OCCASION

This publication has been made available to the public on the occasion of the 50th anniversary of the United Nations Industrial Development Organisation.

DISCLAIMER

This document has been produced without formal United Nations editing. The designations employed and the presentation of the material in this document do not imply the expression of any opinion whatsoever on the part of the Secretariat of the United Nations Industrial Development Organization (UNIDO) concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries, or its economic system or degree of development. Designations such as “developed”, “industrialized” and “developing” are intended for statistical convenience and do not necessarily express a judgment about the stage reached by a particular country or area in the development process. Mention of firm names or commercial products does not constitute an endorsement by UNIDO.

FAIR USE POLICY

Any part of this publication may be quoted and referenced for educational and research purposes without additional permission from UNIDO. However, those who make use of quoting and referencing this publication are requested to follow the Fair Use Policy of giving due credit to UNIDO.

CONTACT

Please contact publications@unido.org for further information concerning UNIDO publications.

For more information about UNIDO, please visit us at www.unido.org
UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION

HIGH-LEVEL EXPERT GROUP MEETINGS PREPARATORY TO THE FOURTH GENERAL CONFERENCE OF UNIDO

ACCELERATED DEVELOPMENT OF HUMAN RESOURCES FOR INDUSTRIAL DEVELOPMENT

YACUNY, UNITED REPUBLIC OF CAMEROON, 30 MAY - 3 JUNE 1983

PROBLEMS OF NATIONAL ECONOMY INDUSTRIALIZATION IN DEVELOPING COUNTRIES, HUMAN RESOURCES GROUP

Vladimir Mourin
This paper was prepared by Dr. Vladimir Mourin, Deputy Director of the Scientific Research Institute for Economic and Technical Cooperation of the USSR with Foreign countries, USSR.

The views expressed in it are those of the author and do not necessarily reflect the views of the secretariat of UNIDO.

The designations employed and the presentation of the material in this document do not imply the expression of any opinion whatsoever on the part of the secretariat of the United Nations concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries.

This document has been reproduced without formal editing.
The problem of national economy industrialization in developing countries have been repeatedly discussed during the last decade by numerous international forums. The adopted documents, among which the Declaration of Lima and the Plan of Actions, introduced by the II UNIDO General Conference in 1975 are the most important ones, projected a programme of actions aimed at increasing industrial output in developing countries. Later on this programme was further elaborated. What the developing countries do not lack is the recipes as to what to do for the solution of the problem of national economy industrialization. Nevertheless, the present rate of the increase of developing countries' share in the world industrial production shows that execution of the adopted programme is only half successful. The following seem to be the key issues of industrial development:

- increasing the scientific and technological potential;
- providing reliable energy supply;
- industrial processing of raw materials;
- supplying the necessary financial resources;
- providing the accelerated development of human resources.

Solution of each of these issues depend on an extremely complicated programme of measures which may be implemented through the carefully aimed strategy on the part of developing countries and with broad assistance from developed states. Training skilled labour is one of the most urgent issues among those mentioned above. It includes a wide spectrum of educational problems such as training scientists, engineers, technicians and workers to meet the demands of national economies as well as permanent upgrading of their skills.
Activities of UNIDO and other international organizations, practice of multilateral and bilateral international cooperation on the problem in question as well as various proposals presented on many occasions by both developing and developed countries help to shape the principles of solving the labour problem with the purpose of national economies industrialization in developing countries. The main of them are as follows:

- complex approach;
- thorough selection of goals;
- careful planning;
- setting and maintaining the ratio between the usage of own resources and external aid;
- maintaining the balance between national, international goals and aims of organizations and companies involved.

The 1st UNIDO Global Consultation on training labour for industry held in Stuttgart (FRG) in 1982 helped to specify these principles.

For the purposes of practical application it is essential to clearly realize the mechanics of utilisation of the above principles.

1. A COMPLEX TASK OF THE HUMAN RESOURCES PROBLEM

A complex nature of this problem is determined by its two basic aspects: firstly, by interconnections with other tasks of national economies industrialization and, secondly, by the usage of various forms of education and skills upgrading.

Let us consider the interconnection between the human resource problem and the tasks of developing scientific and technological potential and the energy supply problem. The shape of developing
countries in the world scientific and technological potential is 5%. About 6% of the world fund of the registered patents are issued to applicants from developing countries. Even so, the patent rights owners from industrially developed market economy countries are responsible for the lion share of this tiny percentage of the issued patents. The analysis of the energy demands of the young developing countries points out the necessity of finding a radical solution for the task of providing a reliable supply of energy. By the year of 2000 the developing states will require about 30% of the world energy production for the performance of their industrialization programmes and during the next quarter of the century their demands might increase up to 50% of the world energy production. Execution of industrialization plans is seriously hampered by the intellectual backwardness of developing states, which account for 75% of the world's population. This fact is illustrated by the literacy data. Only 60% of the population of the countries in Asia and only 40% in Africa are literate.

The interconnection between the tasks of increasing scientific and technological potential and the labour problems points at impossibility of solving the former for the lack of skilled labour and specialists. This could be illustrated by the practice of the Soviet-Indian collaboration in the field of space research. To benefit from the access to the Soviet space technology the Indian experts had to undergo special training in respect of utilization of space techniques in geological, geophysical and meteorological research.

The interconnection between the task of providing the reliable energy supply and raising the level of education could be
characterized in a similar way. Execution of large-scale energy programmes in developing countries puts forward as one of the principal conditions the availability of the specially trained personnel. The Soviet experience in cooperation with developing countries witnesses in favour of the possibility of the successful solution of this problem. The Soviet organizations have already performed and are now performing the orders from developing states for the construction of power stations equal to the total capacity of 29,1 thousand MW in such countries as India, Syria etc. More than 70 thousand specialists from developing countries were trained at the Soviet training centers abroad and at industrial facilities in the USSR. Now they are successfully working in the various industries of the national economies.

All the tasks under consideration are interconnected. Mastering the new energy production technologies is closely tied up with increasing scientific and technological potential. The both tasks require highly skilled personnel for their solution. The Soviet-Indian collaboration in the field of MHD-method of electrical power generation is one of the examples of the complex nature of industrialization problems. In Indian research center in the state of Tamilnadu Indian scientists with assistance from the Soviet experts from the USSR Academy of Science Institute of High Temperatures carry out research work on developing a new type of energy generators. Presently the center has at its disposal an experimental 15 MW unit. The results of the research work performed on this unit allow to proceed in the nearest future to developing power stations of the new type whose efficiency is likely to be 10%
higher than that of conventional power stations.

The complex nature of the tasks in question is also illustrated by construction of energy projects in developing countries as well as of research establishments such as, e.g. Tajura Nuclear Research Center nearby Tripoli, the capital of Libya. It is engaged in carrying out research programmes aimed at peaceful utilization of nuclear energy.

The considered examples witness also in favour of carefully calculating the demand for national personnel needed for performance of research programmes as well as calculating the increase of scientific and technological potential and energy supply as a result of labour programmes realization. The same holds right for planning of personnel training. In fact, training the national personnel is the key task for solution of the labour problem. Its complexity is reflected by the multitude of the forms of training, which include initial education system, vocational education system, higher education, various forms of upgrading the skills of the personnel in the home country and abroad, acquisition of necessary knowledge through the channels of bilateral and multilateral cooperation.

2. FIXING THE TARGETS FOR THE HUMAN RESOURCES PROGRAMMES

For this purpose at least two tasks should be solved: determination of the long-term and current targets and compiling the schemes of reaching them.

Determination of targets is largely the result of compiling national economies' development programmes. Absence of such programmes fixing the principal proportions for the national economy development may lead to a situation where labour training targets are not feasible. Determination of targets includes
specifying the list of professions (skills) needed with demand for each of them for each given period of time as well as fixing the ways of training (including skills upgrading). It is a pity, but one has to state that reaching fixed targets is hampered by the "brain drain" problem. For example, through the years 1961-1975 over 300,000 highly skilled engineers, physicians and other professionals emigrated from developing into only three major developed market economy countries. The most radical way of putting an end to such leakage would be for developed countries to refuse to accept specialists from developing countries for permanent jobs. The Soviet Union and other socialist countries make a point of following this rule. Among other measures to be taken by developing countries could be named various incentives for national personnel aimed at enhancing their desire to work in the local industries.

3. A PLANNED APPROACH TO THE PROBLEM OF NATIONAL HUMAN RESOURCES

Such approach to solution of human resources problem should facilitate meeting the demands of a national economy for the skilled labour. To introduce it into practice it is necessary to have a special state body and the corresponding methods of planning. Taking the demand for the highly skilled national labour for a basis one could determine a programme of establishing new education centers, training establishments for national labour with assistance from developed countries, sending national personnel abroad for education and skills upgrading. The process of planning might be envisaged as follows. The demand for national personnel is calculated on the basis of government's strategies. The latter take into account national companies' plans and local bodies' projects as well as requirements of governmental organiz-
tions. This serves as a basis for setting plans for the system of education on the whole including companies and organizations which train its personnel themselves. It is only natural that various national customs, traditions etc. should be taken into consideration while preparing such plans.

Observation of the corresponding normative documents is an essential part of the planning process. Systematical accumulation and analysis of the data on labour consumption by kinds of works is the key task in this respect as such data form the basis for adoption of labour consumption norms.

Sending local personnel for education abroad does not necessarily mean orientation only on developed countries. A considerable number of specialists from many African states received, for instance, their higher education at the Guinea Institute of Technology, which was built with assistance from the Soviet Union.

4. SETTING A REASONABLE RATIO OF THE OWN EFFORTS AND EXTERNAL AID

For the success of the development and execution of national human resources programmes it is important to fix a reasonable ratio between a country's own efforts and external aid. The former should be a prevailing component. It means having a distinct national economy development plan with clearly fixed demand for national personnel. It also includes a broad and ramified educational system, carefully planned and constantly under control. And, finally, own efforts mean having corresponding economic, organizational and legal mechanism necessary for the functioning of education system.
While the main efforts of a developing country are to prevail, one should not forget the importance of international co-operation in the field of labour education and training. The Soviet Union, for example, carries out a large-scale programme of collaboration with developing countries in education and training of local labour. The programme takes into account the requirements of their governments. Tens of thousands of Soviet specialists work for the implementation of this programme assisting developing states in realization of their industrialization plans. Such assistance includes performing design work, research and development, engineering, consulting and technical services connected with execution of constructive, installation and other works, actual construction of major industrial projects in developing countries, setting medicine and teachers etc.

The Soviet Union widely uses in its cooperation with developing countries such forms of technical personnel training assistance in construction of educational institutions, vocational education centers, training local labour by the Soviet specialists directly in the process of constructing and operating industrial projects: receiving foreign citizens for education in the fields provided consulting services in the fields of national economy, training, drafting developmental projects, certain industries, preparation and execution of various projects, 1) including energy, 2) agriculture, 3) fishery, 4) chemical and democratic society.
In view of the growth and expansion of operating industrial projects in the light of new opportunities in the field of education due to the large scale and relatively low expenditures in the pursuit of national education, the model was utilized for training a greater part of her personnel in the construction of Philippi and Behrark Steel Works in India, etc. Many thousands of engineers from these countries received their basic education and training in developing countries, depending on the nature, capacity and resources of the project. These forms of training are usually for a short time of training, individual training, training in the working sector (workshop) as well as certain international seminars. It may be said that for the successful transfer of new technology, setting up new training courses, developing necessary technical skills, providing the right classes and their equipment, developing learners' manuals, visual aids etc. In some of these countries skilled experts and technical training experts are sent to certain countries in developing countries.

In addition to teaching and consulting services in a particular interesting form of national labour training, they are expected to use new technologies and change the modern approach to education, personnel training, and industrial research and development. Development of the country's human resources is, in the final analysis, an important theme. The experts have the responsibility to contribute to the country's development and economic progress by means to which they contribute to the country's economic and social progress, adopting new techniques, personal training, providing consulting services, organizing seminars, helping to organize technical conferences, training the human resources to meet the new demands and challenges.
of engineering consultancy (such companies operate in quite a number of developing countries, among them in Nigeria, Algeria, Peru etc.).

One of the higher forms of training highly skilled personnel in developing countries is establishing national design and research organizations. This is exemplified by Indian MECON - a consulting company in the field of metallurgy which is a result of the Soviet-Indian cooperation. Establishing design and research organizations in developing countries is an appropriate solution for the problem of technology transfer and its repeated usage for the national and export purposes.

Usage of received technology for export purposes requires a specially trained personnel which receive both industrial (metallurgy, energy production, mining etc.) and export-oriented economic instruction. The latter includes the knowledge of national economy and the role of international cooperation in solving its tasks; knowledge of labour, financial and currency legislations and their observation in joint activities with foreign companies and organizations. The obligatory requirements include also mastering diplomatic protocol, one or several foreign languages, methods of estimating market situation and others. A special attention is nowadays paid to problems of project management in construction of large-scale industrial enterprises which are of the key importance for industrialization of developing countries' economies. The processes of preparation, evaluation and decision-making, works management in the course of project execution require the services of highly-skilled management personnel.
A significant role in providing external sources of labour is played by foreign companies. It is very often that they have considerable difficulties in mastering and observing in their activities the principal clauses of developing countries' legislations. Manuals and guides issued for the benefit of foreign companies solve this problem only partially. Developing states could make a useful step by setting a network of national consulting agencies which would undertake adaptation of the foreign companies' activities to the regulations of national legislations.

5. INTERCONNECTION BETWEEN THE NATIONAL AND INTERNATIONAL AIDS AND THE COMPANY TARGETS

Coordination of the activities of the state firms, private companies and state bodies is the basis for solution of labour problem on the national scale. The issues of target and planning strategies are the key ones for solution of labour problem. A problem of receiving and passing further the knowledge acquired by a company is no less important. It is necessary that the experience gained by a company as a result of its own activities or through cooperation with companies from developed countries, should become a national property. Such experience concerns usually the following main fields:
- technological
- economic
- organizational
- legal.

The technological part is the one that draws the main attention. It includes design documentation, equipment, buildings
and constructions (in case of industrial projects), testing methods, control procedures, operation manuals. Despite the undisputed importance of the above-mentioned, the technological part of the gained experience may be useful only for application in the same or neighbouring industry.

The other three parts are of the universal nature and may be used in any industry. Utilizing the gained experience in execution of new projects, specialists from developing states should take into consideration the following economic issues: a system of economic indices used by a partner from developed country and methods of using them; generalized indices and criteria for coordination of the parties' activities; a system of scheduling for the purposes of long-term and current planning and everyday management; a system of incentives and sanctions; methods of determining norms and using them for complex estimations (materials expenditure, labour consumption, work duration etc.).

A proper arrangement of works performance is one of the decisive factors of increasing the technological level. This means that the local personnel should thoroughly study work arrangement methods employed by their partners from developed countries including provision of main types of resources, materials etc. Determination of works' sequence, studying the causes of negative and positive influences on the works progress and fixing approximate quantitative estimation of these influences are the basic issues which the local personnel should pay its attention to.

An experience of solving legal problems may be accumulated by studying the legal clauses of commercial transactions,
issues that are compiled in the process of project execution, practice of settling disputes.

Studying the practical experience of certain companies and exchange of the results of such studies is one of the important ways of upgrading skills of the national personnel. It is worth mentioning that this doesn't require additional expenditures. Information exchange on the gained experience might be performed between organizations from various developing countries. It would facilitate the development of international cooperation between developing countries, as was pointed out at the conference on non-aligned countries in Kinshasa in February 1961.

Another issue which influences the interconnection between terms of certain companies and the state targets is provision of planned solution of the labour problem. This mainly concerns those countries that have excessive labour force on natural resource. Social production of a certain kind of products requires a certain corresponding number of workers and managers.

Industrialization of economy demands new investment which are distributed through a definite period of time. The initial stages require only a limited number of workers which grow when the project develops and decreases by the time of its completion. Such variations of demand for labour could be regulated by way of executing several projects simultaneously with direct comparison of different plans. This would be a very good example of economic organization of the national economy, on the whole, in order of how such might be utilized by the government policy in collaboration with local administration. It could also be carried out on international scale, however, the result of the experience is by no means
ing economic cooperation between the neighbouring countries.

Usage of the experience of solving the labour problem in other states including the socialist countries is one of the tools of international cooperation. Hungary could be one of the sources of such experience. This underdeveloped country is becoming a developed agro-industrial economy and all the changes occur in what is considered to be a very short period of time from the point of view of man's history. About 47000 highly skilled workers were trained through various forms of vocational education only through the years 1976-1980. Other countries also possess a useful experience in this field.

Coordinated application of the above mentioned principles of the regional and planned approach, orientation on success, maintaining the economic ratio between own efforts and external aid, observing the national and international aims and proper targets is a radical way of solving the problem of a gesture of economic industrialization in developing states.