THE SUSTAINABILITY MAFIA

BUILDING A POST COVID-19 RESILIENT INDIA THROUGH SUSTAINABLE SOLUTIONS

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Introduction

As we get used to the "new normal" of working from home since COVID-19, we have encountered pictures, videos and news reports telling of cleaner air, purer water bodies and wildlife reclaiming habitats. These are stories of hope, and of nature healing itself.

Of course, this might not last forever. As we limp back to the world that was, it is possible that we will see signs of renewed vigour in human activities – whether reflected in greater road traffic, manufacturing output, or waste generation. In the zeal to revive the economy, it is possible that manufacturing and operations might be ramped up, and environmental regulations disregarded, poorly enforced or relaxed considerably.

How do we ease back into a healthy economy while being mindful of our environmental footprint? What can we do differently in order to keep breathing clean air, maintain our lakes and rivers, and continue to have cleaner cities? How can we "build back better" and create a more resilient, sustainable society?

The Sustainability Mafia (eco.susmafia.org) is a network of more than 50 top entrepreneurial practitioners in sustainability working across domains in India and Bangladesh. In this position paper, we outline key implementation proposals informed by experience in energy, water, mobility and green product-development. These proposals are offered as recommendations to the Government of India as well as other stakeholders such as private investors, etc., looking to create a newly resilient economy in response to the challenges we face.

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1 ARTISANAL AND GREEN PRODUCTS EMPHASIS FOR INCLUSIVE ECONOMIC GROWTH

Context. Over the past three decades, India's economic trajectory has leapfrogged from an agri-based economy to being driven by the services sector. While this growth model has yielded rapid results, it has inherent weaknesses, manifesting as high unemployment levels among the semi-skilled and unskilled segments of the labour market. These together comprise over 80% of India's workforce.

While the traditional economic model has been to develop manufacturing and then services, employing India's 55 million[1] potential workers between the ages of 15 and 35 in manufacturing requires investments of such proportion as to not be immediately feasible. The need of the day is to have a decentralised, sustainable and resource-efficient growth engine that links rural, peri-urban and urban economies and effectively leverages available natural and human resources.

The **Rural Non-Farm Sector (RNFS)** includes all non-agricultural economic activities in rural areas such as household and non-household manufacturing, handicrafts, processing, trade, etc. This sector attains criticality for policy and programmatic focus, given the shrinking average landholding size (from 1.15 hectares in 2010-11 to 1.08 hectares in 2015-16) and the fact that 86% of all holdings are classified as 'small and marginal'[2].

An RBI supported study indicates that the RNFS generates 2.4 times[3] higher income compared to agricultural labour and accounts for 36% of rural employment[4]. Considering that access to improved economic opportunities is a primary reason for migration in India, RNFS provides the key to sustainable and inclusive economic growth and achievement of the 2030 Sustainable Development Goals (SDGs).

The **Government of India** has launched several schemes such as the Deendayal Upadhyay Grameen Kaushal Yojana (DDU-GKY) that aim to upskill India's rural poor by funding training projects, benchmarked to global standards. Other financial institutions like Khadi and Village Industries Commission (KVIC), State Khadi Boards, Small Industries Development Bank of India (SIDBI) etc. also work towards development of agro-industries and rural non-farm production. Construction and rural tourism industries have been other areas of programme intervention at the national level.

Revival of Artisan and Green Products. Rich cultural diversity and artisanal craftsmanship are unique strengths that India could leverage to quickly address its currently unmet rural employment gap. For a dedicated and comprehensive impetus towards strengthening of RNFS, backward and forward linkages, microcredit lines and market access need to be cohesively

[1] Government of India, Office of the Registrar General and Census Commissioner. 2011. *Census of India, 2011*. New Delhi.
[2] Government of India, Ministry of Agriculture & Farmers Welfare, Department of Agriculture, Co-Operation & Farmers Welfare, Agriculture Census Division. 2019. *Agriculture Census, 2015-16 (Phase-I)*. New Delhi.
[3] Accessed 15 December 2020. https://nistads.res.in/all-html/Non-Farm%20Occupation%20in%20Rural%20India.html.

[4] Institute for Social and Economic Change. 2018. Policy Brief: Farm Non-Farm Linkage and Role of Non-farm Sector for Rural Development. Meenakshi Rajeev and Manojit Bhattacharjee.

strategized and implemented. Backward linkages include developing production chains that reduce processing time of artisanal products without compromising on the handmade, organic nature of the product. These would retain employment opportunities for artisans, while improving productivity and value of labour. Forward linkages and market access include development of multi stakeholder platforms for end-to-end collaboration among actors at each level of the value chain.

Implementation specs	**Potential market size**
Policy initiatives to refocus current investments towards handmade products Restructuring RDTCs	Gift market size, including CSR and corporate gifting budget: Rs. 2.25 lakh crores Sub-market for handicrafts: Rs. 13,000 crores

Regional Design Training Centres (RDTCs). A large-scale push towards developing the market also requires increasing the supply side, which in this case is the availability of skilled artisans and craftspeople. The Government of India's RDTCs can be restructured and operationalised under a PPP model, where interested parties can employ master craftsmen to institute apprenticeships in specialist skills. The RDTCs have hostel facilities and are established across the country. Such apprenticeship programmes could be established by the responsible government authorities in collaboration with the private sector, similar to the *Kaushal Vikas Kendra* model to provide vocational trainings.

Policy level interventions are key in this area, as government directive incentivising handmade products could be a significant non-budgetary boost for the sector, besides encouraging market-led growth. Mandating a minimum share of sustainable handmade products for government spending with appropriate budgetary backing, ensuring only certified Indian handmade products are sold at government handicraft emporiums, encouraging Corporate Social Responsibility spending on handmade products, etc. are some measures that will lead to market driven growth of the sector.

Impact. The restructuring of RDTCs under PPP model, and development of Minimum Support Prices (MSP) for handmade products is likely to have a significant multiplier effect on the rural economy. It could diversify and potentially double rural household incomes, reduce vulnerability to poverty and improve overall quality of life of rural population. Production and consumption of handmade and natural products is a significantly better alternative for achieving economic growth and SDGs than opting for non-biodegradable product value chains which present environmental challenges including pollution and disposal.

2 PUBLIC-PRIVATE PARTNERSHIP MODEL FOR URBAN TRANSPORT SYSTEM

Context. Transportation has long been a key driver for economic development. In line with worldwide trends, the past decade has seen massive changes in the sector in India, including heavy investment in the infrastructure required for various forms of public transport. Despite this, there still exist several deficits in the system. It is estimated that about 88 million people in India travel by public transport every day[5]. This translates to only around 6-9% of the total trips catered to by public transport, as against the 30-35% in other countries[6].

While mass transit options help decongest roads (by occupying less road space for the same number of passengers transported), the current urban ecosystem does not have effective first- and last-mile connectivity. This results in a high usage of private vehicles, as well as ride-hailing apps like Uber. This has, in turn, led to congested roads and cities choking on air pollution. A report by the Union of Concerned Scientists in the US found ride-hailing services emits 69% more climate pollution on average than the journeys they displace[7]. India has the dubious distinction of having 7 of the world's top 10 polluted cities in the world[8].

The COVID-19 pandemic has shifted the narrative dramatically and added a new dimension to this debate. Where the transition to public transport was challenging due to inadequate infrastructure, today there is an increased preference for personal mobility due to safety reasons. Experts predict a rise in Indian car-sales, especially entry-level vehicles. Two-wheeler sales are already indicating upward trends[9], and used car sales have shown a 15% increase compared to last year[10]. Having said that, however, there is no better time than now to give an impetus to public transport. The benefits to the environment seen in the post-COVID-19 "new normal" from reduced economic activity, including transportation, cannot be ignored, and we owe it to the Earth and future generations to take this into consideration as we restart the economy.

Solution. It becomes important, therefore, to make public transport in India safe, easy-to-use and accessible to all. We propose to do so by providing city-dwellers real-time access to the latest route-relevant information such as arrival and departure times, as well as ensuring good first- and last-mile connectivity in the cities they live in. Towards this, we propose creating a **PPP model** involving public and private transport providers (preferably those with electric mobility), working together to provide end-to-end connectivity in cities.

PPP Platform for Ease of Transport. The proposed platform will provide visibility to users on the options available to them to get from point to point in a city, and enable better first- and last-mile connectivity. Given a starting point and destination by the user, the platform will provide all options available for first mile connectivity to the place of public transport, the timings of the

[5] Review of Performance of SRTUs 2014-15, Ministry of Road Transport and Highways, Government of India, February 2016
[6] 'Reimagining Public Transport in India - KPMG India'. 2017. KPMG. 12 October 2017. https://home.kpmg/in/en/home/insights/2017/10/technology-public-transport-india.html.
[7] https://www.bbc.com/future/article/20200317-climate-change-cut-carbon-emissions-from-your-commute
[8] https://www.weforum.org/agenda/2019/03/7-of-the-world-s-10-most-polluted-cities-are-in-india/
[9] https://www.thehindubusinessline.com/opinion/columns/auto-sectors-on-a-slow-path-to-recovery/article32014662.ece
[10] https://www.counterpointresearch.com/weekly-updates-covid-19-impact-global-automotive-industry/

public transport and all options for last mile connectivity from the drop-off point of the public transport to the destination, preferably with a single ticketing option.

All private transport providers will be aggregated on the platform, including providers of electric bikes, feeder buses, and taxi/auto services to name a few. The timings of all public transport for all routes within the city will further be consolidated. A **quasi-government body** is proposed to be formed to evaluate these collaborations, identify and mitigate possible conflicts of interest, and enable synergies and value propositions emerging from a shared **data ecosystem**.

Case Study 1 – City Mapper. Present in nearly 60 cities worldwide, City Mapper (www.citymapper.com) provides end-to-end transport options across the city. In addition, information on the cost and time taken is also provided. However, this application addresses only public transport and no private transport providers.

Case Study 2- TUMMOC. Closer to home, TUMMOC (https://tummoc.com/) is a last-mile connectivity app that is live in Bangalore. TUMMOC has integrated many private-sector players in providing multi-modal transport options. With about 6500 users, TUMMOC provides bus, metro and cab options to get from any point A to point B in the city.

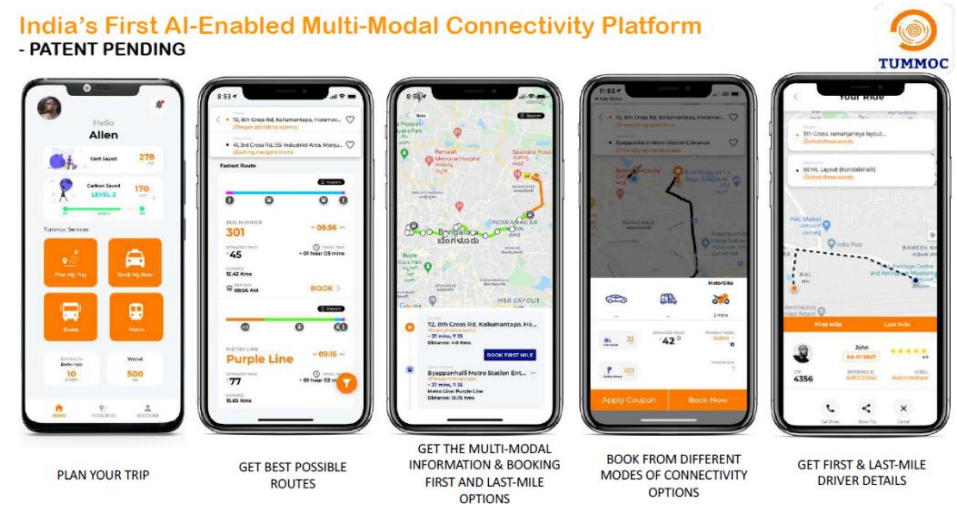

FIGURE 1 TUMMOC DASHBOARD SHOWING MULTI-MODAL POINT-TO-POINT CONNECTIVITY OPTIONS

FIGURE 2 TUMMOC QUANTIFIES CARBON SAVINGS FOR USERS OF THE APP

Potential market size. India has about 170,000 public buses that carry around 70 million users per day. In addition, the Delhi metro alone carries around 2.8 million passengers per day. In Bangalore, the public transport system makes around 6 million trips per day[11]. Public transport has a market share of 35-42% and forms about 7% of total trips[12]. This project has the potential to (1) make it easier for this demographic to use public transport; and (2) make it attractive for the rest of the population to use public transport.

Impact. The proposed model will create the following outcomes:

1. Less carbon emissions from vehicular traffic
2. Less air pollution from vehicular traffic
3. Livelihood and career benefits for citizens

Making transport safer and more accessible will enable the public to commute seamlessly for their livelihood and careers. The solution will further reduce urban air pollution and carbon emissions. According to data released by Bus and Coach, a campaign working towards sustainable mobility, 1 bus can replace a minimum of 30 cars. In terms of carbon emissions, a bus can travel 146,000 passenger-kilometres for each ton of carbon emitted, while a car can only travel 26,000 passenger-kilometres[13] - a factor of more than 5.

With a large population depending solely upon public transport to get to their workplace, and a much larger population needing to be wooed into using public transportation, the stakes are high. A common platform enabling public and private transport agencies to work together to create a seamless end-to-end connectivity experience for users would go a long way to building more sustainable and resilient cities as we recover from COVID-19.

[11] https://www.intelligenttransport.com/transport-articles/21458/city-public-transportation-india/
[12] Primary data collected by Hiranmay Mallick/TUMMOC
[13] http://www.busandcoach.travel/en/green/green_facts_and_figures.htm

3 DECENTRALISED SOLUTIONS FOR WASTEWATER REUSE

Context. According to a 2018 report released by the Niti Aayog, 21 major Indian cities including Delhi, Bangalore and Chennai are in danger of reaching *zero* groundwater levels by 2020, affecting access for 100 million people. The Union government recently formed the *Jal Shakti* (water) ministry for addressing water scarcity issues, and plans to provide piped water connections to every household in India by 2024. Laying huge pipeline networks would mean prioritising infrastructure over other viable options. Even with a pipeline network, the questions remain: *What will happen if there is no water to supply? What will happen to all the wastewater that gets generated?*[14]

India's **sewage treatment plant (STP)** capacity is low, with insufficient underground sewerage network to transport wastewater. The overall treatment capacity is only about **37%** of the **62 billion litres** of sewage generated daily by urban India[15]. This implies that 39 billion litres of untreated or partially treated sewage is disposed into lakes, rivers and other water bodies.

Solution. The COVID-19 pandemic has reinforced the value of clean water and its connection to human health. An important part of the urban solution for increased access to water, addressing water scarcity and untreated sewage load, is the reuse of **recycled wastewater** by **industries**, through on- and off-grid distribution.

Grid Distribution. While sewage treatment "infrastructure" is implemented at the city municipality level, it is common to find STPs within communities, apartments, business campuses or industrial complexes[15]. These can be leveraged by installing waste-water grids to transport domestic wastewater to such STPs, where it can be treated and then transmitted back after treatment to suitable **industrial** consumers. The necessary pipeline installations could be financed through ESCo[16] models developed as PPPs, potentially offsetting the public sector financial burden.

Off-grid Distribution. Bangalore receives its water supply from the Cauvery River, as well as urban and rural borewells. The Bangalore Water Supply and Sewage Board (BWSSB) supplies 1,453 million litres (MLD) per day through pipelines and 167 MLD per day through water-tankers. The centralized wastewater sector is highly unorganized; the excess treated wastewater is unscientifically discharged into freshwater bodies, which can otherwise generate revenue through planned, off grid distribution as exemplified by the following case study.

Case Study 1 - Rent-O-ReWa[17] (Rent-O-Recycled Water) proposes to 'close the loop' and offer sustainable, long-term solutions optimising wastewater disposal. The company aims to reduce the pressure on freshwater sources through an online trading platform, by matching sellers with buyers of recycled water that is supplied through tankers. The objective is to establish market linkages for treated wastewater in order to mitigate dependence on fresh water sources for non-potable usage purposes.

Highlighted benefits include - on demand availability of recycled water without investment; certified water quality test reports accompanying wastewater tankers; hassle-free payments,

[14] https://www.downtoearth.org.in/blog/water/india-s-water-crisis-the-clock-is-ticking-65217
[15] Waste Water Treatment & Reuse. 2018, Urban Waters
[16] See Section 4 for an exploration of the ESCo model in the context of sustainability projects
[17] http://www.ipsnews.net/2019/09/bangalore-city-goes-dry-lets-close-loop/

and a business model that creates financial benefits for both buyers (upto 60% saving compared to potable water) and sellers of recycled wastewater.

Through this platform, Rent-O-ReWa helps companies lower their water footprint and achieve their water-positive commitments at lower cost.

Case Study 2 - Chennai. With rising population and a flourishing economy, water demand from households, commercial hubs, industries and power plants pushed Chennai into a water crisis, as outlined in a 2018 report[18] by the International Water Association. In response, Chennai Metropolitan Water Supply and Sewerage Board (CMWSSB) took 'serious steps' to close the water loop and make most of the available water. Among other measures, it was made mandatory for industries and manufacturers to achieve zero liquid discharge (ZLD) in their operations; all wastewater was treated to be reused. CMWSSB through a PPP model started treating wastewater to a standard, selling it to larger industries in the city that then further treated the wastewater[18].

FIGURE 3 POTENTIAL TO REDUCE GHG EMISSIONS BY 6.2% PER YEAR BY IMPROVED WASTEWATER MANAGEMENT[18]

As a consequence, Chennai was able to meet around **15%** of its water demand through **treated wastewater consumption.** Around 8% of the treated wastewater was sold to industries, and up to 40.7% of domestic water needs in newly built houses was secured from in-situ wastewater reuse. In-situ wastewater reuse in residential areas along with rainwater harvesting reduced nearly 60% of water reaching the sewer system contributing to **improved operation of sewer networks.** As demand for onsite wastewater treatment systems increased, **new markets** for wastewater treatment manufacturers and businesses were created.

[18] The International Water Association, Waste Water Report, 2018.

4 ESCo MODEL FOR FINANCING SUSTAINABILITY PROJECTS

Context. A 2019 report[19] by the Observer Research Foundation states that, three years after the Paris Agreement, the developed world has failed to meet its obligations to help finance climate action in developing countries. Noting that official aid is insufficient to meet the growing energy and infrastructure needs of emerging economies, the report highlights the need for 'new financial instruments and pipelines' to support sustainable development. This is especially true for a large country like India that must 'chart its own path' to 'transition to a middle-income economy in a fossil-fuel constrained world'.

In order to apply some sustainability solutions to properties such as hospitals, businesses, residences etc., there is therefore a critical barrier in terms of the cost or investment required to be addressed and overcome, for these transitions to occur at scale in the Indian context.

Solution. To overcome this barrier, the **performance contracting** model[20] and its variants[21] can play an important role. This approach was originally introduced in the context of energy as the **ESCo** (energy services company) model; however, it can be generalised to other sustainability solution installations such as water efficiency etc.

In this model, there are three **stakeholders** – the property owner, a financier, and a regulatory authority or consultant (also known as the ESCo). The property owner can get sustainability solutions – such as solar energy, energy efficiency retrofits to building, water efficiency solutions etc – installed without having to overcome the barrier of cost of installation of these solutions. This is possible as the financier provides the initial investment on the advice of the consultant/regulator, who ensures that the installations generate a sufficient and known return-on-investment. The property generates savings over the years from the installations, which pays back the financier. The rate of payback is dependent on the savings generated from the installed green infrastructure, hence this model is also known as **'pay for performance**' or '**performance contracting'**. At the end of several years, the financier can exit, with the bulk of savings thereon accruing to the property owner.

Using appropriately contextualized versions of the performance contracting model, green infrastructure – including clean energy capacity, energy efficiency retrofits and water efficiency infrastructure – can be installed in a "frictionless" manner and with minimum upfront cost to the property owner. Financial returns can be generated for investors in the green economy.

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[19] Chikermane, Samir Saran and Gautam. 'Financing Green Transitions'. ORF. https://www.orfonline.org/research/financing-green-transitions-47553/.
[20] Western Resource Advocates, McKinstry. 'Tapping the Power of the Market: Energy Savings, Water Conservation and New Revenue Streams Through Performance Contracting in the Colorado River Basin States'. https://westernresourceadvocates.org/publications/tapping-the-power-of-the-market/.
[21] https://www.enviroaccounting.com/payforperformance/Program/Display/greenbonds.

The model can be considered a "win-win" situation as it allows parties with budget constraints, including public entities such as city municipalities, to partner with private industry and investors to create comprehensive sustainability retrofit projects that pay for themselves and can be conveniently implemented through turnkey service providers. The up-front costs and financial risks may be eliminated through the performance contract – if the savings do not pay the full costs of the project, the consultant (ESCo) and not the property owner covers the shortfall. Further, once the contract has ended, subsequent savings accrue directly to the property owner. It is also possible to apply the model in variant forms such as issuing green bonds with pay for performance, etc.

Case Study – KIMS Hospital, Hyderabad is an example[22] where performance contracting has been used to accomplish goals of improving sustainability and infrastructure modernization without capital expenditures. The Hospital has been able to reduce energy consumption and invest in green infrastructure without diverting financial resources away from its core needs and activities as a healthcare institution.

Elements include design improvements and equipment replacements in the central HVAC system, moving away from diesel based to heat-pump based hot water generation, induction stoves for the kitchen's bulk cooking requirements, ceiling fan retrofits with brushless DC motor fans, conversion to LED lighting, and continuous monitoring and optimization of operations using a state-of-the-art Internet-of-Things (IoT) system. The upgrades have saved more than INR 2 crore a year, and the Hospital has been enjoying 30% of that benefit under the performance contract, without making any investment. Overall, a reduction of 17% in electrical consumption, 100% in diesel consumption and 25.2% in natural gas have resulted from the performance contract, winning the Hospital recognition from CII as the national benchmark for energy efficiency in Hospitals in India.

[22] CII 20th National Award for Excellence in Energy Management 2019 – retrieved from http://www.greenbusinesscentre.com/energyawards/enepresent19/Buildings%20_39_29_KIMS_Hyderabad_0.pdf

ABBREVIATIONS

CSR	Corporate Social Responsibility
ESCo	Energy Services Company
HVAC	Heating, Ventilation and Air Conditioning
IoT	Internet-of-Things
MSP	Minimum Support Price
PPP	Public Private Partnership
RNFS	Rural Non-Farm Sector
RTDC	Regional Design Training Centre
SDG	Sustainable Development Goal
STP	Sewage Treatment Plant
ZLD	Zero Liquid Discharge