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09094

Distr.
LIMITED

ID/WG.309/6
21 September 1979

ENGLISH

United Nations Industrial Development Organization

Third Consultative Group on
Appropriate Industrial Technology

Vienna, Austria, 17 - 21 September 1979

DRAFT REPORT *

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id.79-7236

CONTENTS

I. INTRODUCTION

1. The Third Meeting of the Consultative Group on Appropriate Industrial Technolgoy was held at the Redoutensaal of the Wiener Hofburg from 17 to 21 September 1979. The Meeting was attended by 15 experts and 2 observers. Representatives of UNEP and ILO also attended the Meeting. A List of Participants is attached as Annex 1 to this Report.

2. The objective of the Meeting was to review the recommendations of the UNCSTD as they relate to industrialization and advise UNIDO on the formulation of a programme of work in the field of development and transfer of technology in general and strengthening national technological capabilities in particular. The resultant directions of work would also be presented to the Third General Conference of UNIDO to be held from 21 January to 8 February 1980.

3. The Meeting had as its working document a Secretariat paper entitled: "Strengthening National Technological Capabilities of Developing Countries: The Role of UNIDO"[1]. In addition the Meeting had before it the document containing a cross-sectional analysis of the UNCSTD Recommendations made by the UNIDO Secretariat[2], as well as the Background Paper submitted by the UNIDO Secretariat to the UNCSTD[3]. The List of Documents is attached as Annex 2 to this Report.

4. Opening the Meeting, Dr. Abd-El Rahman Khane, the Executive Director of UNIDO, drew attention to the discernible shift of emphasis in recent years from concern with the transfer of technology to a preoccupation with developing indigenous technological capabilities. While the significance of imported technologies in the industrialization process was not denied, it was necessary to underline the reciprocal relationship between development of domestic capacities and the

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1) ID/WG.309/3
2) ID/WG.309/4
3) A/CONF.81/BP/UNIDO

most efficient acquisition of technology from abroad. More than ever before the political and intellectual climate was propitious for undertaking the formulation of a practical programme for strengthening domestic technological capabilities. Strengthening of capacities at the national level will itself promote wider and more effective co-operation among developing countries.

Dr. Khane pointed out that UNIDO was particularly concerned with building on the experience already obtained at national and international levels. He expressed the hope that one key result of the deliberations of the Group would be to provide detailed components of the programmes which should be implemented by UNIDO and by developing countries during the next quinquennium.

5. The Meeting elected Mr. Ussama A. El Kholy of Egypt as Chairman and Mr. Enno W. Hommes of Netherlands as Rapporteur.

6. The Group commended the Secretariat for having prepared a working document based on a constructive and practical approach and containing a comprehensive and interrelated set of measures for promoting the development of national technological capabilities. It examined in detail chapters II and III of the paper concerning respectively, a review of UNIDO's work in the light of UNCSTD recommendations and an outline of the directions of UNIDO's future work. It expressed the hope that in the light of its comments, appropriate changes will be made in the other chapters viz. "Introduction", "Summary of proposals" and "Resource requirements".

7. The Group emphasized that its comments and suggestions should be taken note of in the context of certain overall considerations which it wished to underline as being essential for understanding of the process of technological development and of the measures to be taken in this respect. Accordingly, chapter II of this Report contains a broad statement of these considerations. Specific comments and suggestions concerning UNIDO's activities and on the directions of its future work are in chapters III and IV, respectively.

II. OVERALL CONSIDERATIONS

8. The technological development of a country is a function of many factors, internal and external to it. Within a country the political, economic and social structure, cultural and value systems, resource endowments and environment are some important factors constraining or promoting it. Outside a country, the global technology power structure arising from the monopolistic nature of the international technology market is a critical factor which renders it difficult for developing countries to mobilize foreign technology to their own advantage. Non-technological factors affect powerfully technological development. In this context, technological development of a developing country requires the promotion of major concepts based on a proper understanding of the process. It is these concepts that can provide the motive force for decisive and effective action.

9. The power of the State could be an effective lever for influencing technological development in developing countries. There is hence the need for a "political will" which requires a political understanding of technology problems in order to push through technological development in the desired directions. At the same time solutions to problems of technological development which ignore the political context have limited chances of success.

10. Technology is an instrument for achieving development objectives. It has therefore to be integrated in the strategy of development and ultimately aim at changing the course of development itself. This means, among other things, that the contours of technological development are to be derived from development objectives and technology policies integrated with development policies. The technological development could be called appropriate only if it fits in the more general development strategy. Measures for technological development should be able to impinge on those who work and take decisions everyday in the productive sectors.

11. Technology has to be applied along with other inputs for production of goods and services. The development or application of technology starts from the point a demand for a good or service arises and ends when that demand is met. In between are a chain of events. Attempts to promote the application of technology will prove abortive if the chain is not complete. Any sustained attempt at technological development would require an integrated system through the completion of this chain of events. The present position is that in many cases research, development and production are often entities isolated from each other and from the component elements of investment and production.

12. The chain traverses a much larger and more diverse ground than scientific research. Hence in considering technological development, it is vital to distinguish between science and technology, as well as between scientific and technological policies and plans, particularly in the context of industrialization. At the same time, their organic link should be taken into account.

13. There is not only a need for consciousness of technology as a resource. There is need for a new approach to it. Instead of taking technology as a matching or residual input together with other factors of production i.e. labour, capital and resources, it could well be taken as the prime resource with which other inputs are combined. This is usually the case in the industrialized societies which have shown dynamic industrial and technological development in recent decades. In this way, technology will become a leading factor in development. Technology ultimately creates and fulfils consumption demand.

14. Consumption patterns will determine patterns of technology use and development. This is particularly important in a long-term perspective. The size and age distribution of the population, the structure of employment and the nature of goods and services required will be increasingly different as between developed and developing countries and among developing countries themselves, and thus portend patterns of future demand, not in harmony with future capacities of supply. As in the past, the technologies of the future will be geared to respond to the demand of the developed rather than the developing

countries - unless new technologies are developed in the latter. Also the process of adaptation of external technology will become more difficult. It should also be realized that the whole course of future industrial development in developing countries may be distorted by trends generated by various internal and external powerful forces creating demand for inappropriate and non-essential goods and services.

15. In this context, measures for national and international action should not stray from certain basic considerations. Such action has to be severely practical and follow a clearly designed framework, rather than be ad hoc or piecemeal. It must be based on a clear analysis of what has been achieved and of what has gone wrong in the past. It must identify missing elements in the "chain". The strategy should include both short-term and long-term measures which can promote technological development directly and indirectly. Selectivity in action is essential so as to concentrate effort in key result areas, thus reaching a higher level of technological application and generation in different branches in different developing countries. This will render co-operation among developing countries more meaningful and make technology a leading factor in their development.

16. The main thrust of action should be at the national level. The plea for an allocation of 3 per cent of the GNP by each developing country[1/] for the development of technological capabilities would need to be elaborated, inter alia, in regard to the type of activities which could be carried out of such increased allocations and the manner in which this order of resources could be mobilized. The fact that this order of increase can not be effected all of a sudden reinforces the need for selectivity. In the branches that are taken up resources should be secured through better utilization of funds and more importantly, through a shift in expenditure from equipment to software as there is a tendency in several developing countries to spend too much on the former and too little on the latter.

1/ A/CONF.81/BP/UNIDO, p.31.

17. Availability of untied finance is of critical importance for supporting technology for development. Unless financial encouragement for developing countries consultants and organizations in the phase of pre-investment and pre-feasibility studies could be assured, local involvement in industrial projects would continue to be limited and the choice of technology itself foreclosed. In addition, experience has shown that private companies, and particularly the transnationals, rarely support pilot plant ventures. Financial support for pilot plants and in fact for the further stages of operation up to commercialization is essential but generally lacking in developing countries. UNIDO could make a contribution in promoting financial support for these purposes.

18. The Group suggested that future action by UNIDO should be taken in the perspective briefly outlined above. It was noted that such action would be taken by UNIDO, consonant with its central co-ordinating role in industrial development, in co-operation with other international organizations each acting in its respective sphere of competence.

III. REVIEW OF THE ACTIVITIES OF UNIDO

19. The Group reviewed the activities of UNIDO presented in Chapter II of the working document in the context of the recommendations of the UNCSTD. It was noted that the description followed the classification of subject areas arising from the cross-sectional analysis of the UNCSTD recommendations made by UNIDO (ID/WG.309/4). The Group observed that the analysis provided a very useful basis for operational purposes.

20. While taking note of the activities described in the working document, the Group made certain observations intended to enhance their usefulness.

21. It was felt that a major project envisaged by UNIDO in the area of technology policies and plans would make a substantial contribution towards assisting developing countries in the critical area of policy formulation. Such an exercise should include an evaluation of past and contemporary experience so that as clear a picture as possible would emerge on what has gone wrong in the past and a deeper understanding of technological development stimulated. In selecting different countries for the project, countries at different levels of development and resource endowments should be included. Policy-makers should be presented with the options for actions that would be possible in the short run and the results that would ensue as well as with long time measures that are necessary.

22. The Group noted that a major contribution of the International Forum on Appropriate Industrial Technology had been a conceptual and policy framework for appropriate industrial technology. In such a framework there was a clear recognition of the need for determining the appropriate technology mix in a given country with reference to its own requirements and objectives of development. With widely divergent conditions in developing countries, no single pattern of technology or technologies should be considered as being appropriate. A technology and product mix will have to be chose and applied in each country. The Group felt that the working document should include a more detailed reference to the concept of appropriate industrial technology and its relation to industrialization strategy, as has emerged from the Forum and the Group's deliberations.

23. With regard to policies for the acquisition of technology, the Group emphasized that the regulatory aspect of acquisition should extend beyond the mere screening of technology contracts to the formulation of policies and guidelines which will induce the demand for local technologies and technological capabilities. It should concern itself with the disaggregation of technology and investment packages as also with prefeasibility studies and their technological implications. The regulatory institutions should make systematic arrangements for the follow-up of technology imports in order to be able to assess clearly the state of technology development in individual sectors.

24. On the subject of assessment of technologies and technological options, the Group noted that there was still a need for developing methodologies which go beyond conventional cost-benefit analysis and for continually updating the data involved. Investigations concerning the disaggregation or "unpackaging" of technology have been carried out only in a limited number of countries and sectors. UNIDO should develop methodologies for the disaggregation of technologies in different industrial sectors.

25. In regard to technological information systems, the Group took note of the positive role of the Industrial and Technological Information Bank (INTIB) as a network of industrial and technological information. It stressed, in this connexion, the need for dynamic information linkages. Such linkages should be created through extension agencies and technology delivery systems involving persons who are dealing with the problems of the particular industry sector as their regular function. Enterprises, technical personnel and decision makers in developing countries should be assisted with "information on information" rather than be provided in every case with detailed information. A data bank could easily possess a built-in bias against increasing the scope of data gathering, it was always liable to inflexibility in its operation as well as obsolescence of its contents, and might well be relatively useless when information on information was lacking. For this reason UNIDO should develop a methodology for, and promote adequate information systems at reasonable cost. It should develop prototypes of techniques for delivering information. It should assist in the establishment of networks within a country and at the regional level. Technological information systems should bring out information on technologies available in the developing countries themselves.

26. The Group was of the view that consideration of problems and assistance at the plant level and to the entrepreneur should be an important element in UNIDO's work in the area of development of indigenous technology and the import of foreign technology.

IV. DIRECTIONS OF UNIDO'S FUTURE WORK

27. The Group examined in detail Section III of the working document on the directions of UNIDO's future work. While it endorsed the directions outlined by the document, it made a number of suggestions for consideration by UNIDO. It also desired that the overall consideration to which it had drawn attention earlier should be kept in mind in the future development of UNIDO's programme of work.

Mobilization of interest

28. It was felt that UNIDO could perform a major service to developing countries by generating a sustained process of creation of awareness, sensitization of issues and mobiliation of interest and effort. It was pointed out that the contribution made in this respect by the Co-operative Programme of Action on Appropriate Industrial Technology, and its further potential in this regard, needed greater emphasis in the working document.

29. While endorsing the measures proposed by UNIDO for mobilization of interest and effort, the Group considered what further innovative measures could be undertaken in this respect so that UNIDO could more effectively intervene in the process. The suggestions made in this connexion included promotion, and even running of demonstration projects and technology show cases; pioneering of the commercialization of technologies of relevance to developing countries; the promotion of "pressure groups" which could accelerate technological development and liaison with voluntary organizations, professional associations and advisory groups particularly through disaggregation of imported technologies and increased involvement of national capabilities at all stages of industrialization. UNIDO should also promote the oonduct of prefeasibility studies for alternative technologies.

One of the most effective ways of demonstrating the utility of local ideas was to pioneer various production systems which would embody those ideas and show that they were capable of yielding profits. As a consequence UNIDO should give high priority to establishing projects which would act as catalysts, through their example, for other technology users in developing countries.

30. Bearing in mind that the evaluation of past and contemporary experience in the light of development objectives was a prerequisite for stimulating deeper understanding of the process of technological development, the Group drew attention to the need to utilize the relevant studies already available and to make their findings more widely known, It was however noted that further action would relate not only to the national level but also to sectoral or specific enterprise levels - areas in which studies have been relatively lacking; besides, studies would be necessary as an integral part of other programmes of UNIDO resulting in presentation of technology options or specific projects in developing countries. Thus in formulating a programme of studies, a detailed review of existing literature is needed so as to identify the gaps, and to ensure that studies are action-oriented.

Development of Human Resources

31. The Group observed that training programmes for upgrading specialized skills would need to cover a variety of levels. They would extend from skilled workers to personnel like industrial engineers, production engineers and managers. The skills to be upgraded include not only those pertaining to the production process but also those pertaining to other technological functions including information, technology acquisition, technology planning and policy formulation, innovation product and process development, R and D, and all aspects of policy-making in relation to technology - in other words, in the whole spectrum of the process of development and transfer of technology. The Group suggested that UNIDO should undertake more training programmes for technology users, technology regulators and for those involved in technology planning and assessment. The need for and the value of training in small scale and

engineering industries was stressed. Training of personnel through their participation in actual execution of projects was far more effective than other forms of training and should be promoted wherever possible. It was noted that the programme of development of human resources would require attention, not only at the hands of UNIDO, but also of UNESCO, ILO and other concerned UN organization.

32. The development of the specialized skills could be fostered only by their constant exercise in the actual tasks involved in the chain of technology development and use. Oportunities for such exercise were not, however, always available and would need to be provided through appropriate policy measures to secure the utilization of local skills, capabilities and services in the process of transfer, adaptation and absorption of imported technology.

33. The Group considered the role of institutions in this context. While the general principle was recognized that institutions would provide a valuable base for training and that institutions which are already advanced in this respect should be utilized for the benefit of the personnel in the developing countries, doubt was expressed whether the phrase "centres of excellence" would be appropriate, since the phrase had already acquired a connotation for institutions of advanced scientific research. The point that the Group would like to emphasize, however, is that such centres should be working in specific sectors and be capable of closing the loop to develop products and technologies in such sectors. The question was also raised whether it would be necessary and desirable to indicate names of specific institutions. The Group agreed that the programmes of twinning and networking of institutions from both developing and developed countries would contribute substantially to the upgrading of technological capabilities in developing countries.

34. The Group also emphasized in this context the need for closely studying, promoting and strengthening linkages of universities and other specialized institutions with industry and also in involving such institutions in both developing and developed countries in problems relating to technologies and technology systems in developing countries.

It stressed the need to make a distinction between science and technology so that the specific requirements of human resources needed for technological development received due attention. The process of upgrading skills should not also ignore professional associations or traditional skills. The Group urged that UNIDO should play an important role in these respects.

35. While welcoming the initiative of UNIDO to develop a technical manpower inventory and also to compile as a pilot operation an inventory for Africa, the Group suggested that such inventories should include organizations as well as individuals. They should be compiled on the basis of carefully developed methodologies so as to acquire the prestige they should have if they are to be of real use to the developing countries.

36. The Group welcomed and appreciated the offer made in the meeting by Mr. Behbehani on behalf of the Kuwait Institute for Scientific Research to grant through the collaboration of UNIDO, two or three scholarships for personnel from developing countries for training in the institute. The Group hoped that similar offers of training personnel from developing countries would be forthcoming from other institutions.

Development of Technology

37. While endorsing the proposal that UNIDO should continuously watch, evaluate and monitor technological developments, the Group drew attention to the fact that break-throughs in fields such as micro-processors, micro-biology and genetic engineering had already occurred and that their commercialization was awaited. Some of these advances were double-edged and they might increase rather than reduce unemployment in developing countries. Some may also lead to considerable advantages if properly exploited.
In this respect, the implications of these technologies for developing countries would need to be studied in some detail. At the same time, the question whether major advances in technology could not be applied directly in line with the needs of the developing countries, was too important to be neglected. In particular, there was a need to identify

those elements of advances in technology which could contribute to a more rapid fulfilment of the basic needs of the masses of the population in developing countries.

38. In regard to programmes of R and D, it was noted that the several possible areas of R and D emerging from the International Forum on Appropriate Industrial Technology were not necessarily exhaustive. It was also pointed out that greater attention was needed to the promotion of pilot plants, prototypes and demonstration plants. Sufficient financial resources were not available for the establishment of pilot plants or for conduct of prefeasibility studies. The Group urged that UNIDO should take the lead in the establishment of pilot plants aw well as demonstration projects for commercialization of new technologies of relevance to developing countries as well as in the promotion of prefeasibility studies. The Group also emphasized the important role that UNIDO should play in securing untied financial support for such projects.

39. The Group noted with satisfaction that the energy implications of industrial technologies were being taken note of in the proposed programme. The UNIDO programme in this respect would need to be spelt out in greater detail. A useful classification of this programme could be in terms of energy development and energy utilization. Energy options for rural and decentralized industrialization and for small-scale industries should also be studied.

40. The Group observed that assessment of existing technologies or development of new ones was almost always directed towards processes and not products. UNIDO should take up the question of assessing alternative products and also promoting the design and commercialization of products which are appropriate to developing countries. A programme for this purpose should be worked out.

41. The Group suggested that the summary in chapter IV of the working document should, besides incorporating the additions and amplifications suggested, include a succinct statement of overall considerations for the attention of the policy-makers.

V CONCLUDING OBSERVATIONS

42. The Group recommended that UNIDO should, as the central coordinative agency in the UN system in the field of industrial development, implement or promote, as appropriate, the programmes outlines in the working document, taking into account the comments made in the meeting. It also recommended that in order that UNIDO meets its responsibilities in this regard more effectively, the capabilities of UNIDO in the form of financial and manpower resources should be strengthened.

43. The Group noted with appreciation the invitation of Mr. Behbehani to hold its next meeting in Kuwait.

ANNEX I

Third Consultative Group on
Appropriate Industrial Technology
Vienna, Austria, 17 - 21 September 1979

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ANNEX II

List of Documents

ID/WG.309/1	Provisional List of Participants
ID/WG.309/2	Provisional Agenda
ID/WG.309/3	Strengthening National Technological Capabilities of Developing Countries: The Role of UNIDO (Note prepared by the Secretariat of UNIDO)
ID/WG.309/4	Recommendations of the UNCSTD
ID/WG.309/5	Provisional List of Documents
A/CONF.81/BP/UNIDO	Strengthening of Technological Capabilities of Developing Countries: A Framework for National Action (Background Document)

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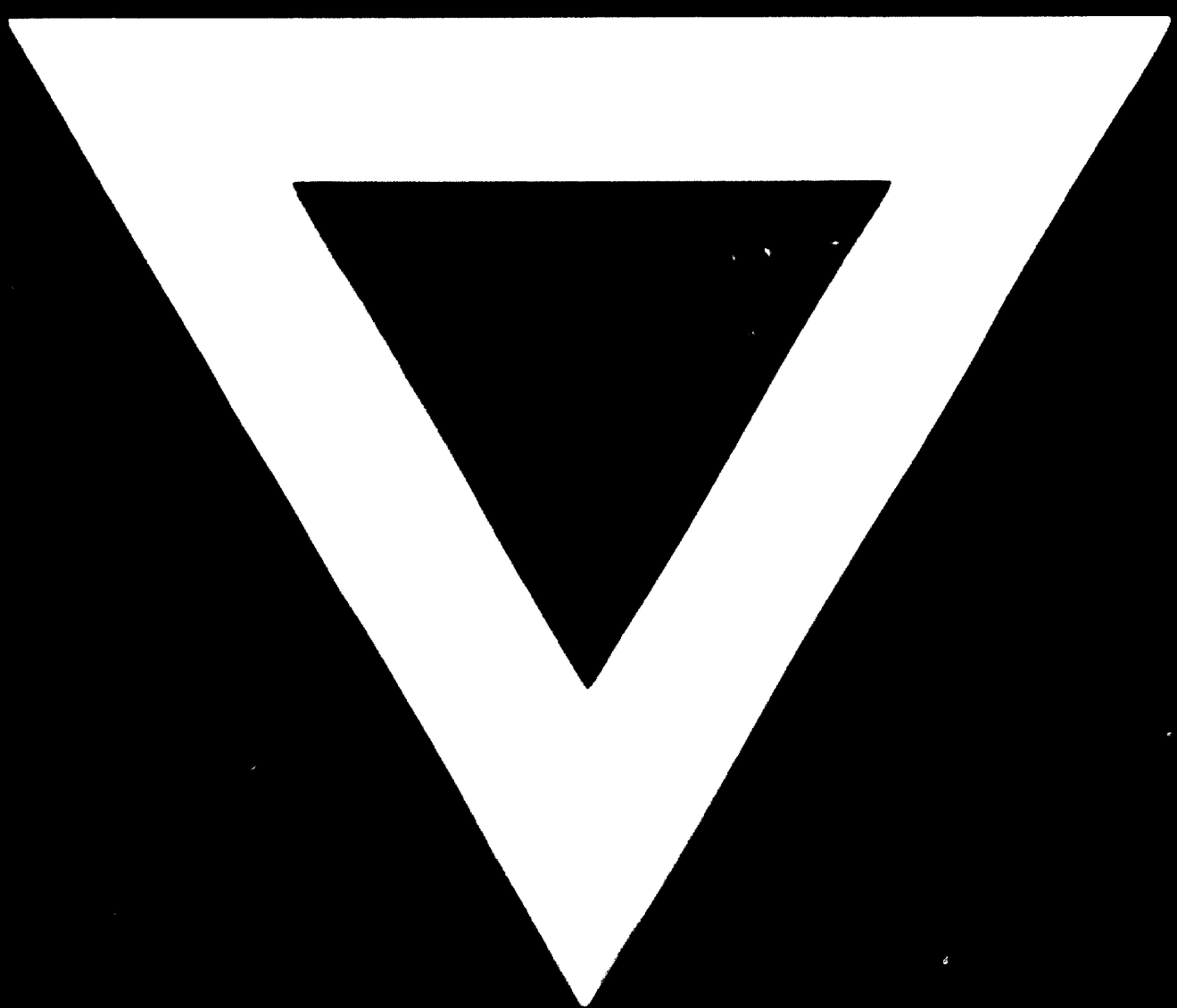

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