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Science And Technology For Self-reliance In Bangladesh-II

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THREE hundred years ago, the pre-industrial countries of Europe had a standard of living which was not infact higher than that of Asia. While the low income of the Asians on the average does not seem to have increased and may at times have fallen, the per capita income in Europe, and the West in general, is now about twenty times more than that in Asia. In addition to maintaing its existing wealth the Western world is saving and investing productively some 10 per cent of its income to create more wealth. The West is thus saving more per head for investment than we are spending on everything.

Besides the enormous gap that has cumulated uptil now between the developed West and the underdeveloped Asia, there are other factors which, if we fail to alter, will continue to increase the absolute and the relative gap between us and the developed world.

I shall mention only two of these problems. The first problem arises from the historical fact that we are trying to industrialise with a time gap. When industrial revolution began in the West the savings and investment needed for the take-off were essentially provided by the rich people who had no scope to live luxuriously on imported industrial products. Thus they invested their surplus wealth in productive industry. In the developing countries now, the prosperous class, with the surplus wealth earned by whatever means, is more inclined to have ostentatious living on imported goods than investing on uncertain productive industry.

The second problem is poor perticipation of the under developed countries in the creation of Science and Technology. The rich countries of today, with less than one-third of the world's total population account for 98 per cent of the total research and development expenditure. The discreapancy here is even more than that is wealth or per capita income. The reason is, we are not only poor, but also spending smaller fraction of our small GNP for R&D (research and development). In Bangladesh R&D expenditure is less than 0.2 per cent at the moment; while in the west it is around 3 per cent

With such a difficult background, self-reliance through science and technology is a difficult proposition for the underdeveloped countries, specially Bangladesh.

Since no clear path of progress is left open to us, and our situation is in no way analogous to any developed country that we could follow, we have to explore our own strategy. To make this subtle, challenging and complex problem of self-reliance through science and technology comprehensible, we shall have to take recourse to models and simulations.

The dependence of the underdeveloped countries on the developed world are of various nature and dimensions. The dependence often term or long time, temporary or permanent, direct or indirect. Often it is for the export of primary mataerials; cash-crops or low level industrial products. And often the dependence is on the import of food, medicine, manufactured good or machines. The dependence after is on technical know how and know why. Again the dependence can be of an absolute nature in the form of financial loan or aid for basic needs.

It is understood that absolute independence or selfreliance is not possible for the individual less developed countries, because of the complex dependence of every country for her progress on what happens in the developed countries, specially in the field of science and technology.

The issue therefore turn, first, on whether the developing countries can reduce their too much dependence on the developed world, and given some dependence on exports, whether they could export more to each other and relatively less to the developed countries. As Arthur Lewis has analysed, the individual LDC does not have to be so dependent on exports in its development strategy, rather it has to look more to the home market. At present our industrial production for home market is limited by an inadequate demand due to low-income of the majority of the farmers. The most tragic thing is that, in spite of our nearly 80 per cent labour force being engaged in agriculture, we have to import food.

If we can transform this mass of low level productivity, the picture will change. The improved food production will first of all give self reliance in food, and secondly the increased agricultural surplus for the large number of workers engaged there will mean enormous development of the domestic market. This in its turn can act as an engine of growth for industrial and agricultural production through technological change.

Here ofcourse, I have to deviate from the conventional thinking in economics and borrow the spirit of the age of reason and enlightenment of the 18th century, when it was believed that "man is the master both of himself and of nature and could wield a cumulative control of the universe."

If not the whole, much of this belief has come true due to the present marvels of science and technology. The nature of Science, not for what it has already attained but for what it can attain, define a life of its own. The growth of science and technology combined with the basis of education on which it depends, is a possible hope to produce the social altitudes and institutions to compensate for the lack of capital.

It might sound very unrealistic to talk of self-reliance, therefore of independence from the outer world, and then to talk of using modern science and technology, which is being created mostly outside the developing world. And again to talk of agricultural and industrial revolution in the underdeveloped countries, where capital is missings.

As in a desperate situation, I shall try to get over this riddle by taking recourse to analogies from the physical world.

We know that electric current does not flow through insulators or airgaps. But if there is a pulse fields, instead of a static field, an effective current can get through the insulating gap, which we call the displacement current. The sudden developments, or should I say the pulses of developments, in science and technology through new inventions and discoveries can likewise penetrate the social and economic barriers of the developing countries. It can be illustrated from the simple equation used before: D=Sp=r.

Assuming that the productivity P is suddenly altered, while population growth rate R and investment S have not changed, there can still be a positive change in Development. Revolutionary discoveries has infact changed productivity rapidly in many fields of technology in this way.

Thus biotechnology can play an important role by improving the efficiency of crop production for conversion of solar energy to chemical energy. This conversion could then dramatically enhance the economic potential of producing valuable energy fuels form bio-mass. For Bangladesh it could in future assist in reducing energy costs and dependence on foreign imports. Energy cane, a new form of sugar cane developed for maximum lignocellulose production, is an important example of this kind of development.

Development in optical materials, in semi conductors and electronically active polymers have brought about new developments in advanced sensors, control systems medical diagnostics, microsurgery techniques and communications. Similarly development trends in polymers are at the forefront of future technologies. These developments include polyamide fibres with strength and modulus properties superior to those of many commercially available materials. There are electronically active polymers now having electrical conductivity close to those of conventional metals.

In the waves of such inventions the demands, all patterns and sources of materials can be expected to change dramatically. Among the various classes of materials, use patterns can be expected to change more rapidly for ceramics, polymers, composite materials and amorphous materials to replace the more conventional metals and alloys. (To be continued)