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Interregional Training Workshop on the
Implementation of Industrial Projects and
Related Systems

Beirut, Lebanon, 10 - 26 August 1970

REPORT OF THE INTERREGIONAL TRAINING WORKSHOP ON THE IMPLEMENTATION OF INDUSTRIAL PROJECTS AND RELATED SYSTEMS 1/

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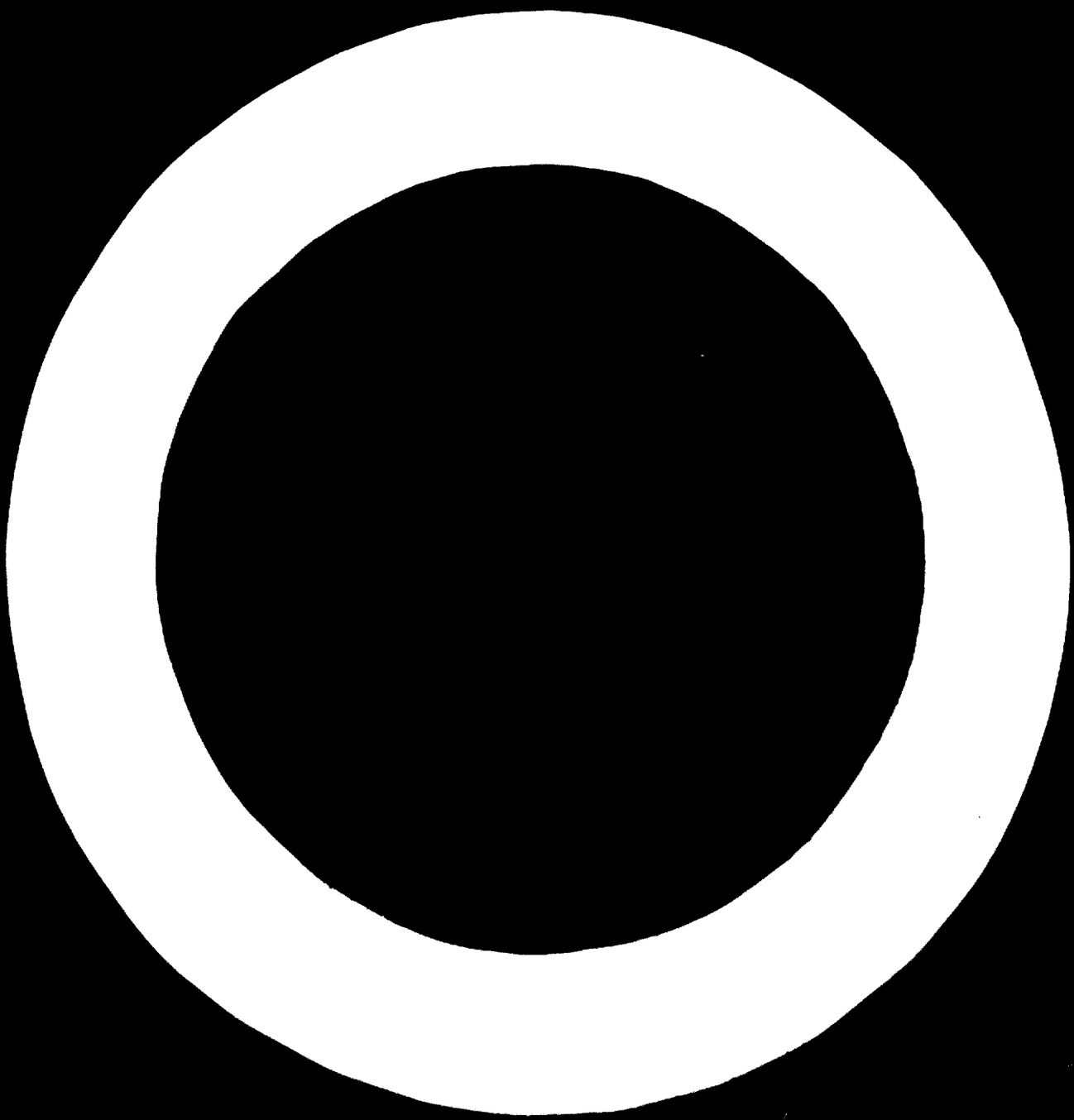

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1. Objectives of the Workshop:

The main objectives of the Workshop were to train a number of technical personnel and local experts from a number of developing countries in:-

1. Identifying problems encountered in developing countries during the course of project implementation.
2. Introducing and applying operational techniques for programming, scheduling and controlling the implementation of industrial projects including those dealing with cost planning, project budgetting and cost control, and resource allocation.
3. Applying the system approach to project implementation and the design of related organisation and control information systems.

Furthermore the Workshop intended to provide a forum for discussing actual problems, faced by the participants in their countries, in implementing projects and for exchanging views regarding approaches used and actions taken so that new avenues for approaching problems could be introduced.

II. Teaching Experts in the Workshop

In alphabetical order, they were:;

Mr. Mohamed I. Desouky, Associate Professor of Industrial Engineering, University of Illinois, U.S.A.

Mr. Mostafa H.A. Hamdy, of the Industrial Policies and Programming Division, UNIDO, Vienna. Director of the Workshop

Mr. Gerold R. Patsak, Lecturer, Industrial Engineering Institute, Technical University, Vienna.

III. Procedure of the Workshop

The Workshop was organized by UNIDO in cooperation with the United Nations Economic and Social Office, Beirut (UNESOB) and the Industrial Development Centre for the Arab States (IDCAS) and was held between 10 - 26 August 1970 in Hotel Beau Rivage, Beirut, Lebanon. Twenty participants from the following countries attended:-

Algeria	Iraq	Jordan
Lebanon	Libya	Sudan
Syrian Arab Republic	Tunisia	UAR

A list of participants, their posts and countries is included in Appendix I.

The Workshop comprised lectures, discussions based on exercises, case studies collected from developing as well as developed countries, and study groups. Appendix II includes a list of the training and reference materials used in the Workshop.

IV. Outline of the Workshop

4.1 Opening Session

On behalf of Mr. I.H. Abdel-Rahman, Executive Director of UNIDO, Mr. J.-P. Martin, Director of UNESOB, delivered the opening address, a copy of which is included in Appendix III.

4.2 The Workshop

The Workshop comprised five major parts which can be briefly described as follows:

4.21 Identification of project implementation problems

This included an analysis of possible problems which could be encountered in the course of project implementation and their causal factors.

Since the latter originate during work done at both the aggregate as well as the project levels, it was necessary to review the various

industrial development functions, particularly the various phases of project development, and to determine the impact of each on project implementation and to analyze these problems in this context. This has provided a good framework for analyzing the problems and, hence, the subjects that have been dealt with in the Workshop, and their interrelationships.

4.22 Application of techniques for programming (planning) scheduling and controlling project implementation

This mainly comprised the application of network analysis techniques in undertaking those functions which constituted a basic part of the Workshop. Before dealing with network development, it was necessary to consider the difference between production programming (planning) and project programming, the use of bar (Gantt) charts as a tool for programming and scheduling and their deficiencies, particularly as a programming tool.

This was followed by introducing network analysis as applied to project implementation. Both basic as well as advanced network techniques were covered. The first dealt with certain enquiries of a predictive nature, such as the estimated duration of the project, project completion date, the critical path(s), and the effect on total project duration in case one or more activities are delayed (consideration of total and free float of project activities).

The second, mainly considered techniques for time-cost trade-off or cost duration analysis and resource allocation. Cost duration analysis involves the determination of the relationship between project duration and its cost, and is required when the project planned completion date does not meet the scheduled or desired date. Or, more generally, when the project duration needs to be shortened. This is done by shortening some of the project activities which lie on the critical path or paths at an additional cost. The issue here is to achieve feasible or desired duration reduction at the minimum additional cost. The latter

oomprises both the direct and indirect cost incurred. Resource allocation frequently presents a problem since project activities require one or more resources for their accomplishment and since most of these resources are scarce in developing countries, satisfying resource constraints may frequently necessitate the prolongation of project duration. The resource allocation techniques used are capable, therefore, of developing an implementation schedule that economically meets resource availability and minimizes the extention of the duration of project implementation (the latter is applicable in those cases where extention of project duration is necessary to meet resource limitation). The same techniques are applied to both single project resource allocation as well as multi-project resource allocation. The latter is the case when a number of projects require resources from the same resource pool.

4.23 The systems approach to project implementation

The systems approach requires the consideration and analysis of all factors that bear on the problem under study. It is a useful problem-solving procedure which could be applied to great advantage to complex problems. It was, therefore, necessary to adapt it to the complex problems of project implementation and include it in the Workshop. The Workshop first dealt with the question "Why the systems approach to project implementation"?

The complexity of project implementation particularly in the environment of the developing countries has challenged existing available procedures. This complexity is due to a number of factors such as:-

(a) most development projects are of a new nature to developing countries and prior experience is lacking,

(b) the implementation of these projects, on an average, extends over a number of years and involves a large number of activities or tasks which are interrelated,

(c) these activities require various capital, human and material resources for their accomplishment which are frequently scarce,

(d) there are a great number of organizations and agencies which participate in the implementation of a programme (a group of projects) or a project.

This part of the Workshop, therefore, dealt with how to define a "System" and determine its boundaries in the context of industrial project implementation and its different aspects: objectives, components, environment, resources and functions; the decisions taken which are strategic and tactical and the difference between both in terms of scope, range, level and impact; the techniques used in making such decisions and control and evaluation of project implementation systems.

This part also dealt with how to organize for project implementation: the organizational structure and the impact of matrix (or project-oriented) organization on effective implementation, coordination between the various parties participating in the implementation process and feedback control process.

4.24 Management Information Systems (MIS) of Industrial Project Implementation

MIS is directly related to the organizational structure of the agency or body using it. This part of the Workshop dealt with this subject in terms of the decisions taken and the techniques used in making these decisions at the various levels of the organisational hierarchy which is responsible for implementation. This part also included, how an MIS collects data, stores it, organises or processes it into information[1/], transfers it for decision or stores it and retrieves it when required. In doing so, the building of information starts at the lower level, through higher organisational levels and eventually culminates in progress reports for top management for use in decision making. After transforming decisions into instructions, the latter are communicated to action centres down the line in the organisational hierarchy for execution.

1/ Information is generally regarded as data organised or processed to serve a particular usage.

Information flows or reporting systems and some types and forms of progress reports have also been treated, which are based on basic scheduling data derived from network techniques.

4.25 Computer utilization for project implementation

A brief introduction on computer systems as the data processing component of MIS for project implementation was included. Guidelines were given on when to use computers for programming, scheduling and control of project implementation and the advantage they have over manual computing systems in performing these functions. This was followed by giving the basic elements of computer systems and the basic principles of computer programming. This part was given by the IBM Near East.

All the above mentioned subjects and procedures were illustrated by examples. Moreover, participants applied these procedures during the Workshop to a number of case studies. These cases were collected from developing and developed countries.

V. Evaluation and Recommendation

The last session of the Workshop was devoted to the participants, giving them the opportunity of expressing their opinions in evaluating the Workshop and putting forward some pertinent recommendations. The participants' evaluation has affirmed the fact that the contents of the Workshop have met a long standing need of their countries in the field of project implementation. They urged UNIDO to continue furthering its technical assistance in this field and stressed the urgent need for UNIDO to organize these Workshops at a national, regional and interregional level. As a result of the Beirut Training Workshop there are four requests in the pipeline to hold four national Training Workshops on project implementation and related systems in the U.A.R., Libya, Syria and Jordan. A need has been voiced for UNIDO to collect, analyse and dissiminate data and information on time duration, resources required, costs inourred and delays occurring in the implementation of major component activities of industrial projects which have recently been implemented in a representative number of developing countries. Also to assist project

planners and implementors in programming, scheduling and controlling the implementation of industrial development projects. The participants were then briefed on the UNIDO project entitled "Time Profiles of Industrial Project Implementation" which primarily meets this need and emphasizes the determination of implementation delays, their causal factors and their cost or effect on net worth of investment. They were also briefed on the Training Workshop on this subject, which is envisaged to be held early 1971 by UNIDO in cooperation with IDCAS, and which will be followed by the collection of relevant implementation data and information (time profiles) in a number of countries for analysis and dissimination.

APPENDIX I

LIST OF PARTICIPANTS

Participant and Country	Profession
H.K. Chachoua Algeria	Economist, Expert assistant en organisation, Institut National de la Productivité et du Developpement Industriel, Alger.
Z.I. Al-Doori Iraq	Mechanical engineer, Director General of the Mousel Textile Factory, Ministry of Industry, Baghdad.
S. Ibraheem Iraq	Mechanical engineer, General Director of Dry Battery Company, Ministry of Industry, Baghdad.
H. Kaddouri Iraq	Industrial engineer, Project engineer, Senior Officer of Industrial Design and Construction, Ministry of Industry, Baghdad.
T.Y. Batarseh Jordan	Chemical engineer, Deputy Director, Jordan Centre for Industrial Development, Ministry of Economy, Amman.
D.M. Younis Lebanon	Engineer, Industrial Development Engineer, Industry Institute, Beirut.
Mrs. N. Khuri-Makdisi Lebanon	Research Assistant, Economic Section, UNESOB, Beirut.
I. Kishini Lebanon	Economist, Research Assistant, Industry Unit, UNESOB, Beirut.
Z. Kassem Lebanon	Economist, Research Assistant, Economic Section, UNESOB, Beirut.
M.A. Zaied Libya	Official in Planning and Statistics Dept., Ministry of Industry Libyan Arab Republic Tripoli.

Participant and Country	Profession
M.F. El-Moula Sudan	Economist, Industrial Inspector, Ministry of Industry, Khartoum.
M.S. Mohdi Syrian Arab Republic	Production Director, Union of Textile Industry, Damascus.
K.K. Abdulnour Syrian Arab Republic	Docteur en droit, Vice-Commercial Director, UNICHEM, Damascus.
I. Hilou Syrian Arab Republic	Petroleum Engineer and Planner, Acting Director of Industrial Planning, State Planning Commission, Damascus.
M. Bettaieb Tunisia	Juriste, Administrateur chargé d'études, CNEI, Tunis.
A.H. El Husseini UAR	Engineer, Director-General of Planning and Follow-up of Industrial Projects Sector, General Organisation for Industrialisation, Cairo.
H. Rassem UAR	Architect, Director-General for Planning of Industrial Projects Execution, General Organisation for Industrialisation, Cairo.
M.K.A Eyada UAR	Engineer, Strip Mill Manager, The Egyptian Iron and Steel Co. Helwan.
M.K. Mostafa UAR	Business Administration, Productivity and Management Studies Dept., IDCAS, Cairo.
S. El-Assouni UAR	Engineer, Chief of Productivity Section, Productivity and Management Studies Dept., IDCAS, Cairo.

APPENDIX II

LIST OF REFERENCE MATERIAL

Item No.	Title
1	John Fondahl and Mostafa H.A. Hamdy "Procedures for Programming and Control of Implementation of Industrial Projects in Developing Countries", UNIDO/IPPD/3, 16 February 1968.
2	"General Procedure Followed in Network Scheduling".
3	Simple exercises
4	Exercise
5	"Activity-on-Arrow vs. Activity-on-Node"
6 and 7	Exercises on project scheduling
8	"Brief Note on Cost Control" ID/WG.39/7, 15 September 1969
9	Exercise on Time-Cost Trade-off
10	"Utilization of Computers in Industrial Development" ID/WG.67/4
11	Case study "Textile Mill Project".
12	"A Brief Primer on Project Network. Scheduling under Resource Constraints".
13	Mostafa H.A. Hamdy, "Network Techniques for Project Implementation in Developing Countries".
14	Exercise on Resource Allocation.
15	"History of Digital Computers" and "The Essential Elements of a Computer", ID/WG.39/5, 11 September 1969.
16	"The Impact of Computers on the Society and Developing Countries and E.D.P./Automation", ID/WG.39/6, 15 September 1969.

Item No.	Title
17	Mostafa H.A. Hamdy "Computers and Network Techniques for Project Implementation".
18	S.M. Nyssen "Network Planning; Criteria for Computers use and Programme Specifications", ID/WG.39/4, 11 September 1969.
19	A. Schinkel "Systems and Systems Design","Systematic Approach to the Development of Business Information Systems".
19a	- ditto - "Supplements"
19b	- ditto - "Appendices"
20	Mostafa H.A. Hamdy "Problems encountered in the Application of Network Analysis Techniques in Project Implementation in Developing Countries and Pertinent Recommendations",
21	"A Brief Note on the Development of Management Information Systems (MIS)," ID/WG/67/3.

APPENDIX III

OPENING ADDRESS BY MR. J.-P. MARTIN

This meeting is sponsored by a worldwide organisation - the United Nations, and by a regional organisation - the Industrial Development Centre for the Arab States (IDCAS).

The United Nations organisation on whose authority, and under whose budget this meeting has been launched is UNIDO, the UN Industrial Development Organisation, one of a number of UN organisations in the economic and social field engaged in helping to meet the great modern challenge of narrowing the gap between developed and developing countries. UNIDO has the key role in the UN family of nations with respect to industrial development, and it is UNIDO that has taken the initiative of calling this meeting.

I am speaking to you today on behalf of the Executive Director of UNIDO, Mr. Ibrahim H. Abdel-Rahman, and also on behalf of UNESOB, the UN Economic and Social Organisation in Beirut, responsible for handling economic and social questions in this region.

The IDCAS, whose director of the Department of Productivity Study - Dr. Tarabishi - is participating in these meetings together with other officials of IDCAS, has also helped to organise the meeting. As it was necessary to be somewhat selective regarding participating in the meeting, IDCAS helped to make it a meeting of area countries without stopping at the Nile but continuing westward. Our friends from IDCAS bring to the meeting multinational perspectives acquired in the secretariat of IDCAS in Cairo.

UNIDO, for its part, is financing all costs of the meeting and of the preparation of the procedures. Equally important is the contribution UNIDO will make in terms of its accumulated knowledge and experience, obtained on a worldwide scale. Mr. Handy, who has come to the meeting from UNIDO headquarters in Vienna, has participated in similar workshops in other parts of the world and brings us the kind of experience that cannot be bought but has to be acquired year by year.

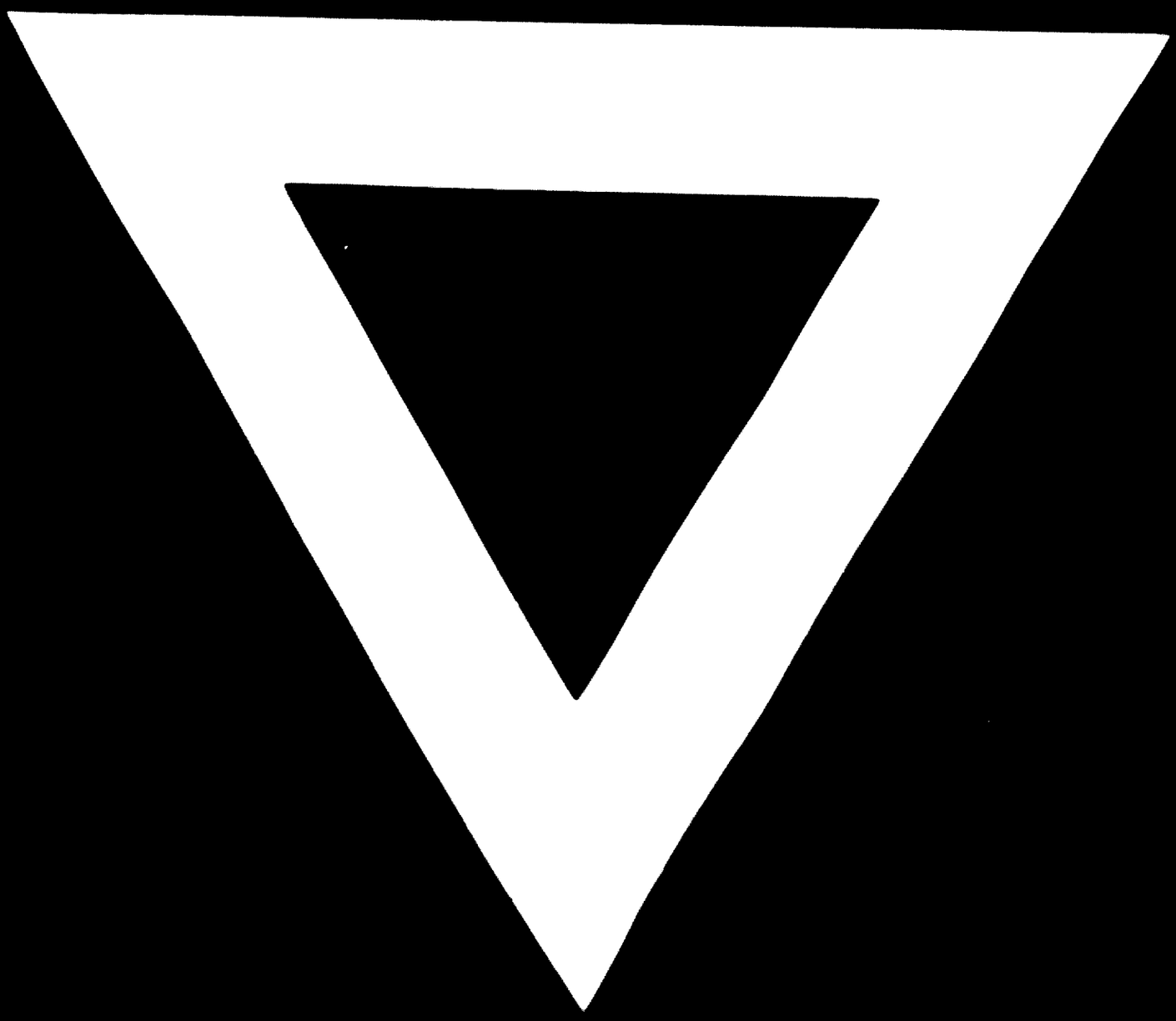
The physical inputs for the meeting include two sets of documents prepared by UNIDO for workshops of this type. They have to do with the process of the workshop as well as with the substantive matters to be discussed. A few of the documents relate specifically to the experiences of the countries you represent. Some additional documents are being prepared in the region and these will be available at a later time.

Perhaps I should comment on this "training workshop" as compared to other types of meetings. There are in the UN structure many meetings of those who have to decide on policy and strategy, but such meetings are not very useful unless they are followed by further activities at the working level. It is easy to agree on generalities, but general policies are a bit elusive, and what counts in the long run is whether the policies can be implemented. In my view, we should have more meetings of the type of this one - bringing together the people who actually deal with projects, who exchange views about their methods and their difficulties, and who want to keep abreast of the latest methods and p oedures for doing their work.

What is the best strategy for industrial development? When Chiefs of State gather in New York next week to celebrate the 25th anniversary of the United Nations, the UN will also proclaim the 1970s as the Second UN Development Decade. This is a declaration of faith, so to speak, but it is more than a slogan - it expresses the endeavour of the world community to come up at least in part to the expectations of the people of the world. The trends of the preceding decade showed the need for new strategies and concerted action to lessen the difficulties of the poorer countries in achieving progress, while the developed countries themselves experience problems so serious as to menace the very existence of the world community.

The development decade will be meaningful only if efforts are made at the national level and individual efforts are shepherded to provide policies and strategies with a maximum of coherence and efficiency. You cannot have a world strategy unless you have a national strategy, nor can you have a national strategy unless at the project level you have personnel who know where they are going and how to implement projects in a sensible coherent manner.

Development planning is only in its infancy: most such plans are mere lists of projects. It is of no more than theoretical interest to list the proposed projects; they must be spelled out in their proper framework, with objectives clearly marked and interrelated. Before you can build sound policy and strategy you must have a groundwork of properly conceived and executed projects. For these reasons inter alia, this workshop is of fundamental importance, and it is gratifying that the countries are represented by men who are important in their own countries. There must be both competence and continuity in the management and execution of projects. We hope that your Governments, who have spared you for this workshop will find adequate recompense when you return to your work richer than you came away and having contributed to the enrichment of the others in this meeting by sharing your ideas and experiences. We are not an academic society: what we discuss here must filter down to the level of project administration in your individual countries and improve performance for the benefit of the people.



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