MANPOWER ZONES

BASIC TERRITORIAL UNITS OF BALANCING

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The planning methods developed in Czechoslovak Institute for Urbanism and Regional Planning, Bratislava (Regionplan) may be regarded as the missing link which fills in the hitherto existing gap between the traditional manpower balances and their concrete utilization for an effective investment policy.

The specific feature of this manpower assessment system is in the territorial breakdown of the regional manpower balances. These balances constitute a part of the overall plan drawn up yearly by the State Planning Commission and its regional commissions.

As it is known, Czechoslovakia from the administrative point of view, is divided into 10 regions; the average size of these units, which are endowed with a great measure of self-government, amounts to 5000 sqm. Each of the regions entails a number of districts - altogether 109 of them in the country. The districts constitute the lowest level of the state administration, of course not including municipalities.

Practically none of the centrally planned measures go further than to the district level, that means that these measures relate to a territory of some 400-800 sqm. with about 150,000 people on the average. It is natural that at this level the planned measures reach the desirable degree of accuracy and that further methods must be put to work in order to break down the plan objectives into workable decisions apt to be realized in the concrete form of investment or other action.
As to the manpower assessment, much greater emphasis is now being given to its methods. We are now realizing what a vital factor the labour force constitutes in the promotion of economic development. We have come to the conclusion that no decision on new investment and no measure in development program (involving the allocation factor) can be made without knowing the precise territorial disposition of the labour force.

Perhaps the attention we give to the problem of balancing manpower resources and requirements and to the commutation in particular might seem exaggerative, but this attention results from the specific situation in our country. The percentage of small communities is very high in our country (96.3%) and, consequently, we have a high density of communities--per one on 4 square mile. At the same time, the industry and business being highly concentrated, the country shows an unbearable ratio of commutation.

The significance of commutation is outstanding, as more than 50% of the working population has to travel from one community to another in order to reach their working place. The permanent character of commutation is given for the time being by the concentration of enterprises on the one hand and by the settlement pattern on the other.

As to the projection years, we do not intend to make any decisive alterations in these figures. In our opinion, the reduction of commutation depends:

- on a new investment and allocation policy;

- on a revolution in the mental attitude of the population concerning their settlement habits.
The greater part of the population being traditionally connected with agriculture and with the rural way of living, it is not willing to reside in towns. On the other side the requirements of productivity increase and better organization of enterprises induce the allocation of new industrial investments on places that are well provided with the infra-structure roads, public utility installations, etc. Thus, the gap between residence and working place gets wider and the only hope to close it lies in systematic allocation measures on both sides: on the field of industrial investment policy as well as on the field of new housing investment.

Both measures can be put into effect over long periods of time only, and this fact is reflected in the balancing system; in the first phase of balancing we do not calculate on any reduction of commutation, though this is one of the main objectives of the plan.

Hitherto, the investment practise paid little attention to the location of labour force and consequently was not interested in housing and settlement pattern either. There were few exceptions, but on the whole the practical investment policy did not bother with this question.

Though the new plants were owned by the state, the investors did not care for wider economic aspects. The costs of installation were measured from the point of view of the direct investor only. Thus, new installations were constructed on places that were appropriate from the technical standpoint, but inadequate from the standpoint of labour force allocation.
Somehow it was taken for granted that through administrative measures - the wages being on the same level in the whole country - the public administration would take care of the labour force procurement. Having found that dwellings were the most efficient incentive the new plants required, and usually acquired, new housing stock was constructed at public cost.

In recent years the ratio of public housing investment has been more and more reduced, and nowadays the greater part of newly constructed dwellings belongs to the cooperative category. Thus, the allocation policy can't rely upon an automatic solution of the labour problem any more. Our contribution to the solution of this problem is based on the assessment of the future occupancy of dwelling units.

The official processing of the census data being of limited use to us only, we reappraised all punched cards of the 1961 census in order to get statements on the age and the quality of buildings and every dwelling at the same time. These statements, which include further details on the living space, number of inhabitants, and other items were summed up for communities, manpower zones and districts.

Through a special inquiry and analysis we had to find out which categories of dwellings are usually scrapped or put out of use and what is the relation between the losses of dwelling units and the indicators we had at our disposal. Owing to this procedure, we are able to assess the losses of dwelling units that will occur in the area concerned in the next 15 years.
There will be losses of housing capacity resulting from the general increase of living standard too.

Taking all factors into account, we are able to assess what the number of the population and the minimum number of labour resources that will be on disposal in every manpower zone in the projection years. This minimum number of manpower resource results from the capacity of the housing stock in the area concerned and is calculated without regard to new housing investments.

1. In this way the balancing shows what the resources minimum will be in the area and indicates the minimum of employment opportunities that must be established in the area concerned.

2. The balancing indicates the extent of new housing investment that must be ensured in the future if new plants are to be allocated in the area.

3. The balancing indicates the origin and number of "disposable" labour force, i.e., those resources bound to the area neither by ownership of dwellings nor by working place. The areas showing a long-time lack of labour force should concentrate their immigration policy on the surplus manpower zones and try to win over the available workers for migration.
The Project "Manpower Zones - Basic Territorial Units of Balancing"¹ (project manager F. Culik) covers the time period 1961-1980. In the course of this period, a considerable growth of population and economy is to be expected:

1. The population will be increasing as the rate of 16%, i.e., 2.2 million more people will be living in the same area.
2. In 1980 the number of persons belonging to the productive age group will increase by 1.3 million and corresponding by new employment opportunities must be created and allocated.
3. Taking into account the population rise as well as the natural losses in housing stock during this period, we will have to procure new dwelling units for some 4 million people in the course of 20 years.

Whereas these figures are well known and manageable on the overall planning level, the consequences of this program have hitherto not been examined and assessed on the level of concrete areas. It is obvious that this general trend of development would not apply to every territorial part of the country with the same intensity and that the areas will be affected in different ways by it.

¹ elaborated by the Department for Population and Settlement in the Czechoslovak Institute for Urbanism and Regional Planning, Bratislava
Consequently, the main objectives of this project can be formulated as follows:

1. To find out and delineate concrete areas which would represent an integral unit from the economic and territorial point of view; i.e., these chosen units must be small enough as to guarantee that all measures derived from the overall plan and allocated to an area as a whole will have the same effect whether they be realized in one or another part of the area.

2. To enable the assessment and balancing of manpower resources and requirements to be on a level which guarantees a true reflection of the real character and needs and possibilities of the area in question. Naturally, this system must provide for the consistency with the overall planned targets at the same time.

3. To combine the solution of manpower problems with the planning of housing stock and of the urban development as well.

4. To give the authorities concerned detailed and sufficient sources enabling them to take appropriate measures in allocating new industries, dwellings, services, recreation centers, etc. All these decisions should be based on the results of manpower balancing. Thus, the balancing would constitute the guiding principle in dealing with these matters.

Concerning the screening of centres

There are 12,000 communities in the country. As a rule, those of them which have an industrial base are apt to function
as a center, and so further investments will be concentrated on them.

By analyzing this set we came to the conclusion that for our purpose, only communities with 500 and more employment opportunities in industry were of significance. Their number exceeded 600 and they were dislocated unevenly throughout the country.

In order to reach a regular pattern of dislocation, the relative significance of the centers concerned had to be examined and not the absolute value. The target was to screen the centers in such a way so as to give the same results in an industrially developed area as in a somewhat backward part of the country.

According to this method, three types of centers have been established:

Centers of the predominant industrial type

This category includes those of the original set of centers which have one criterion in common: the number of industrial employment opportunities they offer must exceed the average of the province concerned (i.e., the total of all opportunities divided by the number of centers, separately for each province).

Centers with mixed predominancy (industrial centers with the urban function prevailing)

The centers which did not belong in the first group were examined on their importance as urban centers. For this purpose the indicator of reduced settlement value was introduced.
Centers in which the number of population exceeded the indicator value were embodied into this category.

**Centers of reduced (local) importance**

Our country shows distinct regional diversity as to the level of industrialisation and urban development. The screening of centers must take this fact into account. Consequently, for the regions with a low density of industrial localities a special criterion had to be introduced.

Proceeding from the assumption that a commutation distance of 45 minutes is the upmost bearable limit, we used this criterion for the last phase of screening. Using this time-distance limit we mapped the commutation areas of all remaining centers and compared them with the corresponding areas of centers selected before. If their boundaries did not collide, the center in question was classified as being of major local importance and was embodied into the third category.

The result of this screening system was satisfying. From the original set of 605 localities with 500 or more opportunities for employment, 288 centers were elected, their respective categories being as follows:

- centers of the predominant industrial type ........ 173
- centers of the mixed type .................................. 93
- centers of reduced (local) importance ................. 22

This result has confirmed our initial assumption on the appropriate number of centers. From the beginning, we took for granted that the ideal territorial unit (from the point of view
of commutation, trading, servicing, and other relations) would be limited by the radius of some 12 km. That represents a territory of 173 sqm. The size of the country being 49,500 sqm., 173 sqm. gives 286 territorial units.

This total number of units derived from a theoretical assumption has been almost exactly equalized by the number of centers we have selected as the nod-points of our balance units.

The Delimitation of Manpower Zones

The regional manpower balances are based on territorial units, the centers of which were selected by the application of methods described previously.

We discern there types of territorial units:
1. permanently delimited areas;
2. areas based on a commutation structure; and,
3. optimized areas.

1. The Permanently Delimited Areas

The boundaries of an area of this category comprise a territory covered by the 45 minute limit of commutation. Every community within this area is connected with the center by means of public transport (buses or railways) so that the total time of commutation does not exceed 45 minutes.

The characteristic feature which distinguishes this type of area from the other two, is the steadiness of its size and form. Except for a significant change in the speed of means of transport, these areas do not change over a long period of time.
2. **Areas Based on Commutation Structure**

The census of 1961 provided us with data on commutation in a very profound manner: it classified the number, sex, and occupation of all commuting persons.

Using these data we developed a system according to which every community in the country was attached to one of the centers or remained in the so-called resources area. Owing to this method we could fix a new type of area which corresponded to the real frequency of the labor force commutation. Besides this, we could map resource areas which are characterized by the absence of industry and economic activity in general.

The areas of this category differ very substantially in size. Big towns as well as centers with great industrial base form extensive areas, whereas centers of non-industrial character have small hinterlands only.

For the analysis of economic influence of centers and of correlations between centers and surrounding communities, the basic sources are provided by this method, i.e., the territorial sphere of influence of centers. Thus, we are able to draw the boundary line around an area which constitutes an economic, social, and cultural unit as a rule. The link which is demonstrated by the direction and intensity of commutation usually proves to be characteristic of all other relations between communities.

3. **Optimized Areas**

This program is based on the following principles:
A. Three indicators on every community have to be procured: the manpower resources, the manpower requirements, and the housing capacity.

B. The first step includes the comparing of these 3 indicators. It usually results in a balance which shows either surplus or deficiency of resource. If projection year is concerned, the results are split into two groups:
- resources bound to the locality by means of the housing stock, and
- resources without this binding.

C. The next step involves linear programming methods. The surplus of manpower resources of every community is combined with a deficiency existing in other communities and especially in the centers. Simultaneously, the following principles must be observed:
- the total number of workers who are due to commutate must be kept to a minimum;
- the total commutation measured in person-miles must be kept to a minimum; and
- all housing stock that will exist in the projection year must be taken into account.

D. The pattern which results by balancing the manpower requirements and resources shows the economic links between communities and centers. In this way areas can be delimited, which represents the theoretical best possible (optimum) solution of labour force disposition:
- every area constitutes a unit which is self-sustaining as to the labour force requirements;
- the size of every area corresponds to the actual dislocation of dwelling units, manpower resources, and employment opportunities;
- every change in one of the three main factors evolves new delimitation of area boundaries; consequently, this method can be used for keeping the delimitation continuously up to date. This flexibility is of advantage, when e.g. the installation of a new plant, the construction of new settlements or the liquidation of an enterprise is planned. The implication of such a measure can be traced readily and transferred to the area pattern.

From the territorial point of view the balancing covers the following territorial units:
- 221 manpower zones;
- 104 resources areas;
- 104 districts.

That gives 429 territorial units and for each of them the balancing is carried out. The balances of manpower zones and resource areas represent the target of the project, whereas the balances of districts are needed for control purposes only.

The delimitation of manpower zones has been described previously. It should be mentioned that these zones do not respect any administrative boundaries (such as of the provinces or districts).
The resource areas represent the part of a district that is not occupied by the manpower zones. Practically, these areas can be denoted as territories not included in the development program for the next 15 years at least.

The balancing of district data serves in the purpose of control only. The manpower zones having no consistency with the district division of the country, a proof must be given that the data used for balancing are consistent with the data on which the district development program is based. In simultaneously making a district cross-section of balancing data we can prove the consistency with over-all plans clearly.

**Manpower Requirements**

We could take advantage of the fact that there is a statistical evidence on all enterprises and all employees in our country, but this evidence has a fault which makes it only of limited use for the purpose of manpower balancing. Namely, the data on manpower requirements are collected and processed in such a way as to give the survey on the level of districts only.

So we had to start our own inquiry, addressing all reporting units in the country and asking them to specify the district totals they had previously given, so that the allocation of the statistical units (enterprises) in particular communities could be derived from. In this way we obtained data on the territorial structure of the labor force for the two base years: 1961 and 1965.
We have collected the following data related to communities:
- the name of every statistical unit (enterprise), the name of its reporting unit (that shows us the internal organization of reporting units), the sectoral classification, and the competent ministries;
- the number and sex of all employees of every statistical unit.

The data obtained through this inquiry were processed on punched cards and the following statements were produced:
- the number of employment opportunities in every community with specification of sex and industrial sectors;
- the district total of these data for the purpose of the consistency control;
- the cross-section of these data according to the manpower zones delimitation.

In this statement the data are summed up in 3 categories only: opportunities in the industrial sectors, agricultural sectors, and the rest.

The data collected and processed in the described way relate to the base years 1961 and 1965 only.

The assessment of manpower requirements in the projection years is a more intricate work. It is guided by the following principles:

A. The balancing is not intended to be a single action, but a continuous operation in the course of which new data on planned employment opportunities will be confronted with new data on resources development and other indicators.
B. This continuous confrontation will enable us to decide whether a planned investment is advantageous from the aspects of manpower resources, housing investment, and settlement pattern. But, there will be no definite data on requirements for any of the projection year.

C. This system of balancing will be carried out on two levels simultaneously:

- by the State Planning Commission, and
- by the Regional Planning Commissions.

D. For the sake of the State Planning Commission we have automatized the whole program of balancing by using electronic computer and business machines. This automation enables every operative exploitation of the balancing system. In feeding the computer with new input data, we can get promptly the results in the desired territorial cross-section: either on the district level or in the form of manpower zone balances.

Manpower Resources

This item is divided into two components: resources of the productive and of the postproductive age groups. Both of them are derived from the projection of the natural increase of population. For this purpose we had to collect data on the distribution of 5 year age groups in all the 12,000 communities of the country. In this case we could make use of the 1961 census data. The 5 year age groups were summed up for manpower zones and the projection of the natural increase in population was made by the usual methods. Thus, we obtained the age structure of population up to 1980 for every balance unit.
As the statistical yearbooks do not give enough information on the ratio of economic activity, we had to reappraise the basic census data in a new process. Thus, we obtained the needed indicators for districts and the other balance units:

1. the ratio of economically active population to the total of postproductive age;
2. the same ratio to the total of productive age;
3. the latter data had to be analyzed and broken down into the main components:

- students and apprentices (over 14 years old)
- women occupied solely in domestic duties
- women taking care of children up to 1 year
- disabled persons
- persons occupied by unproductive jobs.

Having obtained all these data for the base year we could proceed in assessing the ratios for the projection years. These considerations were made in close cooperation with the State Planning Commission and the Regional Commissions. The indicators agreed on, were incorporated in the balances, and thus the data on manpower resources up to 1980 were obtained.
APPENDIX

The Manpower Balance and its Structure

A. Productive Resources

1. Natural Increase in Population
   a. population in productive age groups
   b. population in postproductive age groups
      including groups of 55-59 years (females)
      60-64 "
      65-69 "
      over 70 "

2. Indicators of the economic activity
   a. ratio of economically active part to total population of productive age
   b. ratio of economically active part to total population of postproductive age

B. Economically Inactive Population of Productive Age

1. students and apprentices (over 14 years old)
2. women occupied solely in domestic duties
3. women taking care of children up to 1 year
4. disabled persons
5. persons occupied by unproductive jobs (police force, officials of political parties, etc.)

C. Manpower Resources

1. resources from the productive age groups
2. resources from the postproductive age groups
3. total

D. Manpower Requirements

1. employment opportunities in industry
2. employment opportunities in agriculture
3. other employment opportunities
4. total
E. **Manpower Budget**

1. total of resources
2. total of requirements
3. Saldo (commutation not included)
4. inward commutation
5. outward commutation
6. net result: manpower surplus
   manpower shortage

F. **Housing**

1. number of households
2. number of dwelling units (housing stock)