The New Challenges in the Indian Economy and Society via Human Resources

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Many of the revolutionary effects of Science in Technology … are obvious enough. Yet we are reluctant to face all its implications, which are only just beginning to be felt. Science offers the possibility for greater well being for the human race, than has ever been known before. But it offers this on certain conditions: the abolition of war, the dispersion of power, a general diffusion of prosperity, the low birth-rate every where, provision for individual initiative both in work and play. Though we are in the middle of a race between human skill as to means and human folly as to ends, men must and will choose the path of reason… Knowledge is Power but it is Power for evil just as much as for good. Unless men increase in wisdom as in knowledge, increase of knowledge alone will be increase of sorrow.

(Bertrand Russell "The Impact of Science on Society', 1952)

Twentieth century was distinguished by the unprecedented progress in science and technology within the context of sustainable development and most countries place high value on it as a means towards development.

Jayashree Ramadass in an article 'Science and Technology in South Asia'; had written "The Central problem in the education systems of South Asia is that they continue to carry an uneasy burden of alienation.'SS he welcomes the re-emergence of **Indigenous approaches to science, technology and development.** Ramadass also drew attention to underlying social problems, such as child labour and enduring low standards of professional accountability that must be overcome if substantial progress is to be made towards a worthwhile science and technology education for all.

During the last few decades especially science and technology have been recognised as having a profound impact on the individual as well as society at large. Despite development in various fields that have had a profound impact on the quality of life of the major part of the human population, many countries still have little or no access to the full benefits of scientific and technological education progress. It is vital that diverse sector and levels of the population be prepared and involved in its knowledge and dynamics. Here education in general and scientific and technological literacy in particular have a key role to play.

At the beginning of the twentieth century, science had not established a secure place in the school curriculum in any country yet by century's end it became a major subject in secondary schools everywhere and had penetrated deeply in the primary school. A spectrum of people – teachers, politicians,

curriculum designers, test constructors and researchers had to cope with new challenges. The present predominance of science in schools is connected with remarkable advances in scientific knowledge and their successful application in technology that occurred in 19th and 20th Centuries. Governments supported science, and science education, because they perceived that strength in science was essential for national prosperity and security. Students accepted science enthusiastically because of its intellectual challenges and excitement and also because it opened attractive careers for them.

Training of science teachers is intimately connected with attracting and retaining them.. **Learning to teach** is a life long process in which progress occurs through **reflection** on events. Pre-training should include a mix of science and pedagogy. There is a case for more time to be spent on training in pedagogy . Recent advances in learning theory with development models of information – processing and constructivism… and additional skills that students will need to be taught (such as learning from the internet) have increased the knowledge and skills that teachers should possess.

Recently, the **Prime Minister of India** inaugurating the **93rd Indian Science Congress** at Hyderabad in 2005 had said :" In the mid sixties India was living a 'ship to mouth' existence. By 1976, the Green Revolution had transformed many parts of the country. Scientists, farmers, community development staff and extension workers worked together to liberate the country from external dependence in food. Thirty years later the Indian farmer has benefited from the contribution of science and technology. However, the challenge of bridging the development gap between urban and rural India still remains… There is a need for a renewed thrust on research that can enhance farm productivity. Increased efficiency of utilization of input can improve farm management practices, reduce post harvest losses through improved management technologies in storage, transportation and processing – to increase both yields and value addition at the farmer level leading to better incomes… Rural life should be so enriched, it has to prevent the migration of people and resources from villages to town – to improve the quality of life in rural India, based on easily accessible and appropriate technology… Science must serve the needs of the farmers. The second Green Revolution will not be possible unless our research institutes are revitalized to improve their academic standing and their relevance to agrarian society and its economy. **All advanced agricultural economies are knowledge based economies.** We must broaden the knowledge base of our farmers to enable them to make the best use of new technologies."

More than 360 national and sub-national human development reports have been produced by 120 countries in addition to 9 regional reports. These reports have injected the human development concept into national policy dialogues. Many of India's 25 states, rival medium sized countries in size, population and diversity. The Government of Madhya Pradesh was the first to prepare a State Report on Human Development in 1995 to bring the subject to political discourse and investment planning. By 1998, social services accounted for more than 42%

of planned investment. The Human Development report have also been prepared in Gujarat, Karnataka and Rajasthan and are underway in Arunchal Pradesh, Assam, Himachal Pradesh and Tamil Nadu.Recently, Delhi has also brought out the report on Human Development (August 2006). These reports have made human development priorities an important part of political discourse and development strategies.

Creating an **environment that encourages innovation** requires political and macro-economic stability. The Asian success stories are built on a strong commitment to education and health coupled with low inflation, moderate fiscal and balance of payments deficits and high level of savings and investments. It is not just big firms that demand stability, small businesses and family firms also depend on a stable financial setting from where innovations and adaptations often start**. Proactive policies** are required to stimulate innovation;

- Technology policies can help to create a common understanding among key actors about the centrality of technology to economic diversification;
- Reforms to make telecommunications competitive are vital for giving people and organizations better access to information and communication technology;
- To stimulate technology – oriented research. Governments can promote links between universities and industry – and provide fiscal incentive for private firms to conduct research and development.
- Stimulating entrepreneurship is also essential and venture capital can be important in fostering technology – based start up businesses.

Employment Generation and Non Farm Activity: Public policy must respond to an important trend in the Indian economy. While the share of agriculture in national income is falling rapidly, the share of population dependent on agriculture is not declining as rapidly, causing rural distress – migration to urban areas. Scientists and technologists must develop labour intensive technologies both in agriculture and in rural manufacturing - to enable jobs to be created closer to their home in villages. This will require a multi-pronged approach with an investment in skill development. “Science and technology can play a decisive role only when it advances the well being of all sections of society not just a privileged few.” This need was expressed by India’s first Prime Minister Jawaharlal Nehru at the Science Congress in January 1947 at the dawn of India’s independence, when the best minds of the nation embraced politics for social good in **the service of the nation**. “What is needed is the formation of new creative policies, strategies and models of participation through a national innovation system, which strategically allows rural community to be integrated into India’s onward march to prosperity. Government must promote the

participation of all actors for the coordinated construction of policies, planning and their implementation."

Nehru advised the Scientists in 1947 not to wait for the government to take action which were normally very slow and discouraged them from a reliance always on what government may or may not do. The current Minister for Science and Technology at the 93rd Indian Science Congress in 2005 had said in Hyderabad that what was needed was a partnership between government, the scientific community, civil society and the entrepreneurs of India. He promised to transform the Council for Scientific and Industrial Research (CSIR) in a manner as to allow greater autonomy for bolder initiative for public-private partnership and investing knowledge as equity. "This transformation should be completed in 2006,"he said. The Director-General of the Council, however was of the opinion that innovative policy initiatives could give access of high technology to the poor but added that merely the availability of a technology is not sufficient. "It should also be affordable, accessible, and appropriate."

Another feature affecting the rural population is globalization. As a result of the WTO, Indian farmers are unable to get remunerative prices on exports of their agricultural produce and products, on account of depressed global prices.

Measures to bring science and technology benefits for rural development could be:

- Enhance the demand for science and technology in and from the rural sector by providing task-oriented literacy projects;
- organize networks of social and productive sectors of rural society and motivate scientists and technologists to address the problems of rural areas;

and

- modify the priorities and programmes of publicly funded science and technology institutions to address problems of rural development;

Research and Development:

In 1998, 29 OECD countries spent $520 billion on research and development more than the combined economic output of the worlds 30 poorest countries, whereas a dollar invested in a developing country could be stretched very far to enhance development. The R & D budget for the Indian Space Research Programme is barely half a billion dollar. India has developed a strong capacity to design, develop and to test and fabricate its own launch vehicles and satellites. It has moved from one sophisticated launch vehicle to another without any external help as no help in technology was forthcoming in these strategic sectors This progress in space research, enabled India to reach distant villages, valleys, hilly areas witnessing a connectivity revolution. Distant education, open learning, and open universities have greatly proliferated as a result. Primary,

secondary and tertiary education reached vast masses through the use of these devices as well as remote access to diverse educational resources.

Space research has impacted on other human needs such as drinking water to 180 thousand villages which had no access to it before and now it was made possible to draw hydro-geo-morphological maps across the country. This scientific source finding approach has meant that the success rate for ground water targeting has moved from 45% to more than 90%.benefiting 160,000 villages with drinking water problem. Lives of the poor fishermen have been impacted too. Potential fishing zones were identified, information on the locations of the zones is communicated to them through radio and internet.

Lack of cyclone warning in the coastal regions used to wipe out entire villages. Now, the early warning system ensure that this is not the case any longer. The greatest medical break through of the 21st century was the simple oral rehydration therapy which saved the lives of thousands of children in the developing world from diarrhea, whereas the treatment earlier used to cost $ 50 per child.

Collaboration and Partnerships:

If India aspires to solve its social problems it has to bring together the four pillars of society: academia, industry, government and people. Over 400 IITians from Canada, USA and India came to Toronto to discuss the theme 'knowledge and skills: Creating values beyond borders.' This theme was chosen in recognition of India's contribution to the knowledge based economy and with respect to the increasing inter connectedness of nation's economies and individual. These IITians – engineers, entrepreneurs, academics, business leaders, and decision makers from the industry, government and academia – took up various topics and exchanged views and discussed future collaborations.

It was only recently that the Indian government gave these institutes the green signal for the IIM's to set up branches abroad. There have been a host of tie-ups with International Institutes in recent times, which enable students to gain global exposure even before final placement and the faculty gains through teaching and research collaboration. The business education industry is thriving providing its students international exposure.

India's IT entrepreneurs are a product of our education system. The 1960's and 70's reflected the socialist nature of the state. The graduates knew how to design computer but knew no programming. All that changed in 80's and 90's with the spread of computer education across the country and concept of computer application became the most sought after subject. Many private engineering colleges mushroomed all over the country. India produced around 3.30 lakh engineering graduates in 2005. There has always been a gap between what's being taught in the universities and what the industry required across the world. In the US the gap is met by forging industry – academia partnerships. India

has made a beginning with many software companies tying up with universities for the purpose of research. The education sector in India have not been fully tapped. Many management institutions have already taken the lead and changed their curriculum to cater to the needs of the global Indian work force. The Business. Schools have demonstrated an edge over engineering colleges as MBAs are in great demand even in the IIT industry and in project management. As Indian IT Companies strengthen their presence overseas, a large number of marketing and sales professionals will be in demand who will need the right tools. India has more than adequate entrepreneurial skills.

A generational shift is underway in the Indian talent market. Till the 1990's the Indian professionals would flock to join multinational corporations. In most cases there were no other alternatives. In the 1980's multinational corporations were the only refuge because they offered a structured process. Throughout the 1960's and 70's when the government dominated the Indian society, the MNC's hired English speaking children of civil servants. Today, the democratization of Indian business is breaking the social barriers. The son of a bicycle dealer created a $ 1.4 billion telecom business in less than a decade (Bharti Telecom). Several home grown companies have generated a string of incredible success stories. Over the last 7-8 years Companies like Ranbaxy, Tata, Infosys, Wipro and ICICI Bank have shown that they can give MNC's a great competition.The focus isn't so much on a choice between MNC's versus Indian employees but on the **intrinsic** merits of the assignments. Indian companies are now on par with MNC's. So even when salaries aren't strictly comparable there is satisfaction in being able to shape the strategy and business decision of the company. The ICICI Bank is also neutralizing the other disadvantages, the lack of a global career. The strategic alliances they forge with another foreign company, allows the Individual the best of both worlds – an entrepreneurial culture along with the opportunity to learn global best practices from the partner. As Indian firms hit the high growth phase, they are creating far more jobs and arealso willing to pay higher salaries to attract talent.

Regional Cooperation:

There is a growing recognition in Asia of the importance of regional economic integration for generating growth impulses from within. Voices from different parts of the region is increasingly in support of a Pan – Asian Cooperation and integration. South Asia is no exception to all other groups of countries world wide, and in a global world, SAARC member countries cannot possibly survive without regional cooperation. The South Asia Foundation was created with the raison d' etre for regional cooperation, nourished with culture, technology, the energy and idealism of youth. A culture of peace and democracy can emerge from promoting educational projects which are coupled with sustainable development and partnership with nature.

In an innovative move designed to promote equal opportunities within a cooperative regional framework, the South Asia Foundation has instituted two full

residential scholarships in each of seven SAARC countries to study at the Asian College of Journalism (ACJ) Chennai, choosing any three media streams – Print, Broadcast and The New Media. This foundation also has an ambitious educational project of linking a number of open universities and other institutions in the SAARC countries which will provide students a wider choice of subjects including a well designed course on South Asian studies. It was suggested that this foundation could support programmes on South Asian studies as well as teacher training which may encompass issues like sustainable development, women empowerment, the environment, peace cooperation and development, renewable energy studies and human rights.

There is a strong case for an Asian Economic Community (AEC) that would be broader in coverage than the current programmes for economic cooperation in regions such as East Asia, South Asia and Central Asia. Such a grouping would facilitate fuller exploitation of the regions' considerable resources material for expediting the development process.

Conclusion:

Regional trade liberalization and freer movements of investment, technology and skills among the Asian countries would enable the participants to exploit their complementarities to mutual advantage. If we hope to have the future globe to provide the sustainable eco-space, a paradigm shift towards harmony and co-existence is a necessary condition for re-directing our educational system. Asia must retain its competitive edge and innovation proclivity by investing in the sciences. An Asian model of the Nobel Prize could be instituted named after an eminent multi-disciplinarian, representing the best of the Sciences and the Social Sciences.

India was considered the Light of Asia, providing that enlightenment which came with the birth of Lord Buddha more than 2000years ago. It is now time for Asia to provide in a spirit of solidarity that beacon light to the world that ushers` in guidelines for peace, prosperity and human security for all.

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