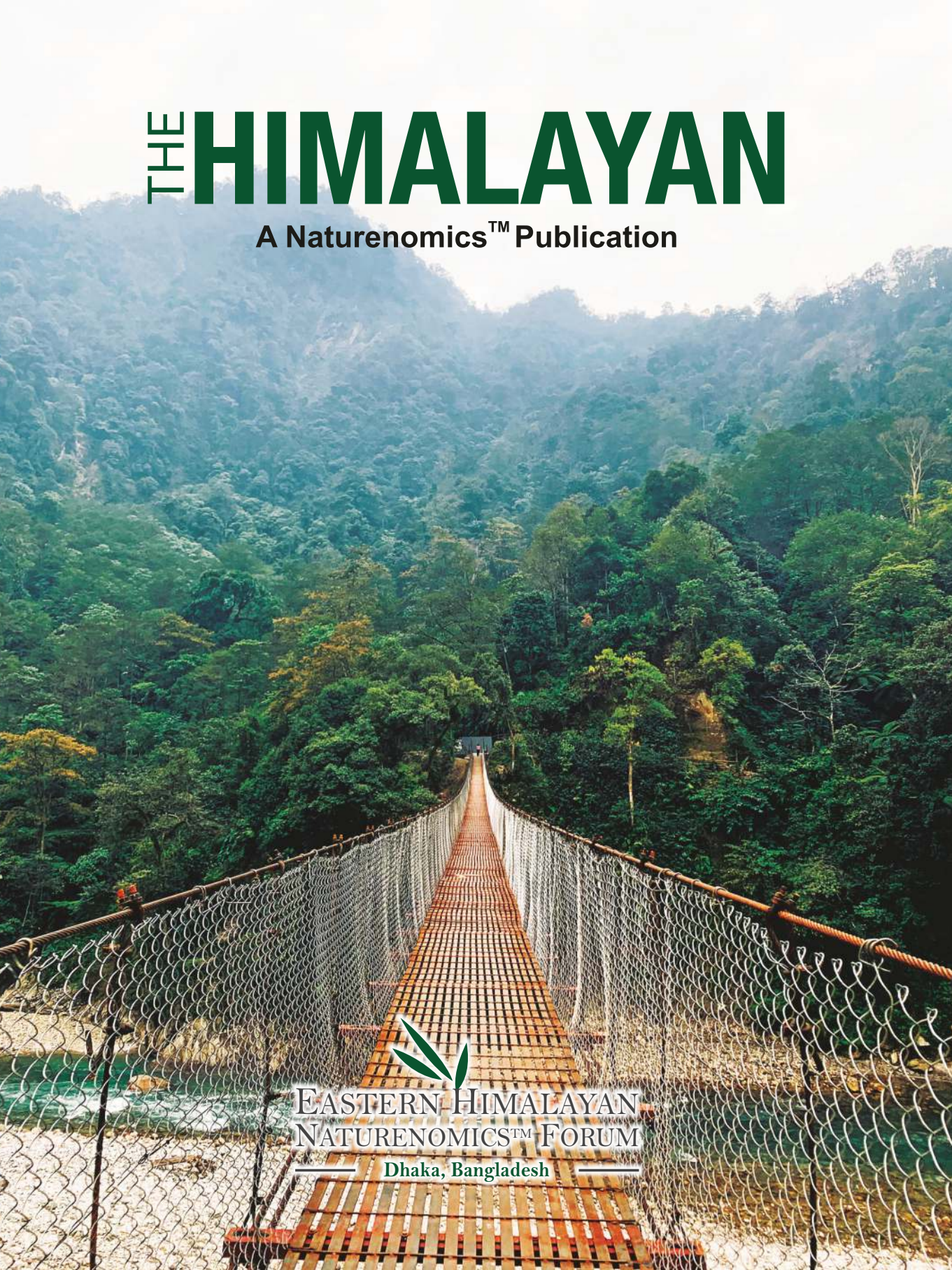
THE HIMALAYAN

A Naturenomics™ Publication



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BALIPARA FOUNDATION
Assam • India

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Foreword
Building the Natural Wealth of Nations

– Ranjit Barthakur
Founder, Balipara Foundation

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The Eastern Himalayas lie at the heart of a paradox of our global economy today: the world's richest natural capital nations, are often amongst its poorest. Some economists call this paradox the resource curse. Nations with the richest natural capital resources often have underperforming economies or poorer development outcomes than nations with less natural capital. Within India, its Eastern Himalayas account for 25% of the country's green cover, while having a PCI of $1524 against an average of $2226 for the rest of the country and poorer scores on multivariate poverty indicators compared to the rest of the country.

The dynamics behind this "resource curse" are complex, ranging from governance issues to the devaluation of ecosystems services. Ecological economists make the case for the role the devaluation of natural capital has played in shaping these economies, resulting in the offshoring of environmental costs on to largely resource rich (producer) nations versus capital rich (consumer) nations.

Others theorize this as the mechanism of unequal ecological exchange, which leads to an "invisible" ecological debt borne largely by poorer, but natural capital rich countries. A calculation from 2008 revealed that 87% of climate change and ozone depletion related impacts faced by lower income countries can directly be traced to emissions and industrial activity in mid to higher income countries (Srinivasan et al., 2008). By this estimate, the $5 trillion created in ecological devastation by the rich world dwarfed the $1.8 trillion owed in international debt by third world countries (Patel, 2010).

Economic arguments like these about the responsibilities that richer, high emissions nations have towards developing and resource rich nations have been behind the push for a loss and damage fund facility, led by countries like Bangladesh amongst others. This year at COP27, the international community agreed to the establishment of a loss and damage fund for poorer developing countries, recognizing the undue pressures that the climate crisis is putting on already debt-strained economies.

Economic and ecological inequality: interlinked consequences

Another paradox at the heart of the intersection between nature, economics and inequality is that nations with high economic inequality are still linked to high levels of biodiversity loss, even in cases where they have strong institutions and enforcement mechanisms for protecting biodiversity (Mikkelson et al, 2007; Holland et al, 2009; Mirza et al, 2020). This reflects a simple truth that we have learned repeatedly through our work: people are at the heart of any conservation work.

The Eastern Himalayan region is a primarily agrarian economy, with the vast majority of its rural communities dependent on nature for their incomes, in one form or the other. 80% of farmers in the region are smallholder farmers – and over 70% of its 250 million strong population is employed in farming. The region is amongst the most climate vulnerable globally. As climate change accelerates, the region is expected to lose 20% of its GDP to climate losses. But while those losses lie far off into the future, the reality of these changes and their impacts on the lives and livelihoods of people is present and near. 60% of Bangladesh's population lives in high climate exposure areas, and within India, its Eastern Himalayan states are the country's most climate vulnerable, with low forest cover per capita and high dependency on rainfed agriculture limiting their adaptive capacity.

Caught between decades of under-investment, a history of ethnic conflict and the lived consequences of climate change spurring economic inequality has had devastating consequences for biodiversity in the region. Every year, the Eastern Himalayas lose around 80,000 hectares of forest annually. 74% of deforestation that takes place within India, takes place within its Eastern Himalayan region. 75% of the region's original habitat is either degraded or destroyed. In states like Nagaland, over 40% of the soil is desertified and no longer fertile. With limited livelihood options, shrinking agricultural incomes and no income that can be derived from the natural capital value of standing forests, timber becomes a lucrative livelihood option as does replacing natural forests with cash crop species.

The role of natural capital

The case of the Eastern Himalayas is not unique. Stories like this play out everyday around the world. Rural economies and forest ecosystems face similar challenges, all stemming from the systematic devaluation of standing forests.

The GDP based economic model excludes the contribution of natural resources such as forestry, biodiversity, soil, and water. This significantly undermines the value of natural capital that flows across the economy through supply chain – and the constant devaluation of nature's contributions to the economy paves the way for reckless over-exploitation that undermines the abilities of ecosystems to regenerate themselves. Valuing natural capital, therefore, is a question of valuing our world. Valuing natural capital is the first step in building an economy that equitably distributes economic value to the communities that play a role in managing the health of ecosystems.

Till recently, visualizing an alternate economy where standing forests have as much value as timber has been a long shot. Global efforts to recognize the role of these ecosystems in fighting climate change, however, have started to pay off. At COP26 and COP27, nature-based solutions and healthy ecosystems were centred as key tools to fighting the climate crisis. Today, nature-based carbon credits command the highest prices in the global carbon credit market.

But carbon is only one facet of the value ecosystems provide.

Globally, the economy is reaching the end of value generation through further extraction, exploitation or consumption. Momentum is growing, internationally, on the need to value natural ecosystems. Today, sustainability is the new frontier, offering growth opportunities of up to $10 trillion, with $3.6 trillion of opportunities in sustainable food, land & ocean use systems. In 2021, the Dasgupta Review on the Economics of Biodiversity, commissioned by the UK Treasury, systematically outlined how nature needs to be included in policy and economic decision-making.

This movement reflects growing international interest in Naturenomics™: nature and economics are not separate or independent, they are interdependent. Without nature there is no economics. Naturenomics™ proposes a new paradigm based on the valuation of our natural assets (land, energy, waste, water, air, carbon, biodiversity, food, living materials). Historically, we have had a linear extractive relationship with these natural assets, but Naturenomics™ is about investing in restoring and regenerating these natural assets while sustainably earning on their natural capital value.

Creating a nature-positive economy

Effective valuation and stewardship opens up new vistas for investing in communities using nature-debt, to create access to universal basic assets such as education and healthcare. An ambitious plan to invest in the country's ecosystems, however, could go a long way to dealing with its rural employment and economic crisis. For example, a rural recovery plan to rewild the North East's forests and agricultural lands – 4.1 million hectares – would generate earnings up to INR 450,544 crores annually over a 30 year period through agroforestry produce and sustainable bamboo. Investing these earnings back in the community could deliver universal basic assets such as healthcare, education, energy, water access to over 6 million households – with spending on healthcare and education matching international OECD standards.

To effectively steward these natural assets, creating ecological budgets and integrating them into financial accounts at both the state and national level is critical. Integrating environmental factors into the fiscal structure of an economy, especially the annual national budget, will allow the government to track natural capital

expenditure - and invest for its regeneration.

An ecological budget also offers policymakers the tools to incentivize new businesses, by restructuring incentives, taxes and subsidies towards projects, businesses and infrastructure that generates both economic and ecological benefits. In Eastern Himalayan states such as Arunachal Pradesh which hold the vast reserves of India's natural capital, the weighting of an ecological budget as the progenitor of the financial budget will provide the structure for fiscal decisions that align ecological and economic growth. Budgeting natural capital will also facilitate the development of new incentive structures for businesses such as a regulatory framework for environment impact assessment that positively grades businesses creating positive impacts on the environment – paving the way for smoother clearances and tax benefits. New schemes and subsidies can be shaped to target MSMEs dedicated to regenerating natural capital – whether through the restoration of degraded ecosystems, or through transitioning industrial farmlands to better, sustainable farming practices.

While carbon is only one facet of natural capital, investments in payment for ecosystems services through carbon markets will create new income opportunities for forest-fringe communities. Building this market in the Eastern Himalayan region will require comprehensive protocols for nesting targets, to link private investments with national targets and minimize double-counting of credits. Previous REDD policies were criticized for their limited attention to safeguarding protocols and internationally, REDD programmes have faced challenges when managing conservation needs against forest-fringe community needs. A policy which focuses on directing benefits and flows to communities will not only manage these problems, but also revitalize rural economies with robust long-term income streams they can invest in their communities.

Beyond policy, we need action on the ground. The theme for this edition of *The Himalayan* reflects this: *Rewilding the economy: the investment, business and employment opportunity*. Each of the articles gathered in this edition of *The Himalayan* dive further into what rewilding an economy looks like in practice, from building circular economies to enhancing energy efficiency to restoring forests in a way that benefits communities. They examine how building natural capital not only heals ecosystems but enhances human wellbeing – and what this means, going beyond economics to social and cultural wellbeing and the role nature has to play.

Every year, new reports are released showing how far the world is falling on our collective goals for biodiversity, climate and economic equity (the SDGs). Until we restructure our budgeting systems and incorporate our undervalued ecosystems – and the rich natural capital reserves they hold – these goals will always remain out of our grasp. We need to revolutionize our approach to economics and work with the natural world, not against it: with the natural capital we already have in hand.

A nature positive budget and economy is not a burden. It is the future of our economy. We must be wise and seize this opportunity, investing in our ecosystems for people and planet. The quicker we can ramp up our collective efforts to make this transition the better placed we will be to face the biodiversity and climate crisis. The Eastern Himalayas rich biodiversity is a natural buffer against the threats of climate instability. Investing in a Naturenomics™ transition is not a luxury: it is the future.

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Circular economy: a concrete model to answer to the climate and biodiversity challenges

– Axel Darut
European & International affairs advisor in the Circular Economy
– Shalini Goyal Bhalla
Managing Director ICCE

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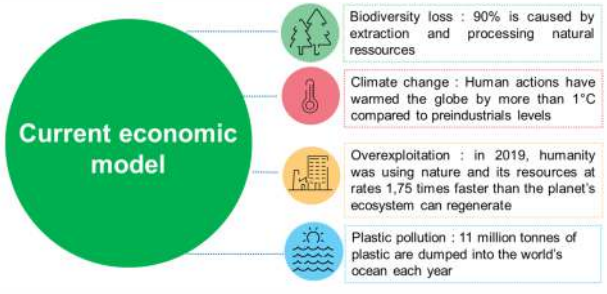
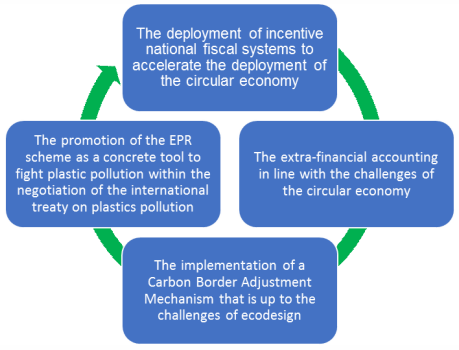
The Covid-19 pandemic and the latest extreme weather events remind us once again of the threats posed to humanity by the erosion of biodiversity, and the urgent need to mobilise all stakeholders to answer to the ecological crisis. In this context of awareness of the climate crisis, the latest report of the Intergovernmental Panel on Climate Change (IPCC) published on 9 August 2021, deplores that even if the commitments made during the Paris Agreement were respected, they would lead us to a global warming of 3°C. It confirms the anthropogenic origin of global warming and its magnitude, due in particular to our linear consumption and production patterns. The latest report by the IPCC[1] and the



Intergovernmental Panel on Biodiversity and Ecosystem Services (IPBES) also stresses the importance of protecting biodiversity in the fight against climate change. We are using about 1.6 earths; meaning we're using about 60% more of the earth's resources than it can regenerate every year. The world is only 8.6% circular[2] and the European Union's circular material use rate (referred to as the circularity rate) increased in 2020 but is only 12.8%[3]. By 2050, with an increased global population and a resulting rise in consumption, that "overshoot" could get to 3-4 earths, which is clearly unsustainable.

Furthermore, over-extraction harms people, the planet and our economies. Our current linear system depends on extraction, including of rare natural resources, and is responsible for 53% of the worlds carbon emissions and more than 80% of biodiversity loss[4]. Such systemic change can be catalysed by the circular economy. This includes reducing, reusing and recycling products as well as making better use of materials at different stages of their life cycle, notably through eco-design.

The next coming months will be important for the fight against the climate crisis with the hope that it be followed by a clear political vision and translated into impactful actions by public authorities and industries, in the light of IUCN, COP 26, COP 15 and the UN negotiations for an international to fight against plastics pollution. Because biodiversity and climate change are not two separate crises but two aspects of the same global crisis, key measures need to be implemented to accelerate the circular economy model at the global level.



For a treaty to expand EPR Systems internationally in order to fight plastic pollution

In order to fight against the pollution of natural spaces generated by plastic waste, a draft resolution on an internationally legally binding instrument will be examined at the United Nations General Assembly in 2022. Convinced of the need to provide a global and coordinated answer to this challenge, numerous companies and environmental associations are supporting the draft resolution for the adoption of a legally binding global agreement[5]. This treaty must therefore promote a circular economy encompassing the entire life cycle of plastic products and EPR systems to best fight against litter and integrate them into the circular economy loop, in line with G7 Charlevoix leaders' declaration from June 2018[6] and G20 Osaka leaders' declaration from June 2019[7].

For a Carbon Border Adjustment Mechanism that is up to the challenges of ecodesign

At the European scale, the continent has managed to decouple its greenhouse gas emissions (-24%) from its economic growth

[1] IPCC report, "Climate Change 2021: The Physical Science Basis", August 2021
[2] Circle Economy, Circularity Gap report, January 2020
[3] European Commission, "EU's circular material use rate increased in 2020", November 2021
[4] Resource extraction responsible for half world's carbon emissions, UN study, The Guardian, March 2019

(+60%) between 1990 and 2019[8]. However, these figures do not take into account emissions from international trade. At the heart of the legislative proposals of the "Fit For 55" package presented by the European Commission on 14 July 2021, the Carbon Border Adjustment Mechanism (CBAM), which is inspired by the emissions trading system, would enable the EU to extend its rules on emissions to companies operating on its territory and thus combat carbon leakage. Citeo supports this mechanism as an efficient tool to avoid producers of virgin material to relocate their activities to regions of the world subject to less coercive environmental rules. The CBAM should enable efficient management of resources within the internal market while contributing to the objective of carbon neutrality.

Therefore, to have an incentive CBAM mechanism, at the worldwide level, such as the EU level, that will take into account the economic incentives and the environmental impacts of virgin materials and recycled ones, such tool could:

- Strengthen the recycling market regionally;
- Support measures aimed at integrating recycled materials such as recycled content targets, such as the ones promoted within the G7 Charlevoix leaders' declaration[9];
- Contribute to closing the price gap between virgin and recycled materials;
- Support an equivalent level of competitiveness between products incorporating recycled materials and those made from virgin materials.

For incentive economic tools to accelerate circular economy

Finance is a key lever for achieving the ambitious goals of economic prosperity, social inclusion and environmental regeneration. The World Conservation Congress, held in Marseille last September, made a strong call to large companies and other investors to analyse the potential impact of new investments on nature at an early stage, favouring those that benefit nature. In this perspective, the classification system of sustainable economic activities, as foreseen by the European taxonomy, should recognise the complementarity between circular economy activities and climate change actions, and could be a source of inspiration for others regions of the world.

In this perspective, at the worldwide level, it's necessary to support complementarity approach between:

- a CBAM to include the carbon impact of raw materials importation and limit the carbon leakage of regional production;
- a regional taxonomy to give incentive to green activities that help the deployment of the circular model;
- a sustainable product strategy that takes into account the raw materials resources within the territory and the reduction, reusability and recyclability of the products at the scale and in practice, to support strategic investments and

[5] NGOs and Businesses Call for UN Treaty on Plastic Pollution, WWF, October 2020
[6] G7 Charlevoix leaders's declaration, June 2018
[7] G20 Osaka Leaders' Declaration, June 2019
[8] European Commission, Progress made in cutting emissions, 2020 targets
[9] G7 Charlevoix leaders's declaration, June 2018

answer to the "3R" of the circular economy;

- an incentive fiscal system to provide an incentive for all the raw materials, and specially the plastic value chain players to discourage the purchase of virgin materials outside the regional market, while favouring the purchase of recycled materials to combine environmental preservation and industrial resilience while meeting a common environmental ambition.

For moving the environmental impact from "extra financial" to "financial" reporting in accounting rules

In line with the circular economy strategies, the there is a need to improve the world corporate governance and the world regulatory framework to prioritise long-term sustainable value creation over short-term profits, while aligning the interests of companies - their shareholders and managers - and society by including the environmental impact of industries within the accounting process, moving from the "extra financial" to the "financial" reporting.

In this perspective, the circular economy will be a at the core of the business strategies while being a competitive variable, combining in this way the business and the nature with a circular economy model that is truly sustainable, and not based on green washing principles.

What is a community well-being approach to conservation and why is it so important?

– Beth Allgood,
President, OneNature

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Introduction

As we take stock of the social, environmental, and economic crises facing the world today, it's clear that our current way of life and the systems we have built to sustain it are inequitable, unsustainable, and economically precarious. For decades, policymakers have used Gross Domestic Product (GDP) as a leading indicator of the economy's general health (Kramer, 2021). GDP as a single metric cannot meaningfully assess a country's overall standard of living or well-being (Callen, 2020).

At OneNature, we believe this is true not just at a global level but at a local level as well. The focus on economic productivity as a measure of success has been ingrained in community development and conservation projects for decades. Most wildlife conservation work has emphasized economic approaches to saving wildlife and wild places. At times this approach has

been at odds with traditional community values; It may have even undermined the relationship with wildlife and nature that has kept species and spaces thriving for generations. Without deeply understanding and supporting community well-being, conservation projects will fail to reverse the extinction crisis, secure environmental sustainability, and support social justice and human thriving in communities stewarding the world's remaining wildlife and wild places.

The problem with existing global metrics.

The emphasis on economic measures of progress, like GDP, is founded on the concept of infinite growth potential, but our planet, lives, and resources are, undoubtedly, finite (Jones, 2021). By aiming at impossible growth, these models take an unsustainable toll on human society and planetary health. Moreover, research and experience have shown that favoring the economy's health over the health of the environment is counterproductive; a healthy environment is the necessary foundation of a healthy economy (Bruyninckx, 2021).

The definition of well-being, "the combination of feeling good and functioning well" (Ruggeri et al., 2020), includes "domains" such as life satisfaction, psychological health, community, culture, education, environment, government, and economy, among others (Musikanski et al., 2021). Measuring well-being therefore means measuring values and priorities beyond economic growth and productivity.

The well-being economy movement offers models for valuing the links between nature and well-being while understanding the importance of sustaining natural resources to protect a healthy economy and environment (Chrysopoulou, 2020).

The importance of nature and wildlife to human thriving.

There are various ways of understanding the value of nature. The instrumental value of nature refers to how it directly benefits people by providing food, energy, and raw materials (Sandler, 2012). The intrinsic value of nature is the inherent worth of nature, independent of people (IPBES, n.d.). These first two values are often seen to be at odds. The relational value of nature emphasizes the connection between people and nature such as the role of nature in people's identities and moral values (Schröter et al., 2020).

It is challenging to isolate the value of wildlife from the value of nature as a whole. Attempts to assign value to wildlife have often relied on an economic frame in which wildlife parts and products are assigned a higher value than living, thriving animals contributing to a flourishing ecosystem (Heal, 2001; van Uhm, 2018). Valuing wildlife in non-material ways is difficult using our current valuation systems, but it's urgent and necessary to do so if we are to prevent a catastrophic loss of biodiversity. The well-being of many human communities is directly dependent on local wildlife and the survival of wildlife populations depends on the stewardship of local communities (Gross et al., 2021).

The importance of linking community values and conservation success.

As with global metrics, rather than relying solely on models that equate economic growth with human thriving, we should use common values grounded in well-being. We must have an understanding of diverse worldviews to reassess what actually matters to society, acknowledge the systemic issues we face, and develop new

practices that promote well-being for people, wildlife, and the planet (Chrysopoulou, 2020).

To understand and measure well-being in conservation projects, it's common practice to rely on objective indicators (information observed about the community) instead of subjective indicators (information about the subject's experience from the subject's perspective) in assessing community impacts. OneNature believes that both types of indicators are vital to establishing a true well-being baseline that can provide reliable information on community perceptions and early warning signs of unanticipated challenges. OneNature and the Happiness Alliance have created a peer-reviewed validated community well-being index that is a model of such a subjective well-being survey. It's designed to assess life satisfaction, the many domains of well-being, and communities' feelings about wildlife and nature around them.

The cultural and spiritual significance of nature can offer important perspectives on why and how to protect animals that scientists, policy-makers, economists, and conservationists are only beginning to recognize. OneNature and our academic researchers recently worked with conservation and community partners to identify examples of cultural and spiritual connections to species that serve as an important underpinning of a successful conservation approach. In case studies contributed by these partners authors described how existing spiritual and cultural connections between communities and wildlife can be supported and strengthened while addressing human-wildlife conflict and other community challenges.

Community ownership of the project can be enhanced through deep listening to the community, creating a wellbeing baseline as discussed above, participatory planning and capacity building with this wellbeing baseline in mind, and monitoring and evaluating the project with wellbeing as a critical success measure and indicator of unforeseen community impacts.

Recommendations

OneNature recommends the adoption of a new, comprehensive approach to community conservation centered on community values and perceptions. This approach allows conservation practitioners to better support communities and wildlife. It can be used not just support communities, but can inform and encourage decision-makers to better understand the value and connection communities have to wildlife and nature. This information can then be used to develop more socially just and sustainable policies and funding to increase human thriving, protect species and habitats, and improve long-term economic sustainability.

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Building a climate-smart restoration economy in India

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India is home to 17.7% of the world's population living on a meager 2.4% of the world's total land area that puts a huge pressure on its natural resources including land. Facing extreme events such as flooding, heat stress and droughts among other climate stresses, India is also one of the most vulnerable countries in the world, according to the latest IPCC report released in 2022. Hence, locally led strategies like forest protection and landscape restoration are critical for mitigating climate risks, building resilience, and enhancing livelihoods.

The Government of India has made strong commitments to land restoration pledging to restore 26 million hectares (Mha) through its Bonn Challenge and Land Degradation Neutrality targets, to sequester 2.5 to 3 billion tonnes of carbon dioxide equivalent by expanding its forest and tree cover by 2030 under its Nationally Determined Contribution targets and the Net Zero by 2070 commitment. These commitments also underpin key domestic targets such as the vision of doubling farmer incomes, National Mission for Sustainable Agriculture, Mission for Integrated

Development of Horticulture, National Bamboo Mission, and *Nagar Van Udyan Yojana*, among others.

However, to achieve these climate targets, there is a need to adopt a climate-smart restoration economy - one that restores landscapes, creates new carbon sinks, enhances resilience, and generates sustainable livelihoods through nature-based activities. WRI India's Restoration Opportunities Atlas identifies that over 100 Mha land in India has a potential for forest protection and mosaic restoration that can sequester 3 to 4.3 billion tons of above ground carbon by 2040 (Chaturvedi et al. 2018). Additionally, restoring this land can also enhance livelihood opportunities and food and nutrition security for local communities. For example, an ongoing restoration action in ~9000 hectares of land in Sidhi District of Madhya Pradesh has been able to create a work demand of 4,081 days from households, wage employment for around 6500 persons, and a total of 38,778 person-days of jobs with an employment value of INR 74,84,154 (~USD 9,500) in the initial months only through the Mahatma Gandhi National Rural Employment Guarantee Scheme (MGNREGS).

In context of India, while our analysis for the period of 2011-2016 showed that the Government of India allocated around INR 1,02,505 crores ($13 billion, based on 2018 conversion rates) for protecting forests and extending tree cover, 75 percent of which was sourced from MGNREGS. However, this national scheme primarily aims at jobs creation, not landscape restoration. (Singh, R., 2022). There are a few other budgetary supports within the government schemes and departments that are a mix of compensatory mechanisms and incentives that provide financial support for forest protection and landscape restoration. Despite the bio-physical potential, government commitments, and enabling policies, however, implementation of restoration interventions has been sub-optimal and face several barriers such as low awareness of communities towards land restoration interventions and its potential, limited capacities of entrepreneurs, small and medium enterprises and small holders in building sustainable business models, limited avenues of finance and policy and regulatory gaps for enabling restoration at ground.

Nurturing restoration entrepreneurs in India for transitioning to a climate-smart restoration economy

Investing and supporting forest protection and landscape restoration is an important solution that can equitably bring rural prosperity to struggling communities. In India, there are emerging entrepreneurs who are looking at this synergistic linkage between communities and our land ecosystems, which have suffered from

decades of unsustainable farm management practices. Although there is an opportunity for developing and upscaling restoration-based businesses, few of the entrepreneurs working to restore India's damaged landscapes have accessed the finance they need to restore land. Empowering small businesses and community led ideas with additional capital and capacity (for harmonizing efforts at landscape level, developing inclusive landscape and community management plans) while creating a policy environment that can help them thrive, can bring significant economic and carbon benefits – to the tune of INR 525-2,250 (~ $7-30) for every INR 75 ($1) invested (Ding et al. 2017).

Land Accelerator South Asia is one such program which is supporting these entrepreneurs implement land restoration initiatives and creating sustainable livelihood opportunities for local communities who are facing the risk of climate change at large, through their.

These entrepreneurs are mobilizing local communities to adopt restoration models providing nature-based solutions that can contribute to the restoration economy. Aadhimalai Pazhangudiyinar Producer Co., for example, processes, purchases and markets NTFPs collected by over 1,600 indigenous people from over 160 villages in Tamil Nadu's Nilgiris Biosphere Reserve. The producer company trains them in sustainable harvesting and processing of NTFPs like wild gooseberry to shikakai, soap nuts and wild honey etc. After selling it to wholesalers, the company provides returns that are 20-25 percent above the market rate to these villagers, tribals and small holders in and around the reserve. Offering better incomes and livelihood alternatives in this way incentivizes community members to protect their forest area and prevent clearing of forestlands for farming.

Another example in Eastern Himalayas is Jeev Anksh Eco Products that works with more than 10,000 small farmers of organic and indigenous products in the Himalayan foothills of Guwahati in Northeast India. It has created strong value chains for native crops like Manipuri Black Rice, Himalayan Red Rice, Bao Red Rice, Lakadong Turmeric, etc. By providing profitable market linkages, it's encouraging these farmers to grow indigenous crops, restoring fragile Himalayan croplands, thereby creating local livelihoods. The team also manages their own 1000-hectare organic farm that employs local people for entire farm management thereby building their skills.

Similarly, a small enterprise called SP Foods, based in Kakching, Manipur is developing value chain for bamboo, an ideal crop for land restoration, thanks to its rapid growth and extensive root systems that locks soil in place with a long lifespan. This is particularly important for fragile landscapes like the Eastern Himalayas. It engages with local women farmers/tribals in harvesting and processing of tender bamboo shoots to create value-added, marketable bamboo product which is in high demand as a delicacy, thus securing incomes for local women and tribal farmers and encouraging bamboo planting by developing market linkages for its by-products.

Over the last three years, the Land Accelerator South Asia has supported 120 such business leaders who are restoring farms and forests and together have created around 2600 jobs, restored more than 1 million hectares of land, engaged 1.5 million small and marginal farmers, and planted

nearly 8 million native and indigenous trees supporting farm-forestry, agro-forestry and food forest models. The entrepreneurs are also building their skills around how to measure, document and communicate their impact resulting from these self-reported interventions with the help of targeted curriculum at Land Accelerator.

Thus, the local enablers and practitioners of landscape restoration (entrepreneurs and communities) are contributing towards building a restoration economy through these emerging and innovative interventions. Impactful results of these businesses at local levels are generating traction for impact investment and investor communities are eyeing their growth and potential to scale up. These emerging stories of success and transformation from local communities, now self-reliant and climate resilient, are helping establish the credibility and acceptability of such restoration-based business models for funding. The success and profitability of these early stage interventions depends to a large scale on the access to right kind of capital.

However, landscape restoration is a complex task, and no technique or business model will be a silver-bullet solution. But by empowering local entrepreneurs and building their capacities around developing sustainable and profitable business models, creating and tracking their socio-environmental impact, and enhancing their pitching skills through the Land Accelerator Programme is certainly helping create local solutions to the challenges posed by climate change in an ethical and community-led way, thus building a new restoration economy.

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Creating wellbeing on the frontlines of climate and biodiversity crisis

– Joanna Dawson, Binita Kakati, Harikrishnan Palampatta & Ankit Jha
Balipara Foundation – Socioecological Research Team

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India's Eastern Himalayas stretch across a diverse biocultural landscape that is home to over 200 different indigenous communities. But today, this is a landscape at risk, plagued by rising deforestation, including the loss of natural primary forest, and by accelerating climate change. Over 80% of the region's population is employed in heavily nature-dependent industries ranging from agriculture to tourism. A high dependence on rain-fed agriculture, poor access to forests and poverty mark some of the biggest risks to the communities of the region, according to the recent Climate Vulnerability Assessment report – with states like Assam, Arunachal Pradesh and Mizoram ranking within the top ten most vulnerable states of India.

In the next decade, reports such as ICIMOD's report on climate change impacts in the Eastern Himalayas, the region will see a disruption of its usual weather systems, ranging into extremes. While rainfall is expected to increase, delivered in shorter, more intense spells, overall evapotranspiration is set to rise as well: by 4-10 times more than overall rainfall increase.

Meanwhile, rapidly melting glaciers are set to make floods more devastating and unpredictable, creating a water paradox of devastating floods and prolonged dry seasons.

The region is also one of India's deforestation hotspots: nearly 75% of India's net deforestation occurred in the North East, as per the Forest Survey of India's 2019 report. This forest loss has serious repercussions. The region's hydrogeology depends heavily on forests and shrinking green cover contributes to rising desertification. An estimated 12.5% of the region's land is now barren, spoiled by the twin forces of green cover degradation and water erosion of the soil – worsened by the shrinking forest cover.

Rural & Indigenous communities on the frontlines

On the frontlines of these burgeoning natural challenges are the region's indigenous and rural communities. According to multivariate poverty data, India's Eastern Himalayan region is one of the weakest performing regions in the country because of poverty. On average, the region is scored at 0.4 on the index's scale and around 35% of the region's households are multidimensionally poor.

India's silent rural employment crisis has meant that the average age of farmers is rising, as young people migrate to urban centers to earn for their families. Farmers at home find themselves barely breaking even. But in the absence of alternate livelihood streams, farmers still continue to farm simply because there is no alternative. As per the 2011 census, over 526,000 people had migrated out of the North East, and an additional 430,000 had migrated across states in search of employment. Intra-state migration is even higher, with over 13 million people in the region migrating within states – largely in search of employment opportunities.

Other statistics bear the statistics on multidimensional poverty out. The fifth National Family Health Survey found that stunting in children had risen in Meghalaya, Mizoram, Nagaland and Tripura: a reversal of a fifteen year trend showing improvement in this area. Nearby Assam fared no better, with only 8% of young people (ages 6-23) consuming healthy, balanced diets. On the whole, indicators on the diets and nutrition of infants and children show deterioration from the previous survey.

With a future of climate instability on the cards, the region's social and economic challenges are likely to worsen, compounded by the rising ecological degradation. In this future, it is the region's rural and indigenous communities that will face these challenges.

Building a nature positive economy in Baligaon Miri Green village

In Sonitpur district, Assam, not far from Arunachal Pradesh, the Mising community at Baligaon Miri village have been working to achieve balance between ecology and economy. Since the 1980s, Komison Mili has been working with his community to not just adopt sustainable, scientific practices, but also to revive and pass down the traditional practices of their community that were already sustainable, or were built on a rich body of traditional ecological knowledge. Under his leadership, Baligaon was certified a Green Village by the CII and Indian Green Building Council in 2016.

Over the years the community has been involved in conservation programmes,

energy conservation, recycling, the planting of trees and the introduction of low-carbon tourism through eco-friendly homestays. In 2019, working with the Balipara Foundation the community began to experiment with the creation of food forests on fallow and waste lands, as well as restoring forests to prevent erosion of community land. Since then, the community has seen their incomes increase by up to 40%.

Agroforestry allows farmers even with extremely marginal holdings to benefit. In a total of 0.3 acres of land, a farmer can grow up to 8 crops simultaneously, from lucrative cash crops such as pepper and ginger, to nutritious food crops such as pumpkins, moringa and sweet potatoes. Studies indicate that agroforestry in tropical countries like India improve overall land productivity by up to 64%, simply by optimizing land use.

Despite the pressures being faced by villages around them, Baligaon took the opportunity to involve the 200 returning migrant workers in expanding their agroforestry. During this period, they initiated the plantation of commercially viable species of amla and bamboo on village common lands, further enhancing their livelihood opportunities.

Komison Mili reflects: "It was not our job exactly, as young children, to think and act in this way, but I am glad that we did, perhaps out of adversity, and lack of guiding authority, to think for the future, in terms of preserving our inseparable rich ecology and culture." His interest in the village's future led him to encourage famers to adopt models like agroforestry and move away from chemical-based farming towards organic farming.

"The importance of conserving our environment, maintaining an ecological balance, not to destroy our 'traditional' relationship with nature, I felt necessary all my life," he says.

Human and ecological wellbeing: intimately intertwined

Fig:- 1 The diagram above shows some of the interrelated variables of wellbeing

For many, the growing threats to traditions, cultures, well-loved places that are now disappearing are motivating them to transform the landscape. For others, it is a matter of immediate survival and finding alternate, climate-resilient incomes that can help them weather the coming challenges.

Baligaon is located by the Jia Bhareli river which has been changing course over time due to sand mining and the increasing floods over the years poses a threat that is increasingly felt by the communities. The awareness of wanting to save, conserve or protect nature didn't come from an ideological or ritualistic understanding but was determined by real consequences that the communities faced. The people have been actively involved in reforestation and efforts at conserving nature to counteract the threats they were facing.

Indigenous communities around the world

have been known to have respect, honour or reverence towards nature closely intertwined into their lives. The thinking of nature not as a resource which requires extraction, but as a being that requires care is intrinsically a part of the way most communities view their everyday life. However, it was mostly for very existential reasons that the people felt they need to be close to nature- this was also the case in most other places- the single most important determinant in shaping their lives with nature was not entirely religious or cultural but logical- people "knew" the extent to which nature was a part of their lives and the ways in which it contributed to their well-being.

This was exacerbated by the increasing threats they were facing- there is an urgency now to protect nature as they had seen through their experience of watching the landscape change around them for the past few years, that their only way forward was not to destroy the home they live in. This is important as it is commonly assumed that tribes or forest fringe communities have a relationship with nature which revolves around esoteric "religious" and "cultural" significance that nature has for them- this narrative in some ways undermines the lifeworld, scientific understanding communities have of nature as a part of their own being and the real challenges communities face at this point that compels them to protect nature.

Creating wellbeing through nature-positive economies

Research from around the world shows the biggest predictor of biodiversity loss is socioeconomic inequality: even in countries with robust institutions for protecting biodiversity, high levels of inequality led to rampant biodiversity loss. Other research in Indonesia showed having easy access to clinics significantly reduced deforestation on the fringes of rainforests. At the core of the Rural Futures model lies the question: why not people and forests together? Rather than the zero-sum game of forests versus development, the Rural Futures model aimed to change the way people saw the earning potential of forests – from commodification through destruction, to natural capital through regeneration.

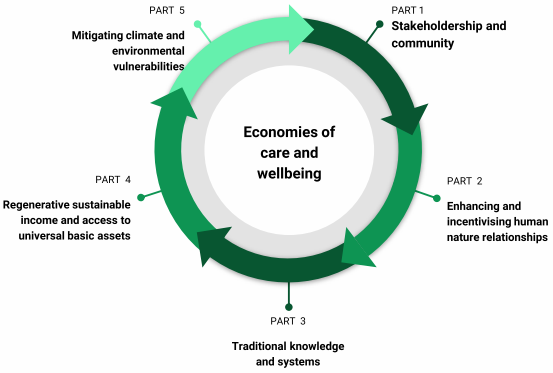


Fig. 2: Elements of sustaining economic and social wellbeing

In this five year journey to refine and perfect our model, we have seen the people we work with improve their incomes by 40% and use that money to invest in their homes and communities in innovative ways. Families in a village on the fringes of Nameri National Park used the income to ensure their children stayed in school, instead of needing to work to supplement the household's earnings. In Balipara Reserve Forest the community used communal earnings to invest in upgrading some of their local infrastructure. Through our research on wellbeing, over 90% of the nearly 200 people we interviewed preferred the opportunity to have nature-positive job opportunities within their communities over

migrating to cities and nearly 60% stated that a sustainable stable income in their communities is essential for them to live well – even if it meant earning less than they would outside their homes. Wellbeing, in other words, is more than just pure economics: it is also the social fabric of communities, healthy ecosystems and the intangible value of a "home".

Fig. 3: Findings from Balipara Foundation's research on wellbeing

Today forests are the top of the global agenda for fighting climate change. For the Eastern Himalayas, these forests aren't just a stepping stone: they are a lifeline for its people and this lifeline is in critical danger. The magnitude of the problem facing Eastern Himalayas, its people and biodiversity is cataclysmic. But the opportunity for transformation is just as powerful. This is the moment in history for us to establish and take a lead on biodiversity, conversation, nature-based recovery and climate action for decades to come. Investment in full-scale restoration and transition to climate-smart agriculture can easily generate quality, new jobs. Our estimates suggest a potential of nearly 2 million, and INR 36,045 crores in agroforestry based income for the region.

The recognition of the role of ecosystems and communities in fighting the climate crisis at COP26 and COP27 is slowly moving the world towards a Naturenomics™ paradigm. Old linear models are no longer fit for purpose. We need regenerative models that recognize the role that nature plays in the wellbeing of people – and changing our economic practices is the first step to changing our understanding of the role it plays. The future of our rural and indigenous communities depends on our willingness to invest in nature.

Revitalising ecosystems and building resilience through 'Amar Bon' – Structured agroforestry project that offers lessons for the world

– *Abu Sadat Moniruzzaman Khan*
Programme Head | Climate Change Programme | BRAC

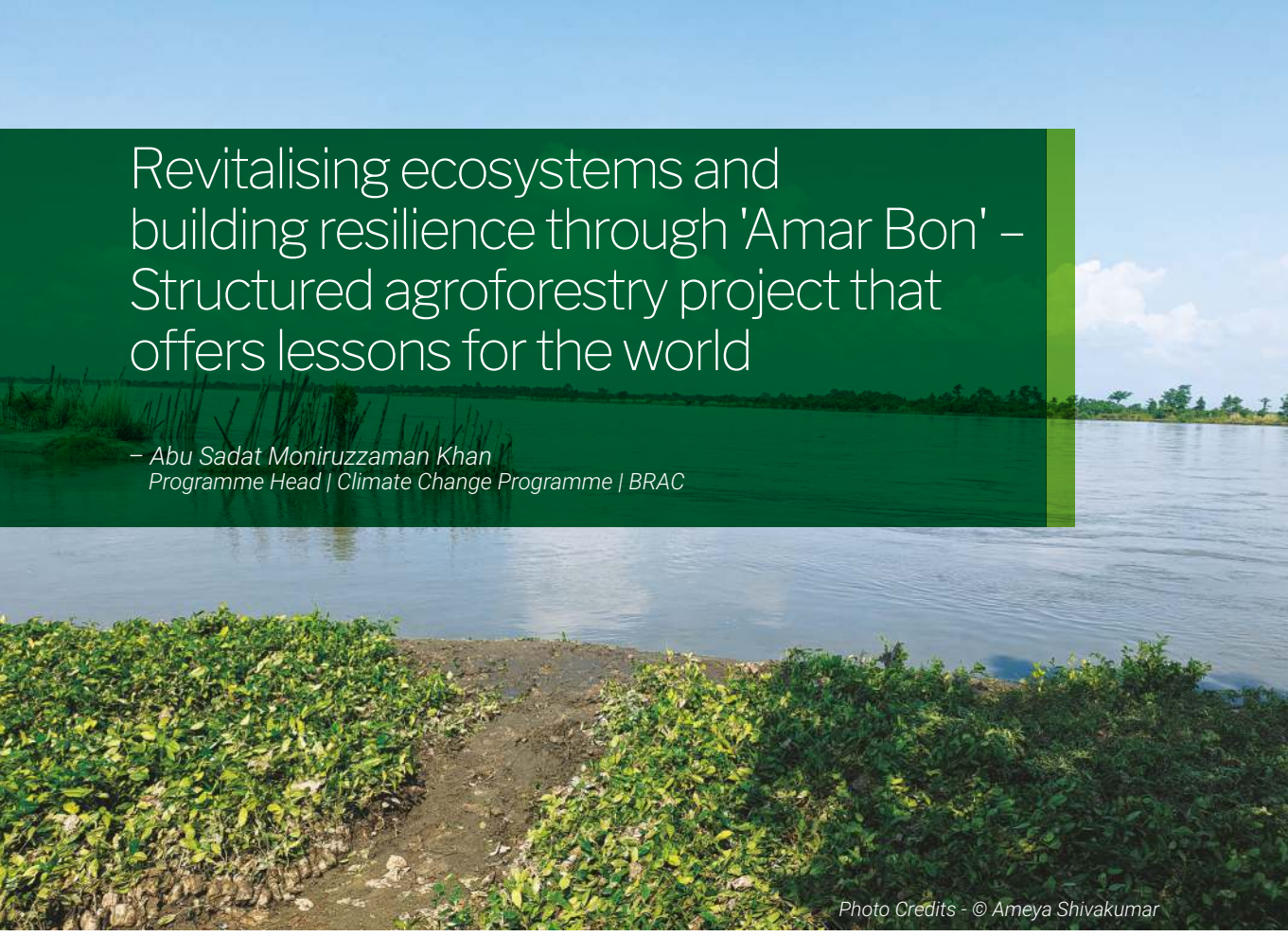


Photo Credits - © Ameya Shivakumar

Bangladesh's economic growth has been hailed the world over as a modern day miracle. Can a curse reverse that miracle and undo all the gains the country has made so far, progress only made possible by unleashing the potential of human agency? It can and the process has started – the climate crisis is that curse.

Situated in a geographic location which is inherently vulnerable to climate change, Bangladesh's growing industrial base and fertile farmlands need protection from the consequences of rising sea levels and changing weather patterns.

To make matters more challenging, a large section of the country's population lives at or below the poverty line, with many relying heavily on agriculture and local forest resources. The majority live in highly climate-vulnerable areas and experience first-hand the climatic extremes caused by a changing planet. More frequent cyclones and storm surges, intensified flooding, drought, flash

floods, saltwater ingress and waterlogging, erosion and rising sea levels can wreak havoc on people's lives.

According to the latest report from the Intergovernmental Panel on Climate Change (IPCC - AR6), parts of the country could lose between 31 and 40 percent of agricultural output due to sea level rise, by the end of this century. The consequences are devastating for ecosystems and the people who depend upon them. Diminishing soil fertility, shrinking farmland, destroyed fishponds, and degraded forests and natural resources are already resulting in tremendous damage to livelihoods and biodiversity.

Despite the gargantuan challenge, Bangladesh has shown enormous resilience and determination to tackle the climate crisis – a crisis in which they had little contribution. By championing community-centric and locally-led adaptations to climate change, Bangladesh is tackling the climate crisis head-on and showing the world that even in the gravest of circumstances, there is always a way— innovative adaptive technology, rigorous research, new policy development and local-level implementation, all of these ignite hope for the future and guide actionable adaptation initiatives for the present.

At the core of Bangladesh's approach to both adaptation and mitigation is its emphasis on nature-based solutions. There is no greater force than mother nature herself and the country has been quick to recognise that healthy, vibrant ecosystems and socio-economic well-being go hand-in-hand.

The country has huge potential for using re-wilding techniques, conservation, and nature-based solutions in the fight against climate change. The fertile alluvial plain, forest reserves, and a flourishing agrarian economy combined offer a powerful toolkit with which to weather the worst of the climate storm.

One such initiative is *Amar Bon*, which translates to 'my forest' in Bangla, by BRAC. BRAC focuses on bringing inclusive, cost-effective, evidence-based, adaptive, and nature-based solutions to the problem of climate change and has contributed to the socio-economic development of over 100 million people in Bangladesh.

Amar Bon or 'My Forest', is an innovative agroforestry project that uses afforestation to positively impact the local environment and mitigate climate change. The pairing of forestry and agriculture has numerous benefits for the environment and for climate-affected communities both.

One of the key issues in many parts of Bangladesh has been the increase of fallow land during the last few decades. A huge portion of the previously arable have been rendered non-arable due to long-term climate-change effects such as erratic weather patterns.

The *Amar Bon* system replenishes the fertility and stability of these areas and can lead to long-term environmental regeneration, significant carbon capture and improved local economies. Landowners or farmers

with 10 decimals or more of land in selected localities receive tree saplings, seed, and the technology to plant and manage them in accordance with the principles of agroforestry laid out in the programme.

The concept utilises a unique 'alley cropping' method using three different types of sapling — one for its timber potential, one for fruit, and one for its medicinal properties. To ensure optimal growth and the harness maximum possible yield from the land, the tree plantings are paired with an understorey of shrubs and bushes that have their own economic, environmental, and agricultural value.

The variety and range of the plantings — each of which can be tailoured to the needs and demands of the specific location — means that monoculture is avoided and resilience to disease and weather is built into the system.

Landowners receive a supply of native and climate-adaptive tree and shrub species, along with information on planting and maintenance. In return, they commit to maintaining the new green plots for at least 20 years. After planting, the landowners retain ownership of the trees and their products.

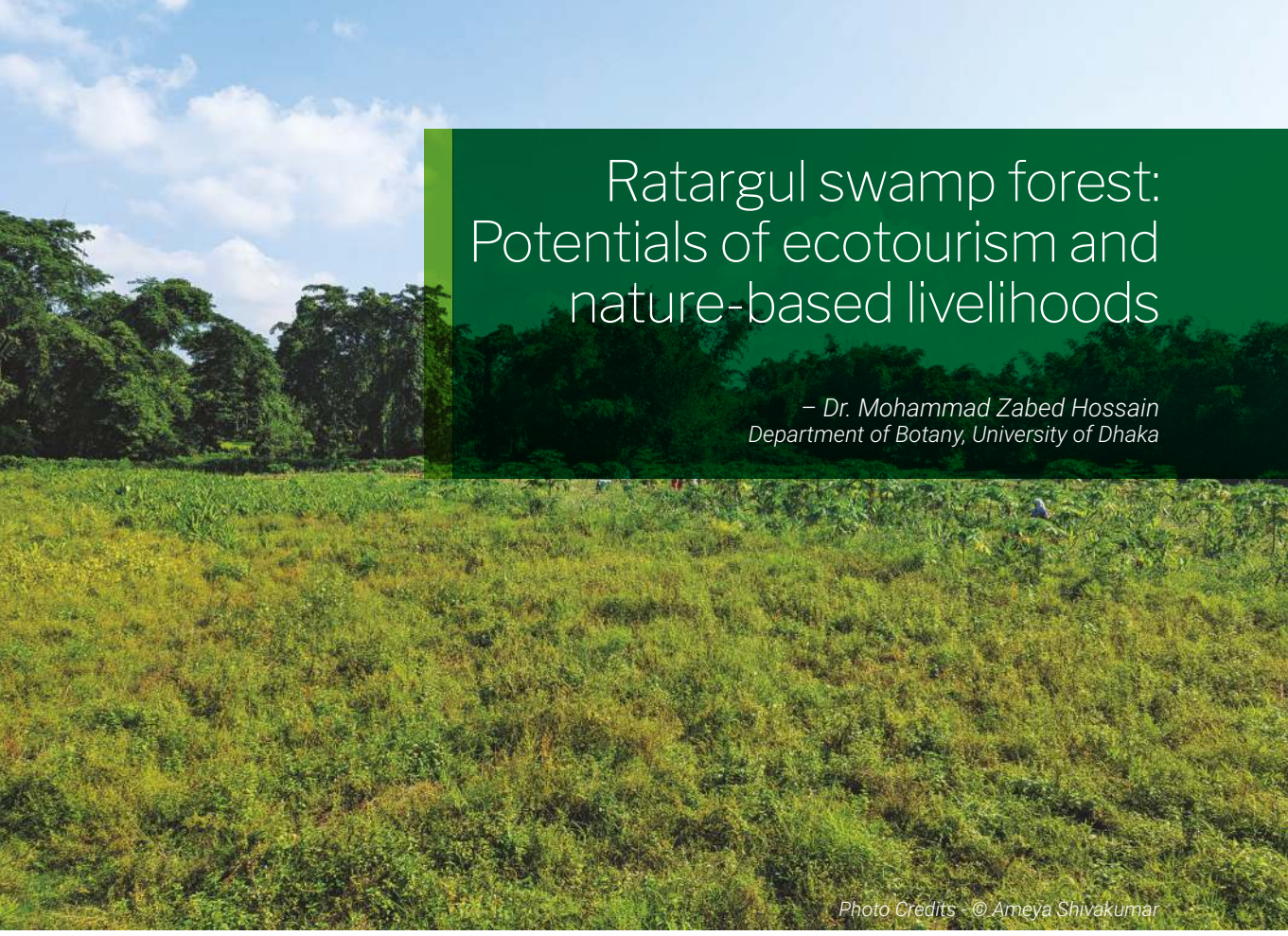
Amar Bon is an egalitarian and inclusive programme where participants contribute their labour and share the bounty the new agroforests produce. It contributes indirectly to the local economy by stimulating local nurseries and plantations, and directly by generating short and long-term returns for the landowning households that planted them.

Most importantly, *Amar Bon* creates a flourishing and diverse agro-ecosystem that enriches the soil, improves air and water quality, and offers a sustainable model for future development and regeneration.

BRAC Climate Change programme currently manages approximately 100 *Amar Bon* plots in coastal climate-vulnerable areas. Forty-four of these plots are situated in the Shoronkhola sub-district of Bagerhat in southern Bangladesh, which has been heavily hit by saltwater ingress. The rest of the plots are in the Galachipa sub-district of Patuakhali, an area that has suffered erratic rainfall patterns, leading to severe waterlogging.

The vast ecological and socio-economic benefits of the *Amar Bon* system hold incredible potential for the entire world and despite rising sea levels and changing weather patterns, the battle against climate change is not lost yet. Bangladesh has proven that improved biodiversity, coast and soil stabilisation, socio-economic well-being, and increased adaptive capacity are within the grasp of everyone.

**The author is the Programme Head, Climate Change Programme at BRAC.*



Ratargul swamp forest: Potentials of ecotourism and nature-based livelihoods

– Dr. Mohammad Zabed Hossain
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Photo Credits - © Ameya Shivakumar

Ratargul swamp forest is the only fresh water swamp forest in Bangladesh. This forest is located about 45 km in the North-West of the district town Sylhet. It is situated in the Surma-Kushiyara floodplain on the southern side of the river Goyain. The forest was declared a Reserved Forest under the Assam Forest Act in 1932. The area of the reserve forest is 204.25 ha. In 2015, the government of Bangladesh declared Ratargul swamp forest a Special Biodiversity Reserve Area to protect its environment and biodiversity.

The forest is inundated during the rainy season when the canopies of the tree species are seen above the water level. During the dry season water flows through the three canals known as *Chengir Khal, Kaier Khal* and *Shiali Chhora* in the forest area. Tourists are attracted by the beauty of the forest during both wet and dry seasons.

Ratargul swamp forest is a tropical wetland ecosystem with diverse plant and animal communities. The Department of Forest of the Ministry of Forest, Environment and Climate

Change of the Government of Bangladesh has reported about 73 plant species, 26 mammal species, 195 bird species and nine amphibian species in the forest. A two-storeyed vertical stratification of plants is distinctly seen in this forest. The top storey is dominated by three tree species namely *Borun (Pongamia pinnata), Hijol (Baringtonia acutangula)* and *Karach (Crataeva nurvala).* Cool mat plant (locally known as *Murta or Patipata) (Schumannianthus dichotomus)* and cane plant *(Calamus viminalis)* are grown in the second layer. Another shrub species which is a wild rose *(Rosa involucrata)* is also found in this tier. Besides, some common undergrowth herb species including *Diplazium esculentum, Mikania cordata, Dopartium junceum, Mucuna zygantea* and *Asparagus racemosus* are seen during the dry season. A diverse wildlife community of monkeys, fishing cats, civets and mongoose snakes as well as winged species such as heron, egret, kingfisher, swan, water fowl, dove, parrot, bulbul, eagle and kite birds are seen in the forest. Moreover, some migratory birds including cotton pygmy goose and vultures are also found in the forest during winter season. Various local fish species including Rohu and Anabus fishes are found in the canals flowing through the forest.

The biodiversity of the forest is the source for providing provisioning, regulating, cultural and supporting services (Box). These services are playing significant role in enriching local and national economy of the country. Impact of the forest on the culture and socio-economy is also immense. People living surrounding the forest area depend totally or partially on this wetland in various ways. Farmers do cultivation of rice in the area surrounding the forest. Besides, fodder and biomass comes from this wetland ecosystem. Some local people lead their lives by selling mat made of the bark of the cool mat plant collected from this forest. The good quality of this product is called *Shital pati* (cool mat) which is famous in the region. Canes are also another kind of natural product of this forest. Cool mat and canes are used for making handicrafts, thatching materials, and many other purposes. Some people also live on fishing in this wetland across different seasons of the year. With the increasing number of tourists, several other occupations are also on the rise, creating more livelihoods for the local people. Villagers are getting involved in operating shops, vending shops, local transport such as boats, manual and auto-rickshaws, automobiles and so on.

Glimpses of Ratargul swamp forest

The forest provides not only the provisioning and supporting services, but also regulating services. It plays an important role in storing and maintaining ground water level which improves agricultural lands in the nearby area. Its role in regulating climate, atmosphere, biogeochemical cycling, soil formation and biological control is also significant. Aesthetic and cultural services provided by the forest contribute to the betterment of the local community. Huge number of students from different institutions of the country visit this site as

part of their study tour. Thus, this forest has become a hub for the study tours of educational institutions.

BOX 1: ECOSYSTEM SERVICES			
Provisioning	**Regulatory**	**Cultural**	**Supporting**
Timber, biomass fuels (litter), crop cultivation, fishery, wildlife, forestry, agriculture, fodder	Atmospheric, climatic, hydrologic, erosion control, soil formation, biological control, nutrient cycling	Ecotourism, recreation, study, landscapes and beauty, aesthetic, religious, spiritual, ethical	Floating hawker (vendors), local transport business, boat renting, hotel, restaurant, shops

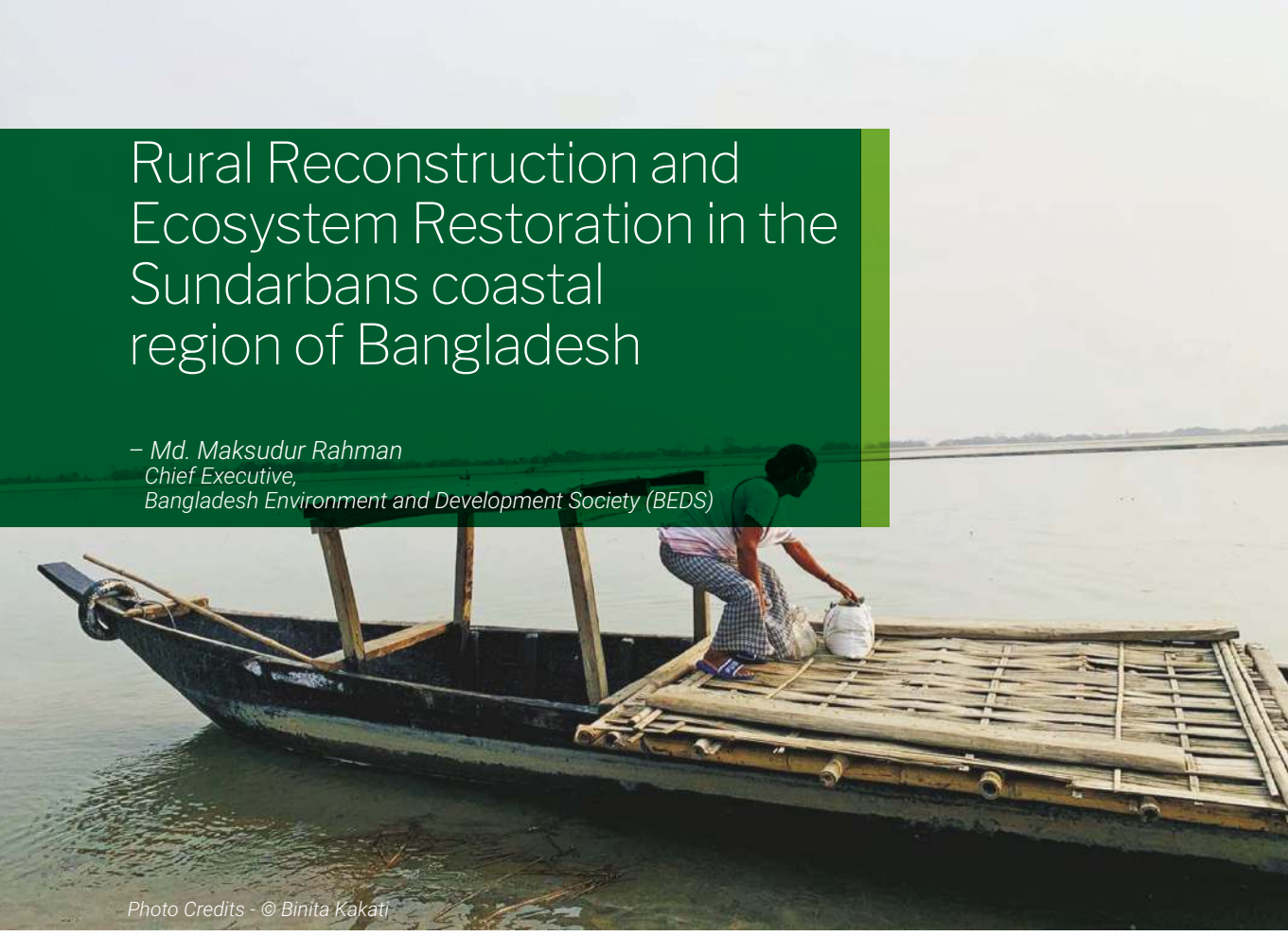
Ratargul swamp forest has become one of the most attractive tourist spots in the country. It tops the list of the destination for tourist visiting Sylhet area. Thousands of tourists are visiting the site throughout year and the number is increasing day by day. Visitors can enjoy the scenic beauty of the site during both wet and dry seasons. Therefore, there is ample scope of flourishing the ecotourism based on this forest. Local community can be engaged in ecotourism activities in a sustainable way. Big enterprenewers can invest to develop ecotourism facilities for the tourists. Road communication should be smooth. There is no tour bus toward Ratargul from other parts of the country. Currently, people visiting the site are hiring vehicles for the journey which is expensive. There is no hotels, motels or restaurants near to the site to stay and take foods. Home stay, a potential economic activity in tourism sector can be introduced in the villages near to this forest area. Village people should be trained on this concept. However, home stay should be emphasize on the cultural practices of the area. Further, attempt should be taken to create a genuine interest and commitment among the local people in the region. Social security should also be ensured in order to build confidence among the visitors.

Tourists should follow some rules and regulations to avoid any disturbances in the forest. Tourists should avoid any activities that can disturb ecosystem components including vegetation and wildlife as well as their functions. They should also not through away anything including polythene made bags, plastic bottles or litter that can cause pollution of the area. Number of tourist boats should be restricted. Oil spillage from the boats should not be there to maintain the quality of the wetland. Sounds created from the boats or other electronic devices carried by the visitors should not be allowed inside the forest. Collection of biological specimens either plants or animal should not be allowed from this area.

Globally, fresh water swamp forests are very few in number. There are only about 22 peat swamp forest in the world. There are only two such forest in the whole continent of Asia, one in Srilanka and the other one is Ratagul in Bangladesh. Thus, Ratargul swamp forest is one of the few freshwater swamp forests on Earth. Therefore, proper management and conservation of this forest is of utmost importance.

Rural Reconstruction and Ecosystem Restoration in the Sundarbans coastal region of Bangladesh

– Md. Maksudur Rahman
Chief Executive,
Bangladesh Environment and Development Society (BEDS)



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Eastern Himalayan countries are on the frontlines of both climate and biodiversity crises today. South Asian countries are expected to face the worst consequences of climate change, from rising temperatures to floods and droughts. These changes are already having devastating consequences for the lives and livelihoods In 2020 alone, 4.4 million people were displaced in Bangladesh because of climate change.

As cyclonic storms in the Bay of Bengal amplify and multiply due to climate change, the Sundarbans form a critical storm breaker: absorbing the first shock of the storm and reducing the velocity and impact of storm surges. With cyclones increasing in intensity and frequency, communities around the Sundarbans have had their livelihoods disrupted – increasing the chances of them seeking to either directly exploit forest resources for their livelihoods, or else to do shrimp farming to meet their needs. These disruptions have weakened the integrity of the ecosystem and since the 1970s, the Bangladesh Sundarbans have lost between 66 – 127 sqkm

of area as per LANDSAT data (Aziz & Paul, 2015).

This is a unique journey towards Rural Reconstruction and Ecosystem Restoration in the Sundarbans coastal region of Bangladesh by BEDS (Bangladesh Environment and Development Society) by the name of under BANOJIBI in terms livelihoods improvement and Sundarbans mangrove ecosystem conservation. The story of BANOJIBI comes from the unique journey to provide systemic solutions for the local population and natural ecosystem under the Eco Village Concept. This story of transformation is—ultimately—about a new development model able to bring together economic and social progress with natural regeneration in one of the most precious natural ecosystems of the world: the Sundarbans Mangrove Forest. A story of empowerment, collaboration, trust and social entrepreneurship to shape a resilient future in the face of climate change, poverty and natural degradation. A community-based approach to have the way for a new relation between humans and nature.

BANAJIBI

BANOJIBI is a Bengali Word, meaning the people whose livelihoods depend on the forests' resources. Our targeted BANOJIBI are mostly Sundarbans resource harvesters and coastal marginal farmers. The Sundarbans Resources Harvesters Cooperative Society Limited has formed with 265 members from various occupations in the Sundarbans coastal areas under BANOJIBI. Collectively, the conservation of the Sundarbans and local socio-economic development is the main goal of this cooperative society. To achieve increased economic and food security; local beneficiaries are developing shelf-stable agro-products, building eco-cottages, and selling and marketing local handicrafts under the "BAJOJIBI" brand. The slogan of the brand is "Exploring the Sundarbans with BANOJIBI" The Bangladesh Environment and Development Society (BEDS) and the Japan Environmental Education Forum (JEEF) have been cooperating in the implementation of these activities, with the financial support of the Ministry of Foreign Affairs, Japan. The association has been registered by the Cooperative Department of the Government of Bangladesh.

BEDS has been working the following sectors with the local people for solving these complex social and environmental problems since 2010.

1. Environment and ecosystem
2. Livelihoods
3. Disaster Risk Reduction and Climate Change Adaptation
4. Clean/Solar energy
5. Water and sanitation
6. Wildlife conservation and protection
7. Women and child rights
8. Gender development
9. Relief and Rehabilitation

For improving the livelihoods and ecosystem conservation we have taken the following initiatives under BANOJIBI;

Mangrove based solution in order to livelihood improvement & ecosystem restoration

The Need:

Most of the Sundarbans coastal people depend on the Sundarbans forest resources and agricultural activities for their livelihood.

But they are deprived of a fair price for poor production, processing and packaging of the products and dominant market management by middlemen and various companies. Lack of skill of production, processing, packaging and knowledge on conserving natural resources, the people are extracting maximum number of resources but earn minimum income.

The Solution:

Considering this situation, the model of sixth sector industrialization has been taken to improve the eco-friendly farming and skill development of the poor farmers in coastal areas on agricultural and non-timber forest product preparation, processing, packaging and creating supply chain for product marketing as well as providing environmental education for conserving the Sundarbans ecosystem. The members have been providing commercial skills in producing, processing, and packaging of nature-based products through maintaining health hygiene and establishing the mangrove products processing and packaging facilities. The selected members have given commercial skills in tourism management on the basis of community-based eco-green tourism.

Impact:

Now the BANOJIBI members are producing mangrove-based products (mangrove pickles, Nipa palm molasses, mangrove leaf wall mate, sculpture of Sundarbans biodiversity by using remaining wax, and so on) along with some local products (mango pickle, tamarind pickle, recycled sharee blanked, puffed rice, mustard oil, flattened rice, and so on) using the established infrastructure and facilities. The members are now selling the products by establishing selling points in Khulna city and using various online platforms for product selling under the BANOJIBI brand, with the aim of expanding the market in the future at the local and regional level. Community-based eco-green tourism has been started by the members through establishing eco-green cottages where they have given service as eco-tour guides. Their monthly income generation has increased day by day through marketing the products more commercially than before. So, their present socio-economic condition has improved compared to before, limiting their dependency on the Sundarbans for resource harvesting, which helps restore ecosystems and turn out regional change in the case of socio-economic development.

Better home for better life through Integrated Farming Approach

The Need:

Bangladesh is an agricultural country and three fifths of the population depends on different agriculture sectors. But the agricultural system in the coastal region has been badly affected by the devastating effects of climate change, such as salinity intrusion, rising temperatures, reduction of land area due to soil erosion, changing cropping patterns, weather viability, and so on. Furthermore, farmers in this region engage in monocropping, a practice in which farms remain barren for a specific period of the year. For this reason, farmers are cultivating high-yielding varieties (HYV) of crops instead of indigenous varieties to meet the demand of a growing population. As a result, farmers become fully dependent on the companies for HYV seeds, chemical fertilizer, and insecticides. But the excess use of chemical fertilizers and pesticides causes environmental pollution, less fertility and degrades the Sundarbans' coastal

biodiversity. Nowadays, farmers have become helpless due to the evil cycle of companies and middlemen and they do not get the proper value for their produced products. Farmers do not have the proper knowledge to get the maximum benefit while utilizing the minimum resources.

The Solution:

BEDS has been working for the livelihood improvement of the coastal community since 2013 to recover from this critical situation and to ensure the food security of the marginal people. A community-based seed bank has been established where native seeds are preserved and farmers can get the native seeds from the seed bank based on a double return policy. The local community has been trained on how to cultivate native crops organically (use of green manures, vermicompost, Integrated Pest management practice) and how to integrate different farming systems (mixed farming, crop rotation, poultry, prawn and livestock rearing, fish farming) so that they can utilize each and every sector of their homestead areas. The farmers linked with the BANOJIBI platform for processing, packaging, and marketing of the local products directly to the consumer.This is a model for reducing the poverty of the marginal farmer to ensure the sustainable use of natural resources and utilize the capacity of the local people. Through this initiative, we would love to support the farmers based on their capacity and need assessment.

Impact:

Farmers have become self-dependent by integrating farming and getting proper value for their products through BANOJIBI. Thus, their socio-economic condition has improved. Farmers in the Banishanta union now have a better understanding of environmental friendly agriculture and the preservation of native seed varieties. Native seed stocks have been increasing and farmers are engaged in native seed cultivation for commercial purposes. They are also engaged in organic farming, through which good quality products are produced, which ultimately increases the regional biodiversity as well as the health of the local community. Through these initiatives, every home will be a production area, and their family income will be increased along with the socio-economic condition of the local women has improved.

Climate information services (CIS) for reducing Climate risks in agriculture production

The Need:

Disaster frequency and risk are increasing rapidly day by day in the Sundarbans coastal area due to climate change. Sundarbans coastal people used to predict weather using traditional methods, but nowadays it's quite difficult to predict the weather due to uncertain weather. These poor and marginal people of agricultural sector often lose their crops, agricultural inputs, and farm assets to the sudden attack of cyclones, droughts, heavy rain, tidal splashes, and floods. Sometimes, fishermen go fishing without the knowledge of the weather forecast and risk their lives. Undeniably, Sundarbans coastal people have no access to climate information service (CIS).

The Solution:

BEDS in collaboration with Delta Research Initiative (DRI), aims to support climate-vulnerable communities in agricultural

sector through CIS. In time, reliable and dependable information on weather forecasts has been providing to them to better capture the benefits associated with favorable climatic conditions. BEDS formed a Local Weather Club and built the capacity of the local farmers to access and use climate information services using ICT tools. Youth members of the coastal communities have been engaged and facilitated through the power of social media such as Facebook and Messenger groups. The dissemination of climate information by pictorial method in the social media group helps uneducated farmers get the weather update easily.

Impact:

The risk of crop failure has been minimized and their agriculture production has been increased as the farmers cultivate crops according to the weather forecast. They are now getting weather information easily with the support of the developed social media group, which has improved their livelihoods through based decision-making and community-based adaptation strategies in terms of climate change.

Safe Drinking Water service for Sundarbans coastal community:

The Need:

The scarcity of safe drinking water is acute as the ground water is saline in the Sundarbans region. Around 73% of the people in the Sundarbans coastal region of Bangladesh are deprived of safe drinking water. They depend on rainwater for drinking but it's not enough for the yearly demand. About 48.3% people depend on rainwater harvesting as primary source of drinking Water but rain water does not remain useable for a long time. During summer season the water scarcity become severe due to lack of rain. As a result, around 24% of women are forced to walk more than 3-5 km away from home for fetching potable drinking water and most of the times per head drinking water availability is lower than a regular person needs in a day. Therefore, most of the coastal people suffer from waterborne diseases and 80% Women suffer from urinary tract infection and miscarriages.

The Solution:

BEDS has established a social business model to ensure the safe drinking water service in the Sundarbans coastal region. Through the model we have re-excavated ponds for preserving rainwater and established Solar based Pond Sand and Filter (PSF) System with the use of local knowledge, nature-based solution and modern technology. Reverse Osmosis (RO) system has been installed to improve the water quality. Water ATM card has been introduced in this system to run the business more smoothly. Beside this, door to door water supply system has been ensured through this model. We have adopted a water recycling system into our filtration process.

Impact:

Every day, around 12,000 people are getting access to safe drinking water from our initiatives. Local people are getting financial benefits through involvement in this social business model. Now the women can collect safe drinking water by investing less time and effort. However, with this assistance, they will be better able to adjust to local climate changes and lessen the severity of water-borne illnesses by ensuring adequate safe drinking water for every life.

Renewable energy at Sundarbans Eco village to enlighten the darkness

The Need:

The majority of the people in the Sundarbans coastal region live in darkness at night because of their poor economic situation and the unavailability of electricity. Through the ages, the local people have depended on kerosene or fossil fuel for their evening household and livelihood activities like fishing. Due to their poor economic condition and the rising cost of fossil fuel, their family and livelihood activities are being hampered. The biggest problem is students are unable to continue their studies after dark, which increases the rate of dropouts, early child marriages, anti-social behavior, etc. Additionally, marginal people's electricity expenses are too high to cover consistency and frequent power cuts interfere with their daily activities, which eventually has a negative impact on their financial status.

The Solution:

Promoting renewable energy has been one of the major working areas of BEDS in the Sundarbans coastal region since 2013. Coastal families have been supported with solar home systems, solar lamps, solar generators, and solar batteries to promote renewable green energy as an alternative source. Training sessions have been organized to develop solar based entrepreneurship capacity and promote clean solar technology among villagers. Solar stations have been established for increasing the production of clean energy in this region. Also, RO water purifier stations are running with the help of solar power. Recent initiatives have been taken for creating solar charging stations to support electric vehicle owners in recharging their vehicles.

Impact:

In 2017, Banishanta union under Dacope sub district in Khulna district of Bangladesh was declared as the first ever solar union in Bangladesh after the green energy actions. Around 2800 coastal students have solar lamps to enlighten their educational life and the literacy rate has been increased performing good result in their education. Coastal families and fisher folks replaced the use of kerosene with solar equipments which eventually reduced their daily expenses and carbonization rate. Till now, more than 3000 coastal families directly or indirectly enjoying increasing family income with solar home system, solar lamp, solar generator and solar battery and solar charging stations.

Community Based Ecological Mangrove Restoration (CBEMR)

The Need:

Once, there were plenty of mangroves in the Sundarbans periphery that created a buffer zone that was beneficial for coastal protection as well as for the habitat of wild animals and birds. But that buffer zone is no longer exists due to extreme natural disasters, random cutting of mangroves for agricultural land extension, shrimp cultivation, household making, collecting fuel wood, and free grazing of livestock. Apart from this, coastal people are also disturbing the mangrove regeneration process by destroying the seedlings; seeds while catching shrimp fry and collecting seeds for cooking fuel. So, the mangrove ecosystem in Bangladesh has come under severe pressure for climatic and anthropogenic reasons. Due to the lack of mangrove protection, tropical cyclones sweep across the Sundarbans,

which are claiming many lives, destroying houses, damaging agricultural crops and lands.

The Solution:

Mangrove restoration in the Sundarbans coastal region to a great extent can be a realistic approach to conserve the Sundarbans forest. Bangladesh Environment and Development Society (BEDS) has been working for mangrove restoration since 2013 together with local people. BEDS has been regenerating mangroves on the river bank side to create a mangrove buffer zone by assisting the natural regeneration process so that it can protect the coastal embankment and create a forest. As a part of climate change adaptation, BEDS introduced integrated mangrove aquaculture system among the coastal shrimp farmers to increase the economic condition of the farmers and mangrove coverage in the shrimp farm area while engaging different multi-stakeholder partners. BEDS also encouraged coastal women to establish mangrove nurseries due to the high demand for mangrove saplings. The women who are only engaged in daily housekeeping activities and collecting mangrove seeds for cooking fuel get a chance to have another livelihood opportunity. BEDS facilitates the women with training and support materials to establish a mangrove nursery.

Within this initiative, BEDS has created a model of a community-based conservation initiative. BEDS believes that any kind of conservation initiative can be successful with the active participation of the local community.

BEDS Impacts:

Under the Community Based Ecological Mangrove Restoration BEDS has planted more than 0.51 million mangroves covering 84 ha of coastal land. The biodiversity of the area has been also increasing, like the appearance of bees, birds, monitor lizard, crocodile and etc. Our trained shrimp farmers on IMA (Integrated Mangrove Aquaculture) have stopped to cut the existing mangroves and replanted mangroves in their farms. A total of 7 mangrove nurseries (6 nurseries in Dacope and 1 nursery in Shyamnagar) have been established by the coastal women of the Sundarbans and they have become self-employed to contribute to their family ensuring sustainable livelihoods in response to global climate change.

CEPA Program, a leap for environmental protection

The need:

Economic solvency is the prime concern for most of the people of Bangladesh. They do not consider the environment before undertaking any economic development. They don't consider ecological and environmental benefits, which are much higher than economic development benefits. By this process, people hamper the environment and face serious environmental hazard after a certain period. Apart from this, most coastal people do not participate in organized conservation activities due to their poverty and lack of conservation knowledge, but rather they involve themselves in mangrove ecosystem distractive activities. Many people in the country are interested in learning more about mangroves, coastal life, and livelihoods.

BEDS Initiatives:

Since 2013, BEDS has regularly inspired, educated, and developed the leadership of

students and communities, especially in mangrove peripheries, through conducting the Communication, Education, Participation, and Awareness-raising (CEPA) programs to develop the capacity of the students and community in order to involve them in solving complex environmental and social problems. BEDS has published more than 44supplementary education materials such as (books, booklets, games, posters, etc.) and using these, BEDS is operating school programs, awareness-raising programs, community-based nature education programs, onsite training programs, study tours, field trips, and other activities. Under the mangrove education program, BEDS has also conducted a Community Based Ecological Mangrove restoration program by ensuring the active participation of coastal people.

BEDS is going to establish a well-equipped and facilitated "Mangrove Information & Education Research Center" to continue the CEPA program among the target communities beside the Sundarbans mangrove forest so that BEDS can offer both practical and theoretical education for the interested participants and increase their knowledge of nature and the environment.

BEDS Impacts:

So far, 1209 teachers have been trained by BEDS to conduct mangrove education among the students since 2013. Through the Sundarbans mangrove education program, 28,500 students have been educated on Sundarbans mangroves by BEDS to help them realize the importance of the mangroves in daily life. Around 30,000 people receive mangrove and environmental education every year through the CEPA program. Through its Community Based Ecological Mangrove Restoration program, BEDS has achieved the goal of restoring 84 hectares of areas through mangrove plantation till the year 2022 with the active participation of coastal people. Coastal people are now protecting the planted mangroves.

Rural reconstruction and ecosystem restoration will be the key solutions for the overall development and conservation of the marginal coastal community and vulnerable environment. This can be achieved by planting and regenerating mangroves; raising awareness in collaboration with local people in terms of biodiversity conservation; coastal protection; promotion of mangrove-based alternative livelihoods, entrepreneurship development; clean solar energy equipment and services; and climate change adaptation and mitigation. Addressing the aforementioned issues for social and environmental development would be ensured by establishing multi-stakeholder collaborations and stable finances.

Role of Nature-based Alternative Livelihood Options for Sustainable Coastal Forestry in Bangladesh

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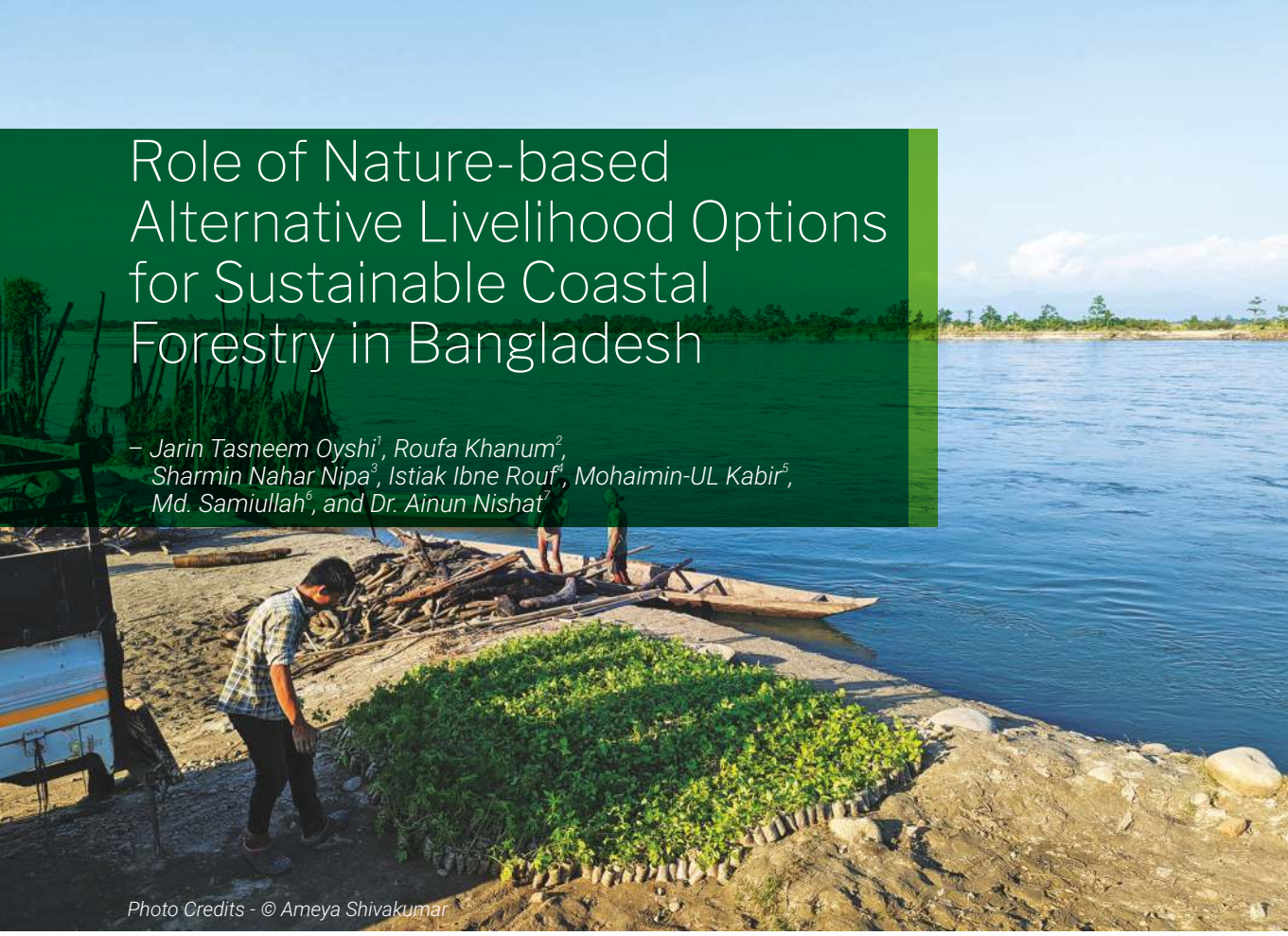

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Mangrove forests in the coastal belt of Bangladesh serve as a sink for greenhouse gases, protect from coastal floods and tidal surges and provide socio-economic and ecological services in terms of life-supporting, provisioning, and regulating functions. Thus, the mangrove ecosystem contributes to climate change mitigation and adaptation in the coastal areas. Recognizing the role of the mangroves, the Bangladesh Forest Department (BFD) has been establishing mangrove greenbelt along the coastline since 1966[1]. However, increased population pressure and over-extraction of forest resources from the mangroves made it almost difficult to protect the forests with the existing human resources of the BFD. Hence, while

[1] Das, S. & Siddiqi, N.A. (1985). The Mangroves and Mangrove Forests of Bangladesh. Mangrove Silviculture Division. Bulletin No. 2, Bangladesh Forest Research Institute. pp. 142.

implementing the 'Thana Bonayon Project' in 1990, BFD began to involve local people as 'participants'. Gradually, local people were involved in training activities, labor for plantations and monitoring, and non-forest-dependent alternative livelihood generation activities (AIGAs).

The mangrove plantations are raised mostly on clayey mud flats in and around estuaries and low-lying river banks and are regularly visited by tides. Hence, fishing and crab collection is typical in the canals adjacent to the mangrove forests, damaging the new plantations. Moreover, local people extract fuelwood, timber, honey, thatching materials and other forest products. Thus, dependency on forest resources risks the natural ecosystem and biodiversity. Since climate change will directly impact the provisioning services (major forest products), forest-dependent livelihoods will be directly affected concerning occupation, income level, and seasonality. Monotypic occupation of a significant share of the population will lead to overexploitation of one type of resource and decreased individual income. Some people, who cannot compete in the local labor market, may migrate to urban centers. Degradation and loss of mangroves substantially reduce the ability to mitigate and adapt to climate change. Mangrove degradation also releases large amounts of 'blue carbon' stored in sediments to the atmosphere, a process that has been underestimated.

Community-based initiatives for sustainable forest management and monitoring can help to conserve natural ecosystems efficiently. Since the last decade, the BFD has started involving community people through initiatives like "Community Based Adaptation to Climate Change through Coastal Afforestation Project" (2008–2016), "Climate Resilient Participatory Afforestation and Reforestation Project" (2013–2016), and "Integrating Community-based Adaptation into Afforestation and Reforestation (ICBA-AR) Programme in Bangladesh" (2016–2020) by redefining coastal afforestation as a climate change adaptation measure. A similar approach was also followed by the "Climate Resilient Ecosystems and Livelihoods" (CREL, 2013–2018) project and is currently being followed by "Sustainable Forests and Livelihoods" (SUFAL, 2018–2023). These projects provided livelihood support to the local communities living near the forest areas to decrease the dependency on forest resources. Under the projects, local forest-dependent communities were supported to shift to various income-generating occupations such as agriculture, business, and other livelihood options. Some common forms of AIGAs in practice are livestock and poultry rearing, homestead vegetable gardening, handicrafts, payment for ecological protection, climate-resilient agricultural production, fish farming, bee keeping and drying. However, adequate evidence-based research is not available regarding the most suitable options for a particular community for a specific locality. Along with this, capacity-building support on skill development, savings-based loans, agriculture-based loans for the local community people, community group formation, and ecosystem conservation were provided to the beneficiaries.

The results of community engagement in afforestation projects so far are significantly positive. With the involvement of locals, the issue of their livelihood is emerging as an essential component in afforestation activities. From the experiences of CRPARP

and SUFAI, it was observed that promoting alternative livelihoods to support forest communities contributes to lessening pressure on the forest and hence the sustainable use, conservation, and protection of forest resources. Under the Climate Resilient Participatory Afforestation and Reforestation Project (CRPARP), local beneficiary groups were given loans for income-generating activities and received training on capacity building and financial management. The training mainly focused on team formations and different forums, including village development forums, people's forums, and community development forums. By the project's second year, livelihood options are to be provided. By the 4th year, their access to loans needs to be ensured, and support needs to be delivered to make them able to diversify their livelihood options. As the areas are disaster-prone, the diversified livelihood options will help them lower the risk and financial damage during natural calamities.

However, the previous and existing afforestation programs did not incorporate the research-based findings on coastal livelihoods. As a result, they lacked a need-based assessment for introducing alternative income-generating activities (AIGAs) to forest-dependent communities. Also, there is not enough research involving coastal communities for forestry development to cope with climate change-related hazards. Considering the dynamic characteristics and vulnerability to natural calamities, local community participation in coastal afforestation programs must be reinforced by enhancing their adaptive capacities in withstanding climatic variations and extreme weather events, even though the recent coastal afforestation programs acknowledge community participation and ownership of forests. More evidence-based research is required on the most appropriate nature-based AIGAs for the coastal communities considering the community's perception and policy practice. Furthermore, research is needed to identify the roles of coastal communities in protecting the natural ecosystems of coastal forests through proper conservation and management of forest resources.

Climate-resilient and nature-based livelihood activities can be promoted in the targeted areas by following a conservation-linked value chain approach. Furthermore, nature-based AIGAs can improve and diversify non-forest-based livelihood opportunities of poor forest-dependent households in selected communities, thus safeguarding the forest and ensuring the project's sustainability. Besides, support mechanisms, such as integrated zone management and knowledge sharing at the regional level, will be implemented, and the national level will also be promoted.

Acknowledgement: Centre for Climate Change and Environmental Research (C3ER), Brac University, has been supporting Bangladesh Forest Department (BFD) and IDCOL in developing a project proposal for the Green Climate Fund (GCF). The analysis presented in this article is part of the project's feasibility study.

Rewilding Nature by the People of Nature

– Afsara Mirza
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The Intergovernmental Panel on Climate Change (IPCC) highlights that indigenous peoples and local communities (IPLCs) can play a crucial role in addressing climate change. Consequently, a group of indigenous peoples from 42 countries affirmed in response, "Finally, the world's top scientists recognize what we have always known…that strengthening our rights is a critical solution to the climate crisis" (IPCC, 2019).

This notion resonates with my learning experience gathered through conducting field works for my research work in the central, north and south-eastern and western part of Bangladesh. The indigenous peoples and local communities residing there are seen to be maintaining strong economic, cultural and spiritual relationships with their natural environments. However, the geographical regions and natural ecosystems, where the indigenous peoples reside, are prone to the effects of climate change; making them vulnerable to the impacts of natural disasters. Indigenous peoples are also systemic victims of discrimination and exclusion from social, political and economic power, which hinders their capacity building and resilience.

For instance, in the Chittagong Hill Tract (CHT) region of the south-eastern part of Bangladesh,local indigenous communities (such as Chakma, Marma, Mro) are actively involved in planting trees (banana, bamboo, and fig) beside the waterfalls to hold the water bodies for ensuring water security during water scarcity caused by the changing climatic pattern.They are also seen to raise the heights of their houses to protect themselves from floods/storms when they approach. Certain trees are also not grown anymore for less biodiversity benefits. To ensure food security, communities build their own dam for fishing purposes. Whereas, in the south-eastern part of Bangladesh, an indigenous community known as Munda community are practicing rainwater harvesting systems through maintaining their water purification and filtration systems (such as boiling it, and using pebbles and stone); as there is lack of fresh drinking water in the area due to saline intrusion.

One thing was evident during these visits: 1) community mobilization, and their participation is key in maintaining the adaptation solutions by including them in design, planning and implementation; 2) capacitating local institutions and individuals is key in increasing their ownership of natural resource management and addressing the structural inequalities. ; 3) collaboration and investments are needed from local government, central government, national and international donors, researchers, private sectors, youth, academicians, etc.

A Case Study from Central Bangladesh: Enhancing adaptive capacity of enthusiastic girls like Samching and Shabonte during the climate crisis

Samching Nokrek and Shabonte Nokrek are students of Class 7 and Class 8 at a community school of Beribaid union of Modhupur Upazilla in Tangail district. Samching wants to become an Army Officer and Shabonte a Police Officer when they grow up. Their parents are both farmers and work diligently from 8AM to 4PM everyday of the week. After finishing school, Oftentimes, Samching and Shabonte help their parents to feed the cows and work on the fields. However, the changing climatic patterns due to climate change is creating drought-like conditions and erratic rainfall. This is affecting their parent's livelihoods by reducing agricultural activities and making it tougher to work under the scorching sun. Both Samching and Shabonte feel that their parent's health is deteriorating due to the weather pattern altering.

Photo Details:
Date: 15th March, 2022
Village: Beribaid, Modhupur, Tangail, Central Bangladesh
Photo credit: Afsara Mirza, Research Officer, ICCCAD

Nonetheless, their families are keen to find solutions to protect their livelihoods. For instance, they are practicing homestead gardening to adapt to the changing climate and ensure food security during harsh weather conditions. They are growing jackfruits, mangoes, liches in their gardens and getting adequate nutrition slowly.

The major Sal forest is an integral ecosystem of the region and spans near their houses which is now mostly destroyed due to sustained deforestation and illegal logging activities. This is hindering their daily food consumption. Now they have to walk a few kilometers to collect wood for cooking. However, the love and unity embedded in their community and the reciprocal relationship with nature is making it easier to adapt to climate change. Samching and Shabonte are aware of how indigenous knowledge aids in early warning systems. An insect known as 'Banaash' is seen everywhere which signifies rain is on its way. Additionally, their indigenous and traditional knowledge still encourages them to practice ethnomedicine. They use a leaf called 'neem' to make small rolls of strips and later dry them to consume as medicine for calcium sources.

However, the younger generation, like Samching and Shabonte, is realizing how they are losing their indigenous and traditional knowledge due to lack of attention and non-existence of a knowledge-base repository. Slowly, they are forgetting the indigenous ways to make eco-friendly products, and live sustainable livelihoods as the modern techniques are much easier to grasp. Hence, it is crucial to work together with the local indigenous communities residing in remote regions and build a rapport through early consultations to create this knowledge-base. This should resonate with co-production of scientific and indigenous knowledge, and focus on individual and institutional capacity-building of the local communities to build their ownership over the natural resource management.

Energy Efficiency – A Key Enabler for Decarbonization

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Sustainability Lead - India
International Operations
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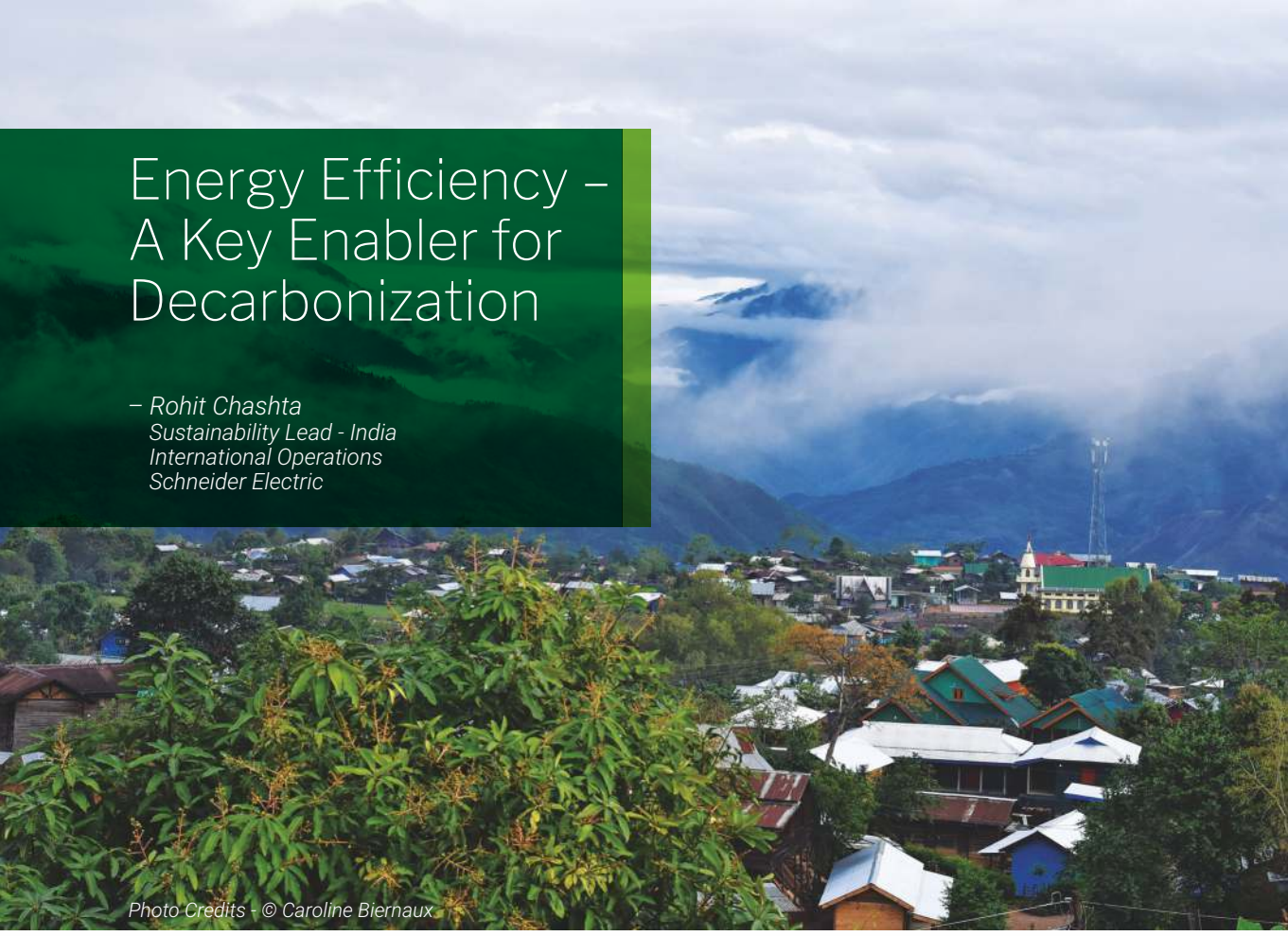

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Climate Change: A code red for humanity

At the recently concluded COP27, we saw world leaders coming together to reiterate the importance of the fight against climate change and issues like global warming, and that the window of opportunity to change the course on which the world appears to be set on is closing rapidly. Our current policies and commitments would take us to an increase of 2.6 – 2.8^{0}C by 2100 (compared to pre-industrial levels)[1], which would be catastrophic and mean more natural calamities that we face today – extreme weather conditions, rising sea levels, hurricanes, typhoons, droughts, forest fires. To keep global warming limited to 1.5^{0}C scenario, carbon emissions must be zeroed by 2050, and reduced by 30-50 percent by 2030[2].

[1] UN Emissions Gap Report (EGR) 2022
[2] Schneider Research Institute (SRI) Back to 2050 report

Reducing global energy demand can close the gap between promises and actions in tackling the climate crisis as the bulk of these emissions come from energy (more than 80%). On the other hand, many economies around the world have not yet reached the levels of wealth and development of their industrialized counterparts. The energy demand per capita in lowest income countries of the world ranges at 10 times lower levels than those of affluent economies, and the world has still nearly one billion people with no access to a modern source of energy such as electricity. As these economies develop and global population continue to increase, the energy demand will further go up, and this will at large happen in the developing economies. Therefore, a transition toward a net-zero economy also needs to be an energy transition of momentous proportions.

Importance of Demand-side Decarbonization

History indeed reveals that what drives energy transitions is actually the way energy is used and consumed. Energy transitions happen because new energy resources bring about positive changes in consumption patterns, or because new consumption patterns emerge and call for innovations in energy use. Energy supply has always chased energy demand. What this means is that the only way to realize a transformation of the energy system of such magnitude is to design a transition which makes sense for the consumer, hence drive adoption – rather than resistance – at an accelerated pace.

While power generation has long been a key area of focus, we find that decarbonization of the demand side is absolutely key. Demand-side decarbonization comprising of Energy efficiency and Electrification, contributes to more than half (55%) of the total opportunity to reduce CO_2 emissions by 2030[3].

Energy Efficiency enabled by Technology

There is no needed arbitrage between human progress and climate change mitigation. In fact, there will be no climate change mitigation if it does not build on human progress. But we need to have an inclusive energy transition, as the richest 1% of the world population accounts for 17% of total emissions, the next 9% accounts for 31%, while the middle 40% accounts for 40% of total emissions, and at only 12% of total emissions, the poorest 50% of the world population emits the least[4]. Unfortunately, they're most likely to face the harshest consequences of climate change with the least means. The challenge for developing countries is to grow without increasing per capita emissions, and the only way to reduce emissions, without compromising economic growth, is through better technology to reduce energy and carbon intensity.

If we look at energy efficiency as a resource, it's the cheapest, cleanest, and most abundant source of energy, and when executed in the right way, comes with a compelling business case. Taking India's example, 50% of the emission reduction by the end of this decade would come from energy efficiency[5].

Today, 70% of emissions reduction is

[3] Schneider Research Institute (SRI) Back to 2050 report
[4] 2022 UN World Inequality Report
[5] Bureau of Energy Efficiency (BEE)

achievable with existing and proven digital tools and technologies to help us arrive at the net-zero future the planet depends on.

As stated earlier, while decarbonization has long been associated only with moving away from fossil fuels and clean energy alternatives, it's also equally important to be smarter and more efficient with our resources and energy use. Energy efficiency enabled by digitization has immense untapped potential across commercial buildings and industries, which ranges from 30-75%.

The Way Forward

We must achieve net-zero emissions in the next 30 years and at the same time cater to the rising energy demands and provide access to energy. This requires us to be 4 times efficient and need multiple integrations.

First is the integration of energy and automation, merging two areas of efficiency – energy and process. Industry 4.0 technologies, using IT and OT convergence, provide new insights to optimize not only the processes itself, but across the entire infrastructure and lifecycle – from energy procurement, to building and power management, to industrial machines. The second integration, with the help of Internet of Things (IoT), Big Data, and Artificial Intelligence (AI), is making sure that everything is connected from end point to the cloud, making every installation fully transparent for everybody with the data shared from operator to control room. The third integration is all along the lifecycle, from design and build to operate and maintain. Once everything is connected, we see major efficiency potential around the lifecycle of projects. Digital twins are a perfect example here. And the last aspect is moving from site-based to an integrated enterprise-level management. Most of the companies in the world are managed site-by-site. We reach our real efficiency and leverage our scale when we connect buildings and plants together, as we get a better picture of what we consume across our entire operations.

Hence, the ambition to achieve net-zero emissions would be paved through an All-Electric All-Digital world. As electricity is the most efficient vector for decarbonization; and digitization, powered by IT & OT convergence opens up newer & bigger opportunities to make installations & operations energy efficient.

Rewilding Nature by the People of Nature

– Zaved Akhtar
Chief Executive Officer and Managing Director
Unilever Bangladesh Limited

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Our world is filled with paradoxes. As many as 828 million people go to bed hungry every night while more than 1 billion people are obese, and top 1% of the households own 43% of net worth. On one hand, there is a massive progress in education, health, and poverty reduction while on the other hand, there has been a steady degradation of the nature and the environment. Economic development, social progress and technological disruption have changed people's perspective and lifestyle. To meet the growing consumer demand and to reach more people with quality products, manufacturers are using diverse types of plastic packaging to ensure the supply chain efficiency and cost-effectiveness. Plastic for Fast Moving Consumer Goods (FMCG) companies like Unilever is a blessing since it is a tool to reach more people with quality products. For example, without the access to flexible packaging, access to hand washing, safe sanitation or balanced nutrition would never have been possible. Plastic gives the flexibility and cost effectiveness demanded by the market to take the right product, to the right market, in the right quantity at the right price.

Plastic has become an indispensable commodity and its usage has gradually been increasing. According to UNEP, one million plastic bottles are purchased every minute around the world, while up to five trillion plastic bags are used worldwide every year. However, this practice has caused the creation of a throwaway culture globally. Approximately 36 per cent of all plastics produced are used in packaging, including single-use plastic products for food and beverage containers, and UNEP research suggests that up to 85 percent of these plastics end up in landfills or as unregulated waste. The study also reveals that if this trend continues, the level of greenhouse gas emissions associated with the production, use and disposal of plastic is forecasted to grow to 19 percent of the global carbon budget by 2040.

At Unilever, we know that some of the plastic in the environment has our name on it, and we are not okay with this. Globally, our goal is to reduce the amount of plastic packaging we use, improve the materials we do use, and engage in a system-wide approach with other actors to ensure none of it ends up as waste or pollution. Last year we made a public commitment that by 2025, all our plastic packaging will be reusable, recyclable, or compostable. Sustainable waste management starts with 3Rs – Reduce, Reuse and Recycle, and Unilever is constantly working with innovation and research to champion this. In the new sustainable business strategy—the Unilever Compass—improving the health of the planet and creating a waste-free world is a core pillar of our business, and we believe that a good business needs to take care of the environment. We have set ambitious targets of addressing plastic pollution, which are: 50% virgin plastic reduction by 2025, 25% recycled plastic by 2025, and

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collect and process more than we sell by 2025. Through the combination of our commitments, we believe, creates a comprehensive and industry-leading programme to address plastic waste and is aligned with our internal framework: less plastic, better plastic, no plastic. We are transforming our approach and are rethinking how we design our packaging to either use less virgin plastics or eliminate the use of plastic altogether.

In Unilever Bangladesh, to meet 100% better plastic goal by 2025, our ambition this year is to become 100% technically ready and be in 80% implementation. To meet 50% less plastic goal by 2025, we have the target of ~25% virgin plastic reduction (vs 2018 baseline) and achieved ~10% till now. On virgin plastic reduction through Post Consumer Recycled (PCR) plastics, technical readiness is achieved for many of our product packaging, such as hand wash and body wash. Less plastics is about cutting down how much we use in the first place. For example, our new Vim 1 litre bottles have 33% less plastic, the new Lifebuoy handwash bottle 18% less plastic, and we have removed most of the foil from the inside of our Glow & Lovely creams, among others. Better plastics is about recycling and circularity where we have leveraged for purposeful partnerships discussed in the later part. No plastics is about 'thinking differently' – using alternative materials where possible and coming up with new business models. We introduced the first-ever refill machine in the country for dispensing liquid products to reduce plastic use through technology and behaviour change. We know that for people in the bottom of the pyramid, we have to invent even simpler technology to make it easy for adoption, so we are also working with a Netherlands-based innovation company BopInc to create refill technology to serve the needs of the low-income population. By making refill and reuse formats more widely available, accessible, and affordable, we aim to use our scale and reach to drive lasting change.

With our global targets to reduce plastic in our environment and Unilever Bangladesh being a committed partner in Bangladesh's growth, we started our journey of collecting post consumer used plastic waste. We piloted project of waste collection in the city of Narayanganj in 2020, in partnership with the Narayanganj City Corporation, United Nations Development Programme (UNDP) and Eco Social Development Organisation (ESDO). The project titled 'Plastic Waste Management: Building Circular Cities', aimed to create a circular economy model for plastic waste, with a specific focus on Single-Use Plastics (SUP) and flexible packaging; these are the major problem of NCC since SUP makes up about 40%-50% of the total plastic used in the city, but negligible amounts of SUPs are recollected or recycled. Through the project, we created a economic model with a value proposition for each actor involved in the plastic waste value chain, such as street cleaners, waste pickers, Civil Service Organisations (CSOs) and recyclers.

From the learning of our pilot project and to create a bigger impact, we started working in Chattogram, the second largest city in Bangladesh, through our partnership with Young Power in Social Action (YPSA), a local NGO. As we found from our research that the waste recycling industry at Chattogram is more mature and capable, we decided to invest in the traders *(bhangariwalas)* to create a circular value chain. Currently, we are

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working in 41 wards in Chattogram incorporating 561 waste pickers, 76 CSOs and 42 recyclers in total and the initiative has already been endorsed by Chattogram City Corporation (CCC). In total, we have collected over 3000 tonnes of plastic waste through our project as of November 2022. So far, this is the largest plastic waste collection and management initiative taken by any organisation in the country providing unique local insight.

Besides plastic collection, UBL is also raising awareness on a national level to ensure that waste management policies are created holistically and collaboratively, bringing in representatives from the Government, businesses, local and internal NGOs, development partners and the policy makers. To initiate the dialogue, we hosted a national seminar titled 'Enabling Policy for Sustainable Plastic Waste Management', in partnership with the Federation of Bangladesh Chambers of Commerce and Industry (FBCCI) to initiate a coordinated approach that will be important to manage the plastic waste issue in Bangladesh and identify policy and regulatory framework, economic instruments, technology and infrastructure, and capacity building requirement.

At Unilever, we believe that our business simply will not prosper without a healthy planet and society, hence, we are committed to transforming the way we use plastic in our business and in the environment. Through a multistakeholder collaboration, we can build a better future where resources are never wasted. All of us are much stronger than one of or some of us!

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