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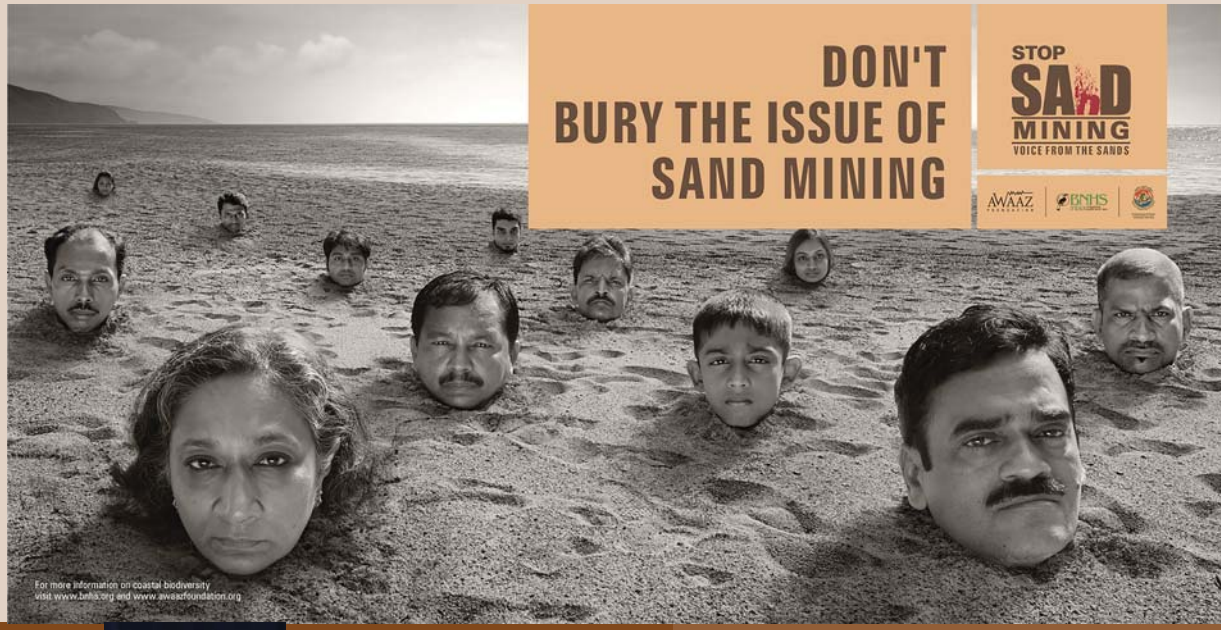
Manufactured Sand

The high demand for sand has led to environmental concerns because of the dependency on riverbed. Alternate materials such as sand made by crushing sedimentary rocks can be considered as a viable alternative to riverbed sand in order to meet the demand. This sand has higher efficiency rate too, says Shyam Sunder P of CSTEP

Sand is an essential element in concrete and hence plays an important part in the construction and infrastructure industry of a modern economy. It is the primary raw material in concrete and is typically sourced from riverbeds, which are usually ecologically sensitive areas. Excessive mining leads to the degradation of riverbeds, which affects the local groundwater system, biodiversity and the recreational potential of these places.

Karnataka officially produces 9 Million tonnes (Mt) of sand per year, and a large part of this quantity is currently sourced from riverbed mining. Some sand is also imported from



NEWS

CII

Confederation of Indian Industry

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Purpose: To excite Indian businesses, SMEs, executives and students about the immense business opportunity in not only adopting Sustainability as Strategy in their companies but also inspire them to the possibilities of a big market for innovative sustainability products and services.

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neighbouring states. The Center for Study of Science, Technology and Policy (CSTEP) recently conducted a study which estimated the current demand for sand in Karnataka as 26 Mt (in 2014) with an expectation to grow to 56-81 Mt per year (by 2030). Due to the high demand for sand (as compared to supply), the state has observed high sand prices leading to an increase in construction costs. **The high demand for sand has also led to environmental concerns given the dependency on riverbed sand. Alternate materials such as sand made by crushing sedimentary rocks can be considered as a viable alternative to riverbed sand in order to meet the demand.**

Manufactured Sand

Crushed-stone sand or 'manufactured sand' is produced by crushing rocks to a grade comparable to that of natural sand. A study was conducted by the Department of Civil Engineering, Indian Institute of Science (IISc) for the Department of Mines and Geology, Government of Karnataka (GoK) on the suitability of manufactured sand as fine aggregates in mortars and concrete. The study reported that while the physical characteristics of manufactured sand are similar to riverbed sand, the concrete made has higher compressive (6-9%) and flexure (12-15%) strength. The technical analysis showed that manufactured sand is suitable for applications in mixtures such as mortar and concrete.

Popularity of Manufactured Sand in Karnataka

The current production and use of manufactured sand is estimated to be 3Mt per year in Karnataka. Mining rules set by the state have been drafted to encourage sand manufacture from allotted quarries. Several independent manufacturers and popular cement manufacturers can benefit from these rules. Recently, the State Cabinet decided to provide 5% subsidy on interest for loans taken to set up manufactured sand units in districts which lack natural sand resources (as reported in The Hindu). In order to create demand, the State Government has also encouraged the use of manufactured sand in all government contracts. **Today, the Bangalore Airport and the Bangalore Metro are some of the major projects that have utilised manufactured sand.**

Availability of Resources

CSTEP's study shows that Karnataka has adequate resource to meet the demand for sand for several decades. The study examined the potential for manufacturing sand from existing mines with expired leases, existing mines given area extensions as well as unexploited

open rock formations (using satellite maps and GIS – Geographic Information System). After excluding ecologically sensitive areas and areas close to human built environments, the study estimates that there are adequate rock resources available to meet the growing demand for sand in the state.

According to the study, the state has a manufacturing sand capacity of about 40 Mt from inactive mines, about 70 Mt by expanding quarry areas and about 3075 Mt from un-exploited resources.While these numbers have been calculated using desk-based geo-spatial tools, verifying the same based on ground surveys will be necessary.

Beyond Manufactured Sand

With increasing urbanization and Government push for 'Housing for all' the demand for building materials will continue to increase. The identification of alternate building materials will play an important role in meeting some of the demand. With ageing infrastructure, the disposal of debris will become an important issue. Relying on fresh raw materials including manufactured sand may not be sustainable. **It will become necessary to examine the potential of converting debris to sand. Recycling demolition waste is an exercise worthy of examination.**

Policy Recommendations

Based on superior technical performance and the availability of manufactured sand resource, and the need to develop manufactured sand capacity in Karnataka, the following recommendations have been proposed:

i. Publicise and promote manufactured sand by highlighting the results of the IISc study on the superior properties of manufactured sand
ii. Mandate the use of manufactured sand by the Public Works Department (PWD), Irrigation Department, and Urban and Rural Development Departments
iii. Revisit the existing tendered quarries to encourage the production of manufactured sand
iv. Identify and demarcate zones for new stone quarries and crushing areas before auctioning and leasing parcels. Provide access and associated infrastructure such as roads, electricity, etc. to these zones
v. Provide structural and financial incentives for stone crushers to engage in the production of manufactured sand
vi. As a long-term plan, the Government should explore the potential of utilising building debris or new building materials to produce sand and adopt innovative architecture.
vii. Encourage more manufacturers in the process to build ready capacity
viii. Include mandated Occupational Health and Safety (OHS) processes to support human resource at mining and manufacturing sites

The government, through its forward- looking policies has the power to create a conscious and focused **"reduce, re-use and recycle"** strategy which can make a significant impact on making India an environmentally sustainable society.

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CII To Launch Products & Services Directory of For Smart Cities

The Ministry of Urban Development, Government of India has shortlisted 98 smart cities to be considered under the Smart City Mission (SCM). These cities are now preparing for 'City Challenge Competition'.

CII, with its network of offices spread across the short listed cities, being actively pursued by various State Governments / City Administrations to serve as a neutral platform to suggest "Smart" Urban Technical Solution Providers across the following verticals:

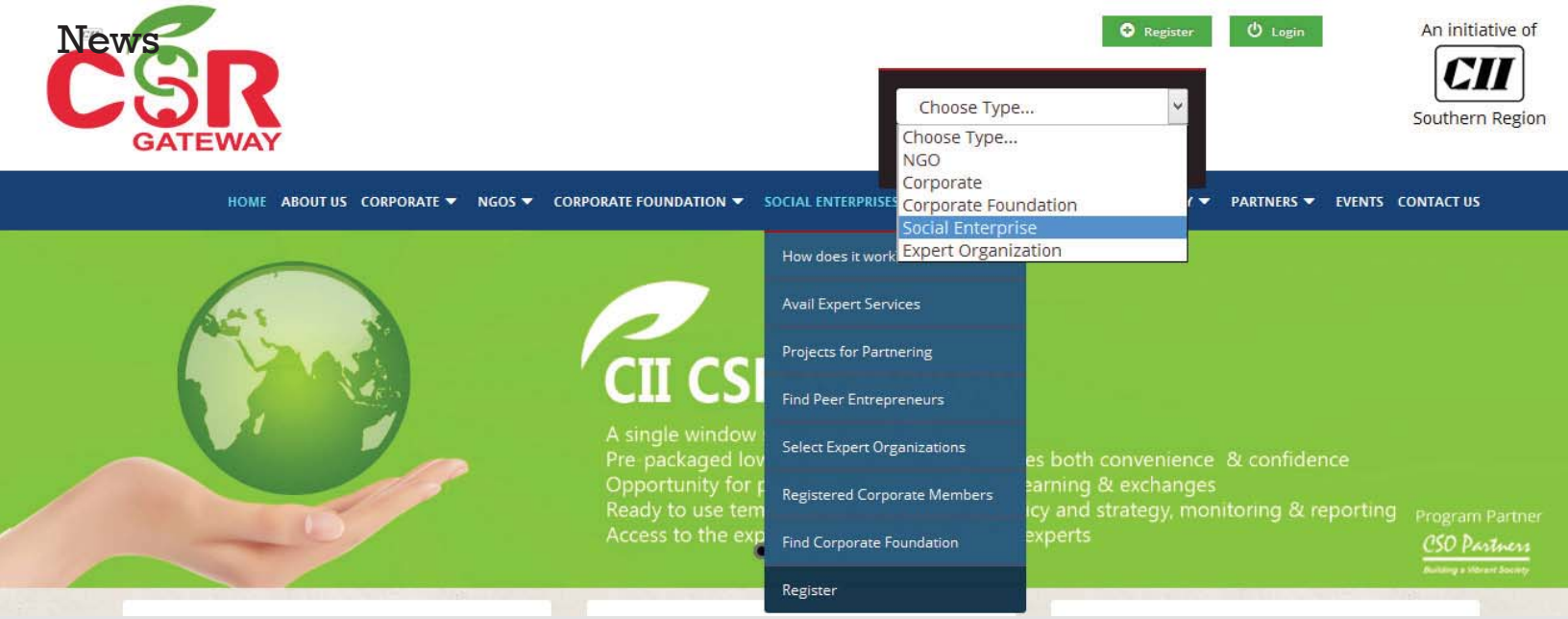
- Water Management, including rain water harvesting & smart metering
- Electricity Management, including Renewables, Green Buildings & Smart Metering
- Sanitation, including Solid Waste Management & Waste to Fuel Technologies
- Urban Mobility & Public Transport including Intelligent Parking
- Affordable Housing
- IT Connectivity & Digitalization
- Good Governance, including E-Gov, Grievance Redressal & Citizen Participation
- Sustainable Environment
- Safety and Security
- Health & Education, including Tele-education & Tele-health
- Skill Development Centres
- Trade Facilitation Centres
- Financial Solutions for Smart Cities
- Consulting Services for Smart Cities

To address this requirement, CII is in the process of bringing out a "Directory of Products & Services for Smart Cities". This Directory will feature the key offerings of firms in any of the above mentioned verticals, along with a brief profile over a 2-page spread. This Directory would be circulated among all States Governments / UTs / ULBs, especially the shortlisted 98 City Administrations.

Techno-Commercial solution providers, who would like to utilise this Directory to showcase their products / services are requested to block their space using the URL given below:

https://fs9.formsite.com/CIITN/form219/index.html

For more information, please contact Mr BS Rao at bs.rao@cii.in / Tel +91 124 4014078.



CII Launches Match-Making Gateway for CSR

India's premier industry body, CII, launched the CII-CSR platform recently. It has 132 NGOs, 16 corporates, 47 member projects to partner with, and 10 flagship projects listed on the Gateway. The Gateway is gaining momentum to become the No 1 Match Making Portal for all CSR Needs.

CII CSR Gateway platform will connect the industries and all the relevant stakeholders of CSR to get involved in the social development process through their CSR initiatives.

The platform will serve the purpose of the following:

- Bringing together individuals, NGOs, social enterprises, and corporates from different walks of life that have the common motive to develop, enhance the society as a whole.
- Creating a well-connected CSR network
- Working with NGOs, corporate foundations, business associations, corporate houses and assisting them with formulation of projects, community need assessment, research and documentation is made easier.
- Dependable Third Party Assistance
- Knowledge sharing
- Expert support at all levels of any CSR initiative
- Step by step support, analysis of project, ideation up till implementation
- Access to the wide database available and connection with the right organization for the right cause
- Helping to mobilize corporate funding for NGO's
- Capacity Building on a large scale
- Keep increasing the resources on the gateway with regards to all stakeholders-nationally and internationally.
- An active Discussion Forum with Experts who would give their opinions
- Online courses, webinars and a plethora of activities, resources which will be related to CSR

The link to the platform is - www.ciicsrgateway.org for your perusal.

India's Tech-Smart Villages

Thamna, about an hour north of Anand in Gujarat, **uses solar panels to power water pumps that irrigate the fields of farmers.** Solar energy pump is one of the technologies being promoted by a new project designed to help rural Indians adapt to climate change. The project, run by the international NGO, the Consultative Group for International Agriculture Research program on climate change, agriculture and food security (CCAFS), aims to create 1,000 so-called climate smart villages across six Indian states including Haryana, Punjab and Gujarat.

Haryana and Punjab are known as the grain basket states of India, producing the majority of the country's staple wheat and basmati rice for export to the Middle East and European markets. The pumping of groundwater for irrigation over the past thirty years has led to a spike in productivity and increased food security.

A recent study by the Indian Agricultural Research Institute indicates that climate change may reduce wheat yields in India between 6% and 23% by 2050. Environmental problems such as depleting groundwater and variable rains – delayed monsoons and intense rainfall – limit yields. Indian farmers also typically use almost twice the amount of fertilizer needed, damaging soil, contaminating groundwater and adding to greenhouse gas emissions.

For rural communities in Haryana and Punjab the issue now is how to meet these new challenges, introduce more sustainable practices of farming and still increase yields and profits.

The pilot solar energy pump in addition to energy provides a financial incentive for farmers to conserve water because they can sell energy back to the grid, thus helping to relieve stress on depleted aquifers.

Other climate-smart interventions include **laser-guided land leveling of fields,** which can conserve 20% of water resources and increase yields by 15% through greater precision in seeding, tillage and measuring the moisture of soils.

Handheld crop sensors called Green Seeker is another gadget that helps in assessing crop health. A mobile phone app also helps calculate how much fertilizer to apply throughout the growing season.

While climate unpredictability has made farming more difficult in the past, these smart technologies are certain to boost farmers' confidence and income.

India and China Can End Asia's Haze By Buying Only Certified Palm Oil

The thick haze that blanketed much of Southeast Asia for a month carried the ashy remains of Indonesian forests and peatlands -- burnt in many cases to clear land for producing palm oil, the world's most popular edible oil. It's an annual occurrence dating back decades, and this year it's particularly bad: According to one report, the 2015 fires have emitted enough greenhouse gases to rival Germany's annual output of CO_2. And they're growing worse.

Many proposals to fix the problem target the palm oil supply chain -- from farmers and refiners, to the bankers and politicians who fund and license companies. That's crucial. But to be successful, such efforts have to address demand as well. Unless consumers insist on buying palm oil that's been sourced sustainably -- and are willing to pay for it -- companies and middlemen will continue to look for the cheapest possible ways to clear land, which means burning.

For several years now, campaigns promoting sustainable palm oil -- oil produced with as little impact as possible on the surrounding environment -- have been gaining momentum in Europe. **The Netherlands has committed to using only sustainable palm oil by the end of this year.** Indeed, the Roundtable on Sustainable Palm Oil (RSPO) -- an industry group founded in 2004 -- says that all of the palm oil used in the EU will be certified sustainable by 2020. Public education, advocacy and consumer pressure have all had an impact.

The problem is that the EU only represents around 11 percent of the market for palm oil. The world's biggest consumer is India, which accounts for 15.6 percent of palm oil consumption globally, and 21 percent of all imports. China is the world's third-largest importer, after the EU, and fourth-largest consumer. Together India, China, Pakistan, Egypt, Bangladesh, and Myanmar account for nearly half of global palm oil imports.

The RSPO's efforts have barely made a dent in these emerging markets, admits Stefano Savi, the group's Global Outreach and Engagement Director in Kuala Lumpur. Fewer than 100 of the RSPO's more than 2,000 members are based in India and China. **Savi says he expects around 30 percent of India's palm oil to be certified by 2020, and only 10 percent of China's.**

Price Key Hurdle

Price remains a key hurdle. Across Asia, palm oil's main selling point is its reputation as the "poor man's oil."

In August, for example, crude palm oil imported into India was more than 37 percent cheaper than imported sunflower oil, and 19 percent cheaper than imported soybean oil. Properly sourced, sustainable palm oil can cost as much as 17 percent more than regular oil. For many Indians, whose per capita income was $1,595 in 2014 (as opposed to $51,590 in the Netherlands), that's a stiff premium.

There's no reason for activists to lose hope. Asia's burgeoning, brand-conscious middle classes have shown that they care about the environment. In China, for instance, consumption of shark fins is declining, largely because of a years-long public-education campaign fronted by basketball star Yao Ming. (The process has been helped along by President Xi Jinping's crackdown on official banquets and other extravagances.) International companies that have committed to using sustainable oil -- such as McDonald's, Post and Mondelez -- could use those policies to burnish their brands in emerging markets.

Ultimately, though, **the only way to change behavior in India and China will be to reduce costs.** Currently, only half of the roughly 5.3 million tons of RSPO-certified sustainable palm oil is sold at a premium, though the proportion is increasing steadily, according to the RSPO's Savi. The rest is sold as conventional palm oil to manufacturers and retailers who -- for now -- don't see any commercial advantage in sustainability.

Whatever **losses producers accrue are at least partially covered by a trading scheme whereby they can sell certificates -- akin to carbon trading credits -- to companies that want to support sustainable production.** However, current market prices for those certificates are well under $1 per metric ton, underlining weak demand.

Europe may be able to lend a hand. In search of carbon savings, the EU is keen to expand the use of sustainable bio-fuels. The dregs of palm oil refining could be one source. According to a 2014 industry report, India already has the capacity to produce 435,000 metric tons of palm oil-based biodiesel annually.

Industry, governments and NGOs could cooperate to channel sustainably-produced palm oil into that supply chain. Doing so would open new markets to Indonesian farmers, while giving them a profitable reason not to burn land to make a living. These are all long-term solutions, of course. But they're critical if the skies over Southeast Asia are to be cleared for good.

http://www.bloombergview.com/articles/2015-10-15/india-and-china-are-key-to-ending-asia-s-haze

Punjab Aims For Full Sustainability

The Indian state of Punjab has set a goal of becoming completely sustainable in energy generation and is **increasingly turning to solar to power its industries and farms.**

At the inauguration of the state's largest solar project – the 34 MW PV plant in the district of Bathinda - Punjab's New and Renewable Energy Minister Bikram Singh Majithia said: "We are committed to developing Punjab as a fully sustainable state. Ensuring the state's upward development trend is important and therefore energy security is critical."

Majithia added that the state government had "opted to take an aggressive step by turning to solar energy for fueling energy needs of our industries and farmers. Through projects like these we are ensuring that our immediate future as well as that of our coming generations will be more secure and avert an otherwise polluted future."

Welspun Vice Chairman Vineet Mittal added that the solar project had strengthened the company's "partnership with the state of Punjab and advancement of the state's utility-scale solar industry."

The Bathinda plant will feed 48 million units of energy into the Punjab state grid annually over the next 25 years, mitigating more that 1.3 million tons of carbon dioxide emissions, according to the company.

Welspun has signed a memorandum of understanding to develop a further 151 MW in Punjab and is targeting 11 GW of renewable installations across India. **To that end, the company is planning to install 5 GW of capacity in the next few years, with 1 GW of that to be commissioned within the 2015-2016 period.** The company is currently active in eight of India's 36 states and union territories.

http://www.pv-magazine.com/news/details/beitrag/punjab-aims-for-full-sustainability_100021474/#axzz3oWQAY8Ck

Dr. Navroz Dubash Gets 2015 TN Khoshoo Memorial Award

Dr. Navroz Dubash, senior fellow at the Centre for Policy Research, New Delhi, has bagged the TN Khoshoo Memorial Award for 2015. **The award was given to him at a function organized by the Ashoka Trust for Research in Ecology and the Environment recently in Bengaluru. The TN Khoshoo Memorial Award is in memory of the world-renowned environmental scientist, Dr. Triloki Nath Khoshoo in recognition of the impact his work has had on India's climate policy.**

Dr. Dubash has served on India's Expert Committee on Low Carbon Strategies for Inclusive Growth and other national committees on water and energy policy. He spoke about framing and thinking about climate change in ways that also brings into focus other environmental issues that the country faces. He also spoke about climate change as a development issue, which can potentially result in falling agricultural yields and increase in the incidence of extreme weather events, especially in India. However, he added that since this is an issue which has been primarily caused by developed countries, they have to take up a greater share of emission cuts.

The event also featured a video message by Union Minister of Environment Prakash Javadekar, who highlighted the concerns of developing countries in the context of the Bonn draft and laid emphasis on achieving a "fair, just and equitable agreement out of Paris that recognizes common but differentiated responsibility because of historical role." He also urged developed countries to free up the carbon space for the economic growth of developing countries.

News

YES BANK First Bank in Dow Jones Sustainability Index

YES BANK, India's fifth largest private sector bank, has become the first Indian bank to be selected as part of the Dow Jones Sustainability Indices (DJSI) in the Emerging Markets Index. The Index comprises 92 companies from 14 emerging economies including China, Brazil, South Africa and Taiwan. **116 banks from emerging economies** were invited to participate, of which YES BANK is the only Indian bank to have been included.

YES BANK underwent a rigorous assessment on **1000 data points** that include economic, social and environmental dimensions. Recently, YES Bank and International Finance Corporation (IFC) opened trading of the world's first **Green Masala Bond of INR 3.15 billion** issued by IFC and listed on the London Stock Exchange. YES Bank had issued **India's first-ever Green Infrastructure Bonds** for **INR 1000 crore (USD 160 million)** with green shoe option that witnessed strong demand from leading global and domestic investors.

Rana Kapoor, MD & CEO, YES BANK, said, "We are extremely proud to be the first Indian Bank to be selected in the Dow Jones Sustainability Indices, in Emerging Markets Index. **We believe that banks being central to an economy should influence and facilitate positive impact.** YES BANK strives to set an industry benchmark towards creating a sustainable ecosystem and serve our customers, clients, employees and communities better. We certainly hope that this global recognition will help evangelize sustainability and environment management in the entire banking sector."

Simple Methods Bring Big Gains for Nepal Farmers

Farmers in Nepal's Kavrepalanchok district say they are now confident of getting around the problem of erratic rainfall by adopting simple **'climate-smart' practices** like lining ponds with plastic to conserve water.

Bimala Bajagain, 35, who farms potatoes, tomatoes, bitter gourd and cucumbers in her village of Kalchebesi, Kavrepalanchok district, tells that she has difficulty watering her crops in a timely way. "We have scarcity of water during the summer, but this year it poured torrentially for a day and then stayed dry for the rest of the season."

Yet, Bajagain doubled her income from the sale of vegetables this year. Pointing to a grove of bitter gourds ripe for picking, she explains how **mulching** helped retain moisture in crops and minimise evaporation. **"It involves nothing more than digging a hole for placing organic manure, sowing the seed and covering it with hay as a protective layer."**

The results are palpable. "The bitter gourd seeds I had sown in February this year were yielding six months later, whereas last year's gourds dried up quickly with the harvest lasting only four months," Bajagain says.

In the neighboring village of Patlekhet, other climate-smart methods are in use. Here **ponds are lined with plastic sheeting and waste water is used for irrigation.** Each household in Patlekhet village has its own plastic-lined collection pond while a bigger community pond sits higher up the hill.

"Plastic ponds have greatly assisted the irrigation needs of my home garden," says Saraswati Dhital, a farmer who was helped by a climate-smart project run by the Centre for Environmental and Agricultural Policy Research, Extension and Development (CEAPRED), a local NGO, with support from the International Centre for Integrated Mountain Development (ICIMOD).

Waste-water from wash basins is channeled into a small plastic-lined pond that feeds Dhital's vegetable garden planted with turnip, cardamom, lemon and coriander as part of a year-old action plan by CEAPRED and ICIMOD to encourage water-smart practices.

"Our main intervention is for waste-water management," says Keshav Dutta Joshi, program director, CEAPRED. "According to our research, a typical family that grows vegetables using waste-water irrigation and keeps cattle can earn more than a migrant labourer working in the Gulf."

"We aim to have a scientific basis to design and apply a well-packaged program for the entire mid-hill agro-ecological region of Nepal — a package that will tell farmers how much water can be harvested, the amount of investment required, the crops that can be grown and amount of income that can be earned," says Joshi. "But, we will need data from at least three consecutive years of action research for this."

A study conducted by Kochi Technology University (KTU), Japan, published in EconPapers, found that vegetable production and income can increase by more than 30 per cent if a simple water-conservation technique like lining ponds with plastic is deployed. **Plastic-pond technology, the study says, "is expected to contribute to poverty reduction for smallholder farmers."**

"Overall, the plastic pond shall be a promising technology not only in Nepal, but also many other developing nations," the study said.

http://www.scidev.net/south-asia/farming/news/nepali-farmers-get-climate-smart.html?utm_content=buffer684a4&utm_medium=social&utm_source=twitter.com&utm_campaign=buffer. Copyright: David Breashears / GlacierWorks

Sweden To Become First Fossil Fuel-Free Nation

Sweden's Prime Minister Stefan Löfven recently declared at the U.N. General Assembly that his nation of 10 million people would become "one of the first fossil-free welfare states in the world."

His announcement comes at a time when 146 nations have made promises to reduce their carbon emissions with the COP21 talks in Paris starting in November 4, 2015. Löfven and his government have made a bold statement that has prompted many commentators to ask: How on earth this could this happen, if ever?

The reality is that the Nordic countries already have a strong track record when it comes to action on climate change and clean-energy generation. **Denmark**, for example, hit a point over the summer when it **produced 140 percent of its energy needs from wind power,** some of which it ended up exporting to its neighbors. **Oil-rich Norway produces about 99 percent of its electricity from hydropower** and has one of the highest rates of electric vehicle ownership on the planet. And, blessed by copious amounts of geothermal sources, **Iceland meets about 85 percent of its energy needs from renewables.**

Currently almost 80 percent of Sweden's electricity comes from non-fossil fuel sources. The challenge, however, is that a large portion of this power comes from nuclear. After decades of promising to decommission its nuclear power plants, the country's government decided it would allow new plants to replace shuttered ones in 2010.

Mothballing 10 to 13 nuclear power plants will throw a wrench in Sweden's plans, as not everyone, notably the country's power-sharing Green Party, sees this form of power as "clean" despite the fact it discharges zero emissions into the earth's atmosphere.

That nuclear sticking point aside, Sweden's government claims it is on an ambitious course to wean itself from fossil fuels. **In 2016, the country's energy and environment ministries will spend about 4.5 billion crowns (US$545 million) on projects including solar-cell research and electric-vehicle technologies. Smart-grid and other energy-efficient technologies will also see a boost in research dollars.**

Curiously, Sweden is not just investing money within its borders — some of those funds will be spent on sustainable development projects abroad in poorer countries. In that sense, Sweden is taking leadership and is nudging richer companies to do the same.

Sweden wants to heat its buildings with 100 percent renewables. Sweden's advanced public transport system already mitigates the country's carbon footprint.

http://www.triplepundit.com/2015/10/sweden-on-target-to-become-first-fossil-fuel-free-nation-on-earth/?utm_content=bufferc4fab&utm_medium=social&utm_source=twitter.com&utm_campaign=buffer

How 33 Technologies Save Energy, Increase Profits

Energy accounts for a sizable share of company operating costs. A McKinsey & Company's August 2015 report details 33 technologies to improve energy efficiency—and your bottom line. An extract from a report titled *'Greening the future: New technologies that could transform how industry uses energy'* by Harsh Choudhry, Mads Lauritzen, Ken Somers, and Joris Van Niel

As the world grows, in both wealth and population, so will the demand for energy: global primary-energy consumption is on course to increase by 25 percent between now and 2030. At the same time, concerns over pollution and climate change are forcing businesses and governments to think hard about how they produce and use energy. Energy efficiency, which is sometimes called the "fifth fuel" (after coal, gas, nuclear, and renewables), can play an important role in helping the world meet its demand for power and mobility.

Since the turn of the 21st century, energy costs have risen steadily. Even when prices have fallen, as happened most dramatically with oil from 2014 to 2015, such rapid swings can be difficult for companies to cope with. Moreover, when costs are low, there is a tendency to question whether energy-efficiency measures are worth the effort. The answer is yes, many are—and not just because **energy efficiency offers protection against price volatility.**

The research shows that while operational improvements can reduce energy consumption by 10 to 20 percent, investment in energy-efficiency technologies can boost that to 50 percent or more. For example, the cost of clean-room-environment control could be reduced from 50 percent of energy consumption to a fifth of that, and there are also sizable gains to be made in cement, refining, and steel.

In short, it is not an impossible dream for manufacturing, which accounts for half of global energy consumption, to meet energy demand in a way that is both economically and environmentally efficient. **Innovative technologies could significantly reduce energy consumption and save industry more than $600 billion a year.**

The report lists nine categories: advanced industries, cement, consumer goods, mining, oil refining and chemicals, power, pulp and paper, steel, and those that can be used generally. **Most of these technologies are already available—the challenge for companies is to figure out which ones to use, how to put them into practice, and how to renew them so that they continue to work year in and year out.**

Energy forms a sizable share of operating costs.

Industry sector	Energy cost % out of overall operating costs
Advanced industries	15
Cement	35
Chemical	30
Oil refining	7
Consumer goods[1]	15
Mining	25
Power	50–80
Pulp and paper	15
Steel	30

[1]Including cosmetics, food and beverage, and pharmaceuticals.

McKinsey&Company

Its five core principles of resource productivity are used to help make sense of what technologies to use and how to put them into long-term practice:

- ***Think lean.*** Build a resource-productivity strategy within the organization. **Lean thinking and green thinking are based on the same fundamentals and work together well.** For instance, an Indonesian power plant reduced its cost per megawatt by 7 percent in four months by creating performance indicators and then tracking them systematically.

- ***Think limits.*** Use the theoretical-limit concept—an analysis that identifies the lowest amount of energy required for a given process—to set ambitious but realistic goals. This fosters the kind of creative thinking that can deliver substantial resource-productivity improvements. One Chinese iron-and-steel enterprise reviewed its theoretical limits and analyzed its key sources of operational loss; on that basis, it changed its operations to use waste heat to generate additional power, significantly cutting its production costs.

- ***Think profit per hour.*** Review the full profit equation when making changes. Evaluate trade-offs such as throughput, yield, energy, and the environment as a whole—changes in one will likely affect the others. Profit should be the main factor in making final decisions. By applying advanced statistical analysis, a pharmaceutical company was able to increase its yield by 20 percent while using the same amount of energy.

- ***Think holistic.*** Making and sustaining change is not only a matter of technical improvement; it also means changing mind-sets, behaviors, and the management system throughout the organization.

- ***Think circular.*** Consider your product as a future resource that can be used repeatedly, moving from the usual linear supply chain toward supply circles. A global data-services company applied the "think circular" principle by using analytics to design a facility that streamlined energy to its most important function. This resulted in more capacity and less capital expenditure.

"Around the world, and across sectors, getting smart about energy should be seen as a strategic imperative. The chance to do better is there for the taking," say the authors of the report

http://www.mckinsey.com/insights/operations/technologies_that_could_transform_how_industries_use_energy

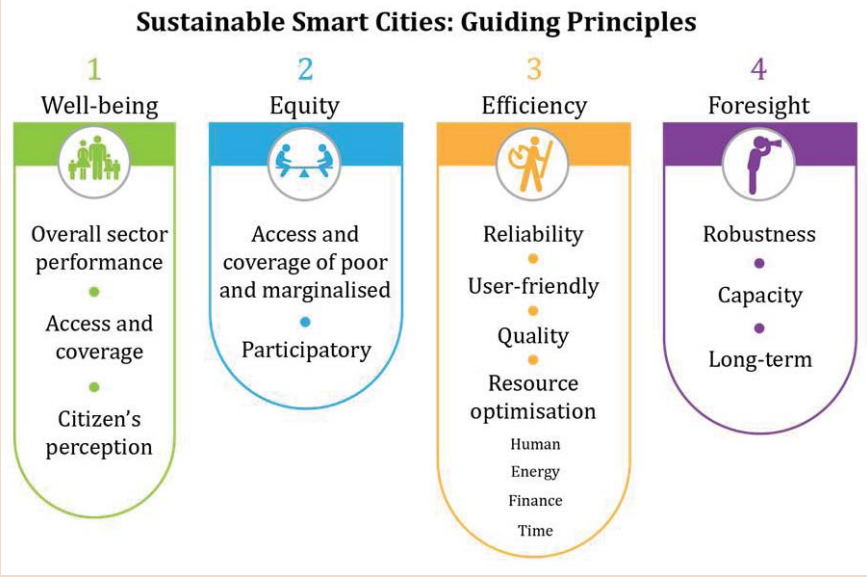
Reconceptualising Smart Cities

A Reference Framework for India

The report is expected to guide policy makers and urban practitioners in making critical decisions, in an accountable manner and spirit, which could truly make Indian cities smart

The Government of India (GoI) initiated the '100 Smart Cities Mission' in 2014. This has triggered deliberations across the country on the concept of smart cities, the need and the orientation of the Mission in the context of India's present urbanisation scenario.

The concept of a 'Smart City' is a relatively new phenomenon in India. This report is a step towards synthesising various aspects related to smart cities that has led to the formation of a proposed Reference Framework by CSTEP, for the Smart Cities Mission in India.



The report begins by carving out the following scope

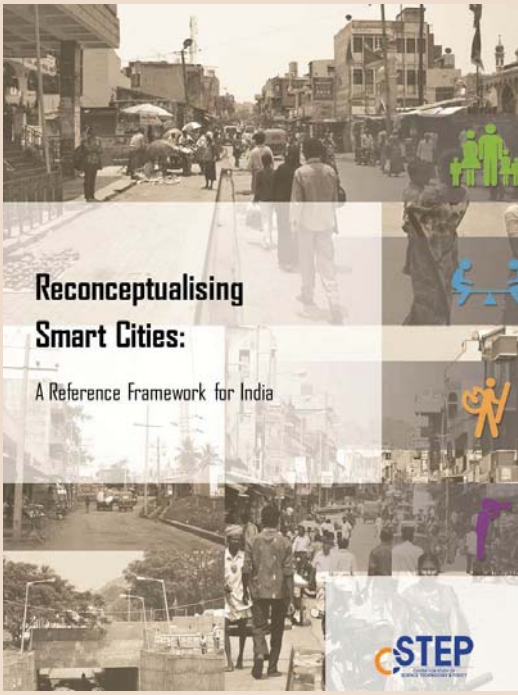
- What is the level of clarity on critical aspects of smart city development internationally and the lessons it holds for India?
- Where does the Smart Cities Mission fit in India's larger urban development trajectory?
- What is needed to orient the Smart Cities Mission such that it addresses India's pressing urban sector challenges and enables different stakeholders to implement the Mission with consistent objectives, to attain a common goal?

Globally, the notion of smart cities is not new. There are multiple ideas, definitions and approaches to smart cities. An analysis of international approaches and the underlying semantics related to smart cities reveals that the concept has only evolved partially. This includes non-clarity in definition, indicators and measures, and standardisation of critical aspects. There is no 'one size fits all' model for smart cities that can be replicated in India. The current scenario indicates a critical need for defining and contextualising the various aspects of smart city development.

This report argues that the larger notions of sustainability and good governance encompass the overarching goals of smart cities across the globe. Technology, especially Information and Communication Technology (ICT) is an important enabler in attaining sustainability and good governance. However, technology needs to be supported by an enabling policy environment. This would need a carefully designed framework, which would provide guidance for the realisation of India's urban agenda. As an important step in India's urban sector programme trajectory, the Smart Cities Mission needs to be equipped to provide solutions to India's urban challenges. The report places the Smart Cities Mission as an opportunity to:

- Create an efficient urban management system
- Enhance the capacity of urban institutions
- Push a decentralisation agenda
- Reduce conflicts in the urban environment
- Create enabling conditions for inclusive and equitable urbanisation.

The interventions for achieving the opportunities mentioned above need to be systemic; they cannot be 'stand-alone' in nature. ***The point of departure (from existing urban development programmes) that would make a difference in an increasingly resource constrained world is how judiciously one plans a city. This has to be supported by the enhanced power of technology, an aware and engaged citizenry and a competent and capacitated set of people working within anaccountable framework.*** This process would determine the 'smartness' of a city and herein emerges the need for a Smart City Reference Framework.



The Smart City Reference Framework, which is the culmination of this report, offers directions to both practitioners and theorists. The Framework is driven by the following four guiding principles:

These guiding principles have been derived from the United Nations' (UN's) draft Sustainable Development Goals (SDGs). The Reference Framework includes major action stages in the Smart Cities Mission and identifies a set of reference guides to support the agencies responsible for carrying out the action stages.

The processes of city selection and indicator designing for base lining have been explained within the Framework. The Framework aims to crystallise future pathways for smart cities development in India, by laying emphasis on the process of city development that leads to sustainable outcomes.

Seed-to-Table Organic Restaurant

Lumiere, the organic restaurant in Bangalore, grows all its needs in its own farms

Lumiere, one of the pioneers in organic agriculture, retail and food business in India, originated in Kerala in 2002 with a vision to show the world a sustainable "Seed-to-Table Organic" business model, thus allowing more and more people to pursue the same and make the whole world a safe and healthy place to live in.

The firm says it supports the organic farmer by practicing FAIR-TRADE. Currently, operations are based in Bangalore, through two organic stores and one organic restaurant. Leafy green vegetables come from their own organic farm in Varthur, Bangalore which also houses their free range poultry farm.

Their journey started when the founders purchased a 10 acre farm land in Kanthalloore, Munnar in 2002 and started converting it into an organic farm. They cultivated vegetables and fruits there. Once they started getting their own produces, they tried to sell these to the community.

Since the whole concept of farmers' market has evaporated from the country, they found it very difficult to market the organic produce to the customers. They were forced to find alternatives to utilize the produce. At this juncture, they came out with a plan of becoming an end user of their own organic produces by starting an organic restaurant.

In early 2006, they opened a restaurant in Panampilly Nagar, Kochi and started using their own organic produces in their kitchen. Thus, with the support of other such farms in and outside Kerala, they became Kerala's first organic restaurant. Perhaps, they are India's first multi-cuisine restaurant to go organic. This means that 100% of everything that you eat at the restaurant has been produced by organic growers and farmers all who share in Lumiere's commitment to sustainable agriculture. They cultivate vegetables and fruits with traditional methods using bio-fertilizers and bio-pest control techniques like farm yard manure, compost, Jeevamrutha, Panchagowia, cow-urine, and other natural fertilizers etc.

Lumiere offers seasonal, fresh organic food, prepared in a healthy way. Free range poultry is raised in their farm for their eggs and meat. They use natural proteins and azola and leafy greens grown on-site, to supplement their feed.

In 2009 they moved to Bangalore and started an organic restaurant and an all organic store outlet where their customers can shop all they want for their home kitchen. Unfortunately they had to close down the Kochi operation during that period. Now they run their restaurant, store outlet, organic bakery unit and an online shopping portal for Bangalore.

Thus their dream of having a 'seed-to-table organic' business model has come true and they hope that many more such ventures would come up in their country as well as all over the world.

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2nd Smart Cities India 2016 Expo

11 12 13 May 2016

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Key Exhibiting Segments for 2nd Smart Cities India 2016 expo

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- Clean energy / Smart grids
- Smart / green transportation
- Smart / Green buildings
- Smart IT and communications / *Digital India*
- Smart education / *Skilling India*
- Smart health
- Smart urban planning
- Smart security, safety and surveillance
- Disaster management
- Smart manufacturing / *Make in India*

Previous show highlights (2015 edition)

- 207 exhibition participants
- Over 40 countries participated
- 39 conferences session
- 241 speakers
- 3 country pavilions by Europe, Poland, and Sweden
- 7 central government ministries endorsed the expo
- 17 Indian states visited the expo
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07 December, 2015

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KEY PARTNERS

KEY DRIVERS:

- Ministry of New & Renewable Energy (MNRE) invites Expression of Interest (EOI) for Energy Storage Demonstration Projects for Supporting Renewable Generation
- IL&FS plans to construct two Solar PV and Wind Integrated power systems with energy storage facilities
- Plan to build 100 Smart Cities and over 1000 microgrids

700+	16+	70+	35+	30+	30+
Industry Experts	Countries	Speakers	Exhibitors	Supporting Partners	Media Partners

KEY SPEAKERS

Varsha Joshi
Joint Secretary,
MNRE

P. C. Pant
Director,
MNRE

Dr. Satish Agnihotri
Secretary Co-ordination,
Cabinet Secretariat
Govt. of India

Pankaj Batra
Chief Engineer
(Regulatory Affairs),
Central Electricity
Authority India

Dr. Pravinray Gandhi
Business Development
Director,
Corporate Fellow,
UL LLC

Madhusudan Khemka
Chair, Indian Wind Turbine
Manufacturer Association
Managing Director,
ReGen PowerTech

Jeff Gates
Director, Sales &
Field Operations,
ALEVO Energy

Archan Padmanabhan
Product Strategy and
Application Engineering
(Energy Storage Group),
Tesla Motors

Bridgit Johnson Hartland
General Manager -
Sales Development,
SIEMENS

Patrick de Broglie
Energy Storage BU
Sales Director for
Europe & Asia,
SAFT

Rakesh Malhotra
Chairman,
SAR Group

Jatinder Singh Chandok
Addl. General Manager,
NTPC Ltd.

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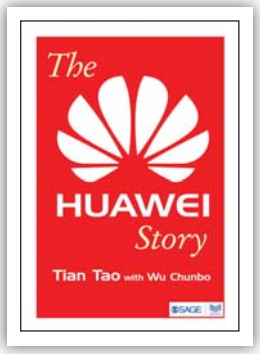
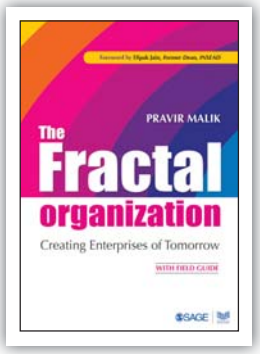
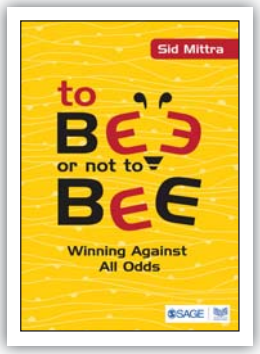
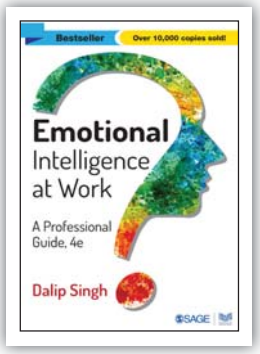
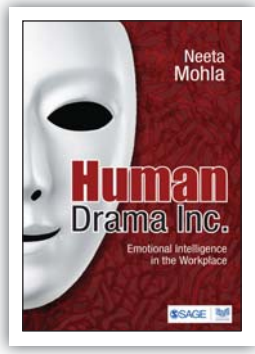
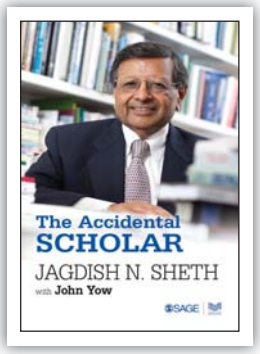


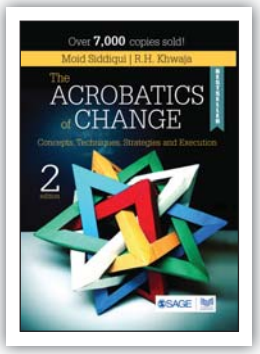


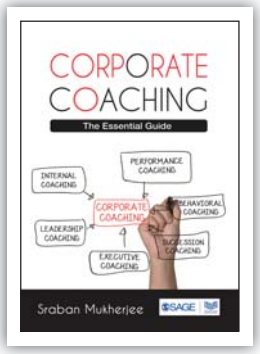


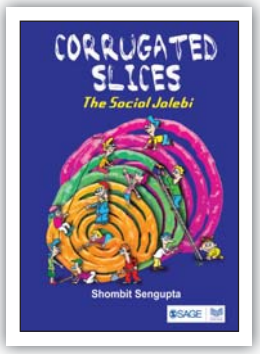


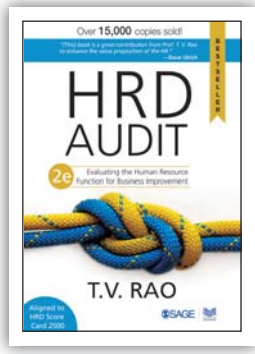




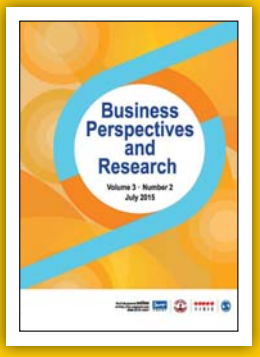


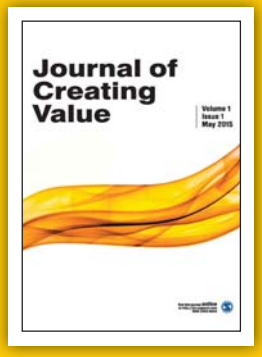






Must-have Journals!





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National Summit

Sustainable Water & Sanitation

7 - 8 January 2016, Sheraton Grand, Bengaluru

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Conference Overview

"Make Swachh Bharat a mass movement – link it to economic activity." Mission Swachh Bharat was launched last year with the inspiration to create a clean India of Gandhiji's dreams by the Mahatma's 150th birth anniversary in 2019. The Prime Minister announced, that all government departments will actively participate in this mission to make it a reality. The planning commission has budgeted US$ 26.5 billion for the years 2012-2017, to provide safe water to all urban and rural areas. The business potential of water treatment plants, sewage and effluent treatment plant is around US$ 130.3 billion with the rural sanitation market being worth US$ 25 billion.

The National Summit on Sustainable Water & Sanitation (NSSWS) will bring together various governments departments and stakeholders on one platform. Access to water and sanitation is a national need and cannot be separated. Therefore, the engagement to find solutions to the problems has to come from private and public organisations. NSSWS focus is to create awareness about the existing water and sanitation issues in India, the governments' future plan for Swachh Bharat Abhiyan & national reforms on water and sanitation. Besides government undertaking this summit will also showcase sustainable solutions for the water and sanitation sector through PPPs models, by inviting the private sector to participate and introduce regulatory reforms.

Event Highlights:

- **13+** Panel Discussions
- **02+** Key Note
- **09+** Case Studies (National & International)
- **500+** Delegates
- **75+** Speakers

Key Benefits

Who Should Attend:

Key Professionals from Ministry of Urban Development, Key Professionals from Ministry of Drinking Water and Sanitation, Urban Development & Municipal Administration Department, Rural Development & Panchyat Raj Department, Policy makers and Regulators, Municipal Corporation, Central, State and District Coordinators for Water and Sanitation, Central, State and District SBM Coordinators, Rural and Urban Local Bodies, Public Health Department, Central and Stare Pollution Control Board, State Water Supply and Sewerage Board, Local & International Solution Providers, Consultants, Technology Providers, Trade Commissioners, Council General, Embassy Officials, Funding Agencies, Start-ups, Research and Development Organization, STP's (Sewage Treatment Plants), Operation & Maintenance Contractors, Urban and Rural Planning and Development Agencies, Instrumentation and Monitoring Solution Providers

Invited Speakers

Dr. M Dhinadhayalan
Joint Advisor (PHEE), CPHEEO
Ministry of Urban Development

Shri. Anjum Parwez, IAS
Managing Director
Krishna Bhagya Jala Nigam Limited

Smt. Sandhya Singh
Joint Director (Sanitation)
Ministry of Drinking Water & Sanitation

Mr. Stanzin Tsephel
Program Coordinator
South Asia, BORDA

Mr. Dirk Walther
Project Director, GIZ Sanitation programme,
German Ministry for Economic Affairs and Development

Mr. Yatin Tayalia
Business Leader
GE Water

Mrs. Sreevidya Satish
Director
CASS at CDD Society

Mr. Rajiv Mittal
Managing Director
VA TECH WABAG

Mr. Indra N. Mitra
Vice President (Technology)
NJS Consultants

Mr. Kirankumar Topudurti PhD
Deputy Director
U.S. Army Engineer Research and Development Center

Dr. Ashwin Mahalingam
Assistant Professor, IIT Madras, MoUD, CoE
Decentralized Waste Water Management and Public Private Partnership

Topics

- Policy Reforms in Water & Sanitation for Urban and Rural Sector
- Water Landscape Future for Better India
- Sanitation Landscape – Open Defecation Free India by 2019
- Innovations in Wastewater Treatment
- Participatory Approaches in Urban & Rural Sanitation Sector
- Skill Development in Water & Sanitation
- Opportunities & Challenges in Water & Sanitation Projects

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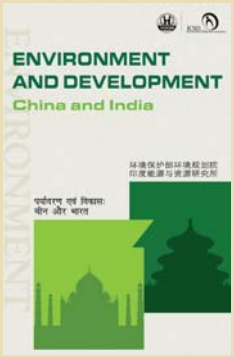
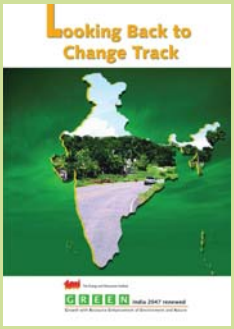


Environment and Development: China and India

By CAEP, TERI, The Energy and Resources Institute, October 2015

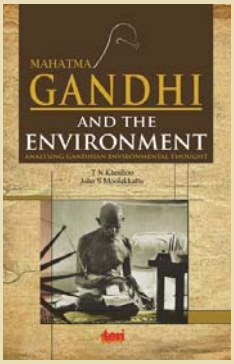
Following a trajectory of high growth, China and India face a common challenge of achieving an environmentally benign pattern of development owing to growing global issues like climate change, land degradation, and biodiversity loss. In wake of the above, the China Council for International Cooperation on Environment and Development (CCICED) and the India Council for Sustainable Development (ICSD) commissioned a joint-study, to be conducted by Chinese Academy of Environmental Planning (CAEP) and The Energy and Resources Institute (TERI). This book is the outcome of the study and understands the environment and development paradigms for both India and China, identifies key issues, and draws commonalities, differences, and lessons that can be learnt.



Looking Back to Change Track

By TERI, The Energy and Resources Institute, October 2015

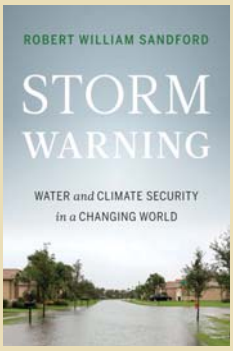
In 1997, when India celebrated 50 years of its Independence, TERI's study Growth with Resource Enhancement of Environment and Nature (GREEN) India 2047 assessed whether the country was moving on an environmentally sustainable path. The sequel to the study, Directions Innovations and Strategies for Harnessing Action (DISHA) for sustainable development, released in 2001, projected environmental and resource implications for the country by 2047 under two scenarios, that is, continuing in a business-as-usual mode and adopting a more sustainable development trajectory. The present study picks up the thread from 1997, examining environmental trends in the last decade, isolating underlying priority issues and identifying strategies that are needed to prevent or ameliorate environmental damage. The mandate of the present study, thus, is to go beyond reporting the state of India's environment. Through an evaluation of the major factors that are responsible for the present state and the characteristics of resulting impacts, the study provides an agenda for action.



Mahatma Gandhi and the Environment: Analysing Gandhian Environmental Thought

By T N Khoshoo, The Energy and Resources Institute, September 2015

The book presents a selection of Mahatma Gandhi's views on the environment and elaborates on their relevance today. It is particularly relevant now when the threat of climate change looms large and natural resources are fast depleting. The book is of interest to all concerned in protecting the earth's environment and its natural resources. The book presents Mahatma Gandhi's views on sustainable use of resources and minimal damage to the environment for the sake of future generation. The need for a significant synergy between rural development and industrial development has also been highlighted. The book has a detailed foreword by Dr R K Pachauri, Director-General, TERI, and Chairman, Intergovernmental Panel on Climate Change.



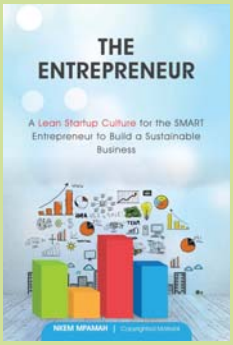
Storm Warning: Water and Climate Security in a Changing World

by Robert William Sandford, Rocky Mountain Books, November 2015

Human beings and industrial-based society are changing the composition of our planet's atmosphere and causing it to warm at an unnatural and oftentimes astonishingly rapid rate. Much of that warmth is being absorbed by water, which as a result is moving through the global hydrological cycle faster and in unprecedented ways. A warmer atmosphere carries more water vapour, which means that as temperatures continue to rise, storms will become more intense, last longer and cause more damage to our towns, cities and vital infrastructure.

On the other side of the hydro-climate coin, we can also expect deeper and more persistent droughts throughout the world, resulting in dramatic crop losses, difficult economic outcomes and fundamental alterations to landscape.

This highly considered, accessible and readable book explains how changes in the water cycle have already begun to affect how we think about and value water security and climate stability and what we can do to ensure a sustainable future for our children and grandchildren.



The Entrepreneur: A Lean Startup Culture for Smart Entrepreneurs to Build a Sustainable Business

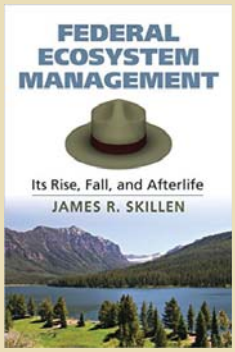
by Nkem Mpamah, CreateSpace, November 2015

Recent Study by Harvard Business School shows that 75 percent of new businesses fail, and a great number of new products are rejected. The biggest question in the minds of most people is: "Why do new businesses or products fail?"

Truth is that new businesses fail, not because founders do not build exactly what they wanted, but because they waste too much time, money and effort in planning and building something that nobody wants to buy. When it comes to starting a business, everyone seems to follow one traditional pattern: find an idea; write a business plan, pitch to investors, built what you want, and sell to the market. For many years entrepreneurs and developers have followed this faulty pattern to build what they thought customers liked; only to realize after trying too hard to sell without success that nobody actually wanted what they built.

But what if entrepreneurs were SMART enough to engage prospective customers early in product design stage to discover what they wanted? What if they had gone out of the building to understand customer's pains and build sufficient features to resolve them instead of relying on untested business plan assumptions?

The Entrepreneur you are holding in your hand is the first part in the series of smart habits, behaviours, proven tools, concepts and strategies which Nkem Mpamah refer to as Lean Culture. The book is carefully written to raise the odds of success of startup founders, entrepreneurs, CEOs, small business owners, product developers, and programmers who are at various stages of starting and growing a business.



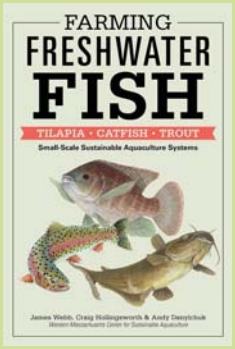
Federal Ecosystem Management: Its Rise, Fall, and Afterlife

by James R. Skillen, University Press of Kansas, October 2015

For the better part of the last century, "preservation" and "multi-use conservation" were the watchwords for managing federal lands and resources. But in the 1990s, amidst notable failures and overwhelming needs, policymakers, land managers, and environmental scholars were calling for a new paradigm: ecosystem management. Such an approach would integrate federal land and resource management across jurisdictional boundaries; it would protect biodiversity and economic development; and it would make federal management more collaborative and less hierarchical. That, at any rate, was the idea. Where the idea came from—why ecosystem management emerged as official policy in the 1990s—is half of the story that James Skillen tells in this timely book. The other half: Why, over the course of a mere decade, the policy fell out of favor?

This closely focused history describes an old system of preservation and multi-use conservation ill equipped to cope with the new ecological, legal, and political realities confronting federal agencies. Ecosystem management, it was assumed, would not demand choices between substantive and procedural needs. Looming even larger in the push for the new approach was a shift of emphasis in both ecology and political science—from stability and predictability to dynamism and contingency. Ecosystem management offered more modest managerial goals informed by direct public participation as well as scientific expertise. But as Skillen shows, this purported balance proved to be the policy's undoing. Different interpretations presented conflicting emphases on scientific and democratic authority. By 2001, when both models had been tested, the Bush administration faulted federal ecosystem management for running "willy-nilly all over the west," and shelved the policy.

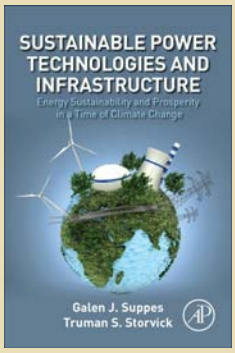
In this book, Skillen gets at the truth behind these contrary interpretations and claims to clarify how federal ecosystem management worked—and didn't—and how many of the principles it embodied continue to influence federal land and resource management in the twenty-first century. How the policy's lessons apply to our politically and environmentally fraught moment is, finally, considerably clearer with this informed and thoughtful book in hand.



Farming Freshwater Fish: Tilapia, Catfish, Trout: Small-Scale Sustainable Aquaculture Systems

by James Webb, Craig Hollingsworth, Andy Danylchuck, Storey Publishing, LLC, November 2015

Farming Freshwater Fish shows you exactly how to build, manage, and maintain a small-scale, energy-efficient recirculating aquaculture system to raise tilapia, catfish, and trout. It explains why these three species are most appropriate for sustainable aquaculture and describes the nature and needs of the fish, with in-depth instruction on setting up your system, acquiring fry, managing both the fish and the system, preventing and treating disease, and much more. You'll learn how to choose the best fish and system for your circumstances, depending on where you live, your access to private waterways, and your state's regulations. Whether you're looking for a steady supply of fresh fish for a restaurant, an economical and healthy source of protein for your family, or a way to bring in extra income, this book shows how easy it is to sustainably farm freshwater fish.



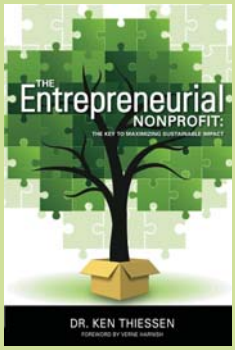
Sustainable Power Technologies and Infrastructure: Energy Sustainability and Prosperity in a Time of Climate Change

By Galen J. Suppes, Truman S. Storvick, Academic Press; 1 edition, October 2015

This book presents an overview of current renewable energy sources, challenges and future trends. Drawing from their longtime expertise and deep knowledge of the field, the authors present a critic and well-structured perspective on sustainable power sources and technologies, including solar, wind, hydrogen and nuclear, both in large and small scale. Using accessible language they provide rigorous technological reviews and analyze the main issues of practical usage. The book addresses current questions in this area, such as: “Is there enough biomass to make a difference in energy needs? Should biomass be used in Energy Generation?”; “How mature is battery technology? Will it finally become cost effective, and will it make a significant difference this next decade?”; “How big a role will small and modular nuclear power generation play in the coming decades?”; “What will be the influence of national tax policies?”. No prior technical knowledge is assumed of the reader. It is, therefore, ideal for professionals and students in all areas of energy and power systems, as well as those involved in energy planning, management and policy.

Key Features

- Presents a realistic and clear overview of the key sustainable energy technologies that will play important roles in the world’s energy mix and their impact on the current power infrastructure.
- Discusses key societal and economic topics related to the implementation of sustainable energy sources in a straightforward way.
- Covers a broad variety of sustainable and renewable energy sources, including hydrogen and bioenergy. It also explores key issues on small modular nuclear facilities, advances in battery technologies, grid integration, off-grid communities and the most recent topics in energy economics and policy.



The Entrepreneurial Non-Profit: The Key to Maintaining Sustainable Impact

By Dr. Ken Thiessen, Power of One Publishing, October 2015

Most non-profit executive leaders and board members hold firmly to the conviction they’re running an efficient, sustainable operation. Few of the organizations they lead engage in a disciplined process of strategic thinking and execution planning. Most of them resist employing best business practises because “we’re a nonprofit!” They do so at their own peril.

Weaving fable and theory, Dr. Ken Thiessen speaks to the heart of the issue facing most nonprofits today. Given the way in which the world is changing, the old way no longer works! Many nonprofit leaders lie awake at night wrestling with that realization but are too afraid to think entrepreneurially. Ultimately that’s the only way to avoid the tsunami about to hit your organization. It’s also the key to maximizing sustainable impact for the people you care most about! Building on the 4 Decisions Planning Model Ken illustrates how nonprofit organizations can employ best business practises without compromising their core values, core purpose and ultimately their mission and do so in a way that increases sustainability and enhances the organization’s ROI - Return on Impact.

Course

Science and Management for Sustainable Living
www.bhoomicollege.org

Post Graduate Diploma Course in Sustainable Development (PGDM-SD)
http://bimtech.ac.in/

M.Sc. in Sustainable Development - Distance learning Course + information
The Global Open University
http://nagaland.net.in/

Post-Graduate Certificate in Sustainable Enterprise
Indian Institute for Sustainable Enterprise
http://theiise.net/pgcertinse.html

Postgraduate in Sustainability Management
Silver Bright Institute of Management
http://www.htcampus.com/college/silver-bright-institute-management-sbim

Post Graduate Diploma in Sustainability (Distance learning)
Chhattisgarh University
http://www.cguniversity.com/

Post Graduate Diploma
IGNOU- Indira Gandhi National Open University
http://www.ignou.ac.in/

MBA in Environmental Science
School of Management & Infrastructure and Development Studies
http://www.minds-india.org/

Master of Architecture (Sustainable Architecture)
Bharati Vidyapeeth Deemed University
http://www.bharatividyapeeth.edu/Campuses/Pune/default.aspx

MBA and MA in Sustainability Management
TERI University
http://www.teriuniversity.ac.in/

M Tech, MSc Environmental Science
Thapar University
http://www.thapar.edu/

PG Diploma
Entrepreneurship Development Institute of India
http://www.ediindia.org/

M Tech in Environmental Engineering
The National Institute Of Technology, Tiruchirappalli
http://www.nitt.edu/home/

Advanced Diploma in Bio Degradable & Solid Waste
Vellalar College for Women
http://www.vellalar.com/Arts/carrer-oriented-programmes.php

PhD in Environmental Science
Gauhati University
http://www.gauhati.ac.in/

MSc in Environmental Science
Dr Babasaheb Ambedkar Marathawada University
http://www.bamu.net/dept/environment/

Advanced Diploma in Energy
Vidya Prasarak Mandals Polytechnic
http://www.vpmthane.org/polywebnew/courses.html

BSc in Environmental Science
University of Calicut
http://www.universityofcalicut.info/

PhD in Environmental Science
Punjab University
http://puchd.ac.in/

MSc in Environmental Science
Bharathiar University
http://www.b-u.ac.in/

MA in Environmental Economics (Distance Learning Course)
Annamalai University
http://www.annamalaiuniversity.ac.in/

PhD in Environmental Bio-Technology & Solid Waste Management School of Environmental Sciences
Jawaharlal Nehru University
http://www.jnu.ac.in/main.asp?sendval=SchoolOfEnvironmentalSciences

MBA in Energy & Environmental Science
Symbiosis Institute of International Business
http://www.siib.ac.in/programmes.aspx

Send Names & Details About Courses Related With Sustainability To uma@managementnext.com

Events

CII Online Master Classes on 'Communications in the Global Market Place' - How to Harness the Power of 'English' to Better Drive Profits

11 a.m. to 1 p.m. on 10 November 2015

http://www.cii.in/OnlineRegistration.aspx?enc=pZVQM37jtSRTHIkmBsithRGGfHs+t9qZjk21GsaUbkZMFL2QD5OVRNeJX7bS9yr2

CII's Indian Women Network - Tamil Nadu - One Day Women Leadership Programme on 'Leader In Me'

Friday, 20 November 2015, The Rain Tree Hotel, St. Mary's Road, Alwarpet, Chennai

5th National Conference on Agrochemicals

Wednesday, November 18, 2015, FICCI, New Delhi

Contact: Charu Smita, charu.smita@ficci.com

8th Annual FICCI Golf Tournament

Saturday, November 21, 2015, Qutab Golf Course, New Delhi

Contact: Shilpa Gupta, shilpa.gupta@ficci.com

Namaskar Africa: India-Southern Africa Business Forum & Exhibition (2 Day Event)

Wednesday, November 25, 2015, Maputo, Mozambique

Contact: Sneh Patel, sneh.patel@ficci.com

EIMA Agrimach 2015 (3 Day Event)

Thursday, December 03-05, 2015, New Delhi

http://www.eimaagrimach.in/

FOODMACH 2015 (3 Day Event)

Thursday, December 03-05, 2015, New Delhi

http://www.goeventz.com/event/foodmach/280

Incubation India 2015 Conference

2nd December 2015, The Grand, New Delhi

http://inc42.com/event/incubation-india-2015/

Training Programme on Mastering the Art of Influencing Build, Maintain, Strengthen Relations by Excellent Influencing Skills

Wednesday, 2 December 2015, Hotel Lemon Tree, Delhi NCR

rohin.agarwal@cii.in

CII - Institute of Logistics is organizing a two day conference titled "Material Handling Equipment Summit"

02 -04 December 2015, MMRDA Ground , BKC - Mumbai.

http://www.ciilogistics.com/MHE.html

CII National Vendor Development Programme

7-8 December 2015, India Habitat Centre, Lodi Road, New Delhi

For more information: Vignesh J Kumar, vignesh.kumar@cii.in

AgriCon 2015, Conference on Precision Agriculture Technologies

17th December 2015, Hotel Hilton, Chennai, INDIA

http://tntdpc.com/agricon2015/register.php

Beyond 2015: People, Planet & Progress

February 1 - 4, 2016, Indian Habitat Center, Lodhi Road, New Delhi, India

The GRIHA Summit 2016

18th-20th February 2016, Indian Habitat Center, Lodhi Road, New Delhi

http://www.grihaindia.org/index.php?option=com_events&id=114

Send Your Events Plans To uma@managementnext.com