CREATING RESPONSIBLE INNOVATIONS

B. N. Mohapatra

Question 1: Compared to Global Initiatives, how would you benchmark the status of sustainability initiatives in India?

Answer: Sustainability and sustainable development are trending topics of 21st century. Sustainability initiatives at global level and in India too is being benchmarked and assessed within framework of trivet structure of triple bottom line philosophy. This is a holistic approach to approach to sustainability and sustainable development under which an country or an organization works for people, prosperity and planet (3P) to make itself socially, economically and environmentally (or ecologically) sustainable.

Economic growth of the India can't be ensured without addressing our social and environmental priorities. In order to create a better and more sustainable future for all and to achieve sustainability at social, economic and environmental front, India has taken holistic and integrated approach in its policies and programs related to sustainable development, climate change, resource efficiency and air and water pollution. Policies, programs and strategies formulated and implemented by the Government of India are in line with the 17 Sustainable Development Goals (SDGs) and agenda 2030 of United Nations.

Government of India initiatives in the direction of achieving SDGs includes Swachh Bharat mission, Beti Bacho Beti Padhao, Pradhan Mantri AwasYojana, Smart Cities, Pradhan Mantri Jan Dhan Yojana, Deen Dayal Upadhyay Gram Jyoti Yojana and Pradhan Mantri UjjwalaYojana etc. The Namami Gange Mission is a key policy priority of India towards achieving the SDG-6 (clean water and sanitation.). Major components include sewerage project management, urban and rural sanitation, tackling industrial pollution, water use efficiency and quality improvement, ecosystem conservation and Clean Ganga Fund, among others. Government of India has launched a National Clean Air Programme in 2019 as a pan-India time bound national level strategy for prevention, control and abatement of air pollution besides augmenting the air quality monitoring network across the country.

India has harmonized its National Policy on Resource Efficiency (RE) as a major tool to meet the resource needs of the country, at the least possible cost to the environment.

India stands at 11th position in global country ranking and accounts for 33% of the Certified Climate Bonds by number in emerging markets in line with Paris Agreement which emphasizes the role of climate finance in strengthening the global response to climate change.

India is one sixth of the global community, our development needs are enormous. Government initiatives are not sufficient to fulfil all the development needs of the country. Therefore, government is ensuring active participation of all stakeholders.

Question 2: Are you seeing any sustainability trends impacting the construction business in India?

Answer: The Indian government has made considerable strides on its path to sustainability and paid attention to the construction sector. Agencies like *GRIHA – Green Rating for Integrated Habitat Assessment (2007)*, adopted as the national green building rating system, and the Indian Green Building Council (IGBC, 2001), were brought about to support energy efficiency and conservation in construction. According to the IGBC, India holds the second largest registered Green Building footprint (3.59 billion sqft), second only to the U.S.A. India has also joined the UN Paris Agreement for Climate Change and in 2016 announced its first 20 Smart Cities, pledging to propel the country in the direction of sustainable and smart development. The government has also incentivized going green for builders and consumers by offering discounts and other benefits.

However, in India, there are no incentives for building sustainable homes or commercial spaces, and the construction industry, in particular, faces several challenges while trying to be eco-friendly. The public, especially in the rural and semi-urban areas, believe that it is extremely expensive, largely because of a lack of awareness and administrative support. However, sustainable living is slowly taking centre stage in the real estate industry in India because of the advent of green buildings. The aim is to create natural and healthy living spaces for the Indian consumers through buildings that have a long service life and high performance by maximizing recycling of materials and minimizing environmental impact. Slowly but steadily, more and more people will be opting for green homes since these homes promote sustainable living and promise a far better future for the people and the environment.

In considering sustainable practices that construction industry of India must adopt, an analysis is required for each stage of construction. And for this we need to have a grade based certification system or a comprehensive plan for sustainable construction of every structure in country such as : A) Planning, design and specifications, B) Current Practices in Construction Industry, C) Material Conservation and Selection, D) Use of Construction Demolition and recycled Material, E) Energy Conservation, F) Innovation, G) People associated with construction. I see the durable, sustainable, responsive and green construction requirement for sustainable development is going to be the trend which will have major impact on construction business in India.

Question 3: As a leader, how do you view your organisation's obligations to sustainability?

Answer: As a premier R&D organization for cement, concrete and construction sector, we clearly understand our responsibilities and obligation to the sustainability. We also understand the infrastructure development need and demand of cement and concrete in the journey of economic progress and holistic and integrated sustainable development.

We cannot think of construction without concrete. It is the largest man made material which has a per capita consumption of 1.5 tons per annum in India. National Council for Cement and Building Materials (NCCBM) is currently doing research & innovation across the value chain of cement, concrete and construction industry. Our research focus is based on principle of "Creating waste to wealth" i.e. on how to use more and more inorganic and organic waste of other industrial process and convert them into values added product such as use of fly ash and other cement substitutes in development and use of low carbon cements, use them as an alternate fuel & raw materials for cement sector etc. Similarly, we are focusing on use of manufactured fine and coarse aggregate, use of sintered fly ash lightweight aggregate, use of Construction demolition and Recycled aggregates, durable construction, use of local materials to reduce the carbon footprint associated with transport, energy conservation, renewable energy etc. NCCBM is supporting Bureau of Indian Standard and other standards & policy makers in formulating the Indian Codes and guidelines for enhancing the usage of sustainable materials in construction. Our research is supporting the country's cement industry in the mission of reducing its carbon footprint by 45 per cent by the year 2050. It is also working on future technologies which can have huge impact on construction sector in future. Few such examples are Geopolymer concrete, Digital concrete etc.

Question 4: What are some of the typical challenges that you foresee in India while implementing sustainable construction?

For implementing sustainable construction, strategies need to be ambitious, action-oriented and collaborative, and to adapt to different levels of development. Sustainable development will need to be inclusive and take special care of the needs of the poorest and most vulnerable. The main hurdle in implementing sustainable construction practices is a time lag between research outcome and commercialization & transfer of technology in the field. Major challenges India may face while implementing sustainable construction are:

- Inadequate government's policies & procedures
- Deficient incentives to encourage adoption
- Expensive equipment and products
- Lack of skilled manpower and subject matter experts
- Awareness in the people

Therefore, in my opinion academia, research institutes, industry and government needs to work in coherence to overcome these challenges.

Question 5: What are some of the initiatives that the concrete construction fraternity needs to immediately implement for achieving sustainable development?

Answer: Construction fraternity needs to recognize and immediately implement the following aspects in developing a sustainable infrastructure in our country:

- Plan, design and adopt specifications based on performance and service life
- Adopt sustainable construction practices
- Select sustainable construction materials
- Use construction and demolition waste
- Focus on energy conservation

We need to encourage the use of less water and less portland cement in concrete production. We also need to promote, use of more blended cements and tailor-made organic chemical admixtures for durable and sustainable construction.

Professionals involved in the cement and concrete industries have the responsibility to create lasting innovations to protect the industries' future viability, as well as the health of our environment. Recycling and creating sustainable construction designs not only contribute to reduced disposal costs but also aid in conserving natural resources. This conservation provides technical and economic benefits. It is necessary for those involved in the cement and concrete industries to eliminate waste and take responsibility for the life cycle of their creations. To be responsible engineers, it is necessary to think about the ecology, equity, and economy of our design.

B. N. MOHAPATRA is the Director General of NCCBM and has rich experience in research along with industry experience. He has worked with several well known Cement organisations in varied leadership roles. He has cross functional experience in development of low carbon cements and clinker, mineralogy & microstructure of cement and concrete, product development & diversification, advanced comminution techniques, energy & environment improvement and Total Quality Management and has pioneered contribution in use of alternate fuel by utilizing hazardous wastes and all kinds of agricultural wastes. He has published over 120 technical papers in various reputed national and international journals and authored a book. He is the chairman of Cement Sectoral Committee of Bureau of Energy Efficiency (BEE) and member of various technical committees of Bureau of Indian Standards (BIS) and various research committees across India. With a new thinking and energy in the working of NCCBM, he focusses on projects promoting sustainable construction such as usage of Alternate Fuel & Raw Materials (AFR), utilization of low grade limestone, development of Low Carbon Cements, utilization of wastes as Supplementary Cementitious Materials, reduction of GreenHouse Gases (GHG) from cement production, energy efficiency, Carbon Capture and Utilization (CCU).