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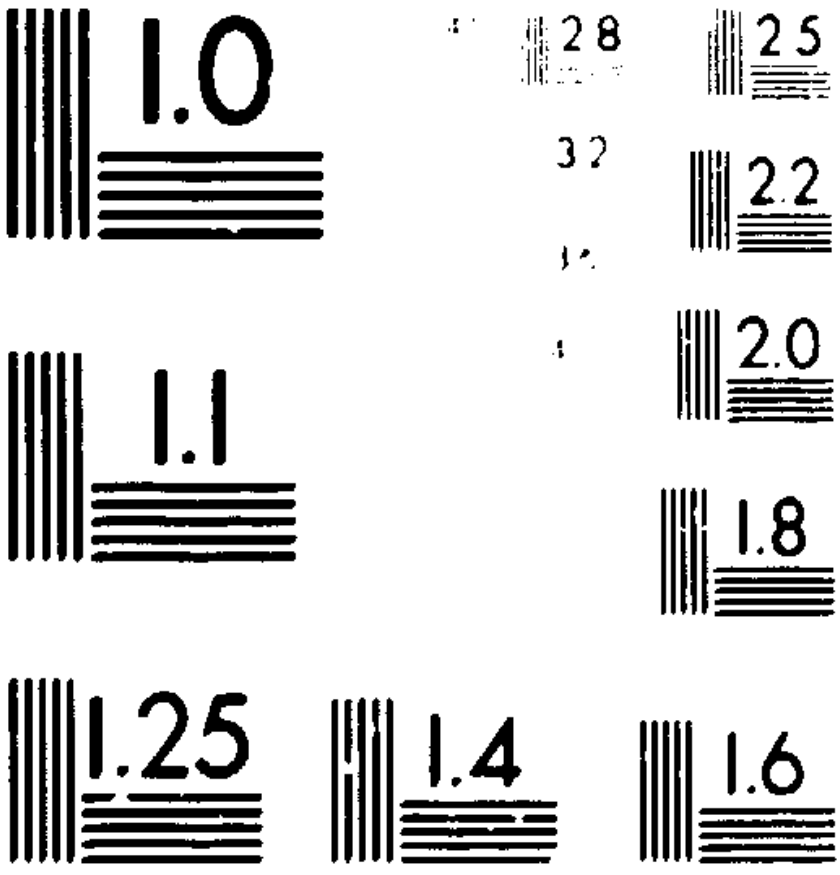

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STRENGTHENING OF SCIENTIFIC AND TECHNOLOGICAL CAPACITIES FOR INDUSTRIAL DEVELOPMENT IN DEVELOPING COUNTRIES

Technologies for Humanity.

Notes on the concept and its implementation*/

Submitted by the secretariat of UNIDO

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Summary

The benefits of technology should reach all sections of the people, including the poorest of the poor. To achieve this aim, the International Forum on Technological Advances and Development, organized by UNIDO in April 1983 proposed that a limited number of technologies, to meet particular needs of a clear urgency to the human community, should be identified and designated as "Technologies for Humanity (TH)". The UNIDO Secretariat is attempting to work further on this concept with the help of scientists and development specialists. Interest in this concept has already been expressed by several distinguished scientists and leaders of society.

Technologies for Humanity are those modern technologies, including technological advances that in their application would bring benefit to a large number of people in greatest need and more particularly to the poorest of the poor. They are unlikely to be developed in the normal course in the present structure of technology development where technologies are developed mostly in industrialized countries. TH is a call for the international community to launch a major, conscious, co-ordinated world-wide movement with a critical mass for mobilizing and directing those technological advances that offer great promise for the benefit of the poor. It will draw upon what exists but the effort required is dimensionally much larger than at present.

The initial area from which TH may be selected would include food and nutrition, water and sanitation, basic health protection, pollution control and rural energy. An example of TH is the improvement of cassava-based traditionally fermented food, particularly in Africa through the use of advances in biotechnology and genetic engineering.

TH, at the moment, requires commitment of political leadership, the dedication of scientists and the mobilization of resources. All nations are encouraged to contribute to this endeavour, both in the private and public sectors. UNIDO will act as the promoter of the movement with the support of eminent scientists and leaders of society who will constitute a consultative body to UNIDO in this field. Projects for problem- oriented technology development and application will be identified and elaborated with the help of experts and substantive and financial participation secured from all interested institutions. Once a technology is developed, it will be disseminated, freely if in the public domain and under moderate costs, if in the private sector. A suitable technology-field-delivery-system will be devised to demonstrate TH to the people.

UNIDO will co-operate with other intested agencies to promote this concept. Resources will be drawn essentially from the existing global pool of resources available for technology development. Funding/ development agencies will be encouraged to fund TH bilaterally and multilaterally.

Background 1/

1. It is well recognized that science and technology are catalysts for growth and propellants for progress. It has also been noted that the technologies have been instrumental in creating a situation of domination, disparity, depletion of resources and degradation of environment. This has sometimes led to a degree of dissonance and disenchantment with technology. The need is to overcome such negative consequences and to make the welfare of the human being the central concern of technology development, both as user of technology and its beneficiary. The benefits of technology should reach all sections of the people, including the poorest of the poor.

2. It is increasingly realized that high intellectual inputs - sophisticated technologies - are needed to solve the ground level problems of the large majority of poor people in the rural areas. The emerging technologies (ET) like genetic engineering and biotechnology, microelectronics, tele-communications and new materials etc. offer considerable promise, opening alternate pathways for rural industrialization based on biomass, for higher productivity, greater economic returns and for improving the quality of life of people. Such emerging technologies should not again become tools of exploitation, but should advance the welfare of the people, especially the poor, in developing countries.

3. The world is confronted with a glaring paradox. In spite of the remarkable, even startling technological advances, fundamental human rights to the essential needs of life of the majority of the people remain unfulfilled. Even worse, the number of persons for whom the right to "a standard of living adequate for their health and well-being" and other basic rights set forth in the Universal Declaration of Human Rights, are beyond reach, and appear to be increasing. Reflecting a growing concern that science and technology are being increasingly used toward destructive ends, the United Nations General Assembly (in its Resolution 38/113, Dec. 1983) called on the international community to take necessary steps to ensure that "the results of scientific and technological progress are used exclusively in the interests of international peace, for the benefit of mankind and for promoting and encouraging universal respect for human rights and fundamental freedoms."

4. It is in the above context, that a new form of international co-operation has been envisaged at the International Forum on Technological Advances and Development, organized by UNIDO at Tbilisi, April 1983. It is a call to the international community to launch a broad frontal attack instead of engaging in occasional and unrelated skirmishes with the application of emerging technologies for development. For this purpose, a limited number of technologies to meet particular needs of a clear urgency to the human community are to be identified and designated as "Technologies for Humanity" (TH). The forum asked UNIDO to work further on this concept of TH and present it to UNIDO IV Conference in August 1984. 2/

5. A Workshop organized by UNIDO at Dubrovnik in June 1983 suggested that an International Roster of Scientists and Technologists in selected Technological Advances be developed to mobilize their co-operation in the development and application of technologies unique to developing country conditions and in particular the development of Technologies for Humanity.

6. To work further on the concept of TH, UNIDO organized a meeting of a small group of selected scientists and development specialists in March 1984. At this meeting and another meeting of specialists on Information Technology for Development, it was urged that TH be made operational by defining the concept more concretely, identifying candidate technologies, initiating some pilot projects on these technologies and disseminating the results. A number of distinguished men of public affairs, scientists and others have evinced keen interest in this concept and are willing to lend their support and co-operation.

What is TH?

7. Technologies for Humanity are those modern technologies including technological advances that in their application would bring benefit to the largest number of people in greatest need and more particularly to the poorest of the poor. They will help alleviate human suffering and improve the quality of life of the people and will meet the basic, urgent and pressing needs of the very large number of poor and largely resourceless people in developing countries. Such TH should be both accessible and acceptable to people and appropriate to their social, cultural and environmental conditions.

The main distinguishing features of TH are:

(a) The central concern of TH is improving the welfare of the human being;

(b) TH are specifically addressed to the poorest of the poor and are unlikely to be developed in the present structure of technological development where technologies are developed mostly in industrialized countries. Such technologies are not also produced in developing countries (where they are needed) because of lack of resources and other reasons. Many efforts in technology development do not address the needy poor. The products from the technology should be cheap and within the reach of the low purchasing power of the poor persons in a developing country or, when the product is to be used by a public service, within the reach of the governments;

(c) There are no doubt some already existing technologies that could help the poorest of the poor. A certain amount of international co-operation has also existed in the past, though extremely limited and hardly increasing. But TH is a call for the international community to launch a major conscious co-ordinated worldwide movement, with a critical mass, for mobilizing and directing those technological advances that offer great promise for the benefit of the vast numbers of rural poor. It will draw upon what exists but the effort required is dimensionally much larger than at present. TH is an international movement - a movement for action backed by resources that could be mobilized by international co-operation. 3/

Candidate technologies for humanity

9. A variety of candidate technologies can be identified but the intention is to be selective. The initial area from which such technologies may be selected would include food and nutrition, water and sanitation, basic health protection, pollution control and rural energy. The development and use of

appropriate industrial products and processes in these areas would help to improve the quality of life of the poorer sections of the people. Some specific possibilities are discussed illustratively.

(1) Food and nutrition: e.g. improvement of cassava-based traditional fermented poor man's foods particularly in Africa through the use of advances in biotechnology and genetic engineering; providing a low-cost, simple package of culture innoculum like baker's yeast resulting in increased protein and vitamin content and improved nutritional value. Cassava is a local, cheap, easily grown and rich renewable resource. The fermented food from cassava is socially acceptable and can be produced in the cottage, small and medium sectors. This will also release pressure of demand for imported wheat, rice etc.

(2) Biomass based industrialization: Biomass is a unique, large, local, sunbelt, rural renewable resource. An integrated utilization of every part of the plant from leaf to root, coupling with existing as well as advanced technologies offers an alternate pathway for rural industrialization, setting up a cluster of industries around each plant. Such an industrialization based on the bulk biomass available in rural areas would result in producing food, fodder, fuel, fertilizers, drugs, construction materials etc. and would provide additional incomes and employment, bringing city comforts to the rural people instead of taking them to city slums thus ensuring a rural-urban continuum rather than rural-urban conflict. It will thus help the poorer sections in the rural areas. Integrated processing plants could set up with a cluster of 10 to 25 industries around cassava, castor, cotton, sugar, paddy, coconut etc. (e.g. cotton for textile, linters for nitrocellulose, seed for edible oil, protein, fatty acids, resins etc; seed cake for animal fodder, fertilizer; cotton stalk for particle board etc.).

(3) Wood: Improved wood-burning stoves with highly energy-saving and smokeless - user-friendly technologies. Such technologies are not only helpful to the poor but save destruction of forests and depletion of national resources. The present average consumption of firewood is 2.1 m3 roundwood per person per year. A saving of 30 - 50 per cent is envisaged.

(4) Energy: Use of efficient wood and charcoal stoves has already been mentioned. Several agro-forest residues could be pelletized or briquetted for potential use as fuel. Similiarly, small, mini- and micro-hydropower plant equipment may be manufactured locally and set up to generate electricity coupled with grain grinding or milling and other small manufacturing units in the remote and inaccessible places utilizing water resources.

(5) Several such examples could be cited, e.g. vaccines for malaria, influenza, dengue fever, leprosy etc; low cost communication and transport; tissue-culture and cloning for increased food production etc.

Actors in the movement

10. TH as a movement involves not only the will and commitment of the political leadership of a number of countries as well as the dedication and participation of the international scientific community, but also the mobilization of resources and scientific talents. All nations are encouraged to contribute to this endeavour. This equally applies to both private and public enterprises. Further, the individual inventors and innovators (apart from those working in organized industrial research institutes) may be enthused to get into the development and dissemination of TH. Sometimes it is they, who know best, the pressing needs of the local poor. In selecting and implementing TH, the developing countries should be fully involved. UNIDO will act as the promoter of the movement. Resources may be shared by participating countries and institutions directly among themselves or through UNIDO. UNIDO's role is important since most of the technologies will be embodied in manufactured products.

Manner of operation

11. UNIDO will secure the interest and support of eminent scientists, technologists and leaders in society for the TH movement. They will together constitute a consultative body to UNIDO in this field. In consultation with them it will identify projects for problem-oriented technology development and application. Each such project will be elaborated with the help of experts in the respective field. At expert workshops involving also funding agencies, institutions participating in research and development and dissemination will be identified as also funding agencies which will provide financial support in addition to any funds which the participating institutions may already have for this purpose. UNIDO will monitor the progress and keep informed all concerned. Once a technology is developed, it will in consultation with the participating institutions, promote the dissemination of the technology. Selected developing countries, appropriate to each case, will be associated throughout the process.

12. International efforts may be focused on specific problems, to find appropriate solutions and disseminate them throughout the world, more particularly in developing countries. Funding agencies and international agencies may be encouraged to fund research relevant to TH and dissemination of research results. Within the framework of the overall objectives of TH, flexible methods of operation may be followed.

13. TH may be developed and disseminated both in the public and private domain. The implementation of the concept of TH would complement rather than duplicate or compete with technologies developed through normal commercial channels. In fact, the past and ongoing work may be reviewed and its early completion encouraged with a better co-ordination of existing efforts.

14. The results of research in the public domain will be available freely to developing countries. The research institutes who join the TH movement may agree to release free of charge TH know-how. Patents may be obtained where possible and desirable. The international funding agencies sponsoring research may make it incumbent to release the patents either free or at concessional rates.

15. Even where technologies are developed and patented by private enterprises, it is possible that some of them in their own enlightened interests may release the know-how at relatively low costs. An international development/funding agency may buy the patents outright and then release the know-how to developing countries at differential costs, e.g. least developed countries free, for developing countries 2 per cent royalty and/or a single down-payment and for developed countries at higher rates 4/. Suitable provisions in regard to patent protection for TH may also be examined.

16. The governments, particularly in developing countries must be committed to TH and their policies so devised as to make best use of TH for the benefit of the poorest of the poor. A commitment to the TH concept on the part of all key actors is essential.

Technology delivery system

17. Technology Delivery System will form ultimately the important component of the whole programme. The results need to be delivered practically at the doors of the people who need it most and disseminated in a manner that is understandable, acceptable and useable by the poor.

18. A suitable technology field delivery system has to be devised to demonstrate TH practically to the people. The "show-how" of the "know-how" is important, as for people "seeing is believing". This sort of function can be best undertaken in the first instance by the Government itself working through its existing mechanisms or through additions to them as required.

19. In addition it will be useful to associate non-governmental and service agencies like Rotary and Lions International etc. who have the confidence of the local people and also the necessary competence - technical, financial, managerial - to ensure that TH is delivered to the right people. For example, the Rotary Club in America may offer vaccines free. The Rotary clubs in developing countries may in each area seek the help of the doctors to vaccinate people for polio, malaria, influenza, leprosy etc. Similarly, young entrepreneurs, students and teachers may be the extension agents. A public agency may manufacture required products using TH. These may be delivered at a nominal cost to the people (not free, however). A certain response and involvement from the people that benefit is essential to make it a success. Spoon feeding, subsidies, doles etc. can only increase dependence and not self-reliant development.

Resources

20. The resources needed are scientific skills, funds and international co-operation. UNIDO's past experience and its current endeavours reveal that the international scientific community is willing to contribute to the success of this concept.

21. Funding/development agencies may be encouraged to fund TH bilaterally and multilaterally. In most countries, including industrialized countries, basic research is funded in the public domain. Mechanisms need to be created to transfer the results of research in the public domain to developing

countries. Developing countries may also participate in international or regional development consortia to develop TH with the right to use the technology for production and marketing at a nominal cost. Some of the service agencies like Rotary International may also provide financial and other assistance in regard to the delivery system. But by and large there need not be much additionality. The existing funding mechanisms may be used and directed to support TH generation and used as a national and international priority.

Role of UNIDO

22. TH as indicated earlier is an overall concept to alleviate to some extent human misery and to improve the quality of life of the poor in developing countries. Obviously, UNIDO has taken the initiative because within its own sphere of competence, it sees TH is a critical and urgent need and because the application of most of the Technologies for Humanity will involve industrial products or processes. UNIDO's main interest is to provide required goods and services through industrialization and also direct them to the poorest of the poor people. Industrialization is the engine of growth and its products and services should reach the vast majority of people providing them with employment, purchasing power and meeting primary needs like food, fodder, fuel, drugs, construction materials etc.

23. UNIDO should join hands with other interested governmental and non-governmental agencies including UN agencies, e.g. World Health Organization (WHO), Food and Agriculture Organization of the United Nations (FAO) etc. which have already programmes on tropical diseases, foods, etc. UNIDO has taken the initative to get the acceptance and support for the concept of TH and to launch it as an international movement, promoting science-based industrialization serving the cause of the vast majority of resourceless people in the world.

24. UNIDO has already selected two pilot projects on TH (improved fermented food and wood stoves) to visibly demonstrate their impact, bringing the maximum benefit to the largest number of needy people. This experience may lead to many more of such projects.

Concluding observations

25. It is hoped that the concept of Technologies for Humanity will attract wide-spread interest, support and international co-operation.

26. It is recognized that deep-rooted social problems can rarely be solved by technologies alone. But at the same time, concerted worldwide effort directed toward a common and urgent goal - an international movement on Technologies for Humanity - should make a vital difference.

27. Let us then commit ourselves to work, and encourage others to work, toward the application of technologies for maximum common human good, especially of those whose basic human rights remain unfulfilled.

Notes

1/ This document has been prepared by Professor Y. Nayudamma, formerly Vice-Chancellor, Jawarlal Nehru University, New Delhi, India, with the assistance of the secretariat.

2/ See in this connection ID/CONF.5/5, page 35; ID/CONF.5/6, page 7; and the Special Report of the Executive Director for UNIDO IV (ID/319), page 15.

3/ As Father Joseph Wresinski founder of the "fourth world movement" has warned, as long as the poorest are excluded from society, poverty will continue to plague the world. "If we could change public opinion to realizing that misery is intolerable, then we would wipe misery off the face of the earth".

4/ These are merely suggested illustrarively and need to be agreed upon at a later date.