

UNITED NATIONS  
ECONOMIC  
AND  
SOCIAL COUNCIL



48583

Distr.  
LIMITED

E/CN.14/SDP/19  
5 October 1963

Original: ENGLISH



ECONOMIC COMMISSION FOR AFRICA  
Meeting of Experts on the  
Integration of Social Development Plans  
with Over-all Development Planning  
Addis Ababa, 9-18 October 1963

MANPOWER AND EDUCATIONAL PLANNING:

SOME BASIC ISSUES

(by E.R. Rado)

## MANPOWER AND EDUCATIONAL PLANNING - SOME BASIC ISSUES

In the whole field of planning for economic growth no topic is more vital economically nor more explosive politically than the planning of future manpower requirements and of the steps required to meet them. Yet, as a branch of the theory of economic development, manpower and educational planning is the newest, most "underdeveloped". Its assumptions and methods are the least rigorously thought out; its answers are largely untested by experience. This paper, then, is an attempt to set manpower and educational planning more clearly in the general framework of development policy for economic growth.

### I.

Planning of any sort is a kind of crystal-gazing: guessing, on the basis of incomplete information at the consequences of one's own (and others') actions. Defining the minimum requirements of a plan as internal consistency and feasibility, I do not think I am taking too great a liberty with truth if I assert that almost anyone with intelligence and a good general education can draw up a plan for almost anything. Drawing up - even carrying out - a plan does not make one a good planner, any more than the man who hits all the right notes is a great pianist.

To judge the merit of a plan, therefore, one must know, in addition to its feasibility and internal consistency:-

- (a) whether the planned increase in production is the greatest that could be achieved by mobilizing all the resources likely to be available; and whether the composition of this production is likely to be most satisfactory from the point of view of the inhabitants of the country concerned;
- (b) whether the plan represents both the quickest and cheapest possible way of achieving the results desired;
- (c) whether a superior result could not have been achieved by using the same resources, over the same period of time, but in different ways, and in pursuit of different objectives.

This, incidentally, is why I find the three World Bank Reports on Tanganyika, Uganda and Kenya, comparatively unsatisfactory documents. Not because I have specific objections to the courses of action they propose, but because by and large they do not show how and why they have come to prefer their recommended courses of action to others equally feasible.

## II.

Manpower planning is a branch of general economic planning. It aims to allocate, over a period of time, a nation's "human resources" in such a way as to maximize the flow of income accruing to members of the society by the target date set. This involves making judgements on how, at any moment of time, the country's existing stock of human skills ought to be allocated as between different occupations. It also involves making a judgement on how, year by year over the period of the plan, the country's population might best be allocated as between all forms of commercial, industrial and agricultural employment on the one hand, and education and training (as students and teachers) on the other. Of all the branches of economic planning, technically this is the most difficult, for it involves guessing how human beings are likely to behave several years hence.

It is easy to take a mechanical approach to the problems of manpower planning: it is the line of least resistance, too often followed. The first steps, in any case, are largely mechanical, and once one has started that way, it is tempting to continue. The process is best understood through a brief step by step discussion.

1. The first step is to fix a target date by which you hope to achieve your results. As we shall see, the further ahead this date is, the better, from the point of view of educational planning.
2. You then do your best to take stock of present manpower in the economy, by numbers and by attributes, such as type and level of skill, age, sex, etc. A tiresome job, but essential.

3. Thirdly, you will need to estimate how many members of the present labour force will survive as active workers by your target date; estimating probable emigration, retirement and mortality for each type and level of skill. The importance of good demographic information need hardly be emphasized here.

4. The fourth step is to estimate the probable additions to this surviving labour force through normal immigration and through the workings of the present system of education. This is really two stages rolled into one.

One part (and if your target date is near, the major part,) of your future stock of manpower is already determined by the number of those now in training for various professional qualifications. Thus we already know the maximum number of East Africans who can qualify as doctors in 1970: they are all first-year medical students today. (The only uncertainty is: how many of them will pass their examinations). The same applies to some other professions, too; architects and engineers for example. (This, of course, also means that if you want to affect the number of doctors at all, you must start planning seven years ahead at least; if you want to make a substantial change, fifteen years is probably the minimum).

But, while it would be a mistake to ignore the extent to which present constraints pre-determine the size and composition of our future labour force, it would be equally mistaken to exaggerate it. True, the number of those in the 6th forms of Secondary schools today sets an upper limit to those who can graduate in 1966. But the proportion which will actually enter University in 1964, and the actual range of jobs for which they will prepare themselves, is fairly flexible (except as between "Arts" and "Science" subjects), if only because most university degrees do not prepare for one specific occupation<sup>1/</sup>.

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1/ A more real limiting factor is the capacity of various University departments in terms of number of teachers and lab-space. The Medical School, for instance cannot possibly admit all those who pass in Chemistry and Biology at "A" level this year).

It is also true to say that the upper limit to the possible number of University graduations in 1970 is already set by the number of those in Form 3 today. But this year's graduates are but a fraction of Form 3 in 1956, and it is obviously in our power to increase this proportion by 1970. (If all of this year's Form 3 reached University in '67 and graduated in 1970, we shall have increased the number of University graduations over six-fold in 7 years!) It should also be added that the occupations which present Form 3 members will follow in 1970 are still largely undetermined, though they will be narrowed down year by year. A major constraint will be the number of 5th form places in 1965 (even more, the number of qualified science teachers), which cannot be radically altered in 2 years; another will be the number of University places in 1967, which we can affect considerably in 4 years.

Thus our future manpowerstock is only partly pre-determined. For short periods, our ability to predict its size and composition may be excellent: our ability to influence it is negligible. The longer our planning horizon, the fewer are our constraints, and the more will be the scope for influencing the future. Nor should we forget that even in the short run a significant fraction of the labour force (its younger members especially) is occupationally mobile, given brief on-the-job training.

For any period of 5 years or more, therefore, a significant proportion of our labour force is indeterminate, in the sense that we don't know what their level or type of skill will be. This, of course, is only another way of saying that it is capable of being planned. One could, perhaps, make guesses as to what they are likely to choose to do (e.g. on the assumption that present trends in occupational choices will continue). But this would be running away from our task, which is not to guess what people might choose to do, but to determine what it would be best for them to choose. This we can only do when we have looked at the demand side of the manpower picture.

It may be mentioned in passing that the calculations performed up to this point make comparatively little call on the special skills of

the economist. Given the basic data, the task of assembling them is a largely mechanical one. If the data are fragmentary, unreliable or have to be collected specially, their analysis and presentation calls for techniques and skills which are more statistical than economic. It is only now that the economist as manpower planner begins to come into his own. His special competence lies in the comparison of relevant costs with relevant benefits, arising from alternative courses of action. So long as there were no alternatives to compare and select, there was nothing for him to do that others could not do as well.

### III.

The next step in our quest is to estimate the demand for manpower of various types and grades through our plan period. Both conceptually, and technically, this is a vastly more difficult step than the ones which preceded it. So long as we dealt with supply, our feet were on comparatively firm ground. Demand forecasting - let us admit it - is a morass. Neither economists nor anyone else has as yet any theories or procedures which can confidently be expected to give us the correct answers. We are not completely hopeless, however.

One thing we are clear about, that the demand for manpower - of any type - is closely related to the level of output which that manpower will be used to produce. For this reason, the task of the manpower planner is hopeless, unless he can start with fairly detailed projections about the size and composition of planned output through the period of the plan. (It is difficult enough, for instance, to derive the optimum number of mechanical engineers required to build and maintain a given mileage of roads of various types. If one cannot even be told the mileage of roads to be built and maintained, one is working in a vacuum, and any guesses thus produced are almost certainly worthless). This is not to say that the volume and composition of future output can be predicted with any certainty: it cannot. But a projection, however uncertain (by broad product-groups and industries) must be made, and it must be made in advance of the manpower planner starting on his calculations of manpower-demand.

It also follows that when Government Departments or Ministries are drafting their sections of the Plan, they should make their estimates, in the first instance, as far as possible in terms of the results they propose to achieve, and not in terms of the resources they will need. If, for instance, the Ministry of Health states that part of its objective is to eradicate malaria from Uganda within ten years, the merits of this objective (as against other, competing ones) can be assessed by the Ministerial members of the planning commission, while its manpower implications can be independently estimated by the economists of the planning commission and the relevant Ministry. If the two estimates differ, there is, at least, a stated objective on the basis of which a reconciliation can be attempted. If the Ministry had merely submitted its estimates in terms of resources (e.g. doctors) required, there would have been no objective basis for discussion, for no one assessing the claim could have said whether the resources claimed were excessive or deficient to achieve particular aims.

Once the manpower planner has in his hand the relevant projections of future output, he can get down to his own special headache of relating the size and composition of future output to the optimum size and composition of the labour force which will be required to produce it. And here a special note of warning is necessary.

Too often, manpower planners concentrate on meeting the requirements of what has come to be known as "high-level" and "middle-level" manpower; i.e. men and women whose jobs will require 14 - 20 years of education and training. It is easy to see why this happens. These are the "key" people who are in scarcest supply, whose training is most expensive and requires to be planned years ahead. Their numbers are relatively small, and this makes calculation relatively easy. But it is not enough to eliminate manpower shortages: it is equally necessary to plan to eliminate surpluses too. People are not bags of coffee which can be dumped in a lake when there is too much of it. The unskilled and the comparatively uneducated are also human beings and citizens, and must be treated as such. A manpower plan, which is not also an over-all employment plan is an "elitist", socially irresponsible exercise.

If anyone believes that the processes of the market create jobs for all who seek them, he should study the recent history of Uganda. Between 1952 and 1962, total gross capital formation was around £200 million - one of the highest for any under-developed country. Output in real terms increased around 40 per cent (in money terms the increase was less, probably around 30 per cent, owing to the worsening terms of trade). Yet recorded employment not only did not increase in proportion - it actually declined slightly. The broad outline of how this happened is relatively clear: the increased employment, created by that part of capital formation which represented an addition to productive capacity, was more than offset by the fact that replacement-investment was heavily labour-saving.

Though total employment did not significantly change, its composition almost certainly did. The whole of the output of secondary and higher levels of education was, in all probability absorbed in the labour force, and probably a significant fraction of the output of Junior Secondary school leavers did not find employment, and that in addition several thousand of the unskilled and the uneducated must have lost their jobs. It is a strange state of affairs indeed when parents toil and sweat to educate their children, and half of them are compensated for their efforts by an unemployed child, while the other half are kicked out of their jobs by their educated children<sup>1/</sup>.

If, in 1952, any planner could have predicted that this is what was likely to happen, he, or at any rate a representative government, simply could not have left it at that. "Development" of this type carries the seeds of revolution within it, and no representative government can afford to tolerate it.

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1/ Of course, it is possible in theory that the school leavers who did not find jobs and the adults who lost theirs, are all happily settled in agriculture, earning as much or more than their "employed" brethren. We can't conclusively prove that this is not the case, but he would be a true optimist who believed that it was.

IV.

The projection of the demand for manpower must, therefore, be seen in the context of over-all employment planning. This clarifies our problem, but far from solving it, makes it more difficult.

The next question to be asked is whether present resources of manpower (and other factors) are being used to the best advantage. Putting it another way, we must try to find out whether the present size and composition of output corresponds optimally to the present level and composition of production. I have already warned of the dangers of concentrating only on shortages and ignoring "surpluses". I now want to draw attention to the need for looking at shortages with a critical eye. If some car dealer took it into his head to start selling Mercedes 220-s at a hundred pounds apiece, the "shortage" at that price would have to be seen to be believed. Many a shortage of manpower is of this artificial type, and would disappear sooner or later if salaries were fixed at realistic levels. Of two equally qualified university graduates, the one who enters commerce or the civil service can expect life-time earnings which are at least twice as high as those he could expect if he chose teaching as a career. Is it surprising then, that there is a teacher shortage, and that it is getting worse, not better?

If a laboratory technician takes a course which qualifies him to be a senior lab-technician or to enter university (at no cost to himself), by choosing the latter rather than the former alternative, he can more than quadruple his expected life-time earnings. The same applies to most other "middle-level" personnel. Is it surprising then, that there is a shortage of such persons, or that it is getting worse, not better?

Of course, not all current shortages are of this artificial kind, but it would be a mistake to ignore the fact that many of them are, particularly for types of manpower which the public sector employs. Most current shortages which are "real" arise from the fact that a large number of expatriates have recently left East Africa, and that the structure and organization of production has been built round their skills. However, before rushing into a crash-programme to replace them it is worth

asking whether their exact replacement is what is really needed by the future structure of production in East Africa. (How many senior tax officers could be saved by simplifying the structure of income tax? Will independent Kenya really require the same top-heavy administrative structure which was built up in the 1940-s and 1950-s?)

Having made allowance for the "real" part of current shortages, (and having instituted measures to eliminate the "artificial" part), our next task is to look into the future. How are future manpower demands related to future output? If history teaches us anything, it is that there is no simple relationship between changes in output, capital and employment. (Cf. Leontief: Studies in the Structure of the American Economy). The assumption that present relations between output, capital and employment will continue, can therefore be discarded, almost a priori. Another assumption, frequently used by manpower planners of some distinction is that there is some fixed coefficient between the over-all rate of growth of output (irrespective of its composition!) on the one hand, and the rate of growth of demand for certain types of manpower (e.g. graduates), on the other. (Thus, Harbison and Hunter, in their study of the manpower requirements of East Africa, assume that the demand for graduates grows 3 times as fast as National Income. If GNP is to grow at 5 per cent per annum, the number of graduates must grow at 15 per cent). There is no foundation, either in theory or in historical fact, for any such simple coefficient. It is a gimmick, which is not the result of economic analysis but a substitute for it.

Beyond rejecting entrail-gazing and other false solutions, there is comparatively little that we can say as yet with any degree of confidence. We do know that the productivity of capital has been tending to improve faster than the productivity of labour (i.e. labour has been getting relatively dearer), and this has the probable result that future levels of output are likely to be produced by more units of capital per unit of labour than is the case at present. In other words, capital (and output) are likely to grow faster than employment opportunities. Such a trend is fine, so long as labour is relatively scarce and capital

abundant. If this is not the case (as e.g. in East Africa), and one is concerned about the over-all employment situation, basically one has two options. The first is to plan for an enormous investment programme, to absorb all the population in remunerative employment<sup>1/</sup>. Alternatively, one must consciously attempt to influence business-men's choices of productive processes in the direction of labour-intensity. This can partly be done by improving the skills of the labour force (a good short-hand-typist saves a dictaphone). In part it may have to be done by altering the relative prices of capital and labour. Accelerated depreciation already gives business-men an interest-free loan; yet, if businessmen are to be encouraged, why should we not make this assistance proportionate to the number of men, rather than to the amount of capital employed?

Guided by this over-all approach, one may then try out several techniques of projection. One is to find another country, rather more developed than ours, and assume that in order to succeed in reaching its level of output by a certain date, we must also aim to reach its pattern of employment. (A fragile method - must be handled with great care). Or one may assume, for each sector of the economy, on the basis of trends of the last decade, that the same trends will continue to affect the relationship between the size of output on the one hand, and the level and composition of employment on the other. Thirdly, one may try out a forecast on the assumption that in each industry what is typical of the 2-3 most profitable firms today, will be typical of the average firm in, say, a decade. (To try out any of these methods at all systematically, we need much better production and employment statistics than we have today).

It must be emphasized that each of these methods is a shot in the dark, and, all of them resting on a flimsy or no theoretical basis, none of them is superior to the other. Consequently, if possible, all three

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<sup>1/</sup> And it really will have to be enormous, when one remembers that, in spite of investing 15-20 per cent of its national income over a decade, Uganda failed to create one net new job.