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SOME CONSIDERATIONS CONCERNING INDUSTRIAL TRAINING*

Prepared by

the UNIDO secretariat

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INTRODUCTION

The purpose of this paper is to focus the thinking of the Working Group on the subject of training.

Although it concentrates on United Nations assistance and experience, the observations apply equally to bilateral assistance programmes (including co-operation between developing countries) as well as to enterprise to enterprise arrangements.

Following a definition of industrial training, the paper reviews the most common United Nations approaches, attempts to identify the lessons of past experience and to set forth guidelines for more effective training activities in the future.

What follows is based on certain assumptions, and these should be clearly recognized at the outset:

1. Industrial Training is a sine qua non for industrial development.

2. Industrial Training is primarily the responsiblity of the developing country itself. Assistance - from UN as well as other sources - is available, but it is only that: ASSISTANCE. What form that assistance takes, how well it is utilized, and the conditions and circumstances under which it is rendered - these are determined by the developing country.

3. For a variety of reasons, much of the assistance already rendered has been less effective than it might have been. But the lessons of the past, if recognized and taken into account, can make future assistance more effective.

DISCUSSION

It is perhaps helpful if we define the term "training" so that, in the discussions that follow all concerned are in fact discussing the same thing. For purposes of this paper, industrial training is any deliberately planned and systematically executed programme of activities intended to change human behaviour toward improved job performance. For purposes of emphasis and clarification, it is desirable to point out what training is not and what it is.

1. Training is not:

   a) formal education, although generally speaking formal education is a prerequisite for training.

   b) work experience, although experience is the ultimate and most effective teacher.

   c) something that A does to B, although A and B each have essential roles to play in the process.

   d) simply a transfer of knowledge/information, although knowledge and information are basic ingredients in almost all training activities.

2. Training is:

   a) deliberately planned to achieve specific behavioral changes and to accommodate the level and kind of background of the trainee.

   b) systematically executed and continuously monitored to be sure that behaviour is, in fact, being changed and in the desired direction.

   c) an experiential process by which the trainee (B) is guided, and learns from experiences arranged for, by the trainer (A).

   d) a process of integrated learning whereby knowledge and skills become integrated into the trainee's behaviour, usually by application on-the-job.

e) a continuous process by which basic information/skills are acquired and upgraded and new skills are learned as the job changes.

Traditional UN approaches to training include the following:

1. Local training by individual experts, most of whom are charged with the responsibility of transferring their knowledge/skills to their counterpart(s) and some of whom additionally conduct specific ad hoc training courses.

2. Local training centres/institutes offering a variety of training courses on a more or less ad hoc basis. Such centres/institutes may serve industry in general or specific industrial sectors.

3. Fellowships, whereby individual trainees are sent abroad - either to an industrialized country, or increasingly - where possible - to a more advanced developing country. UNIDO fellowships are relatively short-term (average about 5 months), do not lead to an academic degree/certificate, are job-oriented, and place the trainee in a special training programme, in an industrial/consulting enterprise or a combination of both.

4. Specialized workshops or seminars dealing with specific topics/problems, and lasting from one to two weeks.

5. "In-Plant Group Training" programmes in selected topics. These programmes average about three months, involve approximately 1/3 academic input and 2/3 in-plant work experience/observation, and are usually conducted in an industrialized country, although efforts are being made to locate them in the advanced developing countries whereever possible.

Common Problems/Obstacles to Effective Training

Over the course of years, a number of problems/obstacles to effective training have become evident. The following, by no means exhaustive, list of such obstacles is offered so that we can bear these in mind as we consider ways and means by which we can assist each other and/or utilize United Nations and bilateral assistance in meeting the training needs of the agro-machinery industry.

The following global observations should be made first: Generally speaking, UN assisted training projects have suffered from:

1. Inadequate planning and the absence of controls. There are two aspects of this problem, one general and the other specific. In general, many developing countries still have not integrated their training needs and activities into their overall development plans so that there is no assurance that the training activities that are undertaken reflect national priorities. Too, training is often undertaken without clear and specific goals in mind and consequently there is no way of controlling the activity. (If objectives are not specified in advance, it is really impossible to say if and when they have been achieved.)

2. Inadequate financing. Training is an expensive activity, no matter what form it takes. For a variety of reasons, some of them mentioned above, it generally is given less importance than other forms of development activities. (Another reason, seldom acknowledged but nevertheless real, is that training results - in contrast to equipment and buildings - can't be seen or touched. Given the choice between investing, say, $ 1,000,000 in plant and equipment or in training programmes/activities, most authorities will opt for plant and equipment.)

3. Inadequate time. Effective training is a time consuming process. Most jobs in industry today demand a complex of knowledge, skills and attitudes. Training involves unlearning old habits (a difficult process) and learning new ones. Although training activities can be made more effective and more efficient than is presently the case, even the best requires more time than is generally allowed. Too, there is a strong tendency to think of training as a finite activity (at the end of which one can say that the individual is "trained") and to ignore the facts of life that people forget what they have learned, change, retire, move to other jobs - and even die; that needs and priorities change, so that what is adequate and appropriate today will almost certainly not be adequate tomorrow.

With these general observations in mind, it is appropriate perhaps to look at some common, specific problems:

1. International experts are sent to the field to perform, or to assist in achieving, many specific tasks - only one of which is the training of counterparts. They are selected, primarily for their technical competence

rather than their training ability (which is far more difficult to evaluate on the basis of their paper credentials) and are subjected, in the field, to pressure to meet and solve immediate operational problems. Consequently, many experts do not know how, and/or are not given the opportunity or time, to train their counterparts.

2. Counterparts, although promised by the Government, are sometimes not available, are unqualified for the assignment, or - frequently - assume the counterpart role in addition to other duties/responsibilities.

3. Closely related to the preceding situation, counterparts are often political appointees and when governments change, old counterparts are released and new ones appointed.

4. Even under the most ideal circumstances of a training-oriented-international expert and a qualified counterpart who can devote fulltime to his counterpart duties, 80 - 85 % of the counterparts leave the job for which they have been trained within 6 - 12 months after the expert has finished his assignment. Sometimes the counterpart joins private industry (where salaries and other emoluments are likely to be more attractive than in government service) and sometimes he is reassigned to a different - often, but not always, more responsible - position within his government.

5. Local Training Centres tend to be general purpose institutions, modeled after western institutions (e.g., the American Management Association Centre in the U.S.A., the British Institute of Management in the U.K., productivity centres, etc.). Their programme of activities tend to replicate the programmes of training and the concepts and values found in the industrialized countries with little or no consideration of/adaptation to the traditions, mores, unique circumstances - or the needs thus implied - in the developing country. Almost invariably programmes stress more or less formal classroom type activities (training courses) with little or no on-the-job follow-up. Frequently, too, training centres and institutes are inadequately funded for too short a period of time to permit optimum results to be realized. Moreover, where such a project does achieve some success, there is a strong tendency to expand its activities and the demands put upon it beyond what can be reasonably expected.

6. Fellowships can be an ideal learning experience for a very select group of trainees. A fellowship is/should be a carefully designed experience tailored to the specific needs of a specific individual - one who is already well-trained and requires only upgrading in his job. It is, and should be recognized as,

a "finishing" experience - designed to bring the fellow up-to-date in his field and/or to equip him to assume higher duties and responsibilities which are already clearly identified. Major problems in the fellowship activity stem from (a) the selection process, and (b) inadequate information on which to design the fellowship learning experience. Often fellows are selected and nominated for reasons other than their job responsibilities and/or for purposes other than improved job performance (one national project co-ordinator quite frankly admits that he uses fellowships as an inducement in recruiting and keeping personnel). Commonly, the information provided concerning the fellows' background and education, his previous work experience, and the responsibilities/job for which the fellowship is supposed to equip him is simply inadequate to design an optimum learning experience. Finally, the majority of fellowships are implemented in the industrialized countries where the conditions of work and the infrastructure may be so foreign to the situation to which the fellow returns, that the learning value of the experience is adversely affected. Efforts to correct this situation by sending fellows to other more advanced developing countries (where conditions are likely to be more similar to "home") are resisted by the fellows themselves and by their nominators.

7. Although they can serve only a miniscule number of people, in-plant group training programmes can also provide an excellent learning experience for properly selected and prepared trainees. In-plant group training programmes are intended for a very select clientele - graduate engineers (or equivalent) who have already had some years of responsible work experience - and an attempt at screening the trainees is made. Roughly 75 % of such programmes are conducted in the industrialized countries and consequently much of the training, which inevitably assumes a level of development substantially above that found in most of the developing countries, is only partially transferable to the trainee's home situation. (Efforts are being made to rectify this situation by transferring the programmes to more advanced developing countries, but the nature and concept of the training programmes makes this difficult - in 1984 only 35 of 90 UNIDO workshops/in-plant group training programmes were conducted in developing countries.) Finally, from a training standpoint, the programmes suffer from the same weaknesses of any programme removed from the work place. In spite of these inadequacies, the programmes do offer a high level of training - but the developing countries do not take full advantage of them (a number of programmes are undersubscribed and some have even had to be cancelled because of insufficient enrollments!)

The foregoing is not meant to be critical either of the UN programmes of technical assistance in the field of training or of the developing countries which have always had the ultimate say in what kind and quantity of technical assistance should be offered - and the circumstances and conditions under which it has been implemented. It is meant to point out the lessons of experience so that the same mistakes/weaknesses can be avoided in the future. It is also meant to provide a background and rationale for the guidelines which follow.

If the developing countries are to meet their industrial training needs, the following prerequisites must apply:

There must be an awareness and acceptance of the fact that the responsibility for training is the responsibility of the country itself. Assistance is available from many sources, but it is only that - assistance. Whether or not it is accepted, how and how well it is utilized, and whether or not conditions are conducive of optimum effectiveness - these depend on the developing country.

Training needs and ways and means of meeting them must be an integral part of the country's industrial development planning. A review of national development plans reveals that, more often than not, this is simply not done. Even where lip service is paid to the truism that plant and equipment can be bought but trained people are needed to run and maintain them, very seldom is the necessary hard thinking and discipline evident. Planning is an inexact exercise at best and existing tools leave much to be desired, but there is no alternative if resources are to be utilized as effectively as possible. Much of the problem stems from a misunderstanding of the process and/or a lack of appreciation as to what a plan can and cannot provide. The following elements, however, seem to be essential.

Long-term planning (5 - 10 years). Although goals can be set even further out, the process of development is so dynamic and subject to so many unforeseeable/uncontrollable factors that anything beyond this period of time is more in the nature of wishful thinking than true planning. But long-term plans do provide goals and the context within which medium- and short-term plans can be framed. Long-term plans are relatively meaningless for industrial training, except as they concern the development of an educational system which will provide the semi-finished product - the educated manpower - to be trained. (In this connexion, it should be noted that most educational systems in the developing countries are not oriented toward producing effective citizens for a technical/industrial society.)

Medium-term planning (2 - 5 years). Within the context of the long-term plan, it is possible to be somewhat more definitive and concrete as to industrialization projects and their training requirements. Many - if not most - projects can be conceived and realized in this period of time. It is possible to say, within limits, how many and what kinds of managers, engineers, technicians, etc., will be needed and steps can be taken to ensure that they will be available in the right numbers and at the right time. Incidentally, experience suggests that most medium-term plans (with respect to training) err on the side of conservatism. An attrition rate of 50 - 80 % should be provided for at this time - i.e., at least twice as many people should go into training as plans and forecasts suggest.

Short-term planning (1 - 2 years). Here, experience shows that one can be fairly certain as to needs, and what needs to and can be done to meet those needs. It is possible to set objectives with a fair degree of assurance that they can be met. Assuming that long- and medium-term plans have been carefully worked out, and priorities set, that an accurate assessment of the immediate situation has been made, and that the will and commitment is present, it is possible to develop ...

Operational Programmes to achieve the objectives set out in the short-term plan. Realistic plans of action can be developed, resource requirements can be defined and marshalled, potential obstacles/problems can be identified and steps taken to overcome them, and - perhaps most importantly - all concerned can become truly involved and motivated toward success. It is at this point, too, that the lessons of the past can/should be taken into account.

At the risk of being obvious, perhaps it is worthwhile to restate them.

Industrial training projects:

1. Should be undertaken in light of and co-ordinated with the country's industrial development plans, priorities and strategies.

2. Should have clearly defined - realistic - targets. Before the project is undertaken all concerned should be clear and in agreement as to what is to be/can be achieved in the time available.

3. Should be adequately financed.

4. Should take into account the fact that an industrial society is dynamic and training must be viewed as an on-going continuous necessity.

5. Require that international experts be chosen for their training abilities as well as their technical expertise and, once in the field, they should be viewed primarily as Trainers rather than operational personnel. International experts should be required to develop specific training plans for their counterparts.

6. Should be adequately staffed with full-time counterpart personnel who are expected to eventually assume complete responsibility for the project. "Adequate" in this context means not only numbers (it is suggested that at least 2 to 3 times as many counterparts should participate in the training activity as will eventually be required) but also background and interest.

7. Should, in the case of training centres/institutes, be designed in full appreciation of local circumstances, traditions, mores, value-systems and needs. In other words, the intent should be to develop indigenous institutions rather than to implant a "foreign institution" on local soil.

Where the training project involves training abroad, as in the case of fellowships, workshops and seminars, and in-plant group training programmes, nominees should:

1. Be selected very carefully to insure that they possess the necessary background and experience to gain maximum profit from the experience. Too, adequate and complete information should be provided to assist in designing the appropriate learning experience.

2. Return to the job for which they have undergone training - and retained in those jobs (or directly related ones) long enough after their return to provide an optimum return on the investment.

Financing. No matter how carefully planned, no matter how carefully designed, programmes must be financed, and financing must be viewed as an integral part of any realistic planning exercise. Given limited resources, financing is always a problem, but the following observations can be made:

1. A great deal of available resources are presently wasted because the lessons of the past have not been and are not being taken into account and/or proper planning and execution is missing.

2. Training costs might be viewed as investment costs (as contrasted to operational costs) and could be so budgeted and financed. Indeed many

banks and other financing institutions are now insisting on this point of view and are requiring borrowers to design and implement appropriate training programmes as a condition of the loan.

3. With respect to possible sources of financing, these include Multi-lateral Assistance under the UN, bi-lateral assistance (including Technical Co-operation Between Developing Countries), World Bank/ Development Bank loans, major manufactures of equipment (both plant machinery and equipment and mechanized field equipment), local financing, or a combination of two or more of the above.

Controls. Even the best of plans and even the most carefully worked out programme of action must be subject to controls, and there must be some mechanism established to see to it that the programme is being implemented in a timely and effective manner, that it is achieving the intended results and/or that it is modified and adjusted when and if changing circumstances require.

SUMMARY

The foregoing are general considerations that apply to all industrial training activities. In the case of the Agro-machinery industry, it seems evident that any meaningful approach must be:

1. Comprehensive to cover all stages of development (from the least developed to the most advanced of the developing countries), and the extreme variety of target groups that need/should have training.

2. Multi-facetted, to include the wide variety of training objectives to be achieved and the whole spectrum of training activities as appropriate to those objectives and to the wide variety of target groups.

3. Realistic in that it must address short-term needs (and can be perceived as beneficial to all concerned - including, in particular, the trainees as well as potential donors) while at the same time contribute to the achievement of long-term objectives.

4. A co-operative effort of all parties concerned: Governments of the developing countries, multi-lateral assistance agencies (such as the UN), national assistance agencies, the industry itself (both local and multi-national), the educational/training establishment of the developing countries, as well as - of course - the trainees themselves.

5. Co-ordinated, to insure that specific training activities/programmes fit into and contribute to the whole.

TRAINING IN AGRO INDUSTRY

Certain types of training activities are appropriate to certain target groups

	Government/Industry Leaders	Testing/Standards Institutions	Manufacturers (International and Local)							Educ/Trng			Artisans	Equipment Users
			Managers	Design Engineers	Development Engineers	Production Personnel	Quality Control Personnel	Maintenance Personnel	Field Service Personnel	Directors/Managers	Trainers	Support Staff		
Seminars/Workshops	x	x	x	x	x	x	x	x	x	x	x	x		
Fellowships/Study Tours	x	x	x	x	x					x		x		
Training Courses:														
- Universities		x	x	x	x	x	x			x				
- Training Centres			x	x	x	x	x	x	x		x	x		
- Professional Trade Associations		x	x	x	x	x	x	x	x	x	x	x		
- In-company/plant				x	x	x	x	x	x					
On-the-Job Training		x		x	x	x	x	x	x		x	x		
Extension Training										x	x		x	x

TRAINING IN AGRO INDUSTRY

Certain types of training topics are appropriate to certain target groups

	Government/Industry Leaders	Testing/Standards Institutions	Manufacturers (International and Local)							Educ/ Trng					
			Managers	Design Engineers	Development Engineers	Production Personnel	Quality Control Personnel	Maintenance Personnel	Field Service Personnel	Directors/Managers	Trainers	Support Staff	Artisans		Equipment Users
Co-ordination/Standardization	x	x	x												
Training in newest technologies, highly specialized fields/topics			x	x	x						x				
Adaptation/design and development of equipment to meet local conditions/circumstances		x	x	x	x								x		x
Production of Equipment			x	x	x	x	x	x					x		
Expansion of existing research and development/other institutions to include training activities			x						x	x	x	x			x
Tractor/Machine operation									x		x				x
Tractor/Machine maintenance									x		x		x		x
Tractor/Machine repair													x		

TRAINING IN AGRO INDUSTRY

A sample guideline for planning a training approach
by the country's level of development

CATEGORY D Countries (Most advanced in the field of Engineering Industries/Infrastructure Base)
(e.g., Algeria, Argentina, Brazil, Bulgaria, China (PR), Czechoslovakia, Egypt, Greece, Hongkong, Hungary, India, Republic of Korea, Mexico, Poland, Romania, Singapore, Spain, Turkey, Yugoslavia)

Possible Requirements	Target Groups	Training Needs	Training Activities	Possible Sources
1. Coordination and Standardization	Govt/top executives of industry, trade associations, scientific bodies, standards institutions, etc.	Sensitization, legal questions, information systems, etc.	- Local seminars/workshops - Design and implementation of information systems - Assistance in setting up communication networks, systems, n.r. programmes, etc. - Study tours/visits	- Local resources - Multi-, bi-lateral agencies (for experts, consultants, computer hardware/software, etc.)
2. Training in newest technologies, selected highly specialized fields/ topics	Engineering/top managers/scientists and other high-level technical, selected engineers	New knowledge/ applications, up-grading of selected technical staff	- Local seminars/workshops - Training abroad - Study tours and fellowships - In-plant/in-company training programmes - Networks/Regional Centres	- Local sources - Multi-, bi-lateral agencies - Suppliers - Major agro-machinery firms - TCDC (other advanced countries)
3. Expansion of existing research and development/ other institutions to include training of local/other personnel	Directors/top managers of selected institutions Government Officials Training Managers Training Staff	Organization of the training function Liaison with/"customers" Training techniques and methodologies	- Expert (local/other) assistance - Study tours/fellowships - Provision of equipment	- Local sources - Multi-, bi-lateral agencies - "Twinning" arrangements with other institutions (both within/outside the country)
4. Adaptation/design of equipment to meet local conditions/ circumstances	Design development and test engineers/ others, engineering/ production personnel in plants, etc.	Upgrading of design, test and development engineers Production methods and technology Sales/other field personnel of agro-machinery industry, etc.	- Long and short term training programmes - Fellowships and study tours - Local seminars and workshops - Provision of equipment and training of personnel	- Local and foreign universities - Local and foreign training institutions - Equipment suppliers - Multi-, bi-lateral agencies
5. In-plant training	Production, Quality Control, Maintenance, Engineering personnel Management personnel at all levels Training managers/ staff	Organization of the training function Training Methodologies and Techniques Production Techniques Quality Control Methods and Procedures Repair and Maintenance of plant and equipment Design and development engineering, etc.	- Ad hoc assistance by local/ international experts - Study tours and fellowships - Provision of equipment - Training of training managers/trainers - Short-term training programmes (in-plant)	- Multi-, bi-lateral agencies - Local institutions - Suppliers
6. Field Training	Users of Agro-Machinery	Organization of the training function Training Methodologies and Techniques	- Ad-hoc assistance of local/international experts - Training of training managers/trainers - Short-term training programmes	- Local/international suppliers of equipment - Local institutions - Multi-, bi-lateral agencies