are changing,
You have to do some rearranging.***

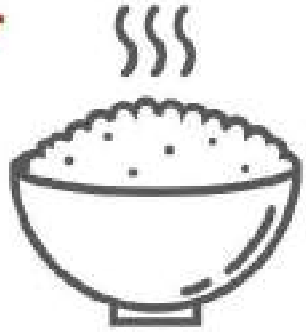
***Switch over to millet consumption,
Switch over to millets cultivation,
Because you have no other option.***





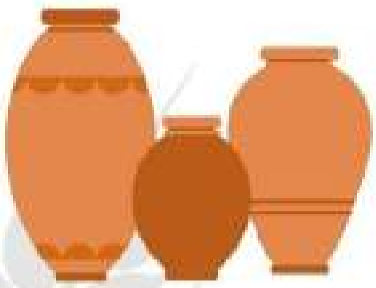
REVIVE THE MILLETS

By Nidhi Kumari, 2nd Year



**Sow the millets, reap the gain,
Ancient grains, now back again,
Programs and policies, in place,
To secure our food, and its trace.**

**With varied dimensions, they come,
Filling plates, for all and some,
Better options, in this age,
Millets on our tables, a new page.**



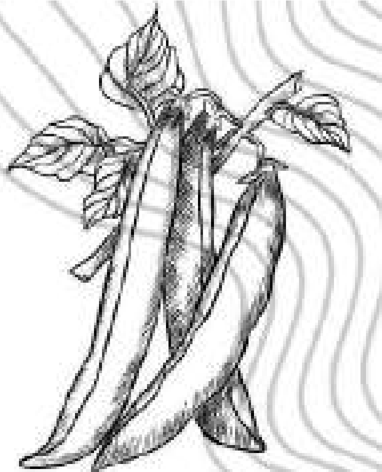
**Health benefits, they do bring,
Nutrition, and wellness, in one thing,
The future of our world, we see,
With millet, a better place to be.**

**Reviving traditions, we should,
The lost wisdom, we must hood,
Millets, our heritage to behold,
For a healthy future, they unfold**

THE GOD'S GRAIN

By Sumedha Chatterjee, 3rd Year

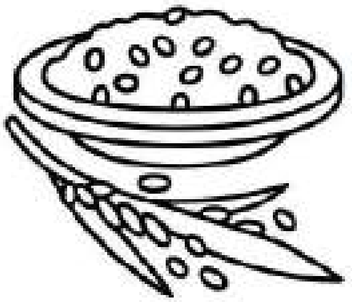
Conveyed there by an artist's hand in peasant garb, at harvest time,
A couple in the Twilight stand
As church bells, in the distance, chime
And ring out to remind the pair
And others who are at their toil
That here and now is the time for prayer
And time to leave the busy soil
And so, the tools of work are laid
Aside, while labour turns to rest,
And there the Angelus is prayed
Her hands are joined, and his cap is pressed
Against his breast, their heads are bowed
The sun sets silent as they say
The reverential words aloud
Which they repeat, this hour, each day
An angel's pledge do they avow?
Or does some grief inflame their prayer?
The basket holds its secret now
The unseen coffin is hidden there.



A TALE OF MILLET

By Rishita Gautam, 2nd Year

In the old days when was a child in the mountains
-we grew everything and were self-sufficient
-our food and recipe -were local for matching what we had, grown there.
I never knew rice
-neither ate Chole-kebab
-nor most of what now is
-famously known as ours:
- Persian Dish
Instead saw mother
-making food with millet, which hammered in mortar
-to remove the hard sheaths that shined, and slipped away.
Fruits and fruits and more fruits
- fresh and dried, cooked
-with kernels of the nuts -vegetables, many kinds...
We lived on the dairies
-and fat and fresh meat -that we raised on our farms
-from the animals
-as well as eggs, chicken...
While beating millet, Mom -dropped in a piece of cloth
-to handle the millet in mortar -and stop the shells from flying all around.
While feeding, Mother joked:
-\What you eat is cloth....-that dad killed, and Mom mixed in the pot...
-while it was the stomach, intestine -and the lamb's inner parts ...
Now, here, and with me
-migrants are like millet
-simple and slippery, unaware -far from their plains and deserts.

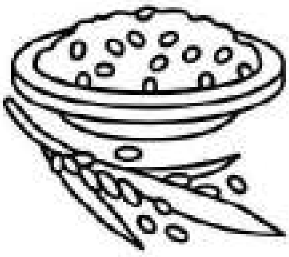


KNOW ABOUT MILLETS

INTRODUCTION

By Suhani Sharma, 2nd Year

Millets are traditional grains, grown and consumed in the Indian subcontinent from the past more than 5000 years. Millets are small-grained, annual, warm-weather cereals belonging to the grass family. They are rain-fed, hardy grains which have low requirements of water and fertility when compared to other popular cereals. They are highly tolerant to drought and other extreme weather conditions.
Millets are nutria cereals comprising of sorghum, pearl millet, finger millet (Major millets) foxtail, little, kodo, proso and barnyard millet (minor millets). These are one of the oldest foods known to humanity. These are one of the several species of coarse cereal grasses in the family Poaceae, cultivated for their small edible seeds. Pseudo millets are so called because they are not part of the Poaceae botanical family, to which true grains belong, however they are nutritionally similar and used in similar ways to true grains.
Millets are highly nutritious, non-glutinous and non-acid-forming foods. Millets have many nutraceutical and health-promoting properties, especially the high fibre content. Millets act as a probiotic feeding for micro-flora in our inner ecosystem. Millets hydrate our colon to keep us from being constipated. Niacin in millet can help lower cholesterol. Millets contain major and minor nutrients in good amounts along with dietary fibre. Millets are gluten-free and can be a substitute for wheat or gluten-containing grains for celiac patients.
Nutritional Composition of various types of Millets with Their Local Name
Millets are high in nutrition and dietary fibre. They serve as a good source of protein, micronutrients and phytochemicals. The millets contain 7-12% protein, 2-5% fat, 65-75% carbohydrates and 15-20% dietary fibre. The essential amino acid profile of the millet protein is better than various cereals such as maize. Millets contain fewer cross-linked prolamins, which may be an additional factor contributing to the higher digestibility of the millet proteins.
Similar to cereal proteins, the millet proteins are poor sources of lysine, but they complement well with lysine-rich vegetables (leguminous) and animal proteins which form nutritionally balanced composites of high biological value. Millets are more nutritious compared to fine cereals. Small millets are a good source of phosphorous and iron.Millets contribute to antioxidant activity with phytates, polyphenols, tannins,
anthocyanins, phytosterols and pinacolatos present in it having an important role in ageing and metabolic diseases. All millets possess high antioxidant activities.



MAJOR MILLETS

Sorghum (Jowar)
A major portion of sorghum protein is prolamin (kafirin) which has the unique feature of lowering digestibility upon cooking which might be a health benefit for certain dietary groups.
Sorghum proteins upon cooking are significantly less digestible than other cereal proteins, which might be a health benefit for certain dietary groups.
It is rich in protein, fibre, thiamine, riboflavin, folic acid, and carotene.
It is rich in potassium, phosphorus and calcium with sufficient amounts of iron, zinc and sodium.
Sorghum
Pearl Millet (Bajra)
Pearl millet contains a considerably high proportion of proteins (12-16%) as well as lipids (4-6%).
It contains 11.5% of dietary fibre. It increases the transit time of food in the gut. Hence, reduce the risk of inflammatory bowel disease.
The niacin content in pearl millet is higher than all other cereals.
It also contains folate, magnesium, iron, copper, zinc and vitamins E and B- complex.
It has high energy content compared to other millets.
It is also rich in calcium and unsaturated fats which are good for health.
Pearl millet
Finger Millet (Ragi)
Finger millet is the richest source of calcium (300-350 mg/100g)
Ragi has the highest mineral content.
It contains lower levels of protein (6-8%) and fat (1.5-2%)
Finger millet proteins are unique because of their sulphur-rich amino acid contents.
The grains have excellent malting properties and are widely known for their use as weaning foods.
It has high antioxidant activity.Finger millet
Minor Millets
Foxtail millet (Kakum)
It is high in carbohydrates.
It has double the quantity of protein content compared to rice.
It contains minerals such as copper & iron.

It provides a host of nutrients, has a sweet nutty flavour and is considered to be one of the most digestible and non-allergic grains. Foxtail millet Kodo millets (Kodon) It has high protein content (11%), low fat (4.2%) and very high fibre content (14.3%). Kodo millet is rich in B vitamins especially niacin, pyridoxine and folic acid as well as the minerals such as calcium, iron, potassium, magnesium and zinc.It contains a high amount of lecithin and is excellent for strengthening the nervous system. Kodo millet Barnyard millet (Sanwa) It is the richest source of crude fibre and iron. Its grains possess other functional constituents i.e., Gamma amino butyric acid (GABA) and Beta-glucan, used as antioxidants and in reducing blood lipid levels. Barnyard millet Little millet (Kutki/Shavan) It is smaller than other millets. It is high in iron content. It has high antioxidant activities. It contains about 38% of dietary fibre. Little Millet Proso millet (Chenna/Barri) It contains the highest number of proteins (12.5%). The health benefits of Proso millet come from its unique properties. It has significant amounts of carbohydrates and fatty acids. It is a cheaper source of manganese as compared to other conventional sources like spices and nuts.It contains high amounts of calcium which is essential for bone growth and maintenance. It reduces cholesterol levels and also reduces the risk of heart di eases Proso millet Pseudo Millets Amaranth (Ramdana/ Rajgira) High protein content (13-14%) and a carrier of lysine, an amino acid that's missing or negligible in many other grains. Consists of 6 to 9% of oil which is higher than most other cereals. Amaranth oil contains approximately 77% unsaturated fatty acids and is high in linoleic acid. It is high in dietary fibre. High in iron, magnesium, phosphorus, potassium and appreciable amounts of calcium. A rich dietary source of phytosterols, with cholesterol-lowering properties. Contains a Luna sin-like peptide and other bioactive peptides which are thought tohave cancer-preventive and antihypertensive properties. Buckwheat (Kuttu) It contains protein 13-15% protein and is rich in the amino acid lysine. Rich in carbohydrates (mainly starch). Contains vitamins B1, C and E. Rich in polyunsaturated essential fatty acids, such as linoleic acid. Contains higher levels of zinc, copper, and manganese than other cereal grains, and the bioavailability of these minerals is also quite high. High in soluble fibre. A rich source of polyphenol compounds. Contains rutin, a bioflavonoid thought to help control blood pressure and possesses anti-inflammatory and anti carcinogenic properties. Buckwheat

Why one should eat millet?

Millets are gluten-free, highly nutritious and rich in dietary fibre. They are rich in micronutrients, including calcium, iron, phosphorus, etc. They are low in Glycemic Index (GI) as such done cause a huge spike in blood sugar. Millets should ideally be an integral part of our daily diet. Dietary fibre in millets has water-absorbing and bulking properties. It increases the transit time of food in the gut which helps in reducing the risk of inflammatory bowel disease and acts as detoxifying agent in the body.

What are the Health Benefits of Millets?

Millets are anti-acidic; Millets are gluten-free; Helps to prevent type 2 diabetes; Effective in reducing blood pressure; Reduces risk of gastrointestinal conditions like gastric ulcers or colon cancer; Eliminate problems like constipation, excess gas, bloating and cramping; Millets act as a probiotic feeding microflora in our inner ecosystem.

2023 IS THE INTERNATIONAL YEAR OF MILLETS

by Komal Kumari, 2nd Year

The year 2023 has been declared by the United Nations as the International Year of the Millet, following a proposal by India, which wants to position itself as a global hub for millet. It's interesting how millets can help the world face the challenges confronting it.
Here's what the Food and Agricultural Organization of the UN has to say about millets. As the global agrifood systems face challenges to feed an ever-growing global population, resilient cereals like millet provide an affordable and nutritious option, and efforts need to be scaled up to promote their cultivation. "Millets can play an important role and contribute to our collective efforts to empower smallholder farmers, achieve sustainable development, eliminate hunger, adapt to climate change, promote biodiversity, and transform agri-food systems," says FAO Director-General QU Dongyu.

How are millets healthier for you?

Millets are cereal, like rice or wheat, but used to be referred to as coarse cereals, an obvious reference to the external texture which is not smooth. All cereals are a rich source of carbohydrates but millets also come with more protein, dietary fibre, iron and calcium content than rice or wheat.
In a 2018 notification, the government says millets are a powerhouse of nutrients and that research had shown millets are a good defence in the fight against diabetes. Millets have a low glycemic index, which means such foods have a lesser impact on blood glucose levels than foods that are higher in the index. To help consumers understand the benefits better, the government has changed the nomenclature from coarse grains to Nutri cereals.

Why are millets said to be climate-friendly?

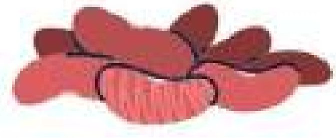
An article at ORFonline tells us that millets use 70% less water than rice; grow in half the time of wheat; and need 40% less energy in processing. They are hardy crops that can withstand extreme heat conditions.

Why did millets lose preference over the past few decades?

Millets are said to be among the earliest, if not the first, cereals to have been cultivated by mankind. In a few years following independence, India was hit with a food shortage and we had to quickly get our act together. The Green Revolution prioritized the production of wheat and rice helping avert such crises. A paper published in the Ethnic Foods Journal, part of Springer Nature, claims that before the Green Revolution, the production of rice and millets were higher than the production of wheat, barley, and maize combined. But since then, the production of millets has gone down, and "the crops that were once consumed in every household became a fodder crop in just a few decades" after the Green Revolution. According to a presentation by the Ministry of Agriculture and farmer welfare, precedence given to rice and wheat meant the millets declined in acreage. Till 1965-70-time frame, millets formed 20% of our food grain basket but are now down to 6%.

SUPERFOOD

by Shristi, 2nd Year



Millets are often referred to as Superfood and their production can be seen as an approach for sustainable agriculture and a healthy world. Multidimensional benefits associated with millets can address the issues related to nutrition security, food systems security, and farmers' welfare.
Further, many unique features linked with millets make them a suitable crop which is resilient to India's varied agro-climatic conditions. Citing these factors, the year 2018 has already been declared as the National Year of Millets and India has called for declaring 2023 as the "International Year of Millets".
However, despite acknowledging their significance as a superfood, the general perception is that millet is increasingly seen as a "poor person's food". Therefore, it is necessary to re-brand coarse cereals/millets as nutri-cereals and promote their production and consumption.
Millets Production in India
The three major millet crops currently growing in India are jowar (sorghum), bajra (pearl millet) and ragi (finger millet).
o Along with that, India grows a rich array of bio-genetically diverse and indigenous varieties of "small millets" like kodo, kutki, chenna and Sanwa.
• Major producers include Rajasthan, Andhra Pradesh, Telangana, Karnataka, Tamil Nadu, Maharashtra, Gujarat and Haryana.

Need For Promotion of Millets

Climate Resilient Crop: As Millets are resistant to climatic stress, pests and diseases, this makes them a sustainable food source for combating hunger in changing world climate.
Further, millets are not water or input-intensive, making them a a sustainable strategy for addressing climate change and building resilient agri-food systems.
Nutritional Security: Millets are high in dietary fibre, nutri-cereals are a powerhouse of nutrients including iron, folate, calcium, zinc, magnesium, phosphorus, copper, vitamins and antioxidants.
They are not only important for the healthy growth and development of children but have also been shown to reduce the risk of heart disease and diabetes in adults.

Millets, being gluten-free and low glycemic index food is good for diabetic persons and can help to combat cardiovascular diseases and nutritional deficiency.
Economic Security: Millets can be grown in dry, low-fertile, mountainous, tribal and rain-fed areas. Moreover, millets are good for the soil, have shorter cultivation cycles and require less cost-intensive cultivation. Given these features, low investment will be needed for the production of millets and thus can prove to be a sustainable income source for farmers. Subdued Use of Millets Green Revolution: With the Green Revolution, the focus was on food security and high-yielding varieties of wheat and rice. An unintended consequence of this policy was the gradual decline in the production of millet. Further, the cost incentives provided via MSPs to wheat and rice, discouraged the production of millets. Increased Demand for Processed Food: In parallel, India saw a jump in consumer demand for ultra-processed and ready-to-eat products, which are high in sodium, sugar, trans-fats and even some carcinogens. With the intense marketing of processed foods, even the rural the population started perceiving mill-processed rice and wheat as more aspirational. Double Burden: This has led us to the double burden of mothers and children suffering from micronutrient deficiencies and the astounding prevalence of diabetes and obesity.

Steps Taken by the Government

Increase in MSP: The government has hiked the MSP of Millets, which came as a big price incentive for farmers. Further, to provide a steady market for the produce, the government has included millets in the public distribution system. Input Support: The government has introduced the provision of seed kits and inputs to farmers, building value chains through Farmer Producer Organisations and supporting the marketability of millets.

Integration Approach: The Ministry of Women and Child Development has been working at the intersection of agriculture and nutrition by setting up Nutri-gardens, promoting research on the interlinkages between crop diversity and dietary diversity and running a behaviour change campaign to generate consumer demand for Nutri cereals.

Way Forward

Changing the Narrative: There is a need to change the general perception around consumption and trade point of view associated with millets and to re-brand coarse cereals/millets as nutri-cereals.

Further, civil society can begin the Jan Andolan by taking small steps towards choosing healthier foods, which are good for the environment and bring economic prosperity to our farmers.

MSP on Lines of Wheat and Rice: Government can try on a pilot basis for providing MSP to millets on the lines of Wheat and rice (state guarantee of procurement at MSP.).

Mission Mode Initiative: The government can encourage farmers to align their local cropping patterns to India's diverse 127 agro-climatic zones and promote the cultivation of millets with local topography and natural resources. Inter-Ministerial Approach: There is a requirement for a multi-ministerial policy framework that is aimed towards building an Atma Nirbhar Bharat and resonates with the global call for self-sufficiency and sustainable development.

Conclusion

As the government sets to achieve its agenda of a malnutrition-free India and doubling farmers' incomes, the promotion of the production and consumption of nutri-cereals seems to be a policy shift in the right direction.

MILLETS DIET WITH DISEASE FIGHT

by Aashi Varshney, 2nd Year

Millets are added to the diet as nutritious diet help to fight diseases.

All thanks to the Honorable Prime Minister of India, Shri Narendra Modi, who initiates to grow and eat millet. He discussed the benefits of millets in his speech and serve the millets to Foreign Ministers. United Nations has declared 2023 as a year of millets. Millets are being in use for many decades. India is the largest producer of millet states like Rajasthan, Maharastra, Karnataka, Gujarat, & Madhya Pradesh. In the Southern part of India, people have wheat and rice and their dieting habits in comparison to Middle and North India, where millets are more in use. Millets are of 16 types: Jowar, Bajra, Ragi, Maize, Jow, etc. Millets can be taken in many forms in our daily diet and treated as a superfood. They regenerate and replenish our bodies These are rich in micro-nutrients, anti-oxidants, proteins, iron, zinc and calcium. These are more beneficial to our health because the low glycemic index is very low and these are not converted into glucose at a faster rate. It is especially good for diabetic persons who have issues with gluten, etc. It can be grown in geographical conditions like rainfall less than 20cm, less irrigation facility, less urea and fertilizers, drought-friendly, climate and environment-friendly, in poor soil fertility. Millets are whole grains with an impressive nutrient profile. Dietary fibre & proteins in millets can stabilize blood sugar levels (an increase in adiponectin concentration may improve insulin sensitivity).Adding millet to the diet can help with weight loss, besides being gluten-free.Fibres in millets lower LDL cholesterol levels thereby lowering the risk of heart disease(Millets contains magnesium, which helps to regulate heart rhythm. Vitamin B3 helps to reduce certain factors of heart diseases, such as high levels of cholesterol and is effective in lowering stress). This anti-oxidant-rich whole grain can fight oxidative stress which is linked to diseases like diabetes & arthritis. Dietary fibre in millets improves your digestive health (millets contain fibre,which contributes to digestive health and helps to regulate bowel movements.Millets also have prebiotics,which stimulate the growth of probiotics within the microbiome which is important for health and the immune system).

DIMENSIONS OF MILLETS

by Bhumika Ahir, 3rd Year, Post Graduate, Chamba, Himachal Pradesh

Millets have high nutritional qualities and produce well under marginal conditions but they are not used to the extent that is possible. It is several small-grained cereal types of grass and based on the grain size, millets are classified as major millets and small grain millets. Major millets include sorghum and pearl millet whereas small grain millet includes finger millet, foxtail millet, kodo millet, proso millet, barnyard millet and little millet. Millets are rich in minerals and vitamins compared to rice and wheat; millets have the huge potential to provide security of food, nutrition, fodder, fibre, health, livelihood and ecology. Given all these qualities that they so amazingly combine; millets only be called Miracle Grains/ Nutria-Cereals.

The inclusion of millet crops in a concerted way in cropping systems and also particularly in fragile ecosystems is a virtuous move towards sustainability. Also, the importance of marketing and value addition improves millet cultivation. In this connection, the present study was carried out to examine the scenario of millets in India from 1950–51 to 2018–19 and data were collected from the Ministry of Economics and Statistics, seasonal and crop reports and analysed by using compound growth rate. The growth rate of millet area and production registered negative growth i.e., area and production declined at the rate of 16.31 per cent and 13.58 per cent per year respectively. In the same way, productivity was declining up to 2005 after that, it showed positive growth (3.23 per cent). Also, studied the economics of crops and observed that the cost of cultivation for millet crops (sorghum and maize) compared to other important crops was lower i.e., Maize - ₹ 85915/ha, Sorghum - ₹ 47830/ha. In the same way, the gross income realized by millet farmers was also low except for the maize crop. In India, the cost of cultivation was high in Tamil Nadu for most of the millet crops across the states due to the high human labour cost. Hence, there is a need to formulate suitable strategies considering the economic value of the crops.

Therefore, the study concluded proper cultivation practices, marketing and processing should be given to improve millet production in India.

INDIA MILLETS PRODUCTION:

India is the largest producer of millet in the world. India's two varieties of millet namely Pearl Millet (Bajra) and Sorghum (Jowar) together contribute approx 19 percent to world production in 2020. In India, millets are mostly cultivated in Karnataka, Andhra Pradesh, Tamil Nadu, Maharashtra, Odisha, Madhya Pradesh, Rajasthan and Uttarakhand states. Rajasthan (87 per cent of the Cumbu area), Maharashtra (75 per cent of the sorghum area) and Karnataka per cent of Ragi and 32 per cent of Cumbu) occupy the maximum area of millets (Stanly and Shanmugam, 2013). Now a day, the productivity of millets is boosted through technologies and high-yielding varieties. The area under small millets decreased in the last six decades i.e., 8 million hectares (1949-50) to 1.8 million hectares (2017-18). Likewise, the production of small millet showed the same trend from 4 million tons to 2.44 million tons in the respective year, predominantly loss occurred in all other small millet compared to finger millet (Shadang and Jaganathan, 2014). Nutrient to nutrient, every single millet is astonishingly superior to rice and wheat, therefore, is the solution for the malnutrition that affects a huge population of India (DHAN, 2012).

Nevertheless, cultivation of these millets now faces many limitations/constraints resulting in the decline in area cultivation of these crops, the existence of high yield gaps (Uma Gowri and Prabhu, 2017), low prioritization in research agenda and subsequently fewer technology breakthroughs in these crops. Also, public and private investments are limited to millet seed development and production (Pray and Latha, 2009). International prices for millets are highly volatile, determined largely by supply volumes, and are usually unrelated to those of other major coarse grains, such as maize, sorghum, or barley. Owing to their nutritional content, any improvements/ developments in cultivation, availability, storage, price and processing technology for millets could significantly contribute to the food and nutritional security of India's population (Michaelraj and Shanmugam, 2013a). Further, these millets contribute to diversifying our food basket, which is at present very narrow because of excessive dependence on major cereals like rice and wheat. This paper analyzes the scenario of millets in India and suggests suitable future strategies to revive these crops considering their economic value. The following were the major objectives of this article; To analyze the decadal trend in area, production and productivity of millets in India; To examine the cost comparativeness of millets with other crops across states in India; and To suggest suitable policy measures to improve millet crop cultivation in India.

BENEFITS OF MILLETS:

Millets are rich in nutrients and plant compounds. Therefore, they may offer multiple health benefits.

RICH IN ANTIOXIDANTS

Millets are rich in phenolic compounds, especially ferulic acid and catechins. These molecules act as antioxidants to protect your body from harmful oxidative stress. Studies in mice link ferulic acid to rapid wound healing, and skin protection, Meanwhile, catechins bind to heavy metals in your bloodstream to prevent metal poisoning. While all millet varieties contain antioxidants, those with a darker colour — such as finger, proso, and foxtail millet — have more than their white or yellow counterparts.

May help control blood sugar levels. Millets are rich in fibre and non-starchy polysaccharides, two types of undigestible carbs that help control blood sugar levels. This cereal also has a low glycemic index (GI), meaning that it's unlikely to spike your blood sugar levels. Thus, millet is considered an ideal grain for people with diabetes. For instance, a study of 105 people with type 2 diabetes determined that replacing a rice-based breakfast with a millet-based one lowered blood sugar levels after the meal. A 12-week study of 64 people with prediabetes gave similar results. After eating 1/3 cup (50 grams) of foxtail millet per day, they experienced a slight reduction in fasting and post-meal blood sugar levels, as well as a decrease in insulin resistance. Insulin resistance is a marker for type 2 diabetes. It occurs when your body stops responding to the hormone insulin, which helps regulate blood sugar. What's more, in a 6-week study in rats with diabetes, a diet containing 20% finger millet led to lower fasting blood sugar levels and a drop in triglyceride and cholesterol levels. Millets contain soluble fibre, which produces a viscous substance in your gut. In turn, this traps fats and helps reduce cholesterol levels. One study in 24 rats found that those fed foxtail and proso millet had significantly reduced triglyceride levels, compared with the control group. Additionally, millet protein may help lower cholesterol. A study in mice with type 2 diabetes fed them a high-fat diet with millet protein concentrate. This led to a decrease in triglyceride levels and a significant increase in adiponectin and HDL (good) cholesterol levels, compared with the control group.

Adiponectin is a hormone with an anti-inflammatory effect that supports heart health and stimulates fatty acid oxidation. Its levels are usually lower in people with obesity and type 2 diabetes.

Millets are a gluten-free grain, making them a viable choice for people with celiac disease or those following a gluten-free diet.

Gluten is a protein that occurs naturally in grains like wheat, barley, and rye. People with celiac disease or non-celiac gluten, sensitivity must avoid it because it triggers harmful digestive symptoms, such as diarrhoea and nutrient malabsorption. When shopping for millet, you should still look for a label that certifies it is gluten-free to ensure it hasn't been contaminated with any gluten-containing ingredients.

MILLETS AND FOOD SECURITY

by Antara Pal, 3rd Year

Millets are a smart food: they are good for your health, good for the environment as hey survive with less water and have a low-carbon footprint, and good for the farmer as they are more resilient and climate-smart," Joanna Kane-Potaka, executive director at Smart Food, a global initiative working on diversifying staples, told Devex. More than 90 million people in Africa and Asia depend on millet. In comparison, wheat, rice, and maize are staple foods for 4 billion people. These three major cereals provide 51% of the world's calorie intake. Millet is a good source of protein, fibre, key vitamins, and minerals. The potential health benefits of millet include protecting cardiovascular health, preventing the onset of diabetes, helping people achieve and maintain a healthy weight, and managing inflammation in the gut. As a part of the National Food Security Mission (NFSM), = which aims to increase foodgrain output by 25 million tons, millets are assigned 2 million tons or 8 per cent of the total. The Indian government shifted its focus to millet farming practices and enacted measures to support the farmers in this sector. Thus, millet promotes food security.

THE MANY DIMENSIONS OF MILLETS: A VERSATILE & NUTRITIOUS CROP

by SHAKSHI GUPTA, 2nd Year

Millets are a group of small-seeded grasses that are widely cultivated in Africa and Asia. Despite being an important staple crop in many parts of the world, millets are relatively unknown and underutilized in other regions. However, millets offer numerous benefits for farmers, consumers, and the environment, and their cultivation and consumption could play a critical role in addressing a range of global challenges. In this article, we will explore the many dimensions of millet and its potential to contribute to a more sustainable and equitable food system.

What are Millets and Why are They Important?

Millets are a group of small-seeded grasses that are widely cultivated in semi arid regions of Africa and Asia. There are many different species of millet, including pearl millet, finger millet, foxtail millet, and sorghum. Millets are well-adapted to diverse environmental conditions and are often grown in regions where other crops cannot thrive. They are also highly nutritious and contain a range of essential vitamins, minerals, and antioxidants. Millets are gluten-free and have a low glycemic index, which makes them a good option for people with celiac disease or diabetes. Millets are an important staple crop for millions of people in Africa and Asia, where they are used to make a variety of traditional dishes, including porridge, loaves of bread, and fermented beverages. Millets are also an important source of income for many small-scale farmers, who rely on millet cultivation for their livelihoods.

The Environmental Benefits of Millets

Millets offer numerous environmental benefits that make them a valuable crop for sustainable agriculture. Millets are drought-tolerant and require minimal water and fertilizer inputs, which makes them a good option for farmers in regions with limited water resources. Millet cultivation can also help to prevent soil erosion and improve soil fertility, which can reduce the need for synthetic fertilizers and promote soil health. In addition, millet cultivation can help to promote biodiversity, as it is often grown in mixed-cropping systems with other crops and vegetables.

The Nutritional Benefits of Millets

Millets are highly nutritious and offer a range of health benefits for consumers. Millets are rich in essential vitamins and minerals, including iron, magnesium, and zinc. They are also a good source of antioxidants, which can help to prevent chronic diseases such as cancer and heart disease. Millets are gluten-free and have a low glycemic index, which makes them a good option for people with celiac disease or diabetes. Moreover, millets are a good source of dietary fibre, which can help to improve digestive health and reduce the risk of certain types of cancer.

THE ECONOMIC BENEFITS OF MILLETS

Millets are an important source of income for many small-scale farmers, particularly in regions where other crops cannot be grown. Millets are also a valuable crop for food processors and manufacturers, who use millet flour to make a range of products, including breakfast cereals, snacks, and baked goods. Moreover, millets are a low-cost and sustainable source of food, which makes them a good option for consumers in low-income countries.

THE POTENTIAL OF MILLETS FOR ADDRESSING GLOBAL CHALLENGES

Promoting the cultivation and consumption of millet can play a critical role in addressing a range of global challenges, including food insecurity, malnutrition, poverty, climate change, and environmental degradation. Millets are a crop that is well-adapted to diverse environmental conditions and requires minimal inputs, which makes them a good option for small-scale farmers in regions where other crops cannot be grown. Moreover, millets are highly nutritious and offer a range of health benefits, which makes them an important food source for vulnerable populations such as children and pregnant women. In addition to their nutritional and environmental benefits, millets can also help to promote social and economic equity. Millet cultivation is often practised by small-scale farmers, many of whom are women, and the income generated from millet cultivation can help to support local communities and contribute to rural development. Moreover, the promotion of millets can help to promote cultural diversity and preserve traditional food systems, which are often threatened by the spread of Western-style diets. Despite the many benefits of millets, their cultivation and consumption face a range of challenges. Millets are often considered to be a poor man's crop,and are stigmatized as a food of last resort. In addition, the lack of research and development on millet has led to a lack of knowledge and awareness among farmers, consumers, and policymakers. As a result, millets are often undervalued and underutilized, and their potential to contribute to a more sustainable and equitable food system remains largely untapped.

WAY FORWARD

Millets are a versatile and nutritious crop that offers numerous benefits for farmers, consumers, and the environment. The cultivation and consumption of millet can play a critical role in addressing a range of global challenges, including food insecurity, malnutrition, poverty, climate change, and environmental degradation. However, to fully realize the potential of millets, greater investment and support are needed for research and development, as well as for policies and programs that promote millet cultivation and consumption. By promoting the many dimensions of millets, we can work towards a more sustainable and equitable food system for all.

ANNUAL REPORT OF GEO-FEST ORGANISED BY DHARITRI, 2023

By Miss Sumedha Chatterjee, 3rd Year

The Department of Geography has always committed to excellence and perfection and provides a magnificent environment for the student's overall development. The session began with a warm welcome to all the students present there through an orientation program, and a lamp-lighting ceremony by all the faculty members which includes the principal the TEACHER-IN-CHARGE, HOD and office barriers. The orientation program serves its purpose of helping the outside participants and freshers get comfortable with the teachers, seniors and classmates. The orientation was a nutshell of all the important information which included various entertainment such as a recital, Ganesh Bandana, dance performance and a brief description regarding our guest speaker.

The department organized this event on the 10th of February, 2023 keeping in mind. THE UN INTERNATIONAL YEAR OF MILLETS, on the agenda "MILLETS: A GATEWAY TO HEALTH AND FOOD SECURITY". The department celebrated this auspicious day by inviting Dr Ranjeet Ranjan Kumar who is an agricultural scientist at IARI, PUSA who gave an inspiring lecture regarding millets, their types, diets and how it was left behind and neglected during the five-year plan. He also gave an innovative vision of how India is protecting millet and encouraging the coming generation to the benefits of 'Mota Anaj'.
He mentioned how millet is the resource of proper immunity as the globe faces challenges of scarcity and gives a broad insight into how pearl millet: is the god's grain for an uncertain future rediscovering hidden hunt followed by a question-answer round.

The Department of Geography organized an inter-college fest on the esteemed agenda, in which almost 50 students across different colleges as well as from the department participated through enthusiasm. Several fun events were lined up on the use of millet such as poster making, cooking competition, Pictionary and treasure hunt. At the end of the day, certificates and prizes were distributed to the winners and title holders from the department for Best Geographer, All-Rounder and nominee for the Student of the Year for the college selected by the department.

GLANCES OF THE EVENT

ORIENTATION PROGRAM

GUEST LECTURE ON MILLETS BY DR. RANJEET RANJAN KUMAR

GLANCES

NUKKAD NATAK

POSTER MAKING COMPETITION

TREASURE HUNT

CULINARY DELIGHT
COMPETITION

WINNERS

Millet Art

Winners - Hadia Shaheen, Kritika Arora and Premlata

Treasure Hunt

Winners - Shweta Singh, Prerna Singh and Raj

Culinary Delight

Winners - Lucky Sindhu and Pooja

CHAMPS

Secured 4th position in Intra-College Chess Match on 25th January 2023, & Played for College Chess Team in Inter-College Chess Match on 4th February 2023 and secured runner-up position.

Mansha Verma, 1st Year

Sonia Tamang,1st Year

Anamika Singh,1st Year

Anamika Singh & Sonia Tamang Kamla Nehru College Geography Fest on 28 March 2023 Won 2nd prize in Treasure Hunt Game.

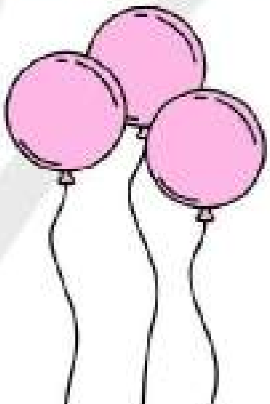
Antara Pal,3rd Year

Secured 2nd position in Annual Geo-fest day & participated in Nukkad Natak.

Lucky Sindhu,3rd Year

Secured 3rd position in Reel Making competition & participated in Poster making competition.

आगमन+अलविदा=आगवी



TRIP TO SHIMLA

(2nd YEAR)

DISASTER MANAGEMENT

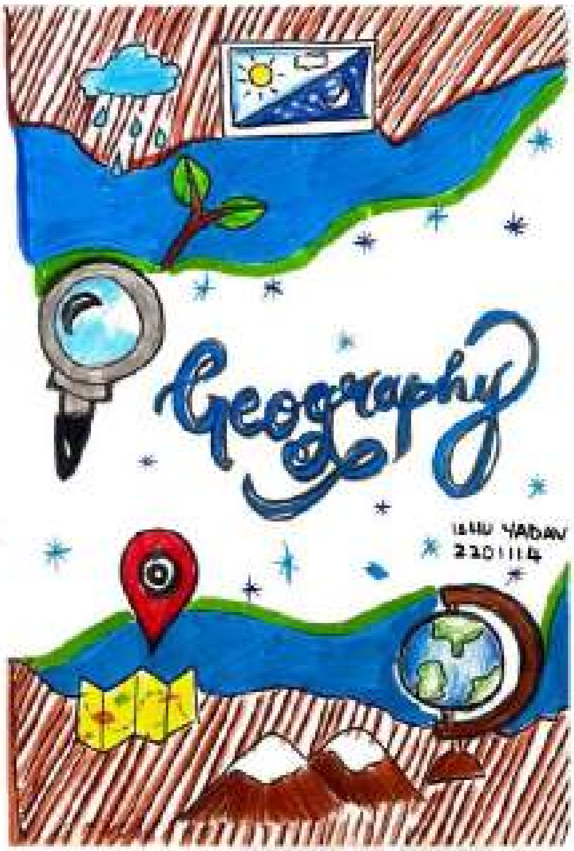
(LOCAL TRIP)

DISASTER RELIEF

TRIP TO UTTARAKHAND

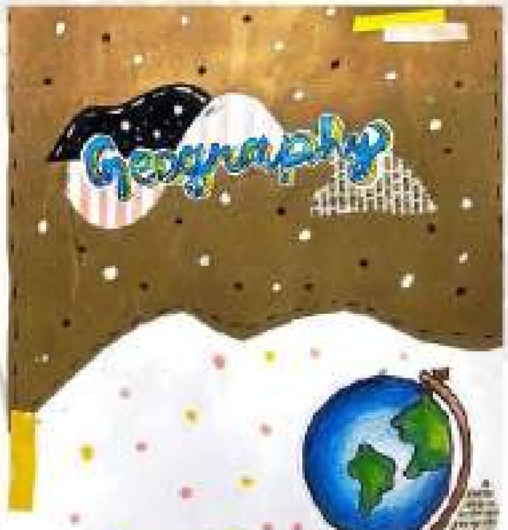
(3rd YEAR)

ART & PEN



Ishu Yadav
B.A. Prog

Rashi Pandey
B.A. Prog



Sweta
B.A. Prog