



The Aim of the SAICM

was to address significant health and environmental harms caused by chemical exposure



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BONN CHEMICALS FRAMEWORK: A NEW DAWN AND NEW HOPE

“Everyone on this planet should be able to live and work without fear of falling sick or dying from chemical exposure. ... This ... framework provides a vision for a planet free of harm from chemicals and waste, for a safe, healthy, and sustainable future”

– Inger Andersen, Under-Secretary-General of the United Nations, and Executive Director of the United Nations Environment Programme

Introduction

Strategic Approach to International Chemicals Management (SAICM) is a voluntary global environmental policy framework that aims to foster sound management of chemicals. The SAICM was a multi-stakeholder and multi-sectoral Preparatory Committee and adopted in Dubai on 6th February 2006. The aim of the SAICM was to address significant health and environmental harms caused by chemical exposure and how chemicals are produced and used to minimize those harms. The first session of the conference and the process to develop the Strategic Approach were co-convened by the United Nations Environment Programme, the Inter-Organization Programme for Sound Management of Chemicals (IOMC) and the Intergovernmental Forum of Chemical Safety (IFCS). It recognises the importance of chemicals in the current societies and economies while acknowledging their adverse impact when not managed soundly.

SAICM is a non-legally binding agreement and is one of the very few instruments that covers the entire life cycle of chemicals, including their products and waste issues, aside from the triple COP (BRS) conventions. It is an essential element in the global chemical framework because it involves all relevant sectors (environment, health, agriculture, and labour), assists its diverse cosignatories in forming National Action Plans for the sound management of chemicals, pushes governments to change policies, and provides funding opportunities to low to middle-income countries.

Journey of SAICM from 2006 to 2020

The SAICM was adopted in 2006, since then the International Conference on Chemicals Management (ICCM), SAICM’s apex governing body has carried out reviews of its progress and proposed suitable global plan actions for chemical management. Subsequently ICCM2, SAICM has identified emerging policy concerns (EPIs) that provide opportunities to bring together key stakeholders, collaborate across sectors,

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SATISH SINHA

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Chemicals use has been on the rise globally and it is estimated that 100,000 chemicals are in use with an addition of about 1000 chemicals annually. It is widely perceived that chemicals use across sectors such as agriculture, product manufacturing, textile, automobiles, and pharma have greatly improved the lives of people. The downside of chemicals impacts on human health and environment is less understood and there is growing evidence on many of these chemicals being highly toxic with serious impacts on human health and ecology. SAICAM a global framework was conceived and adopted in 2006 with an objective of

reducing some of these adverse impacts. While it had some achievements it fell short on many counts and in its place, we now have a more formidable and progressive framework named as the Bonn Framework encompassing elements such as creation of national frameworks, implementation plan, monitoring and reporting mechanism also incorporating multi stakeholder collaboration bringing in transparency and traceability to improve chemicals management and usher safer chemicals regime. The new framework being voluntary in nature brings in an element of limitation to its effectiveness on triggering global action with speed. Voluntary frameworks have been resisted by stakeholders and governments on multiple accounts of financial constraints and unavailability of technology. We are hopeful that the elements of cooperation and collaboration among stakeholders will open the conversation and deal with some of these barriers. The world has great expectation from this framework since the burden of inaction is far greater in terms of loss of life and disease burden due to chemicals exposure. We look forward to having an open conversation on issues related to chemicals management in the country

and a sound and robust chemicals management regime protecting human health and environment while promoting economic growth.

Plastic waste and its impacts on marine ecology continues to be high on agenda for many nations as we come closer to the next meeting of Inter-Governmental Negotiations in April. There is new information and data emerging from across countries suggesting that presence of chemicals in polymers poses a serious threat migration of this toxicity in recycled pellets and further complicating the supply chain. Participants should be extremely cautious in promoting recycling of plastic waste as a solution to the issue of plastic waste.

I am also looking forward to the election manifesto of political parties on environmental promises they hold for the country in view of the highly deteriorating air and water quality across many parts of the country the increasing furry of cyclones, floods, and other weather-related disasters as a result of climate change.

– Best Wishes

explore the most up-to-date information and science, advocate effective policies, and launch and support exchange platforms. The emerging issues ICCMs have proposed for concerted actions are; Lead in paint, Chemicals in products, Hazardous substance within the life cycle of electrical and electronic products, Nanotechnology, and manufactured nanomaterials. Endocrine-disrupting chemicals (EDCs) and environmentally persistent pharmaceutical pollutants. Moreover, SAICM also facilitated resource exchange and encouraged collaboration for collective progress towards the implementation of the SAICM goals. The management programme provided relevant guidance, promoted the implementation of existing instruments, addressed policy issues, and sought to meet technical and funding needs. In this regard, successive ICCMs have also made important decisions to strengthen chemical management and to achieve the 2020 goal.

During these years, there are some important global progresses has been

made to eliminate lead from household paints, furry of regulations to restrict the Bisphenol -A, an endocrine disrupting chemical (EDCs) and development on chemicals reduction from textiles. The SAICM action has resulted the 83 countries in the world have the legally binding regulations on Lead in paints. Moreover, many countries have restricted the use of Bisphenol-A in baby feeding bottles However,

Bonn Declaration and the New chemical framework

However, in spite the SAICM declaration in 2006 created foundation for the critical need of the global the chemical management, the Global Chemicals Outlook II released by UN Environment found that the global goal to minimize adverse impacts of chemicals and waste will not be achieved by 2020. Solutions exist, but more ambitious worldwide action by all stakeholders is urgently required. This report paved the countries unanimously agreed to adopt a new global chemical framework on

Chemicals – For a Planet Free of Harm from Chemicals and Waste, in ICCM -5 at Bonn in 29 September, 2023 after series of multi stakeholders' consultations and discussions. Unlike the SAICM 2006 declaration, the Bonn framework has tried to address entire lifecycle of chemicals, including products and waste, while has kept non legally binding voluntary approach intact.

Some of the key takeaways of Bonn declarations are; commitment to protect human rights, Developing and adopting the necessary national chemicals and waste frameworks, prevent exposure to harmful chemicals, phase out the most harmful ones, development of safe chemical and non-chemical alternatives and recycling free from harmful chemicals. Further the Bonn declaration has urged the countries to develop respective implementation plan on the chemical management and promote regional cooperation and coordination and enhanced sectoral and stakeholder engagement. The chemical farmwork has laid the need of the global actions

on the emerging policy issues and has set twenty-eight targets like bringing new regulatory regimes and setting up strategies based on the chemical footprint approach in the value chain, prohibiting exports of chemicals banned at the national level. The farmwork has also incorporated the resolution for the global alliance on highly hazardous pesticides and phaseout the HHPs in a time bound manner with better and suitable affordable alternatives

A New Dawn and New Hope

The global chemical industry directly added USD 1.1 trillion to the world GDP and is a key driver of the world economy. At the same time, there is a tectonic

shift happening with the production process shifting towards the emerging economic countries. At the same time, there are thousands of chemicals well known for their hazards are in the circulation that can be detrimental to the global environment and human health. Therefore, considering the pace of the use of these chemicals at the global scale, it is an absolute to manage these chemicals in the entire value chain the life cycle approach.

In this scenario, the new chemical farmwork, reiterating the pollution is a planetary crisis has raised a new hope by suggesting tangible actionable steps for the countries need to take to minimise the risk on the ecosystem from the hazardous chemicals and waste. However, there are critical issues like

the fixing of responsibilities with the producers to disclose the hazardous chemicals used in the entire value chain, sustainable finance to meet the chemicals and waste management initiative especially in countries in the South, necessary infrastructure in place, illegal transboundary movement of chemicals, and remediation of the legacy contaminated sites based on the polluters pay. Despite these odds, the Bonn declaration seems succeeded to set the agenda for a sustainable and a chemicals safe future of the 21st century.

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INDIA IS MOVING TO NON-POPS ALTERNATIVES TO DDT

Dimethyl-diphenyl-trichloroethane (DDT), an organo-chlorine insecticide, was first imported to India in 1944. It played a crucial role in the control of vector-borne diseases like Malaria, kala-azar, and many more. It subsequently came to be used as an agriculture and household insecticide. With the increased scrutiny of insecticides and the unravelling of DDT as a chemical that does not degrade easily and is a carcinogen, India banned its use in agriculture in 1989 however continued its use for vector control.

In 2004, the Stockholm Convention classified DDT as a Persistence Organic Pollutant (POP) and listed it under Annexure B to restrict the use of DDT. The convention gave parties the exemptions for indoor spray for public health only due to the lack of effective alternatives. The National Vector Borne Disease Control Programme (NVBDCP) of India prescribes DDT use due to the unavailability of cost-effective and locally sourced products. As of 2023, HIL (India) is the sole producer of DDT in the world with the commitment of phasing out by 2024.

The Government of India (GOI) is committed to phasing out and replacing DDT with environment-friendly alternatives. To fulfil its commitment, the GOI initiated projects supported by the Global Environment Facility

(GEF) to phase out DDT and develop environmentally friendly alternatives. The project is currently being executed with the support of various government and intergovernmental agencies, including the Ministry of Environment, Forest & Climate Change (MoEF&CC), Govt of India, the National Centre for Vector Borne Disease Control (NCVBDC), Central Pollution Control Board (CPCB), the United Nations Industrial Development Organization (UNIDO), United Nations Environment Programme (UNEP), United National Development Programme (UNDP), and the National Environmental Engineering Research Institute (NEERI), are involved in the implementation of the project.

Supported by GEF and UNEP, Toxics Link developed guidance documents to support producers, registration holders, and users in fulfilling the legal requirements at the various stages of the lifecycle of these DDT alternatives, namely, Long-lasting Insecticidal Nets (LLINs), Bt-based and Neem-based products. These guidance documents were developed in consultation with the vector control experts of the National Centre for Vector Borne Diseases Control (NCVBDC), officials of the Ministry of Agriculture & Farmers' Welfare, the Ministry of Ayush, industry representatives, and other vector control experts. These documents are expected

to facilitate the use of DDT alternatives in the country and a smooth transition from DDT to environmentally friendly alternatives.

To this end, Toxics Link also coordinated the dissemination of the guidance documents, closely with the UNEP Law Division. The primary objective of the workshop was the dissemination of user-friendly guidance documents for producers, registration holders, and users of non-POPs alternatives to DDT, to support them in meeting the legal requirements for DDT alternatives (LLINs, Bt-based products, and neem-based products) and thus facilitate their use in the count. The workshops were conducted across six different states in India: Chhattisgarh, Maharashtra, West Bengal, Odisha, Uttar Pradesh, and Tripura, and a roundtable meeting in Delhi. The participants included state and central government officials (NVBDCP and entomologists), government-associated research organizations (like ICMR RMRC and NIMR), industries and industry associations, and NGOs.

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Picture from the meetings:



a) Raipur workshop



b) Bhubaneswar workshop



c) Tripura workshop



d) Delhi workshop



e) Kolkata workshop



f) Pune workshop



g) Lucknow workshop

ECO-DESIGN: A CIRCULAR APPROACH TOWARDS SUSTAINABILITY

The world today is struggling with various environmental issues like depletion of natural resources, growing waste and increasing pollution which are mainly due to the increasing demands of expanding populations which exert extra pressure on the natural resources. For instance, the raw material extraction per year has grown three times over the last four decades but only 12% of materials used get recycled. Moreover, about 50% of the total greenhouse gas emissions and around 90% of the biodiversity loss happen due to extraction of raw materials and processing of materials (Riesener, Michael et. al., 2023).

Until very recently, the approach towards sustainability was mainly finding solutions like improving waste treatment methods, devising technologies to reduce air, water, and land pollution, improving recycling which are applied as remedial approach.

The prevailing linear production-consumption-disposal model is resource-intensive and exceeds planetary boundaries. To address this, Circular Economy (CE) emerges as a viable path to achieve sustainability by creating and closing resource loops, redirecting resources back into the lifecycle instead of discarding them as waste. Recognizing the crucial role of lifecycle stages and design modifications, the environmentally conscious community has started to embrace “eco-design” – the practice of designing products with considerations for both economic and ecological aspects, which is capable to minimize most of environmental impacts from the beginning

Concept and Definition

At its core, eco-design aims to optimize resource efficiency, reduce waste generation, and promote the use of renewable materials. It takes into account the entire life cycle of a product, from raw material extraction and manufacturing to distribution, use, and end-of-life disposal or recycling. It is related to economics, environment, management, ecology, and other subject theories and is an effective way to promote the circular economy model of development.

As defined by UNEP, eco-design is “the integration of environmental aspects into the product development process, by balancing ecological and economic requirements. Eco-design considers environmental aspects at all stages of the product development process, striving for products which make the lowest possible environmental impact throughout the product life cycle”.

In general, the term eco-design has been used interchangeably with terms like green design, Design for environment or sustainable design. It involves designing or redesigning products, services, processes, or systems to avoid or repair damage to the environment, society, and the economy.

What are the basic principles of Eco-design?

The basic principles of eco-design include consideration of the materials to be used in manufacturing a product so that less resources are required in the process and the choice of materials selected. The different stages at which eco-design approach can be applied are- raw material extraction and supply, manufacturing, product distribution, consumer use and end-of-life.

The eco-design principles are therefore, specifically about:

- Reducing materials and resources
- Using low-impact materials and resources
- Minimising waste and pollution to the possible extent throughout all the life-cycle stages
- Reducing the ecological impacts of distribution
- Promoting reuse and making recycling easier by smart design making disassembly easier.

Why is Eco-design beneficial?

The adoption of eco-design has been associated with several benefits which include -

- **Reduction in resource consumption:** By optimizing material use and minimizing waste, eco-design reduces demand for raw materials and lowers the ecological footprint of products.
- **Energy efficiency:** Eco-designed products are designed to be energy-efficient, leading to reduced energy consumption and lower greenhouse gas emissions.
- **Waste reduction and recycling:** Eco-design encourages the use of recyclable materials, facilitating easier recycling and reducing the amount of waste sent to landfills.
- **Preservation of ecosystems:** Through responsible sourcing and production processes, eco-design helps protect biodiversity and natural habitats.
- **Cost savings:** By optimizing resources and increasing energy efficiency, eco-designed products can lead to cost savings for both manufacturers and consumers in the long run.
- **Market competitiveness:** Companies that use eco-design also gain “environment friendly” reputation by offering green products among the consumers.

Eco-design and Circular Economy

Eco-design, through its principles, can potentially aid in the implementation of CE that promotes conservation of natural resources and re-using them in the system rather than repeated extraction. Therefore, eco-design is an effective tool to achieve the goals laid by CE. Both these approaches lead towards sustainability and can be applied to almost every sector making them circular and efficient systems.

These include textiles, packaging, furniture, and construction. Some of the prominent ways of how eco-design has been adopted in different sectors can be seen by reducing the size of the laptops and other electronics without impacting the functionality (sometimes improving it), furniture designed from recycled plastics and modular furniture

which can be used in multiple ways, refillable packaging, and use of bio-based materials to reduce toxicity and designing green buildings which can be naturally lighted and ventilated to conserve energy.

Considering the multifaceted benefits of eco-design application, various countries have either already started or are preparing to adopt its principles through different policies. Globally, these policies include a range of initiatives and regulations which promote sustainable practices. Some of the notable measures include the EU's Eco-design Directive, Extended Producer Responsibility programs, energy labelling standards, product certifications like Energy Star and EU Ecolabel, right to repair

legislation, national strategies, and global agreements like the Paris Agreement and United Nations Sustainable Development Goals.

These policies mandate eco-friendly product design, encourage energy efficiency, advocate for responsible product lifecycle management, and aim to reduce environmental impact across industries on a global scale. Overall, the entire concept requires a collaborative action involving designers, manufacturers, policymakers, and the consumers for an effective impact.

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Eco-Design Elements

- Dematerialization
- Use of low impact materials
- Design to eliminate toxicity
- Design for durability
- Design for resale
- Design for repair
- Design for recycling

CE Principles

- Eliminate waste
- Circulate products and materials
- Regenerate nature



UNVEILING THE STRATOSPHERIC POLLUTANTS: VERY SHORT-LIVED HALOGEN SUBSTANCES

Ozone plays a multifaceted role in Earth's atmosphere, existing in two distinct layers—the troposphere and the stratosphere. Each layer possesses distinctive characteristics and contributes uniquely to the atmospheric balance. Tropospheric Ozone makes up approximately 10% of the tropospheric layer and is recognized as an air pollutant. While it plays a crucial role in shielding the Earth from the harmful effects of the Sun's UV rays, an elevated concentration can result in respiratory issues and formation of smog (a mixture of smoke and fog). Generated largely through human activities such as industrial processes and vehicle emissions, tropospheric ozone is a complex factor in both atmospheric protection and pollution.

Conversely, stratospheric ozone constitutes 90% of the atmospheric stratosphere and is referred to as “good ozone”. This gas layer plays a crucial role by serving as a significant shield against the Sun's harmful UV radiation, thereby contributing to the sustenance of life on Earth. However, escalating human activities have resulted in the

release of Ozone Depleting Substances (ODS), leading to detrimental impact and depletion of stratospheric ozone. ODS can originate from both natural or man-made sources, have a greater potential to deplete/destroy the stratospheric ozone layer. Long-lived halogenated compounds such as brominated halons, hydro chlorofluorocarbons (CFCs), hydro bromofluorocarbons (HBFCs), and hydro chlorofluorocarbons (CFCs) are among the most common and harmful contributors falling under the ODS category.

The depletion of ozone induced by ODS can have adverse effects on human health, including an increased risk of skin cancer, cataracts, respiratory and cardiovascular issues, and immune system suppression. Furthermore, it poses a threat to ecosystems and the climate. Thus, maintaining the concentration of stratospheric ozone is crucial, as changes in its levels can negatively impact the well-being of humans, animals, plants and other micro species.

Montreal Protocol

With the alarming increase in ODS, the Montreal Protocol was signed in 1987, ensuring the regulation and combat of long-lived ODS. Following changes supported by practically all governments worldwide aided in fighting the issue of Ozone Layer Depletion. The Montreal Protocol stands as a pioneering and successful treaty, achieving universal ratification from all countries in the world.

Emergence of VSLHS

Despite the comprehensive measures implemented by the Montreal Protocols to address ODS, very short-lived halogen compounds are not covered by the Protocol, even though they constitute a significant source of ozone depletion. Very short-lived Halogen Substances (VSLHS), with a lifespan of less than 6 months, play a significant role in hastening the decomposition of stratospheric ozone. Their transit nature sets them apart from the long lived ODS, categorizing them as species of high concern.



VSLHs are released into the atmosphere through both natural and anthropogenic sources. Primarily, natural emissions originate from marine algae and specific vegetation types. Nevertheless, human activities, including industrial processes, waste incineration, and the application of certain agricultural chemicals, can augment VSLH levels in the atmosphere. Chlorine and bromine short-lived substances exhibit higher presence and contribution, while short-lived iodine species, although less concentrated, possess a significant ozone-depleting efficiency, resulting in stratospheric ozone depletion.

Challenges and Significance

To date, there has been minimal and insignificant attention directed towards VSLHS. The lack of emphasis on VSLHS is attributed to the considerable challenges associated with their study, primarily contributing from their transient nature. The restricted time available for analysis poses a significant

issue, hindering researchers from gaining a comprehensive understanding of the chemical behavior and properties of VSLHS.

Mitigation Strategies

Giving potential risks associated with VSLHS, it is crucial to implement effective mitigation strategies. These may include:

- ▶ **Regulatory Measures:** Establishing and enforcing regulations to limit the release of VSLHS from industrial processes and other anthropogenic sources.
- ▶ **Monitoring and Research:** Enhancing and monitoring efforts to better understand the sources, distribution, and atmospheric behavior of VSLHS, allowing for more informed policy decisions.
- ▶ **International cooperation:** Encouraging global collaboration and to address the transboundary nature of VSLHS emissions and their impact on Stratospheric Ozone.

- ▶ **Alternative Technologies:** Promoting the development and adoption of alternative technologies and processes that reduce the use of VSLHS.

Conclusion

While VSLHs may have shorter atmospheric lifetimes than traditional ozone-depleting substances, their potential to disturb stratospheric ozone underscores the need for continued vigilance and proactive measures. Addressing the sources of VSLHs and implementing effective mitigation strategies are essential steps to safeguarding the ozone layer and maintaining the delicate balance of our planet's atmosphere.

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IN A DISCUSSION WITH Mr. Siddharth Agarwal

A trained aerospace engineer, for the past eight years, Siddharth Agarwal has been walking along Indian rivers. He is the founder of Veditum India Foundation, a nonprofit research, media, and action-oriented organisation. Siddharth is also a member of the India Rivers Forum steering committee.

Richa: Tell us something about your organisation Veditum India Foundation and what motivated you to start this initiative?

Veditum India foundation is a research, media and action action-oriented organisation based in Kolkata India. We focus on the intersection of environmental and social justice. our current work is Centre around Rivers and life in and around these rivers.

We execute our work through deep and intimate grassroots documentation through the practice of walking and immersing ourselves in the landscape that we are trying to understand. To this end, I, and my fellows at Veditum have walked over 6000 kms along India's rivers, documenting these rivers and life around them.

These journeys continue to inform all the other work that we undertake at Veditum. We have a strong focus on interdisciplinary practises and communication of our learnings. We do this in various formats, while focusing on creating engagement beyond limited urban bubbles and motivating impact-oriented action.

It has been a gradual journey for me to establish Veditum the way it currently stands and it all started with an attempt to understand society through immersive practises. In 2014, while still pursuing engineering at IIT Kharagpur, I cycled from the east coast to the west coast of India, which was then followed by all of my walking journeys.

Richa: Could you please highlight some of your projects that you are currently working on?

Our current work is situated at the intersection of environmental and social justice, with a special focus on rivers and community building. The goal behind our projects is to help make it easier to

do grassroots research which is original and based on people's and communities' lived experiences. The foundation is primarily working on issues concerning rivers in India.

Through different projects, individuals and teams have walked thousands of kilometres along entire lengths of multiple Indian rivers and executed focused work on rivers flowing within Indian cities. Our projects include - **Moving Upstream, India Sand Watch, and City Water Walks.**

(a) The Moving Upstream project series looks at India's river ecosystems and the life of riparian communities. This project started with my 3000 km walk along the river Ganga, followed by a walk along River Ken, which flows through Bundelkhand. Through this process, I felt the need to create an opportunity for others to also experience our ecosystems at boot level, and initiated, the moving Upstream fellowship program.

This programme provides young people with the opportunity to participate in, record, and pursue an exploration of India's rivers on foot. 24 Moving Upstream fellows have walked thousands of kilometers along the River Betwa, Sindh and Luni in India, as part of this fellowship over the past than three years.

(b) India Sand Watch, built in partnership with Ooloi Labs, with an open data platform at its heart, is addressing the challenges around availability of data and pushing for collaborative action in the Sand Mining sector in India.

While sand is the most extracted mineral on the globe, there is little to no accountability of this sector. Our open-data platform collects, documents, and archives data pertaining to sand mining in India, while we work on building community networks and enabling various actors to be able to



take appropriate action in cases of data unavailability, corruption, and illegal mining activities.

c) City Water Walks, is an effort to understand our sources of water in urban areas, the distribution of this available water and how this water eventually flows through drains back into our rivers.

This study arose from a desire to understand how urban commons function and how they are impacted by ongoing changes in governance and development.

Richa: Tell us about your foundation's fellowship program and why did you think of such a fellowship program?

The Moving Upstream fellowship program is an extension of the Moving Upstream project at Veditum. The fellowship programme attempts to bring new perspectives through which we can look at India's river ecosystems and the life of riparian communities. Since inception, the project has been hosted along with Paul Salopek's Out of Eden Walk.

As mentioned earlier, the fellowship program is an opportunity for young Indians to understand this country and the landscape at foot level, enabling them to form deeper and more intimate connections with the environments and take these with them as they go back into their regular practices.

24 fellows have walked thousands of kilometers along rivers Betwa, Sindh and Luni. They have looked at our riverscapes through new lenses and have deployed creative ways of storytelling that has helped build a larger understanding of rivers.

Richa: Please share your documentary titled "Moving Upstream: Ganga" experience with us and what was your motive behind filming this documentary series?

Between June 2016 and April 2017, it took me 6 months to walk along the river Ganga from sea to source, covering 3000 kms on foot. All through this journey, I was filming my experiences and conversations with people that I was meeting. Some friends who joined this journey in parts also contributed to the video documentation. Through a painstaking and lengthy process of going through over 100 hours of video documentation, we were able to produce a document titled Moving Upstream Ganga, which was first showcased in 2020.

The length of the film is 105 minutes, and while we feared people would not sit through the whole documentary, a common comment we often get after people watch the documentary is "this should have gone on for much longer". I agree with them as it is not possible to compress six months of experience into something so short.

I must commend the filmmakers involved in this process including Shridhar Sudhir, Arbab Ahmed, A Bhaskar Rao, Aindri C and myself, for creating a film that has found appreciation in schools, colleges, communities, exhibitions and festivals around the globe.

The film has delivered on our objective of bringing the river closer to people, and

not the river that flows through popular destinations like Varanasi, Allahabad, Haridwar and Rishikesh, but the river that flows in between. And the life of people who live in these parts.

What do the people living next to the river think? What is their relationship with the river? Do they celebrate this river? Are they included in the many government programs that talk about this river?

We have much to learn still, and hope that you will also ask yourself this question - "What is my relationship with the river?"



RENEWABLE ENERGY GROWTH IN INDIA AND THE CHALLENGES FACED

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Abstract:

This in-depth research article offers a comprehensive analysis of India's exemplary strides in renewable energy adoption, meticulously examining its growth trajectory, policy frameworks, technological innovations, economic implications, and the intricate challenges faced. With a keen focus on quantitative data and statistics, this article not only showcases India's position at the forefront of the global shift towards sustainable energy but also provides nuanced insights for future developments.

1. Introduction:

In the vibrant tapestry of India's energy landscape, a profound transformation is underway—a transition from conventional energy paradigms to a dynamic embrace of renewable alternatives. As of 2022, the impact of this shift is unmistakable, with renewable energy constituting over 24% of the country's total energy capacity, a substantial surge from the 13% recorded in 2015. This monumental progress stands as a testament to India's unwavering commitment to sustainable development and its pivotal role in the global pursuit of cleaner and more resilient energy systems.

This article embarks on a meticulous exploration of India's renewable energy odyssey, aiming to unravel the intricacies of its growth trajectory, policy frameworks, technological strides, economic implications, and the formidable challenges that underscore the path ahead. As India propels itself towards a greener future, the narrative presented here seeks to provide not just a snapshot of accomplishments but an informed discourse on the complexities, opportunities, and imperatives that define India's pursuit of a sustainable and resilient energy landscape.

2. Growth and Achievements:

The Indian renewable energy sector has witnessed remarkable progress in recent years. As of November 2023, the country boasts an impressive installed capacity of

over 180 GW of renewable energy, including large hydropower. This figure represents a significant 128% increase since 2014, highlighting the rapid pace of growth. Solar power has emerged as the frontrunner, with a 30-fold increase in installed capacity over the past nine years, currently standing at over 73 GW. Wind power also contributes significantly, with a capacity of over 44 GW.

At the heart of this metamorphosis lies a multifaceted journey encompassing policy innovation, technological prowess, economic revitalization, and the strategic navigation of formidable challenges. India's ambitious policy frameworks, epitomized by the National Solar Mission and National Wind Energy Mission launched in 2010, have set the stage for a renewable energy revolution. With a target to achieve 175 GW of renewable energy capacity by 2022, and a vision to attain 40% of total energy capacity from non-fossil fuel sources, these policies reflect a forward-thinking approach aimed at redefining the nation's energy trajectory.

3. Policy Framework:

India's proactive government approach is evident in its policy frameworks. The National Solar Mission and National Wind Energy Mission, launched in 2010, have set ambitious targets. By 2022, India aims to achieve 175 GW of renewable energy capacity, with an additional commitment to reach 40% of total energy capacity from non-fossil fuel sources.

4. Technological Advancements:

Technological innovations have been pivotal in propelling India's renewable energy sector. Breakthroughs in solar



photovoltaics, with average module efficiency reaching

19%, and advancements in wind turbine design contribute to increased efficiency. Energy storage solutions, vital for overcoming intermittency issues, have seen a 200% increase in deployed capacity from 2015 to 2022.

5. Economic Implications:

The economic implications of India's renewable energy push are noteworthy. The sector has generated over 100,000 jobs, and as of 2022, the cumulative investment in renewable energy projects exceeds \$150 billion. The potential for green economic development is evident, with the renewable energy market estimated to reach \$500 billion by 2030.

6. Challenges Faced:

Despite the remarkable growth in India's renewable energy sector, several complex challenges persist, demanding strategic interventions for sustained progress.

Intermittency and Grid Integration:

- One of the primary challenges is the intermittency of renewable energy sources, particularly solar and wind. As of 2022, approximately 20% of solar and wind projects face curtailment issues due to the variability in energy generation. Addressing this intermittency requires robust energy storage solutions and advanced grid management systems to ensure a stable and reliable power supply.

Land Acquisition and Resource Allocation:

- ▶ The expansion of renewable energy infrastructure necessitates significant land usage. Land acquisition, however, poses a substantial challenge, particularly in densely populated areas. Striking a balance between renewable energy expansion and other land-use priorities requires meticulous planning, community engagement, and transparent resource allocation strategies.

Financing Constraints:

- ▶ While investments in renewable energy projects have surged, financing constraints remain a challenge. The sector often encounters issues related to project financing, with some projects facing delays or cancellations. Attracting sustainable and affordable financing mechanisms, including innovative financial instruments and supportive policies, is essential for overcoming these constraints.

Grid Stability and Infrastructure Development:

- ▶ The integration of large-scale renewable energy into the existing power grid presents technical challenges related to grid stability and infrastructure development. The grid must be upgraded to accommodate the variable nature of renewable energy sources. Investing in grid modernization, smart grid technologies, and energy storage systems is crucial to enhancing grid resilience and reliability.

Policy and Regulatory Challenges:

- ▶ Despite robust policy frameworks, the implementation of policies at the ground level can be hindered by bureaucratic hurdles and inconsistent regulatory environments. Streamlining approval processes, ensuring policy coherence, and providing long-term regulatory certainty are essential to fostering a conducive environment for sustained growth.

Technological Barriers:

- ▶ While there have been significant technological advancements, certain barriers persist. Energy storage technologies, essential for addressing intermittency, are still evolving. Continued research and development, along with incentivizing the deployment of advanced technologies, are imperative to overcome these technological barriers.

Skill Development and Human Capital:

- ▶ The rapid expansion of the renewable energy sector requires a skilled workforce.
- ▶ Adequate training and education programs to build a skilled labor force capable of managing, maintaining, and innovating in the renewable energy field are crucial. Bridging the gap between the demand for skilled professionals and the available workforce is an ongoing challenge.
- ▶ Addressing these challenges requires a collaborative effort involving policymakers, industry stakeholders, local communities, and international partners. Overcoming these hurdles will not only ensure the sustained growth of India's renewable energy sector but will also contribute to global efforts in combating climate change and achieving a sustainable energy future.

7. Social and Environmental Considerations:

Beyond economic implications, this section explores the social and environmental aspects of renewable energy adoption. Community engagement initiatives have been implemented in several projects, contributing to local development. Environmental impact assessments and adherence to sustainable development goals are integral parts of India's holistic approach to renewable energy transition.

8. Future Prospects:

The article concludes with an exploration of the future trajectory of renewable energy in India. India's commitment to achieving 50% of its energy capacity from renewables by

2030 underscores the ambitious path ahead. Continued innovation, policy adaptations, and international collaborations are imperative for India to achieve its target of 500 GW of renewable energy capacity by 2030.

9. Recommendations:

Drawing upon research findings, this section presents detailed recommendations to address identified challenges. Proposals include targeted policy refinements, increased focus on energy storage solutions, and fostering collaborative efforts with international stakeholders. By strategically addressing these recommendations, India can chart a sustainable and resilient course for its renewable energy future.

In conclusion, "Renewable Energy Growth in India" provides a detailed and data-driven exploration of India's journey, celebrating achievements, confronting challenges, and laying the groundwork for a sustainable and greener future.

PUBLICATIONS

"Is Plastic Recycling Safe?"



The study tested a variety of products made from recycled plastic, ranging from children's toys to food containers, finding that an alarming number of them contained toxic chemicals such as phthalates and Bisphenol A. This is a major cause of concern as these products often come in direct or indirect contact with human mouths, which can cause detrimental health effects.

The study shows that these chemicals persist through the recycling process, proving that recycling in its current form is not a sustainable option for plastic waste treatment.

Factsheet on Oceanic Plastic Pollution from Fisheries



Ocean plastic pollution has become a critical issue due to the surge in plastic use in the fishing industry. This type of pollution makes up 85% of marine litter and poses a significant threat to marine life, ecosystems, and the environment.

Urgent action is required to counter this alarming crisis. The sources of ocean plastic pollution are primarily fisheries, which include discarded plastic fishing gear, fish-aggregating devices, and mariculture equipment. The environmental impact of this plastic waste, known as the deadliest marine litter, includes species entanglement, habitat damage, and chemical pollution that harms both marine organisms and human health.

The economic losses caused by this issue amount to \$13 billion annually. Although there are various global initiatives, such as the Ghost Gear Initiative and international agreements that address marine pollution, challenges persist. However, EU directives and Indian policies have some strategies in place. Mitigating plastic pollution in fisheries requires sustainable and collaborative measures worldwide to protect the oceans from this impending catastrophe. Beach clean-up, upcycling, sustainable

fishing, and extended producer responsibility are some of the strategies that can be implemented to tackle this problem.

Factsheet on Microplastics Meandering in Air: Are They Alarming?

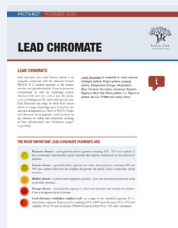


The dependence on plastic and its products, spanning over 50 years, has led to widespread usage due to its cost-effectiveness, durability, and adaptability. However, the surge in plastic manufacturing and consumption has resulted in a significant challenge of plastic waste management and pollution.

In 2004, the discovery of microplastics (MPs) in marine water marked a new concern. This fact sheet delves into the discovery of atmospheric microplastics (AMPs), a relatively overlooked aspect compared to their presence in water and land ecosystems. Despite their potential to pollute urban, rural, and industrial air, there is a lack of attention to AMPs in policy frameworks and exposure assessments.

The World Health Organization's comprehensive analysis of MPs in drinking water does not adequately address inhalable MPs in ambient air. The fact sheet emphasizes the need for further research on the consequences and exposure concerns associated with AMPs. Additionally, it advocates for the development of standard methodologies for measuring AMPs to establish air quality standards.

Factsheet on Lead Chromate



This factsheet is a snapshot of lead chromate that is the main source of lead in household paints. The documents highlight the types of lead chromate pigments, uses, global regulations and alternatives available in the market.

Factsheet on Women's Health and Chemical Exposures

This fact sheet emphasizes the critical importance of women's equity in achieving a toxic-free world. It highlights



how women's unique physiology, biology, and social roles make them particularly vulnerable to chemical exposures.

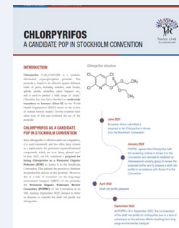
It calls for equal participation and protection for women in chemical management, citing examples of occupational risks and disparities in product safety testing. The fact sheet concludes with recommendations for increased transparency, gender-disaggregated data collection, and the phasing out of hazardous chemicals affecting women.

Factsheet on Antibiotics in Agriculture: A Potential Source of Antimicrobial Resistance



This factsheet highlights antibiotics that are extensively used in agriculture to prevent and cure various diseases in crops. The factsheet emphasizes on the issues and concerns related to antibiotic use in agriculture and potential risk of antimicrobial resistance. Further, it briefly describes the regulatory status of antibiotics used in agriculture globally as well as in India.

Factsheet on Chlorpyrifos A Candidate POP



Chlorpyrifos is a synthetic chlorinated organophosphate pesticide. The pesticide is found to be effective against different kinds of pests, including termites, stem borers, aphids, jassids, whiteflies, plant hoppers etc., and is used to protect a wide range of crops. Chlorpyrifos has now been classified as moderately hazardous to humans (Class II) by the World Health Organization (WHO) based on the review of human toxicity studies. Several countries have taken note of this and restricted the use of the pesticide. In June 2021, the EU submitted a proposal for listing Chlorpyrifos as a Persistent Organic Pollutant (POP) in Annex A to the Stockholm Convention. This initiated the process to eliminate the production and use of this pesticide.

1. Beating Plastic Pollution: Innovative Ways in Which India is Tackling the Problem

Plastic, the ubiquitous material of modern life, has woven itself into the fabric of our daily existence. Globally, over 150 million tonnes of plastic are produced each year, catering to a wide array of applications – from packaging and clothing to toys and industrial products.

<https://www.news18.com/india/beatting-plastic-pollution-innovative-ways-in-which-india-is-tackling-the-problem-8589232.html>

Source: New 18, New Delhi, Sep 24, 2023

2. Six tonnes of biomedical waste collected in a month in Kozhikode Corporation

A month after the Kozhikode Corporation launched the collection of biomedical waste, over six tonnes of biomedical waste has been collected from households in the city through the mobile application 'Aakri'. An increasing number of people are making use of the services as registrations on the app are going up by the day.

<https://www.thehindu.com/news/cities/kozhikode/six-tonnes-of-biomedical-waste-collected-in-a-month-in-kozhikode-corporation/article67263795.ece>

Source: The Hindu, Kozhikode, Sep 03, 2023

3. Delhi LG launches new Summit-themed waste-to-art park

The New Delhi Municipal Council on Monday formally opened the city's fourth waste-to-art-themed park based on the upcoming G20 Summit, in Chanakyapuri.

<https://www.hindustantimes.com/cities/delhi-news/new-delhi-opens-waste-to-art-g20-park-with-sculptures-of-national-birds-and-animals-from-scrap-metal-101693851755501.html>

Source: Hindustan Times, New Delhi, Sep 05, 2023

4. India Achieves Major Sanitation Milestone As 75% Villages Are Now ODF Plus

The country has achieved yet another major milestone under the Swachh Bharat Mission (Grameen) Phase II with three-fourths of the total villages in the country i.e., 75% of villages achieving ODF Plus status under Phase II of the Mission. An ODF Plus village has sustained its Open Defecation Free status along with implementing either solid or liquid waste management systems.

<https://pragativadi.com/india-achieves-major-sanitation-milestone-as-75-villages-are-now-odf-plus/>

Source: Pragativadi, New Delhi, Sep 24, 2023

5. Improving bulk generators' waste management can address India's urban garbage menace

Our urban periphery is haunted by overarching problems of piled-up waste and associated environmental pollution, resulting in massive environmental, economic and health problems. India generates 160,000 tonnes of waste per day, according to the Central Pollution Control Board's annual report for 2020-2021. Of this, nearly 31 per cent remains unaccounted for, accumulating on the streets, back lanes of the residents, waterbodies or drains and nullahs.

<https://www.downtoearth.org.in/blog/waste/improving-bulk-generators-waste-management-can-address-india-s-urban-garbage-menace-91722>

Source: Down to Earth, Delhi, Sep 13, 2023

6. As told to Parliament (December 14, 2023): Over 500,000 tonnes of e-waste collected and processed in 2021-22

In the financial year 2021-22, 527,131.57 tonnes of e-waste was collected, dismantled and recycled, Ashwini Kumar Choubey, minister of state in the Union Ministry of Environment, Forest and climate change told the Rajya Sabha Plantation under Great Nicobar Development Project The central government on October 27, 2022 gave an in-principle approval for diversion of 130.75 sq km forest land for sustainable development in Great Nicobar Island, Choubey told the Rajya Sabha. The area proposed for development is only approximately 1.5 per cent of the total area of Andaman and Nicobar Islands. Further

<https://www.downtoearth.org.in/news/governance/as-told-to-parliament-december-14-2023-over-500-000-tonnes-of-e-waste-collected-and-processed-in-2021-22-93403>

Source: Down to Earth, New Delhi, Dec 15, 2023

7. VMC starts drive to clear plastic waste from canals

The Vijayawada Municipal Corporation (VMC) initiated a special intense drive to clear heaps of plastic waste piled up at canals across the city. Sanitation and malaria wings of the civic body collectively took the drive and cleared around 70 metric tonnes of plastics stagnated at Eluru locks near the railway station in the city on Thursday.

<https://timesofindia.indiatimes.com/city/vijayawada/clearing-plastic-waste-from-canals-vmcs-special-drive/articleshow/106006552.cms>

Source: Times of India, Vijayawada, Dec 15, 2023

8. DPCC to begin collecting real time data of quality of water in Yamuna in Delhi

The Delhi Pollution Control Committee (DPCC) will soon begin installing online continuous monitoring systems (OCMS) at 10 locations across the Yamuna, allowing real-time data collection of the quality of the river water, according to documents seen by HT.

<https://www.hindustantimes.com/cities/delhi-news/dpcc-to-begin-collecting-real-time-data-of-quality-of-water-in-yamuna-in-delhi-101702835295420.html>

Source: Hindustan Times, New Delhi, Dec 18, 2023

9. 10 Stations for Real-Time Data on River Health

Delhi Pollution Control Committee will install 10 online continuous monitoring stations (OLMS) on the Yamuna to collect real-time data on water quality. Currently, water samples are collected manually and analysed once a month. DPCC plans to procure a mobile laboratory van to monitor water samples at various locations. The OLMS will help in determining the quality of water at a given time. In Delhi, the 22-km urban stretch of the river from Wazirabad to Okhla is the most polluted and is responsible for nearly 75% of the total pollution.

<https://timesofindia.indiatimes.com/city/delhi/10-stations-for-real-time-data-on-river-health/articleshow/106073086.cms>

Source: Times of India, New Delhi, Dec 18, 2023

10. India's CPCB Categorises Tyre Pyrolysis Oil Units as 'Orange'

The Central Pollution Control Board (CPCB) has categorised 242 industrial sectors into red, orange, green & white categories and directed all State Pollution Control Boards & Pollution Control Committees (SPCBs/PCCs) for its adoption and implementation CPCB issued directions under 18(1)(b) of the Air and Water Act on 07.03.2016, regarding 'Harmonisation of classification of industrial sectors under Red/Orange/Green/White categories'. Now, the CPCB Committee on Categorisation of industrial sectors, in its meeting held on 23rd October 2023, categorised Tyre Pyrolysis Oil (TO) industries as 'Orange', applicable for advanced batch automated process/continuous TPO units.

<https://www.tyreandrubberrecycling.com/articles/news/indias-cpcb-categorises-tyre-pyrolysis-oil-units-as-orange/>

Source: Tyre and Rubber Recycling, New Delhi, Dec 13, 2023



ABOUT TOXICS DISPATCH

Toxics Dispatch was started in 1998 with the primary objective of creating awareness about environmental pollution related to the management of waste and hazardous chemicals and their impact on the environment and public health.

Toxics Dispatch was born out of the need to reach out to various stakeholders, including government officials, judiciary, youth, and the general public, to sensitise them about the extent of toxic pollutants and their damaging effects on the environment.

Since its inception, Toxics Dispatch has highlighted pressing issues of hazardous, biomedical, municipal solid waste, e-waste, international waste trade, and the emerging issues of pesticides and Persistent Organic Pollutants (POPs). The newsletter aims to disseminate information to help strengthen the campaigns against toxic pollution, provide cleaner alternatives, and bring together groups and people affected by this menace.

Toxics Dispatch comes out thrice a year and is available online and in print. You can subscribe to it by writing to info@toxicslink.org.

All issues of
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<https://toxicslink.org/Page/dispatch>

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