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An Action Program  
Pursuant to the National Science  
& Technology Policy 1986

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One of the main preoccupations of countries in the postwar era has been economic development. While economists rarely agree on any issue, surprisingly a general consensus has emerged among them on development theory, namely that development depends critically on the achievement of rapid technical change.

Bangladesh has made a serious effort at promoting growth through industrialization. The instruments of policy the country has used for industrialization consist mainly of fiscal and financial incentives. The New Industrial Policy of 1982 and the Revised Industrial Policy of 1986 simplified import and investment procedures; introduced a significant degree of liberalization, privatization, and decentralization; and provided about 30 percent more effective assistance through fiscal, financial, and other incentives to industrial investment and production. Yet, according to an indepth assessment of the impact of industrial policies at the Planning Commission, entrepreneurs have failed to respond to these policies.

Various explanations have been advanced for the stagnation of industrialization in this country. Some of them mistake symptoms for real causes. When economic considerations are brought to bear upon the stated causes of sluggish investment and thereby

hidden costs are bared, two root causes of most industrial ills become transparent: (1) The side effects of high effective assistance have caused more harm to industrialization than direct benefits, if any, and (2) the critical factor of growth, namely technology, has been neglected in Bangladesh.

The former result follows from the deceleration of the rates of investment, decline in total factor productivity, stagnant industrialization, and so forth. For the latter result, the analysis of technology was carried out both from the results side and the source side. From the results side, it was found that not only the levels of Bangladesh's productivity and technology are lower than those prevailing in its neighboring countries, e.g., Thailand, India, but relative rates of growth of productivity in numerous industries are also lagging behind. The productivity gap is increasing and Bangladesh is losing in international competitiveness in shrimp, fruit juices, textiles, sugar, coir, hospital services, communications, and so forth.

On the source (input) side of technology, Bangladesh lags far behind in R&D as a percentage of GDP, ratio of S&T personnel with postgraduate degrees to total S&T personnel, fiscal and financial support for technology, organization and institutes of technology transfer (from abroad), indigenous technology generation, creation and levels of diffusion of industrial innovations, development and standardization of spare parts and other equipment, advances and effort in various technology areas, and so forth (see UN, ESCAP, Technology Atlas Project, 1989).

A widespread consensus prevails among local and expatriate analysts that anything short of a big leap frog in industrial

technology is highly unlikely to enable Bangladesh to catch up with its neighboring countries like Thailand and India.

In this regard, one may refer to the February 1986 National Science and Technology Policy, (NSTP86) vide Bangladesh Gazette Extraordinary, Feb. 25, 1986. The NSTP86 was the result of several years of deliberations among policy makers, scientists, technologists, professional bodies and administrators on the ways and means to foster S&T activities in the country so that economic development may be accelerated. One of the important national objectives set out in NSTP is the "attainment of a national capacity for the assessment, selection, acquisition, adoption and adaptation of foreign technology". (italics supplied). It envisages development of national capacity for autonomous decision making in technological matters and the establishment of institutional facilities for efficient absorption of imported technology.

Efficient digestion of imported technology involves attaining capacity to maintain the facilities, developing skills to replicate technology when necessary (thus avoiding repetitive imports) and adapt technology to suit local conditions. It is now widely recognized that countries which have benefited from large scale import of technology did not stop at its adaptation but went ahead and introduced improvements and were able to go for innovation and creation of new technologies. This process of successful absorption of imported technology was possible through the establishment of appropriate institutions for transfer and development of technology. Keeping in mind the experience of

Policy document recommended:

"a Technology Transfer Study Center to be instituted as a think tank for the NST (p.1115).

With further development of a policy regime for technology transfer and institution of appropriate legal, fiscal and financial instruments for imported technology, a National Center for Technology Development and Transfer may be instituted in due course to serve as a focal point to provide information, training, consultancy and extension services in respect of technology transfer" (p.1116, italics supplied).

Nearly four years have passed. No action is known to have been taken to develop this National Centre. In the meanwhile the industry has been stagnating. The longer the action on technology transfer is delayed, the bigger the cost and effort that will have to be made. A rectification of the erstwhile neglect of the cited policy directives is urgently in order.

The existing R&D institutions, like BCSIR, were established several decades ago with the expressed intention of developing or generating new technologies based on local raw materials. So far, the stress has been more on producing new scientific knowledge. Efforts to commercialize the results of research or develop technical knowhow have remained very inadequate. Also, the mandate for doing R&D to absorb imported technology has been absent. In the foreseeable future industries in Bangladesh will remain dependent to a large extent on imported technology. Yet, the existing RDI's do not have enough funding and facilities even to perform well according to their original mandate. The new institution for the absorption of technology, as envisaged in the citation from the NSTP86 above, will neither be a duplication of efforts nor reduce the importance of research

from the existing RDI's.

Proposed Functions for a National Center for  
Technology Development and Transfer(NCTDT)

One of the basic functions of the NCTDT would be to identify existing or potential industries which could accelerate the industrial growth of the country if the industries were given focused support. This function would consider a number of factors such as: does an industry have good potential for gaining export earnings or for producing goods that are being imported into the country in large quantities; does the industry have the potential for high value being added; does the industry require little in the way of imported inputs; does the industry require little energy; etc.

After a promising industry has been identified, the Center would determine what kinds of technologies would be required for the rapid growth of this industry in Bangladesh and which technology is consistent with the country's factor endowment. The technologies could be of several types. One is equipment or other hardware or software. This type is sometimes called technoware. A second type of technology is skilled manpower, sometimes called humanware. A third type consists of shop drawings, electronic circuit diagrams, patent files, reference books, computer data bases, etc. This type is sometimes called inforware. A fourth type of technology consists of management systems, production line designs, marketing and distribution systems, etc., sometimes called orgaware. It is probably obvious that all of these technologies need to be given attention for an

industry to succeed.

After the required technologies have been determined, the Center would determine if they are available in Bangladesh. If they are, then the Centre would determine what would be needed by firms in the industry to assimilate and adapt the technologies. If the technologies were not available in Bangladesh, the Center would search for the technologies outside the country. If found, the Centre would then determine what would be needed to import them, adapt them to the Bangladesh environment, and transfer them to the firms in Bangladesh successfully.

Another function of the Centre would be to maintain contact with firms in an industry targeted for accelerated growth. One of the reasons would be to build their awareness of the opportunities for growth. A second reason would be to identify firms that have managers with the visionary outlook and willingness to take the risks necessary for developing the industry. Once such firms were identified, then the Centre would submit a proposal to them to have the Centre help them to acquire, assimilate, and adapt the technologies required.

If the technologies were not available in Bangladesh or outside, then the Centre might prepare a plan for a project or projects for developing the required technologies. After costing the project(s), the expected costs would be analyzed against the expected benefits. If the analysis proved favorable, the project plan(s) would be presented to individual firms or groups of firms, perhaps in a trade association, to ask them to fund the development(s) of the required technologies.

Another important function of the Centre would be to monitor the progress of the industries that are selected for accelerated development. This would be done to identify problems that the firms in the industries might encounter and to help them find solutions. The problems might occur in: market research for the products or services of the industry; research/development of products or services; production; marketing and sales; distribution; or customer services. Whenever a problem were identified, the Centre would work with the firm to understand the causes of the problem and to find solutions.

After the initial support for a few years to allow it to build up its technical staff and laboratories, the Centre would depend on contracts from firms or trade associations for its operating funds. As such its continued existence would depend on its problem solving abilities and its marketing abilities.

The Harvard Advisory Group of the Planning Commission has prepared a project for the indicated center of excellence for technology transfer. It will cost about \$5 million a year as endowment building and gestating during the Fourth Five Year Plan. In the first few years, it will aim at hiring over 200 technologists, engineers, researchers, scientists, and economists of high calibre, including expatriate Bangladeshis, to produce industrial innovations of high productivity and to handle all aspects of technology promotion: from identifying dynamic industries, assessing appropriate technology from different countries, to arranging/negotiating its transfer to Bangladesh,

adapting it, improving upon it, and diffusing it among industrialists through extensive feedback relations. It is hoped that by the end of the Fourth Five Year Plan, the Center will be able to stand on its own feet by developing industrial innovations made to order for large industries, and developing innovations free for small and cottage industries (against the endowment built during the Fourth FYP and profits from commercial sales of innovations).