#### A NEWSLETTER BY AND FOR THE ANANT FELLOWSHIP FOR CLIMATE ACTION COMMUNITY







May 2022 Vol 2. Issue No. 4

## COMMUNITY



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OPINIONS Focus on plastics



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For the academic year 2022-23, the Anant Fellowship for Climate Action which is the flagship programme at the climate school, received 4258 applications from 78 countries.



## Maria Elena De Matteo

On Earth Day 2022, Fellow Maria Elena De Matteo organized this year's edition of Earth Night in 30 cities around the world to inspire



climate action through the power of music.

## Susan T Jackson

Dr. Susan T Jackson was recently published by the Global Studies Quarterly by Oxford University Press on the impact of sharing, remixing, and endorsing cruel memes on global politics as a way of displaying hostility.



"The politics of the everyday", she argues, "is designed to be entertaining as well as cruel".

Read her article here: <u>http://bitly.ws/</u> <u>p6CJ</u>

Momentum Novum 🖌 · Apr 5 · 6 min read

#### Sustaining business in times of crisis

Article by Susan T. Jackson



## Mofizur Rahman

"Compared to extreme warming, we find that by 2070, geoengineering would nullify a projected reduction of nearly one billion people at risk of malaria". Mohammed Mofizur Rahman explains how solar geoengineering could redistribute malaria risk in developing countries in a recent article co-authored

by him. Read the full article published in Nature

Portfolio. http://bitly.ws/qwGj



## Stacey Alvarez de la Campa

In an article authored by her for Island Innovation, Fellow Stacey Alvarez de la Campa explores the concept of blue economy

and its role in reducing

economic inequality among the island communities around the world. Read the full article here: <u>http://bitly.ws/</u> <u>qr2j</u>



## **Debajit Palit**

Dr. Debajit Palit assumed a new role as a professor at the NSB-NTPC School of Business.



Dr. Debajit Palit wrote an article in moneycontrol.com on how distributed renewable energy could potentially help resolve some of the issues with last mile connectivity. To know how, read his article here: http://bitly.ws/pGAQ

Distributed renewable energy is vital for India's clean energy transition

The mini-grids, interconnected with individual DRE systems at prosumers' homes, and further connected with the main grid to take and feed electricity, along with decentralised management, is the future

DEBAJIT PALIT | AUGUST 26, 2021 / 03.01 PM IST



## Salem Afeworki

Fellow Salem Afeworki was featured on the 2021 Environment+Energy Leader 100 List! Salem also recently received the Heroes 2022 Award from<u>Beam</u> <u>Global</u>.

On Earth Day 2022, Salem Afeworki helped organize the first ever Earth Day Festival in the City of Costa Mesa in Orange County, California.





Image by Marcin Jozwiak via Pexels

"Sustainability is not the trade-off for profitability that many think it is. Indeed, sustainability practices in supply chain management can bolster resilience in ways that business-as-usual cannot", writes Susan T Jackson for Momentum Novum.

Read the full article here: <u>http://bitly.ws/</u> <u>q8GG</u>

## Arunabha Ghosh

Dr. Arunabha Ghosh, Faculty at Anant Dr. School for Climate Action and CEO of the As Delhi-based Council for Energy So Environment and Water (CEEW), has on been appointed as a member of a highlevel group constituted by United Nations <u>bit</u> Secretary General, Antonio Guterres, to bolster action against global warming.

Dr. Ghosh is among three Asians, and the only South Asian, serving on the expert group. Read more: <u>https://</u> <u>bit.ly/3KdWYDq</u>



#### 3 COMMUNITY HIGHLIGHTS

## **Raja Muzaffar Bhat**

"If drastic measures are not taken to address the issue of unscientific waste management, the Kashmir valley will turn into a trash bowl as plastic and other waste is constantly dumped into Kashmir's water bodies like lakes, rivers, streams and wetlands", writes Dr. Raja Muzaffar Bhat in his recent article published in the Kashmir Observer. Read the full story here: <u>http://bitly.ws/</u> <u>orpR</u>

What a Waste! Dr Raja Muzaffar Bhat | January 29, 2022



ment laxity to control Dog menace

Dr. Raja Muzaffar Bhat also wrote an article published in Down to Earth India on how Kashmir's highly fertile



alluvial soil deposits called karewas are being destroyed in the name of development in the Valley. Read here http://bitly.ws/qHYE to know more.

## Abhishek Jain

A roadmap for India's natural farming ambitions Abhishek Jain



## **Gireesh Shrimali**

"While the announcements SO far provide a supply side push, India needs wellа policy defined framework to not only



create a market for green hydrogen but to also ensure its procurement in a costeffective manner"

Read the full opinion piece co-authored by Dr. Gireesh Shrimali published in the ETEnergyWorld, here <a href="http://bitly.ws/oJII">http://bitly.ws/oJII</a>.

Dr. Gireesh Shrimali has joined the Oxford Sustainable Finance Program and the Center for Greening Finance and Investment as Head of Transition Finance Research. He has also been appointed as the technical lead in the secretariat for HM Treasury's UK Transition Plan Task Force, established in 2022.

Dr. Gireesh Shrimali also co-authored a paper published in the Renewable and Sustainable Energy Reviews. The paper reviews Southeast Asia's energy sector trends, with a focus on electricity supply vis-à-vis and demand global decarbonization efforts.

Read here: https://rb.gy/nbaval

## Arpita Bose, Ashutosh Singh, **Jos C Raphael**

3 Anant Fellows for Climate Action have been selected as members of the Island Innovation Ambassadors Program 2022.



Island Innovation is a social enterprise that works with private sector companies, governments, universities, NGOs and utilities to connect them with the island stakeholders vital to the success of their sustainability projects.

## Md. Humayain Kabir

Read the full article coauthored bv Md. Humayain Kabir titled, 'Sea level rise induced impacts on coastal



areas of Bangladesh and local-led community-based adaptation' in the Science Direct: http://bitly.ws/qoIf

## Pankaj Jiwrajka

In his new professional project, Fellow Pankaj Jiwrajka will be working with the Central Pollution Control Board in India as a PMU member



on behalf of the Air Pollution Action Group to support the implementation of the Government of India's flagship air pollution policy, the National Clean Air Programme.

"India's food system needs a holistic transformation in demand, production, and supply chains. Let's hope 2022-23 is the inflection point when we convert intent into action in our journey towards achieving a chemical-free food system", writes Abhishek Jain.

Read this article on India's natural farming ambitions published in the Indian Express: <u>http://bitly.ws/oKHI</u>

## Vikram Chatterji

Galileo, co-founded by AFCA mentor for bench Vikram Chatterji, recently raised \$5.1 scientists to million in seed funding. systematically

"With unstructured data across the inspect, fix and enterprise being generated at an track their ML unprecedented scale and now rapidly data in one place", leveraged for ML, we are building Galileo with the goal of being the intelligent data



said Vikram Chatterji, co-founder and CEO of Galileo.

quickly

and

## 4 EXPLAINED

Gravity May 2022

## Power to the people

#### MD. HUMAYAIN KABIR

Climate change has been recognized as a threat-multiplier by the international community for more than four decades. increasingly Climate change is characterized as a clear and present risk to the world, as well as one of the most serious challenges to human health and well-being. To tackle this global crisis, almost all countries joined an intergovernmental framework in 1992 to restrict the average world temperature increase. Since then, world leaders and countries have engaged in climate diplomacy. negotiated crucial agreements, and signed important international treaties in order to develop solutions to mitigate climate change and adapt to its consequences. The chronology of climate change negotiation is as follows:

1979: The World Meteorological Organization (WMO) organized the First World Climate Conference in Geneva in 1979. 1988: The Intergovernmental Panel on Climate Change (IPCC) was established in 1988. IPCC is a body of the United Nations that reviews climate change science and offers adaptation and mitigation strategies.

1992: At the United Nations Conference Environment and Development on (UNCED), often known as the Rio Earth Summit, the United Nations Framework Convention on Climate Change (UNFCCC) was developed and made available for signature. The UNFCCC (United Nations Framework Convention on Climate Change) is an international environmental convention aimed at combating climate change by limiting average global temperature increases and mitigating the effects of global warming. The Convention's Secretariat is situated in Bonn, Germany. So far, 197 countries, generally known as Parties to the Convention, have ratified the Convention. One of the Convention's fundamental

principles is "common but differentiated responsibilities" (CBDR). It is also known as "differentiation" and is particularly important in negotiations. Although all countries are liable for climate change, the principle suggests that certain countries are more responsible than others. The notion of "common but differentiated duties" recognizes that reducing GHG emissions is a shared obligation, but it also allows industrialized countries - which account for a bigger proportion of previous emissions - to take the lead in addressing the problem.

1997: The Kyoto Protocol was adopted following negotiations at the third Conference of Parties (COP3). The Kyoto Protocol is an international accord related to the United Nations Framework Convention on Climate Change (UNFCCC). It establishes binding GHG emission reduction objectives for 37 developed countries and the EU (Figure 1).





#### Figure 1: Annex-1 and non-annex parties (signatory countries)

2001: Agreements on how to enforce the COP7 summit in Marrakech, Morocco. a series of monitoring and compliance the Kyoto Protocol were reached during The Marrakech Agreements established processes for enforcing the Kyoto

## Gravity May 2022

## 5 EXPLAINED

Protocol's first commitment period for reduction in emissions. Agreements on capacity building, technology transfer, and protocol mechanisms are included.

2005: The Kyoto Protocol entered into force. The first period of the Kyoto Protocol's implementation began in 2008 and ended in 2012. The Kyoto Protocol provided three market-based mechanisms as an alternative means of attaining these targets, resulting in the creation of what is now known as the carbon market.

International Emissions Trading (ET): This system permits countries with excess emission units to sell them to countries that are over their targets.

Joint Implementation Mechanism (JI): This mechanism enables a nation with a Kyoto Protocol emission reduction commitment to earn emission reduction units (ERUs) from a relevant project in a country on the list of countries with an emission reduction target.

Clean Development Mechanism (CDM): This technique enables a country with a Kyoto Protocol emission reduction/ limitation commitment to conduct emission-reduction initiatives in developing countries and count those emission reductions as part of their own efforts.

2007: At COP13 in Bali, a number of forward-looking decisions relating to the activities of various negotiating tracks were approved. The Bali Action Plan, the introduction of the Adaptation Fund, and decisions on technology transfer and deforestation emissions reduction were and agreement on the Cancun Adaptation Framework, were the results of the meeting. The COP in Cancun developed the national adaptation plan (NAP) process as a tool for identifying mediumand long-term adaptation needs, as well as developing and implementing policies and initiatives to meet those needs. The NAP is an ongoing process that is guided by a country-driven, gender-sensitive, participative, and transparent approach. 2011 : The Durban COP17 was a venue for Enhanced Action in 2011. Ad Hoc Working Group on the Durban Platform for Enhanced Action (ADP) is a subsidiary organization tasked with developing a protocol or legal document applicable to all Parties under the Convention, which must be completed by 2015 and adopted at COP21.

2012: Countries accepted the Doha Amendment to operationalize the Kyoto Protocol's second commitment period at COP18 in 2012. The Doha Amendment came into force on October 28, 2020, eight years after it was adopted, after the required number of countries ratified it (i.e., 144 ratifications).

2015: At COP21 in Paris, France, in 2015, a successor agreement to the Kyoto Protocol was reached- the Paris Agreement. This agreement was adopted by 196 Parties at COP21 in Paris in December 2015 and went into effect in November 2016. It aims to keep global warming well below 2 degrees Celsius, preferably 1.5 degrees Celsius, compared to pre-industrial levels.

#### Key outcomes of the Paris Agreement

Keeping global temperature rise this

principles for implementing the Paris Agreement, was closed. The Rulebook lays out the basic procedures and methods for putting the Paris Agreement into action (for example, how to execute its provisions and track progress), with the goal of assisting the world's transition to a low-emissions, climate-resilient future.

2019: COP25 in Santiago/Madrid in 2019 – Loss and Damage, Response Measures, Gender, and Capacity-Building were all highlighted as important factors. Parties failed to reach an agreement on greater climate ambition at COP25, with UN Secretary-General António Guterres stating that "the international community missed an important opportunity." Parties did, however, make some critical decisions to achieve considerable benefits.

A total of 18 new decisions were made. The following areas were by the key outcomes:

- Warsaw International Loss and
   Damage Mechanism
- Work Programme on Response
   Measures
- Enhanced Lima Work Programme on Gender
- Action for Climate Empowerment (ACE)
- Paris Committee on Capacity-Building (PCCB)

2021: In November 2021, the United Nations Climate Change Conference (COP26) was held in Glasgow, United Kingdom, under the presidency of the United Kingdom Government, in collaboration with Italy.

all part of this "Bali Roadmap."

2009: Participating countries agreed to approve the "Copenhagen Accord" during COP15 in Copenhagen in 2009. This Accord, however, was severely criticized because it was not legally binding.

2010: COP16 was held in Cancun, Mexico • Enhancing in 2010. The "Cancun Agreements," a framewor far-reaching worldwide response to climate change that included the 2018: At CO foundation of the Green Climate Fund Paris Rules

century well below 2 degrees Celsius above pre-industrial levels, with efforts to reduce it even further to 1.5 degrees Celsius.

- Improving countries' ability to deal with the effects of climate change.
- The financial flows in accordance with the Paris climate targets; and
- Enhancing the transparency framework for action and assistance.

2018: At COP24 in Katowice, Poland, the Paris Rulebook, which contains the

#### Key outcomes of COP26

- Phasedown of unabated coal
- Phase-out of inefficient fossil-fuel subsidies
- Diplomatic 'handshake' between China and the US a cornerstone for possible future bilateral or trilateral cooperation
- China to stop financing new coal power plants in other countries
- Asian Development Bank to buy out and retire coal plants

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## Circular Economy as 2030 Agenda

#### MD. HUMAYAIN KABIR

Humanity is confronted with its most difficult problem yet: finding a means to ensure social and economic development all while respecting planetary for boundaries, or sustainable development. In this regard, one of the best plans for achieving sustainable development is the 2030 Agenda. The SDGs constitute the agenda's results framework, and they are both integrative and interconnected. Addressing the transition needed for longterm growth would necessitate work on a number of fronts. One example is fixing

our production and consumption systems, which are currently unsustainable due to their linear nature. The Circular Economy is a holistic strategy to address the economic, environmental, and social consequences of the linear system of production and consumption by transitioning to one that eliminates waste and pollution, maintains products and materials in use, and regenerates natural systems. SDG 12, SDG 12 (responsible consumption and production) is directly, is directly addressed by Circular Economy

#### (CE) concepts.

#### Schools of Thought

Circular Economy is a broad term that encompasses and unifies a variety of strands and schools of thought. As a result, it is highly beneficial in guiding and assisting us in rethinking our economic system. However, a closer examination of the many schools of thought might aid us in gaining a better grasp of the concept and its evolution (Figure 1).





the

Applying CE ideas could have several product or service's lifecycle. Circular advantages for citizens, businesses, the systems can be visualized using a variety economy, and the environment. It has of technologies. The Ellen Macarthur the potential to have a profound impact Foundation created on our efforts to mitigate and adapt to Diagram, which focuses on cyclical production (Figure 2). It divides products climate change. The CE views products and services as systems. It goes beyond and services into technological and traditional take-make-dispose models biological components and examines various methods for increasing the to create more value throughout the

product or service's circularity. It also identifies the Circular Value Creation Principles. CE is important not only for Butterfly production but also for long-term use. The UNEP's user-centric Circularity Diagram emphasizes users' essential role in a circular economy and proposes solutions for retaining circular value.



Figure 2: Circular economy systems diagram (Source: Ellen MacArthur Foundation, 2019)

#### **Circular Business Model**

Businesses and consumers have imperatives and possibilities to drive sustainable growth through circularity. It is necessary to change the business model to one that promotes circularity. This necessitates a comprehensive approach that takes into account all aspects of the business, all phases of the product lifecycle, and all stakeholders involved in the processes and supply chains.

Novel business models call into question asset ownership models, reorganize product-customer relationships, and alter the way value is created. Circular products require circular inputs and materials, as well as systemic circular design. To return products and materials to producers, circular supply chains must consider closed loops and reverse cycles. All stakeholders and supply chain participants must work together closely to achieve this. However, different tools and assessments are required to measure actual circular value and detect potential difficulties such as circular rebound and greenwashing in order to measure the extent of circularity and its influence on enterprises. To overcome this, a complete policy mix to support the circular economy aims to break down silos, connect CE to other policy areas, and level the playing field for circular businesses so that they can contribute to long-term circularity.

#### **Circular Cities and co-benefits**

Particularly, because cities represent a to concentration of population, human is productive activity, and a corresponding is development of negative externalities harming cities and their hinterlands, they mare an important hub for transition to a to circular economy. They might also be useful as hubs for circular innovation. A city is seen as a dynamic, interdependent to ecosystem in urban metabolism. It is enables us to look at resource flows, their distributional effects, and their way, allowing us to find and realize at the second second

cyclical opportunities in a city. In this connection, building design and use, material sourcing and reusability, and structural waste in the built environment of a city are all aspects of circularity.

For all of its people, a circular city requires a mobility system that is accessible, affordable, and functional. It must eliminate structural waste in transportation systems, address pollution and congestion challenges, and transition away from car-centric infrastructure and services. In addition, in order to rejuvenate cities and its environs, circular food systems in cities must be constructed in accordance with the natural biocycle of food. Integrated strategies to make cities more circular can help to speed up the achievement of the SDGs, particularly SDGs 11 and 12 but also, indirectly, a number of others.

#### Way forward

While there are various circular projects around the world, the world is still mostly

#### 9 EXPLAINED

tied within linear production and consumption systems, which are aided by variables that are both barriers to circular systems and enablers of circular economies, consumers, people, mainstream circularity. Current policy frameworks are based on linear models and are underpinned by power structures. Circularity policies must be holistic, coherent, and revolutionary in order to address regulatory and commercial impediments. Consumption habits now in place are unsustainable.

The new customers, on the other hand, is demanding and driving change. In and communities are essential change agents. For circular transformations, advancements technological hold immense promise, and a collaborative technology strategy could effectively harness the power of technology. While there is a small but rapidly rising group of sustainable investors, mainstreaming

generation of conscious circular financing will necessitate a broader understanding of value that includes genuine cost and supports a vision of balanced and fair growth. Circular efforts are not a means to an end in and of itself; they must help to implement the 2030 Agenda by promoting equitable and sustainable development.

## Circular Economy Framework 2.0



Figure 3: A simple model of circular business

## Gravity May 2022

## 10 opinions

## The silent plastic pandemic in rural Bangladesh

NURUL ISLAM BIPLOP

Last week I attended a marriage ceremony in my village. Traditionally, this kind of ceremony is followed by a lavish feast attended by hundreds of people. The ceremony that I attended was not an exception. People were having lunch in batches. When I entered the dining area I was surprised to see that food was being served in single-use plastic plates and glasses. This was a big shock for me. I knew that in cities singleuse plastic cutleries were used frequently but in villages I never encountered this phenomena. Culturally, the feast is a big issue in a marriage. How the food is served is also a critical issue because food and services are two major indicators that determine the success of the ceremony. I did some inquiries with the other guests and found out that single-use plastic cutleries are now accepted culturally and gaining popularity in countryside.

After the meal I was waiting to see how they dispose off the used plastic cutleries. With utter astonishment, I saw a guy bring the waste and toss it in the nearest pond. Just like that. No further action or talk about it. Next day when I was roaming around the village, I kept my eyes open, looking into the ponds. In rural Bangladesh almost every household has a pond adjacent to their home. I was looking for a particular kind of plastic (plastic plate) I found a very alarming situation. Almost all the ponds have some white plastic plate either floating on the water or on the bank of the pond. Just like the picture below.

This is very alarming in many accounts. The countryside of Bangladesh is thought to be plastic waste free compared to the cities and has no waste management system. In fact the cities of Bangladesh hardly have a functioning waste management system. Culturally, Bangladeshi people love to throw a feast for their relatives and friends every now and then. The size of the feast depends on the financial capacity of the host but the spirit remains the same for every class of the society. Imagine they are all using plastic cutleries and tossing them into the ponds and wetlands. Within a few years the ponds and wetlands will more have plastics than water. Bangladesh with around 1200 people per square kilometer can't afford to lose its valuable wetlands and ponds to plastic. The consequences would be catastrophic. The ponds and wetlands play a critical role not only in the survival of the people living in rural Bangladesh are also absolutely necessary for biodiversity. With frequent floods many of these plastics would eventually end up in the rivers and all the way to the ocean. Many of these will break down into smaller particles and mix up with the soil, reducing the soil fertility.

Humanity has invented many stupid concepts over the period of civilization. The concept single-use plastic is one of the stupidest things humans have ever invented. It's extremely harmful for the environment and creates pressures on earth's finite resources, this idea also contradicts on the finite earth resources, this idea also contradict one of the core values humanity- the care for things.

The question is how to stop this madness. How to prevent people who are destroying their own living environment in exchange for convenience? There are three options to deal with this particular plastic pandemic in rural Bangladesh. First, make people aware about the consequences of the plastic use. Second, ban plastic cutleries and third, make the plastic cutleries so expensive with stratified tax to force people to switch to more sustainable alternatives. Educating 160 million people on use of plastic cutleries would take centuries and still many wouldn't heed the lesson. Banning things does not work where law enforcement is weak and corruption is high. The only policy instrument that can yield significant results in a short time is heavy consumer tax at every level of business transaction of the plastic cutleries.Governmentandenvironmental groups must act now to stop this plastic pollution before it becomes too late.



## **Plastic in Paradise**

#### STACEY ALVAREZ DE LA CAMPA

Picture this scene: a beautiful, white sandy beach, covered in glistening, sparkling shells and fringed with palm trees. The waves whisper enchantingly in the distance, and the call of the ocean is the siren song. This beauty is breathtaking in its magnificence, and the sun is sparkling in the cerulean sky... nothing could be more perfect. Then, one by one, people start to appear, and a crowd gathers on the beach. Their delight is palpable as they soak in the sun, and sway to the pulsing music playing from the gargantuan speakers. The day wears on into night, and the glistening, sparkling sand becomes churned and soiled. The whisper of the waves is drowned out by the pulsing beat of the speakers and the siren song of the ocean is extinguished by the revelry and excitement.

As the dawn draws near and the last of the revelers fade away, the beautiful white beach is littered with debris, paper cups, plastic straws, and discarded wrist bands. The pristine sand is no more, contaminated



Plastic litter on a beach in Barbados (Photo credit: https://barbados.org/blog/barbados-bans-single-use-plastic/#.YDOXKjKSnIU)

by a deluge of litter and waste.

A scene like this was often the reality on the beautiful beaches of Barbados, and some other popular Caribbean destinations where in the pre-COVID era, there were large gatherings for carnival or a concert. However, even without such activities studies have shown that, per capita, ten of the top thirty global polluters are located in the Caribbean: Antigua & Barbuda, Anguilla, Barbados, Guyana, St. Kitts & Nevis, St. Lucia, Grenada, the Bahamas, Aruba, and Trinidad & Tobago. In fact, according to Forbes, these ten island territories produce more plastic debris than the weight of 20,000 space shuttles (Caribbean Islands Are The Biggest Plastic Polluters Per Capita In The World (forbes.com))

A World Bank study published in 2019 (Caribbean beaches are littered with single-use plastics (worldbank.org)) found that there are as many as 200,000 pieces of plastic per square kilometre in the north eastern Caribbean. This is a result of the consistently high use of single use plastics and plastic bottles in the Caribbean, and datafrom the 2019 World Bank publication, 'Marine Pollution in the Caribbean: Not a Minute to Waste', indicates that plastic





Bottom Bay, Barbados (Photo credit: TripAdvisor)

bottles make up 21% of the single use plastic items found during beach and coastal clean-ups. Other items found include plastic bottle caps, strawstirrers, plastic bags, styrofoam food containers, and plastic lids.

The devastating effect of this is that microplastics in the seas now outnumber all the stars in our galaxy. This was revealed by the United Nations Secretary General António Guterres (<u>The Caribbean</u> <u>addresses the scourge of plastic pollution</u> (<u>unep.org</u>)) and if the rate of pollution ban single-use plastics as of January 1st, 2020. These are: Trinidad and Tobago, the Bahamas, the Dominican Republic, Barbados, Belize, Grenada, and Jamaica. However, it is vital to bear in mind that some of these measures still need to be fully implemented. Take for example Barbados, where the government began by banning the importation of petroleum-based singleuse plastics with effect from April 1st , 2019. This was followed by a ban on the distribution, retail and use of single-use plastics, and, in theory, a ban on based plastic bags for a limited period of time. This was the case because the stakeholders involved raised concerns about the fact that the biodegradable resin used to make biodegradable bags was not available. As at the time of writing this article, petroleum-based bags are still commonly used in the island.

So, what is the way forward? Efforts to raise awareness about the staggering negative effects of single-use plastic must continue, and coordinated action

persists, in less than thirty years there will be more plastic in the ocean than fish. This horrifying reality sends a clear message: there must be a complete rejection of single-use plastic.

There are seven Caribbean territories that appeared to have taken some steps in the right direction, and had pledged to petroleum based plastic bags came into effect on January 1st, 2020.

While this was indeed a crucial first step, the reality is that, having talked the talk, it is still necessary for the Barbados government to walk the walk. In May of 2020, plastic bag manufacturers were given permission to produce petroleummust be taken at all levels: government, the private sector, and individuals in communities. We must continue to build on the momentum created, and invest in the legacy of a healthy blue economy to boost sustainable growth for future generations.

## Millets for taste, health & planet

NEERAJA KUDRIMOTI

## Ragibrownie SERVINGS 8 | PREP TIME 15 MINS | TOTAL TIME 45 MINS

## Ingredients

<sup>1</sup>/<sub>4</sub> Ragi/Finger Millet Flour
<sup>1</sup>/<sub>3</sub> cup Whole wheat flour
<sup>3</sup>/<sub>4</sub> cup Cocoa powder
1 cup Sugar
<sup>1</sup>/<sub>4</sub> Cup Milk
<sup>1</sup>/<sub>2</sub> cup Butter
2 Eggs
1 tsp Vanilla Extract
<sup>1</sup>/<sub>2</sub> cup Chocolate Chips

## Method

1. Preheat the pressure cooker on medium flame for 15 mins. Line a square pan with butter paper and set aside.

2. Mix wheat flour and ragi flour in a bowl and set aside.

3. Take melted butter in a bowl. Add in milk, sugar, vanilla and cocoa powder and mix well.

4. Now add in eggs and mix until combined. Beat it for at least 5 mins.

5. Now add in flour mixture and salt and beat it for at least 5 minutes.

6. Add in chocolate chips and fold gently.7. Spoon this into the pan. Place some pebbles, sand or a small grill stand in the pressure cooker and place the baking

pan on top. This is important as the base of the baking pan should not be in direct contact with the pressure cooker. Now bake for 40 to 45 mins.

8. Keep checking using a knife. Insert the knife into the cake and if it comes out clean it's done.

9. Remove and sprinkle extra chocolate chips on top when the brownies are still hot so the chocolate sticks to the brownies.

10. Cool the brownie completely before slicing.

11. Top it up with chocolate sauce or syrup and nuts.

12. Serve.

## Ragiidli servings 4 | PREP TIME 12 HRS | TOTAL TIME 12 HRS 30 MINS

## Ingredients

1 cup idli rice (parboiled rice) <sup>1</sup>/<sub>2</sub> cup urad dal (split or whole ivory white lentils)

<sup>1</sup>⁄<sub>4</sub> cup thick poha (flattened rice)

- <sup>1</sup>/<sub>4</sub>teaspoon methi seeds (fenugreek seeds)
- 1 cup ragi flour (finger millet flour)

 $^{1\!\!/_3}$  to  $^{1\!\!/_2}$  cup water for grinding urad dal or add as required

<sup>3</sup>⁄<sub>4</sub> cup water for grinding rice or add as required

<sup>1</sup>/<sub>2</sub> cup water to be added later while mixing ragi flour

1 teaspoon rock salt (edible and food grade) or add as per taste

## Preparation

## Overnight Soaking

1. In a mixing bowl, rinse the rice 5-6

water for grinding the urad dal. Take the urad dal batter in a bowl or pan.

- 3. Drain the rice & poha and add them to the same grinder jar. Use <sup>3</sup>/<sub>4</sub> cup water for grinding rice. Grind the rice till there is smooth consistency in the batter.
- 4. Mix the rice and urad dal batter and mix it well.
- 5. Now add 1 cup ragi flour and ½ cup water. And mix well, breaking the lumps if any, until there is smooth consistency.
- Cover the bowl or pan with a lid and let it ferment overnight or for 8 to 9 hours or more depending on the

8. Add salt and mix very well.

## Cooking

- 1. Grease the idli moulds with oil. Pour the batter in the idli moulds.
- Before placing the idli stand, add 2 to
   2.5 cups of water in the steamer or pressure cooker. Bring this water to a boil. Then place the idli stand in the hot water.
- Steam ragi idli for 12 to 15 minutes.
   Depending on the equipment you use, it may take less or more time.
- 4. A knife inserted in the center of the ragi idlis should come out clean and not be sticky. Allow a standing time of 1 to 2 minutes.

times. Then add 1 to 1.5 cups of water and keep aside to soak for 6 hours.

2. Rinse  $\frac{1}{4}$  cup thick poha once or twice and add to the rice. Mix well. Cover and keep aside for 6 hours.

3. In another bowl take urad dal and fenugreek seeds. Rinse 3-4 times and soak both the urad dal with the fenugreek seeds in 1 cup water for 6 hours.

#### **Preparing the Batter**

- 1. Drain the urad dal and add in a mixer jar.
- 2. Grind the mixture till you get a smooth and fluffy batter. Use ½ cup

temperature conditions. Use a large bowl for this as the batter will increase in volume and double up. 7. If the batter does not increase in volume, then just add ¼ tsp baking soda in the batter. Mix very well and then proceed to steam the ragiidlis.

5. Dip a spoon or butter knife in water and slide it under the idlis. Remove and place the ragi idli in a warm container like a casserole.
6. Serve ragi idli with coconut chutney and veg sambar. I also use tomato sauce or chocolate syrup with idlis for kids and they love it.

## Can nutritious diets mitigate climate change?

#### NEERAJA KUDRIMOTI

It has been widely recognized that climate change has harmed agricultural production and has hence increased global food insecurity especially in lowincome countries. (FAO, 2018). It is also restricting the ability of humans to achieve food and nutrition security and it leads to severe food crises and global hunger. It has been observed in many studies that in most countries people do not meet the dietary requirements and dietarv have habits with high environmental impact. The Rome Declaration on Nutrition recognized that current food systems were being increasingly challenged to provide adequate, safe, diversified and nutrient rich food for all that contributed to healthy diets due to different constraints posed by resource scarcity and environmental degradation, as well as unsustainable production by and consumption patterns.

#### Why it is pressing?

Global Facts (Health, 2018), (Michael Ayeah Israel, 2020):

- Approx 800 million people worldwide do not have access to food
- 2 billion people suffer from iron and zinc deficiency

### Production (000 MT)



- 76% of people get their daily nutrition from plants
- Agricultural activities contribute about 14-17% to the global GHG emissions
- Over 34% of crop and livestock production loss in LDCs and LMICs is traced to drought and 19% is traced to floods
- More CO2 in the atmosphere, less nutrition density in staple crops
- One farming household contributes to at least 1 emission activity

Climate change impacts food value chains based on an array of factors that include agricultural yields, nutritional quality of crops, access to food, an increase in food borne pathogens, and energy intensive cold storage chains. Value-chain approaches are usually about upgrading means of increasing returns to communities such as increasing volume or coordination or but very minimal about income, improving nutrition (Corinna Hawkes, 2011). Dietary recommendations suggest that a nutritious diet should combine minimum - vitamins, minerals, fibre - and maximum - total fat, saturated fat, sugar, sodium - nutrient intakes, plus

food-based guidelines for fruit & vegetables, fish, red & processed meat (WHO, 2003). But, the global population doesn't meet this requirement. This is a combination of production systems (that varies from place to place) and the nutrition choices that population makes. Many studies look at a particular food commodity or a sector. But, looking at emissions of a single commodity or a sector or sub-sector will not give an accurate estimation of the environmental and/or nutritional impact. It requires an understanding of nutrition, agriculture, food technology, economics, marketing, value chains and so on. In spite of notable progress in understanding nutritious and sustainable diets to provide nutrition security, finding the appropriate cohesion of climate change and nutrition is still a challenge.

Different stages in the food system decide whether or not diets are nutritious and environmentally sustainable. But, nutritious diets do not necessarily result in reduction in emissions. A healthy diet can have high emissions and unhealthy diet can have low emissions (Graham W. Horgan, 2016). Let's take organic farming for instance. It is known to have better

Major Food Crops Grown

Production (000 MT)



## Gravity May 2022

## 15 HEALTH AND WELLNESS

nutritional outcomes but often result in higher GHG emissions per unit of production as a result of lower yields (Clark, 2020). But, this is certain that the more CO2 is emitted, the less is the protein, zinc and iron content in the crops. And why this is important is because zinc strengthens our immune system, iron improves oxygen carrying capacity in the bloodstream (Samuel S Myers, 2015) and protein deficiency contributes to 90.9 million disabilityadjusted life years (DALYs) and 2 million deaths annually (Danielle E. Medek, 2017), and have large burden of global nutrition.

According to some studies, India would bear the greatest burden, with an estimated 50 million people becoming zinc deficient, 38 million becoming protein deficient, and 502 million women and children becoming vulnerable to diseases associated with iron deficiency. Atmospheric CO2 is estimated to cross 550 ppm in the next few decades. A reduction of 3-17% in protein, iron and zinc is seen in food crops grown under 550 ppm compared to the current conditions of 400 ppm (Matthew R. Smith, 2018). For addressing this, there are many pathways that are suggested by experts and various organizations. And many dietary recommendations fail to incorporate food choices and dietary changes that impact on climate stabilization levels and climate mitigation policies. Now dietary choices are important as what we eat decides what we produce and how we produce it. But, achieving dietary intakes that are nutritious environmentally and sustainable has proved difficult. So, if we is the second highest paddy producing state in the country. Also, paddy is the major crop of the region (Figure 1). But, 21 out of 31 districts of Chhattisgarh have been drought-hit. The state has only 14% irrigated land which is a tipping point for the small and marginal farmers, in turn affecting the production and consumption systems.

30.6% of the state's population is

nutritional value compared to other cereal crops such as rice and wheat. Varieties of millets with short growing duration can be incorporated in multiple cropping systems under irrigated and dry farming conditions. Moreover, millets can be stored for a considerable amount of time under appropriate storage conditions, therefore making them "famine reserves". Indian Institute of Millets Research also claims that a shift

Department	Scheme	Food Provided	Target Beneficiary		
Food & Civil Supplies	PDS	35 kg of rice at INR 1 and INR 2 per kg; 1 kg of iodised salt and 1 kg refined oil at no cost; 2 kg of grams at INR 5 per kg	BPL Families		
Woman and Child Development	ICDS	RTE/THR, Meal (150 g Rice, 40 g Dal, 100 g Sabzi, 10 g oil)	PW, LW, Children (6m – 5y)		
	MSA	Eggs and Milk	Malnourished children & Anemic Women (15-45y)		
Education	MDM	100/150 gm Rice, 20/30 g Dal, 50/75 g Vegetables, 5/7.5 g	Primary/Upper Primary		
Tribal Affairs	Ashram Shala	OII .			
Health Department	JSS	Meals during delivery	PW/LW		

indigenous and malnutrition is the highest among the indigenous population. Anemia as per the NFHS-5 survey has gone up to 60% in women and children. Agriculture can impact nutrition outcomes to varying degrees through several pathways, some of which are stronger than other, the strongest being -

(A) Increasing nutrient dense food production for household consumption and

(B) Empowering women through targeted agricultural interventions

Hence, after taking a closer look at the dietary habits (Figure 2) of indigenous

from millets is one of the major causes for the rise of malnutrition in the region. Hence, it is important to compare paddy and millets not only based on their nutritional value but also on how shifting from paddy to millets can have an impact on emissions.

#### **Emission estimation**

The following calculations have been done using the IPCC guidelines for Rice Cultivation.

Emission factor for Indian rice cultivation = 10 gm/m2

Area of Chhattisgarh under rice

attempt to figure out the minimum changes that can be done at individual level, it may turn out to be an effective approach.

## Estimating using the case of Chhattisgarh:

Chhattisgarh is one of the most multidimensionally poor states of India, where nutrition is the major contributor to the Multidimensional Poverty Index. It is known as the rice bowl of India and population that drive the production systems too, they are largely dependent on the Public Distribution System of the government.

Millets were a part of production and (1 consumption patterns of the indigenous = population in Chhattisgarh, but the (1 Green Revolution and a push for policies = for paddy altered these systems. Millet is a drought-resistant crop, requires less If water for its growth and possesses high er

cultivation annually = 2.7 million Ha = 27000000000 sq. mt.

Hence the estimated annual emission of methane = (A) \* (B) \* (1/100000000000) = 10 \* 27000000000 \* (1/100000000000) = 2.7 Tg per year If a shift was to be made to millets, the

emissions will be reduced by 25%

#### 16 **HEALTH & WELLNESS**

	Protein (g)	far igi	Miserality	<u>Rin işi</u>	Carbohydraf e işi	Galorica MaaD	Culatons (mg)	Phosphoroes (leg)	ice ingl	Thisels (eg)	Electionie (mg)	Masta (mg)	Mg tag/195gl	Za
Sorghum	10.4	3.1	1.2	1.6	70.7	329	25	222	5.4	0.37	0.11	3.1	171	1.6
laira / Reart willet	11.6	5	2.3	1.2	67.5	361	42	296	8	0.33	0.25	2.3	137	3.1
"Finger millet	7.3	1.3	2.7	3.6	72	328	344	283	3.9	0.42	0.19	1.1	137	2.3
Uttle willet	7.7	4.7	1.5	7.6	67	341	17	220	9.3	0.3	0.09	3.2	133	3.7
Foxtall willer	11.2	4.3	3.3	8	60.9	331	31	290	2.8	0.59	0.11	3.2	81	2.4
Kodo willet	8.3	1.4	2.6	9	65.9	309	27	188	0.5	0.33	0.09	2	153	1.4
Press willet	12.5	1.1	1.9	2.2	70,4	341	14	206	0.8	0.2	0.18	2.3	147	0.7
kernyard willet	11	3.9	Â	13.7	55	300	22	280	18.6	0.33	0.1	4.2	82	3
Rice	6.8	0.5	0.6	0.2	78.2	345	10	160	0.7	0.06	0.06	1.9	90	1.4

\* Ease of Processing: Ease of Storage; Longer Shelf life; Post harvest - Roding - removing impurities, Threshing, Pestoning, Pestiting, Rise Holler can be used to remove husk to make them FAQ Ready

(Narasimha D.Rao, 2018). Area under millets in Chhattisgarh = 0.1 million Ha

Hence the estimated annual emission of Methane = 0.75 (10 \* 100000000 \* (1/10000000000))= 0.0075 Tg per year

So, let's say we replace 10% of the area under rice cultivation with millets, then the emissions because of rice cultivation will go down to 2.43 Tg per year. This, however, only takes into account CH4 emissions but grossly underestimates

the amount of nitrous oxide emission from conventional rice cultivation practices.

#### Conclusion

There is strong evidence that diverse food consumption can have a strong impact on nutrition as well as per capita emissions. Focusing on nutritious diets will not help assess and reduce impact on the environment. It must be supported by linking diet to emissions as well. This will in turn alter the production systems, making them more diverse and nutrition sensitive and help in reduction of emissions. Diversification of production systems through promotion of Neglected and Underutilized Species (NUS) can provide both climate resilience and more dietary diversity. Apart from national and regional policies, food production and consumption are strongly influenced by cultures and beliefs which should also be linked to emissions for assessment and hence, paving a way to act on it.

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## Gravity May 2022



#### Down

- 1 The process of increasing the carbon content of a carbon pool other than the atmosphere.
- 3 The region in the world's ocean, typically at a depth of 1 km, where temperature decreases rapidly with depth and which marks the boundary between the surface and the ocean.

#### Across

- 2 A grouping of similar plant and animal communities into broad landscape units that occur under similar environmental conditions.
- 4 Perennially frozen ground that occurs wherever the temperature remains below 0°C for several years.
- **5** The process by which a body of water (often shallow) becomes (either naturally or by pollution) rich in dissolved nutrients with a seasonal deficiency in dissolved oxygen.

#### Answers

J. Sequestration, 3. Thermocline, 2. Biome, 4. Permatrost, 5. Eutrophication

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