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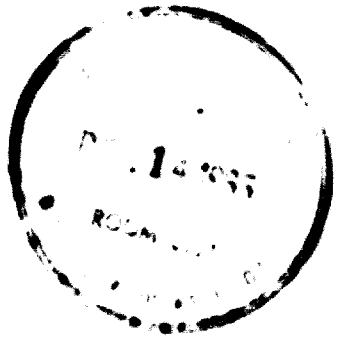
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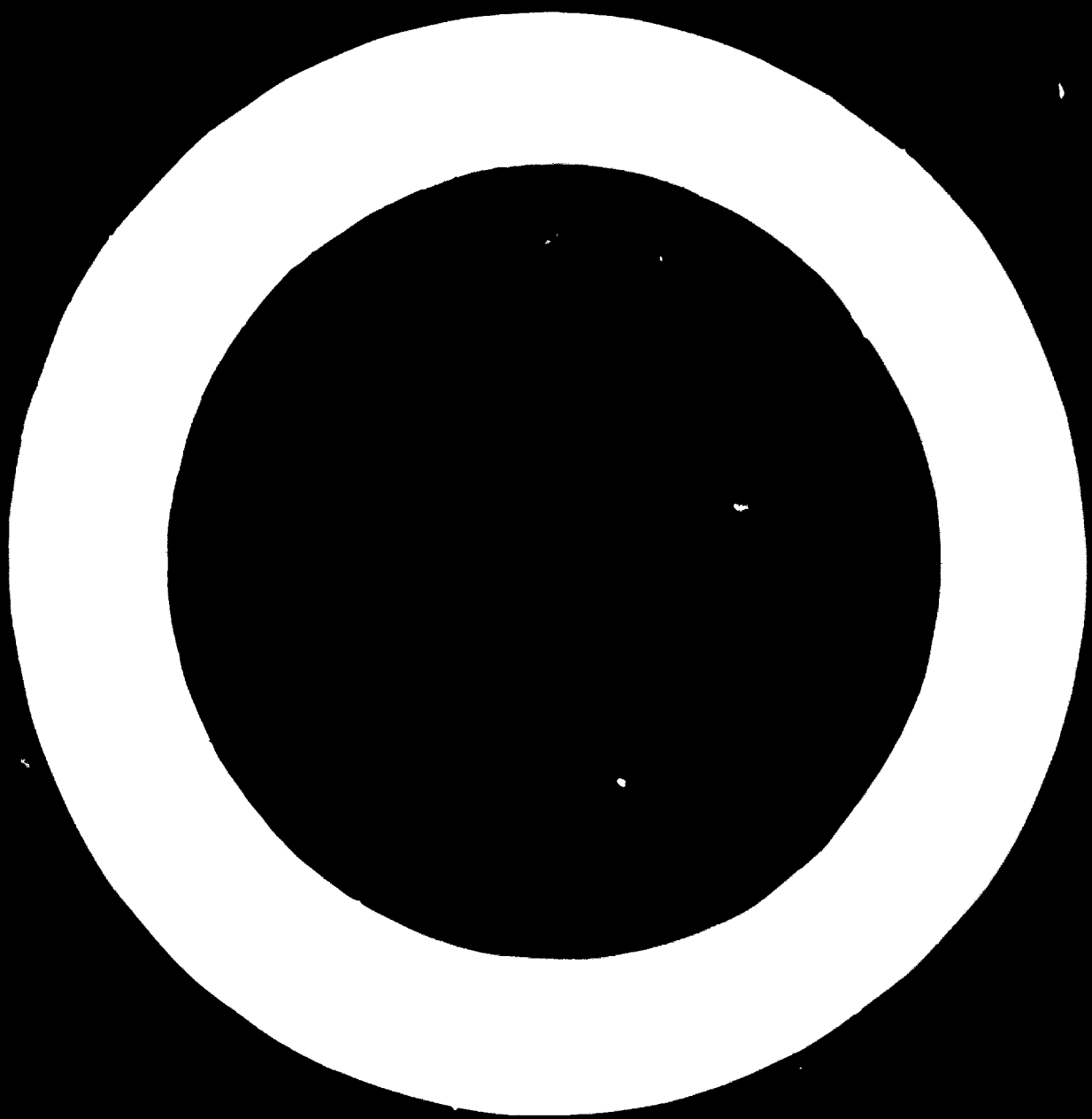
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ASPECTS OF PLANNING TO MEET MANPOWER REQUIREMENTS
IN CONNECTION WITH INDUSTRIALIZATION

(Note by the International Labour Office)



1165-740



(The paper submitted by the E.C.A. secretariat on Manpower Requirements and the Training of Technical and Managerial Personnel covers a wide range of topics under this heading. This paper does not attempt to comment or elaborate on all these topics but to underline certain special aspects of manpower planning which may be considered important for discussion at the Symposium)

1. Consideration of Employment Potential in the Selection of Industries

It is interesting to note the different approaches taken in the two papers submitted on the manpower aspects of industrialisation to the Asian Conference on Industrialisation and to this Symposium. The Asian paper deals almost exclusively with the employment creation capacity of industries whilst this African paper concentrates on difficulties in the supply of high-level manpower.

This reflects a difference in problems. In some Asian countries at least, the problem of the supply of high-level manpower has been largely overcome and problems are now related to utilisation of this manpower. Moreover the besetting problem in many Asian countries overshadowing all others is that of the present rate of increase in employment opportunities not keeping up with the increase in the labour force.

In some countries of Africa a comparable situation is now emerging and is likely to become increasingly acute. In certain countries such as the U.A.R., provision of employment is one of the several objectives of industrialisation. But South of the Sahara generally the immediate objectives are other than such as raising the per capita income, increasing national self-sufficiency and modernising society as a whole. However, employment provision aspects should not be passed over, even if temporarily the other factors seem more important. The beneficial effects of industrialisation in the long run may well depend equally on the extent to which it helps to meet the challenge of providing freely-chosen productive employment for all.

Already at the industrial programming stage the employment creation aspects therefore require consideration as a factor, both in the selection of industries and in selection between any alternative methods of production within these industries. Thus the assessment of manpower potentialities should not, as in most cases at present, follow the elaboration of production plans but should become a primary element in the determination of production plans.

In theory the methods to be selected would be those making most use of the abundant resource factor - unskilled manpower - and the least use of scarce factors such as capital and high-level manpower. In practice the scope for choice in those industries which enter into consideration on account of other factors may not be very great. But the possibility of using labour-intensive methods may exist for instance in construction, food processing, and textile and garment manufacture. Even in capital-intensive and skill-intensive industries there is scope for labour-intensive methods in the materials-handling side of the operation. The methods at present in use in industrial establishments in Africa have often been introduced by expatriate managements accustomed to operating in a setting of abundance of capital and skill, and accordingly may not in the long run be the appropriate ones for the African country concerned. Moreover, it must be remembered that the industrialised countries have little recent experience of alternative labour-intensive methods. This is largely a field in which the developing countries themselves are having to experiment.

Persons responsible for submitting industrial projects for study by the planning authorities should therefore be required to show any alternative methods which may exist, together with the corresponding skill-mix and costs, so as to enable the planning authorities to form an opinion as to the methods which would fit in best with the over-all objectives of the plan.

2. Estimation of Requirements for High-level and Skilled Manpower

As regards making provision for the inescapable requirements for high-level manpower, it is desirable that there should be the closest possible link between the manpower planners and those responsible for individual industrial projects. It has been a criticism of manpower planning in other regions (e.g. Latin America) that there are often inadequate links between macro-economic policymakers and those actually carrying out individual projects. In general, in Africa, planning appears to be starting off on a better footing, but continual attention will be needed to ensure that close contact is maintained between the planners and the executors.

For each industrial project, or alternative way of carrying out a project, the project administrators should submit an estimate of the manpower required, by occupation and skill-level, and accompany it with suggestions as to how this manpower should be obtained. How precise such suggestions may be will depend on the industry and the circumstances of the country concerned. If the industry is to be set up under the sponsorship of a concern with long experience of factories in various countries of the world, this concern will have its own data which it will not have great difficulty in adapting to the production targets and the manpower supply situation in the country concerned.

For industries being established by other means, there is a dearth of publications giving typical occupational composition patterns. There is clearly a vast store of information held by industry, but this has seldom been gathered together, analysed and published. There are certain published ratios giving the total employment related to a given figure of output, and the breakdown of this total employment between broad skill categories such as engineers, technicians, skilled workers and others. These ratios, while indicative of the education and training problems which will arise, are not of great help in determining precisely the programmes which will be necessary to ensure that the required manpower will be available when it is needed. In any inter-country comparisons the greatest care must be taken in relation to job titles, so as to ensure that like is being compared with like.

These estimates and suggestions should be checked and appraised by the planning unit in the light of the general guidelines it has derived from macro-economic studies and from experience in other countries. With the help of the project

planners, the requirements need to be converted into general educational requirements and specific training requirements, to be checked for feasibility and to be added to the other national demands for educated and trained manpower. It is of course desirable that requirements should be forecast long enough ahead to provide the "leadtime" necessary to step up the supply of the high-level manpower concerned. However, such long advance notice of requirements is in practice seldom given and the best compromise between conflicting claims has to be sought.

In some industries there will be specific requirements which can be dealt with ad hoc, for instance requirements for types of workers whose training can only be acquired in one industry and is not transferable to any other industry. In such cases, the training can be tailor-made to suit the precise needs, but there is a danger in attempting to follow a similar course of action for the needs of industry as a whole. Moreover, even in these cases it is necessary to ensure that there is an adequate pool of suitably educated nationals from which the industry can draw candidates capable of absorbing and profiting from the specialised training concerned. In particular, this may entail determining the general educational level needed for specialised training in the occupation concerned - this might be, for example, completion of secondary education up to a recognised standard in mathematics and two sciences - and making certain that plans for the output of enough additional secondary school graduates to cover these needs are included in educational targets.

In addition to these highly specific needs, industries will have requirements for high-level and skilled manpower with more general qualifications, in which categories they will be competing with the demands of the administration, of existing and expanding services and of other branches of the economy.

On account of these implications, both for educational planning and manpower planning, it is essential that estimation of manpower requirements for industrialisation, and the drafting of plans to meet these requirements, should be undertaken, not in isolation as an ad hoc operation, but as part of manpower planning for the economy as a whole. The manpower needs for new and expanded industries should be estimated as precisely as it may be possible so that they may be examined together with the needs resulting from other items in the development plan - rural development, services, administration, teaching, etc. - in order to arrive at a composite estimate of the needed output at different educational levels. Without this, there is a danger of a short-fall in one or other occupation.

At the professional level, there is evidence in many African countries that the shortage of technologists will be more severe than that of pure scientists. This is in fact also the case in many industrialised countries and seems to flow from the present organisation of education wherever it is not properly corrected by advance consideration of manpower needs. Several surveys of African countries foresee shortages, for instance, of mechanical and electrical engineers, civil engineers and surveyors.

As mentioned in paper E/CN.14/INR the severest shortages are forecast at the technician level. The faster growth rate of the need for technicians, and the deficiencies of African education and training programmes in meeting this need, have frequently been stressed in recent years. However, those qualified to train as technicians have hitherto mostly had the chance to train for the professions and have taken it. This, however, must be regarded as a passing phase. In certain occupations essential to much of industry, such as draughtsman and engineering technician, the shortage may be such as to handicap the development of production. Reports of professionally qualified persons having to do technicians' work are frequently made. This is a wasteful use of limited resources which artificially cuts down the number of working hours for which the person concerned is available to apply to the full his acquired knowledge. Moreover, the gap cannot easily be filled by the recruitment of expatriates, since such technicians are frequently in short supply in their home countries and are often not so mobile as professionally qualified workers.

Similar deficiencies in quantity or quality exist in regard to non-technical workers at the same educational level, such as subprofessional accountants, who will also be needed for the operation of industry.

The requirements for skilled workers will normally fall into two types:

- (a) those requiring formal training necessitating a basic general education up to a given standard followed by related technical instruction given in conjunction with practical experience; and
- (b) those where the bulk of training can be given by practical experience alone.

The former will require more extensive educational planning but the latter should not be overlooked by the manpower planner.

In general, there is a deficiency of information as to the source of recruitment of this type of worker and the methods by which his skill is formed. It is therefore desirable that information should be obtained in each country by an analysis of the present recruitment and training methods in industry and the extent to which they are meeting the real needs; this will provide a guide to the future action needed. In this connection attention is invited to the annex to this paper (an extract from a publication of the Republic of Kenya on High-Level Manpower Requirements and Resources, 1964 to 1970) which sets out the considerations in this respect very clearly.

3. Meeting these Requirements

It is evident from the above that it is difficult to discuss the assessment of manpower requirements for any particular activity realistically without at the same time considering what methods exist to meet them, and whether in fact it will be practicable to meet such requirements in full at the same time as those for high level and skilled manpower needed for other development activities. In at least one African country, critical examination of the possibilities of meeting the manpower requirements which would result from implementation of the consolidated development plan revealed difficulties which led to the setting of later dates for the achievement of certain targets.

Study of these aspects will lead to the proposal of such substantive measures as may be possible to correct the situation. In the first place there are the implications for educational planning.

In many African countries in the past, in so far as general education has been oriented to prepare candidates to meet manpower requirements for development, this has been done largely with the needs of the public services in mind. The needs of industry, as precisely as they can be assessed, now call for increasing attention.¹ It is probable that taking these into account will show up the need for further expansion of the proportion of science pupils in the top classes of the secondary schools. The shortage of science teachers raises problems here, but it is reported that Tanzania is succeeding in achieving its

¹ In this connection the Nigerian National Manpower Board expressed the opinion in its 1962/64 report that "the time had come to further broaden Government scholarship objectives in order to make adequate provision for private industry".

objective of having four out of every seven pupils at this level studying science subjects. Moreover, the widely forecast shortages of technicians may point to the need to expand the output of secondary school graduates in science subjects well in excess of the number proceeding to university level education, so that a pool of students may be available to enter technician training.¹ All these measures will of course entail in turn increasing the supply of science teachers, and for some time it may remain necessary to "plough back" into the educational system a fairly high proportion of the output of science graduates.

At the professional level, the frequently forecast shortage of technologists cannot easily be dealt with in one country. Technological courses cannot easily be accommodated in the programmes of the newer national universities and, in the more specialised technologies, even if one university is also to serve several neighbouring countries, the demand from students is unlikely to be sufficient to justify the considerable outlay involved in setting up the faculties concerned. Thus, for a good many years it is probable that there will be dependence on foreign educational facilities for these subjects. There may therefore be a case for giving priority, in the granting of Government scholarships for training abroad, to proven technological training needs, as also in requests made to foreign governments offering study facilities in their countries. There may still remain some difficulty regarding the practical experience in industry which is an essential part of such education.

In addition to planning for the expansion of study opportunities leading to industrial employment, it is necessary to attract suitably gifted and motivated entrants. Attention is needed to providing schoolboys and schoolgirls with up-to-date information about the prospects in occupations in industry.² Among those aiming at professional level employment, the claims of technology over pure science have to be put. With regard to opportunities for technicians, it may be necessary to supplement such information with measures aimed

¹ Proposals to this effect have for instance been made in the Ivory Coast.

² A special effort in the provision of occupational information about new opportunities for young people in the development of their country has been made in Tanzania.

at raising the practice of the subprofessional occupations, not excluding the improvement of salary levels so that they clearly show the urgency of the economy's need for the services of these workers.

The provision of occupational information and vocational guidance is also of importance in connection with the needs for skilled workers. A number of developing countries are finding it desirable, in addition, to introduce selection techniques to select, from among the many applicants for training, those with the greatest apparent aptitude for the training and employment in question. The actual new measures to be taken to meet the forecast requirements which will arise with industrialisation, will depend on the relative proportion of the training which needs to be given in the institution and that which needs to be given on the job.¹

If the proportion of the former is considerable, this may necessitate some reorientation or expansion of vocational courses in national institutions, in close co-ordination between the heads of these institutions and the industrial project planners. If training can in great part only be given through practical experience, then a preliminary period of such training in an established industry at home or in a foreign country may be called for. Once the industry is established, consideration may then be needed of arrangements for the regulation (whether by an apprenticeship system or otherwise) of the training given thenceforward in national undertakings to ensure that an adequate standard is maintained.

A particular problem also arises in the case of foremen. In the early stages of industrialisation, difficulty is reported in some countries in finding skilled workers who can be promoted to undertake supervisory duties over their fellow workers and who are prepared to accept the responsibility for these duties. In some cases there are cultural factors contributing to this situation which will gradually disappear with increasing familiarity with industry. However, direct training in the functions and practices of supervision in an industrial setting can play an effective part towards solving this problem.

¹ For international standards as to the co-ordination of the different aspects of vocational training, see the recommendations contained in the I.L.O. Vocational Training Recommendation, 1962, which are relevant in this connection.

Planning to train enough manpower to meet forecast requirements is clearly not fully effective unless a substantial proportion of entrants satisfactorily complete their courses and take up employment which makes proper use of the qualifications they have obtained. Some developing countries experience difficulty in this respect, both in connection with students trained abroad who do not return home, and with those who return home but take up some other activity.

It is important in this connection that managements should be aware of government manpower planning activities and should be encouraged to introduce corresponding planning activities in their undertakings, both with a view to the best utilisation of the trained manpower which they receive and with a view to the long-term development of the manpower already employed by them.

Many African countries have recourse to the system of "bonding" in respect of persons who have received government scholarships, whereby these persons undertake to remain in approved employment for a specified period following completion of their training. It is clear that, where students have had a share of the limited resources of their fellow citizens spent on their education and training for purposes of national development, they have a moral obligation to use their qualifications in this development. The "bond" should, however, be applied with flexibility, for instance so that the obligation may be considered as met if the person concerned becomes employed in any capacity in the national economy, whether in public service or private industry, which makes productive use of his education and training. In some countries it is argued that "bonding" should apply also to persons who have been granted scholarships by foreign governments or to those who have been allowed foreign exchange facilities to study abroad at their own expense. Generally speaking, where there is privilege there should be obligation, and some measures along these lines may be appropriate, providing due regard is had to principles of freedom of choice of employment.

Another potential source of qualified persons sometimes suggested is that of nationals at present working in industry in foreign countries. Organised migration for a limited period from developing to industrialised countries may, in certain circumstances, help to build up the stock of workers with modern industrial experience, but African countries generally have not yet been able to profit to a great extent from such movements, and attempts to attract back individual workers have not always met with great success.

Even if all these various measures are followed there will remain gaps which have to be filled by expatriate manpower. There should be no basic objection to this (the tendency in the industrialised countries is towards a greater interchange of high-level and skilled workers rather than towards greater self-sufficiency), but expatriate manpower is becoming harder to recruit, is expensive and the presence of too many foreigners in senior positions may not be welcome to the public at large. Efforts are normally made, therefore, to emphasise the transitional nature of such employment.

Solution of many of the problems described above - such as technological training, specific industrial training in establishments in foreign countries, recruitment of expatriate manpower on a temporary basis, supervisory training, etc. - is facilitated if an industry is being set up with the assistance of some long-established international or foreign industrial concern with its own possibilities for the placement of trainees and the recruitment of specialists.

4. The Manning of Industries Established on a Regional Basis

The first steps have successfully been taken in obtaining regional agreement on the location of new industries in African countries in cases where it would be uneconomic to set up individual industries in each country. Whenever it is so agreed that an industry should be set up in one country to serve the needs of the region as a whole, agreement should also be sought on the nationality composition of the personnel in the industry concerned. This will no doubt to some extent depend on whether the industry is to be financed nationally or regionally, but in either event it would seem logical to envisage the recruitment of any high-level personnel who may become available in any of the neighbouring countries (in other continents, where agreements are made regarding common markets, these frequently include provisions for the free movement of persons within the common market area to take up employment available in a country other than their own). It is suggested that this aspect might be explored at this Symposium.

Geneva,
December 1965.

Annex

Extract from Republic of Kenya, Ministry of Economic
Planning and Development, High-Level Manpower
Requirements and Resources in Kenya, 1964-1970

Industrial Training

Skilled manual occupations in the "modern crafts". As economic development progresses there is a heavy increase in the number of highly skilled manual jobs in metal working, electricity, electrical machinery, chemical and petroleum processes, telecommunications, etc.

Generally these modern crafts require a more substantial educational base than the traditional crafts (painters, plasterers, tailors, brick and stone masons, handicrafts of various types, etc.) since they involve ability to make precision measurements, a good level of arithmetic, blue print reading, reading and interpreting complex instruments, a working grasp of electrical theory and an ability to communicate well both orally and through writing. A secondary or secondary technical educational preparation is highly desirable for these occupations.

Acquisition of the specialized manual skills to journeyman level, with few exceptions, can only be achieved on-the-job, in the plant under normal industrial pressures and environment. The extent to which pre-employment training in trade schools (post primary) provides the most useful preparation for subsequent in-plant training could not be determined during the course of this study. Some employers took a dim view of trade school graduates, some had no opinion at all and some were favourable. Objective evidence was lacking. In any event all agreed on one point and that was the final achievement of the journeyman level in manual skills had to take place in-plant. In fact a majority of the individuals in skilled industrial occupations must receive all their training from the very beginning in the plant, since the nature of the process and the machinery and equipment involved cannot be reproduced outside of the employing establishment (e.g. skilled steel smelting and rolling occupations, petroleum stillmen, alumina plant operators, large scale shovel and drag line operators, cement kiln operators, skilled textile plant weavers and loom fixers, heavy forging machinemen, structural steel erectors et al).

It is necessary, therefore to look to industrial, in-plant training for the production of all but a very few of

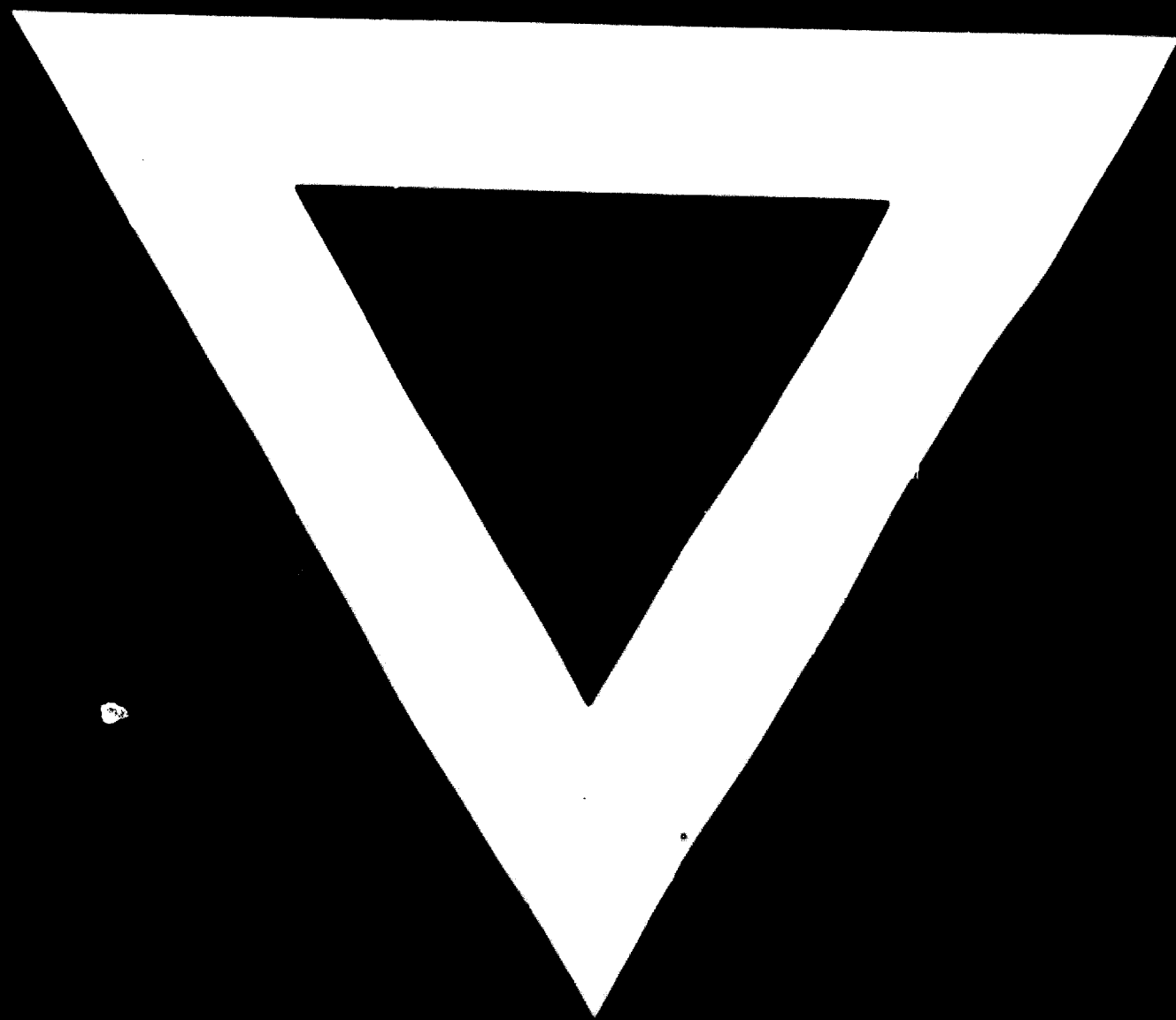
the skilled manual occupations. In occupations of this kind, out of a total six-year requirement of 7,128, only about 2,200 will emerge from existing formal in-plant training schemes (including apprenticeships). While it is true that quite a number of the remaining 4,900 of the requirements will acquire their skills through wholly informal means, it is clear that an industrial training problem of considerable magnitude faces Kenya during the six plan years.

Kenya is considerably ahead of many other African countries in its resources for stimulating and assisting industrial training programmes (in the Ministry of Labour and Social Services). Kenya is also ahead in the development by employers of their own training organizations. Nevertheless it is recommended, in view of the extensive need for additional training activity revealed by this Report, that a high priority be given by the Ministry of Labour and the Employers Associations, with supplemental assistance from the Ministry of Education to improve and step up formal in-plant training schemes and apprenticeships very substantially in order that development will not be retarded for lack of properly trained, highly skilled manual workers in the modern crafts.

The Manpower Planning and Programme Section should stimulate development of systems of incentives to private employers to establish, expand and improve in-plant training programmes for skilled manual (and executive) personnel either for their own use or "over-training" for the general enrichment of Kenya's labour market. Employers who carry out approved training programmes might be rewarded through special tax allowances, special import subsidies, special consideration in granting procurement contracts or outright subsidies to pay the costs of training.

Agreements should be reached with all new firms coming into Kenya to assure that they agree to train Kenya citizens for the majority of the skilled, office, technician, professional and managerial posts within a specific (but reasonable) future period. This agreement in fact should be a standard part of the whole process of bringing in and establishing a new plant.

Existing employers who rely on substantial numbers of expatriate staff should be required, as a condition of renewal of work permits, to show that they have a training scheme to train specific Kenya citizens in those skills and to indicate when the training will be completed. These would be reviewed by the Ministry of Labour for adequacy."



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