UNITED NATIONS RESEARCH INSTITUTE FOR SOCIAL DEVELOPMENT

P r o g r a m m e II

MEASURING SOCIAL VARIABLES IN REAL TERMS

A Survey of Issues and Possible Solutions

by

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1. INTRODUCTION

The present paper is one of a series of UNRISD studies concerned with the quantification of social variables. So far the level of living and level of welfare have been the variables on which the quantification effort was mainly concentrated.[1] Quantification was attempted through measurement of the level of living and level of welfare in real terms.

The origin of that approach goes back to the pioneering work of Bennett.[2] A wider recognition of its merits was however achieved much later as a result of the work of the UN Committee of Experts on the International Definition and Measurement of Standards and Levels of Living[3] and of the inter-agency working party which continued the work of the Committee.[4] It is from that point that the problem of measuring the social variables was taken over by the UN Institute of Social Development. A number of studies[5] were proposed on the subject and extensive discussion followed both within the Institute and outside it.[6]

The experience gained in the preparation of these studies and in the discussion with their critics strengthened our conviction that the real terms approach is the right one. We also realised more clearly the full significance of this approach for understanding socio-economic reality and for influencing it. On the other hand it has become evident that certain elements of our approach require reconsideration. It was also felt that there is an urgent need for all the experience gained in this field to be fully and systematically stated to make clear all issues under discussion and to prepare the road for future work.

The present paper is an attempt to do this.

1/ The explanation why the level of living and level of welfare should be quantified first and the respective definitions of the two concepts are found in UNRISD Report No. 3, Social and Economic Factors in Development Geneva, February, 1966.

2/ Bennett, M.K. On Measurement of Relative National Standards of Living, Quarterly Journal of Economics, February, 1937.

3/ Report on International Definition and Measurement of Standards and Levels of Living, United Nations, New York, 1954.

4/ International Definition and Measurement of Levels of Living, An Interim Guide, United Nations, New York, 1961.

5/ UNRISD Report No. 4, The Level of Living Index, Geneva, Sept. 1966; UNRISD Report No. 7, Cost Benefit Analysis of Social Projects, Geneva, April, 1966; Indicators of Social Development, a paper prepared for the OECD Conference at Bergen, July, 1966. Level of Living in the Netherlands, 1921-1965; Level of Living in the United Kingdom 1921-1965; (working papers of UNRISD). Level of Living in Czechoslovakia by J. Krejci, Prague, January, 1967. The Japanese Level of Living (1925-1965) by T. Sohara, Tokyo, August, 1967.

6/ No attempt is made here to give a full account of the work done on the measurement of levels of living outside UNRISD.

2. THE PRINCIPLES OF MEASUREMENT IN REAL TERMS

2.1 The limitations of this exercise

It must be made clear that the measurement of social variables which is proposed below is not an attempt to find a numerical expression for everything that may come under the term of "social conditions" nor for human well-being broadly understood. The meaning of welfare used here is of necessity rather narrow. We call it "measurable welfare". It refers only to such elements in the social conditions which (1) are observable and significant on a "macro" scale (2) are amenable to quantification within the existing knowledge and (3) when quantified can serve as an expression of either improvement or deterioration in the conditions in which people live. It must be added that the number of elements to be quantified cannot be too large for practical reasons.

What can be quantified therefore are elements of "social conditions" that refer to the degree of satisfaction of generally recognised and universally valid human needs. This is the interpretation given to "measurable welfare" and consequently to the tasks of the present paper.

The institutional setting of social conditions, the pattern of social groups and of relations between these are difficult to measure as such within the existing knowledge. These conditions influence what we define as measurable welfare and therefore they do not escape our attention entirely, but there is more to them that can be measured by our methods.

Some characteristics of society are quantifiable (the main example being its demographic features) but their changes do not constitute by themselves an improvement or a deterioration in the satisfaction of needs of the people. No attempt is made to apply our measurement to them, although indirectly they may exert an influence on the elements that are measured.

There are some elements of moral character that certainly affect well-being, but are very difficult to measure and to deal with on a "macro" level. These are such things as happy family life, national prestige, consciousness of achievement, etc. They are left out of our measurement attempts.

2.2 The distinction between flow and state (stock) of welfare or between the level of living and the level of welfare.

When trying to find a numerical expression for "measurable welfare" it is necessary to realise that two distinct forms for it are possible. It may be measured either as a flow of welfare or as a state (or stock) of welfare.

This is so because human needs themselves have to be conceived in these two ways.

In the course of life the population has recurrent needs such as a need for food, shelter, medical assistance, education etc. Such needs are satisfied with a flow of goods and services obtained by the population at the rate of so much per unit of time.[1] As "satisfying needs" means "receiving welfare" it may be said that this flow of goods and services brings a flow of welfare to the population. It is evident that the size of that flow (or the extent to which needs are satisfied) has to be measured also per unit of time. It is that flow of welfare which we call level of living. And the level of living index becomes an instrument for measuring it. The economic counterpart of the level of living is the national product per head. It expresses the monetary value of goods and services which are supposed to generate the level of living. National product is also a flow concept, i.e. is measured per unit of time.

It is possible, however, to approach the problem of satisfaction of human needs (i.e. the problem of welfare) in a different way. Instead of asking a question "How much has the population received of what they need in a given period of time?" it is possible to ask: "What is the state of the population at a given instant of time?" The answer to that question will consist in statements about the nutritional status, the health status, the educational status,[2] etc. which are characteristics of

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1/Some examples may make this clear: The need for nutrition is satisfied by the intake of so much food per day or per year, the need for health by so many doctor/hours of consultation per sick person or so many patient/days in hospitals per year, the need for education by so many pupil/lessons per year, etc.

2/Nutritional status measured by physiological tests; health status by the percentage of the population free from disease at a given date or by life expectancy; education status by the percentage of literates and number of school graduates at various levels.

the population observable at an instant of time. These statuses of the population are also expressions of welfare but that welfare cannot be considered a flow, as it is not possible to measure it per unit of time. It must be considered as a state (or stock) of welfare to be measured at a given instant of time.

The state of welfare understood this way is supposed to be measured by the level of welfare index.

The economic counterpart of the level of welfare is wealth, which is also a stock concept.

The logical distinctions between the flow and the state (or stock) of welfare is obvious. Some practical consequences follow. The flow and stock elements where quantified belong to different dimensions (i.e. are expressed in different kinds of units), consequently they cannot be added to make one index, hence the necessity of having two indices. The Level of Living Index and the Level of Welfare Index as numerical expressions for the "measurable welfare" of the population.

The flow and stock concepts have different places in policy and planning decisions. In planning for the increase of welfare it is necessary to plan for the increase of flows (the level of living) and only after the flows have been increased the stocks can be gradually built up. An analogy exists here on the economic side. It is for the increase of the national product that we have to plan first. Out of the greater national product an increase in wealth may eventually come.

It must, however, be noted that there are also important differences between the way the flow of welfare contributes to the stock of welfare and the way national product contributes to the increase of wealth. When wealth is to be increased national product must be divided into two parts: one which is accumulated serves to increase wealth, the other is consumed. That division of the flow of welfare does not take place. A flow that satisfies nutritional needs is bound to build up the nutritional status at the same time as it provides for current needs. The whole flow fulfills both functions. On the other hand a relatively high level of the flow is necessary to maintain the level of the stock. The necessity of some product accumulation to maintain wealth including capital constant is evidently necessary; but in the absence of accumulation

wealth depreciates relatively slowly. Not so with welfare. Not even a stop, but a decline in the flow of satisfaction of needs for food would cause a dramatic fall in the nutritional status within weeks if not days. The same is true of health, but not of education. Educational status seem the only element of the state of welfare that is durable.

Although both the level of living and the level of welfare are liable to measurement and they are both needed if we want the social elements quantified, so far the UNRISD work was concentrated on the level of living.[1] Consequently in what follows we shall concentrate our attention on the level of living, bearing in mind however that many methodological devices proposed for the level of living are also applicable to the level of welfare.

2.3 The method of indirect quantification

2.3.1 Components and indicators

What we try to measure is the level of living (the flow of welfare) and the level of welfare (the state of welfare). We want to measure both variables in real terms. This is a consequence of the rejection of the measurement of these variables in terms of monetary values per head.[2] For this purpose the level of living and the level of welfare are first divided into their component parts according to the types of human needs or types of human activity directed towards the satisfaction of these needs.

So we may divide the level of living into components such as "nutrition", "housing", "health", etc. Just as welfare itself, these components are amenable to quantification, but only indirectly. There are no obvious measurable variables that can be considered as yardsticks for these components. It is therefore necessary to apply an indirect method of measurement. A number of variables will be selected to represent each of the components. They will be called indicators and be directly measurable. They will be measured in real terms, i.e. each indicator will be expressed in its own units. To give an example: to measure the component

1/ UNRISD Report No. 4. No document on the level of welfare has been prepared yet.

2/ See section 4 below for the explanation why it has to be rejected.

"nutrition" we shall use (among others) an indicator "calorie intake". It will be measured in the number of calories consumed per day per head of the population. The components should cover between them the whole field of what has been defined as a level of living or level of welfare. The indicators should as far as possible cover all the main aspects of each component. The coverage of the whole field of level of living and level of welfare should be as complete as possible. At the same time double coverage, i.e. using two indicators to measure the same aspect of the component, should be avoided.[1/]

2.3.2 Critical points

The indicators which are to serve as yardsticks for measuring the satisfaction of needs have to be given a scale to show the range of the indicator values that is meaningful for that measurement. It may also be useful to have this range sub-divided according to the degree in which the needs of the community are satisfied. That scale can be provided in the form of "critical points" for each indicator.

The critical points are supposed to represent characteristic levels of satisfaction of needs expressed by each indicator. They should be as much as possible based on objective facts. These facts may refer to knowledge derived from natural sciences, as e.g. the requirements of the human body for nutritive elements. But this is possible only seldom. In most cases the facts will have a social character, that is will refer to the established informed opinion about what is the "unbearable", "adequate" or "affluent" level of satisfaction of needs. It should be stressed that this "social" origin of critical points is the proper one. After all who is better qualified to express opinions about the satisfaction of needs if not society itself? It must be admitted that a uniformity of opinion is never reached in these matters. Consequently, it is necessary to realise that in determining critical points in practice (as in section 3 below) the "informed opinion" taken into consideration was

1/Cf. Report No. 3, pp. 18 sq for a discussion of quantification problems, and Report No. 4, part II, pp. 25-45 for an attempt to formulate a unitary level of living index based on these principles.

an opinion guided by the European type scale of values and that when doubts existed the arbitrary judgment of the maker of index had to prevail. These are methodological deficiencies which are probably unavoidable.

On the other hand it should be clearly stated, that critical points should not be based on magnitudes derived from statistical data, such as the world average level of an indicator or a world median value for it, etc. Statistical data refer to what has been achieved in practice, and that depends on many influences determining the possibilities. The critical point is supposed to state needs, it is, therefore, not concerned with possibilities at all. To make it depend on possibilities would be to misunderstand its role entirely. That does not mean that the level of needs satisfaction actually reached has no influence at all on the establishment of critical point. The "informed opinion" is influence by what happens in the world and may adjust its requirements accordingly. But this is very different from taking crude statistical data as sources for critical points.

In Report No. 4[1] two critical points were used: the lower point was called "survival point" and referred to the level of the indicator at which the population could barely survive. The upper critical point was called "full satisfaction point" and referred to a level which was considered entirely satisfactory.

There is also a third critical point which seems to gain more and more recognition lately. This is based on the concept variously called "minimal level" (of human living conditions), "level of minimum well-being" or simply "the poverty line".[2] It is situated somewhere in between the "survival" and the "full satisfaction" points and is supposed to represent a level which is the acceptable minimum at which life is tolerable. This critical point is situated towards the middle of the scale and not at the far end of it, in which it differs from both previously described critical points.[3] It seems that the "poverty line" is a concept which can be useful

1/Page 12.

2/See: Report of the Group of Experts on Social Policy and the Distribution of Income in the Nation (Note by the Secretary General - Addendum) U.N. Document No. E/CN.5/420/Add. 1 of 14th Nov. 1967.

3/This concept is used in the revised version of the Level of Living Index. See "Level of Living Index" - New Version, UNRISD working paper.

in policy considerations, as it is shown by some recent discussions in the United Nations.

When all these critical points are established the whole range of the indicator values becomes divided into four sub-ranges: (A) values above "full satisfaction point"; (B) those between "full satisfaction point" and "minimum point"; (C) between "minimum point" and "survival point", and (D) below "survival point". Knowing the value of the indicator we can determine in what range of the satisfaction of needs what part of the community finds itself.

Critical points have also an important role to play in the aggregation of the level of living index. This is explained in section 4.4 below.

2.3.3 Cardinal and ordinal indicators

It may sometimes be difficult to find a proper indicator, i.e. a variable the values of which could be observed all over the relevant range and expressed in cardinal numerals. (Calorie intake is an example of such proper indicator for nutrition). When no proper cardinal indicator can be found an ordinal indicator can be used. This is an indicator which might be also described as a variable, the values of which however can be expressed in ordinal numerals only. Such a variable can take only a limited number of values the order of which can be determined and which can be designated accordingly as e.g. very satisfactory level, satisfactory level, unsatisfactory level, etc. As an example for this sort of indicator we can quote the quality of housing. It is extremely difficult to find a measurable continuous variable to stand as a proper indicator in that field. But an ordinal indicator can serve as a useful substitute. It is certainly much better to have here an ordinal indicator than not to have any indicator at all. The "values" of ordinal indicators should be made to fit into the "sub-ranges" of indicators proper as explained in the previous paragraph.

2.4 The distribution problem

The level of living indicators are supposed to measure the conditions in which the bulk of the population lives. To measure the level of satisfaction of needs of the bulk of the population we must have information not only on the average level of satisfaction of needs measured by that particular indicator (for short: "not only the average value of that indicator") but also information about how the indicator is distributed among the population.

It is obvious that the highest possible level of indicator is enjoyed by the greatest number of population when distribution is absolutely equal: every deviation from equality signifies that somebody was made worse off because somebody else was made better off, which is an undesirable change.[1] The level of living index should reflect that i.e. the distribution should be an integral element of the index.

When the distribution is absolutely equal the national average of the indicator per head is a sufficient basis for the index. Where, however, the distribution is not quite equal an element representing distribution for each indicator of the index will have to be brought in. This procedure would reduce the value of the index and the more so the more unequal the distribution is. Several ways of introducing the distribution element into the Index are possible.[2]

1/ There is a value judgment implicit in that statement. It has its root in the conviction that "all men are equal". As it is a position very widely approved it can serve as basis for further reasoning. It should be noted that this position cannot be challanged without discarding the most fundamental principles of human rights. If any arguments can be legitimately put forward in favour of some inequality they must be based on the fact of the inequality of needs, and never on unequal satisfaction of equal needs.

2/ A very simple method would be to eliminate from the computation of the index a small group of population at the top of the scale (enjoying the highest level of satisfaction of needs) and to calculate the average for the remainder. This method was tried in an early unpublished version of Report No. 4.

The best is probably to correct the indicator by multiplying it by a coefficient derived from the familiar Lorenz type concentration curve.[1]

2.5 The "higher needs" or "surplus" problem

It is relatively easy to find indicators for basic needs of the population which must be satisfied to make life bearable. The basic elements of well-being are not too many and they are rather similar under any conditions (geographical, cultural and political). The position is different with higher needs. They are numerous, more and more varied when the level of well-being increases and depend very much on the specific conditions of each national community.

It has, therefore, been suggested[2] that the satisfaction of higher needs should not be measured by the indicators expressed in real terms, but by the surplus monetary income per head. By "surplus" was meant the income that remained after the basic needs have been satisfied. In the light of the experience gained in the computation of the levels of living for a number of countries[3] this approach has proved unsatisfactory. It brings an undesirable duality into the structure of the index, which makes the analysis of its changes unnecessarily complicated. Then the calculation of the "surplus" income presents difficulties not only of a statistical but also of a conceptual character. It seems rather clear now that the concept should be abandoned.

One of the approaches possible is to establish a separate set of indicators to measure the satisfaction of higher needs in real terms. This has not proved satisfactory either.[4] The principles of drawing a line between the indicators belonging to basic and higher needs proved very difficult to formulate and no entirely satisfactory solution was found.

1/ This is the method applied in Report No. 4 (section 1.3.2). Another improved version of it is presented in UNRISD working paper Level of Living Index - A new version.

2/ Report No. 4, p.4 and p.41.

3/ Report No. 4, part 3, and an unpublished paper, Level of Living Index in Czechoslovakia.

4/ UNRISD working papers on the Level of Living Index in the Netherlands and Level of Living Index in the United Kingdom.

The best procedure, therefore, seems to be a single set of indicators for both basic and higher needs, higher needs being expressed by higher real term values of indicators. That does not allow of course for the great variety of higher needs that may arise at top levels of well-being and will make the index little sensitive to changes in needs satisfaction towards the top of the scale. This is, however, relatively less important, as the whole exercise in measuring social variables is meant to contribute to the improvement of the conditions of life, of the great masses of population that are far from being affluent.

An example of this approach will be presented in the paper that is being prepared as Level of Living Index - New Version.

2.6 Measurable Welfare and Utility

Measurable welfare with which we have been concerned here is not identical with utility as understood in the theory of value in economics. Quite the opposite: it may be looked upon as an alternative to utility.

In economic theory individual and social welfare is expressed in individual and social utilities which are the dependent variables of respective preference functions. If we could measure individual and social utilities the problem of measuring the level of living of a population would be solved. Unfortunately, there is no way of measuring social utility or even obtaining an aggregate social preference function by adding up individual preference functions. Consequently, measurement of the level of living in terms of utility is not practicable.

In establishing the final aims of the plans a "social welfare function" (as conceived in welfare economics) should play an important role as it contains a valuation system by which planning could be guided. But so far this concept has not been useful to planners. It is because it has never been formulated in a way that would be adequate for planning purposes. It was first the problem "whose preferences represents the welfare function?" If the answer is "It is the sum total of individual preference functions" the situation is hopeless. We cannot perform the summing up operation and consequently we would never know anything definite about the function. If the answer is "State's preferences", the approach is at least promising, but immediately two problems arise: (1) : what independent variables should enter into the function and

(2) : how the function is to be "revealed" (in the sense the individual preference functions are revealed by market actions). If the independent variables represent all the goods that the national economy deals with, their number is practically infinite and the function is unmanageable. Also a satisfactory method of revealing the function has not been elaborated yet.

The "measurable welfare" differs from utility in two important respects.

First: the number of variables selected for its measurement is limited. It corresponds to the number of needs of the population as seen at the national level. The number of such variables may vary within wide limits but will never reach unmanageable size.

Second: the degree of satisfaction of particular needs i.e. the flow of welfare received from various components is expressed in measurable indicators which are scaled according to some established norms. That makes it measurable and comparable.(?)

Because of these characteristics the concept of "measurable welfare" can be useful in performing tasks at which the concept of utility proved inapplicable.

First the flow of measurable welfare (which is the same as the level of living) when measured by the Level of Living index provides a numerical expression for the degree of satisfaction of needs of the population. As such it can also serve as a means of comparing the conditions in which people live with the conditions in the past and with those prevailing in other countries. A similar use could be made of welfare measured by means of the Level of Welfare index. The second task of measurable welfare refers to development planning. As development is supposed to improve conditions in which people live the level of living index is an obvious device for assessing the results of development. If this is so it is most proper that final aims of development plans should be formulated in terms of variables of a type similar to level of living indicators (i.e. in terms of measurable welfare).

"Measurable welfare" also can fulfil one more task for which it was not originally designed. It was mentioned above that one of the serious limitations of the traditional welfare function, even when it is interpreted as a state preference function, is the impossibility of revealing it.

Applying "measurable welfare" concepts to planning means to set final targets of development plans in terms of "level of living indicator type of variables". Once this is done the set of final plan targets becomes an expression of the decisions taken by the state in respect of final aims of development and it is therefore an expression of state preferences. The final targets of the plan represent then the independent variables of the state preference function and the valuation coefficients at the margin can be read from last increments envisaged for particular variables and the allocation of resources which are supposed to make these increments possible. Consequently relevant fragments of the state preference function can be revealed from the plan.[1/]

It is the possibility of revealing the state preference function which may become a third task to which "measurable welfare" can be applied. The importance of being able to reveal state preference function seems to be very considerable both for the theory (especially the theory of economic systems) and for the practice of development planning.[2/] The examination of these prospects is, however, outside the scope of the present study.

1/Strictly speaking from the plan and its supporting documents, it is not possible here to enter into the detailed description of the procedure to be applied. In fact, much work remains to be done in elaborating that procedure.

2/The possibility of revealing state preference functions is also important for the solution of the problem of weights for the Level of Living Index. See section 3.5.2 below.

3. THE PROBLEM OF THE UNITARY INDEX

3.1 Introductory remarks

What we have discussed so far were the merits of measuring welfare (its flow or state) by means of sets of indicators representing various aspects of welfare and numerically expressed either in real terms (their own specific units) or in indicator indices into which the real units were transformed. Now comes the problem as to whether it would be useful and advisable to aggregate these variables into a unitary level of living or level of welfare index.

Let us see the arguments against it and in favour of it.

3.2 Arguments against

The first argument against it is that it is not necessary. A number of selected social indicators measure welfare (flow or state) in the form of a set of numbers representing the respective sizes of indicators. This is a kind of an image of welfare. It is the best we can afford to provide given our knowledge and ability. Nothing is added to what we know if by some mathematical manipulation we transform it into a unitary index.[1] Therefore we should refrain from doing it.

The second argument stresses the difficulty of the operation. If the aggregation of the indicators into a unitary index could be performed in a way that would not be controversial, there would be no objection against doing it. But in fact it is highly controversial because of the difficulty of establishing a generally acceptable system of weights. As the method is controversial so is the result. The unitary index would be unacceptable to those who do not approve the method.

Both of these arguments carry some weight: it is therefore quite understandable if somebody chooses to refrain from aggregation and prefers the inconvenience of using a set of figures as an expression for the level of living instead of a single figure.

3.3 Arguments in favour

The first argument in favour of a unitary index is that there is a great need for it. So much so that we cannot do without it.

A rise in the level of living is a criterion by which the

1/ This was the gist of an unpublished UNRISD paper: On the Objective Information provided by the LL Index by M. Inagaki.

achievements of development ought to be assessed. It should also constitute the aim of planned development. It is extremely awkward not to be able to give it a numerical expression.[1] What sense does it make to speak about a level which is not measurable? If we are interested in knowing what is the level of living of a nation, the natural thing to do is to try to express that level in a single figure. If this cannot be done comparisons of levels of living through time or between countries cannot tell us whether the level of living has risen or where it is higher. In fact, the persistent use of the monetary value of consumption per head for measuring the level of living is the proof of a need for a unitary index. The monetary method of measuring the level of living which is clearly inadequate and in every way objectionable[2] would have never been tolerated if it were not filling a yawning gap in our analytical tools.

A unitary level of living index fulfils the need for a synthetic measure of the achievements of development. It does not contain any more information than the individual indicators but it presents that information in a form that is more convenient, more clearly understandable and more amenable to at least some forms of analysis.

There is nothing new in it: calculating averages and computing indices has always the same purpose: to present the information available in a more convenient form. But the merits of having our knowledge stated in a manageable form should not be underestimated.

The second argument in favour of the unitary index is that although its construction is difficult, is it, however, feasible. The main difficulty is of course the system of weights to be applied to the various components of the index. It is maintained that no such system of weights can reasonably be established. There is a striking paradox latent in this statement which seems to have escaped the attention of its propounders. It lays in the fact that the weighting of social aims (pretended to be impossible) happens in practice all the time. In determining development strategies, in establishing plan targets, in solving problems arising out of the implementation of policies and plans, decisions are made which imply weighting the social aims against each other. Those are facts or real life.

1/ Cf. The preface by the UN Secretary General to the Report of the International Definition and Measurement of Standards and Levels of Living, UN, New York, 1954.

2/ See Section 4.3 below.

To say that a weighting (i.e. a valuation) system for social aims is impossible comes to the same as saying that a price system is impossible when we see all around transactions being made at prices. The proof of the possibility of a weighting system of social aims lays in the fact that such systems exist.

It is of course a long way from stating that prices of goods and weights of social aims are real phenomena and from observing them to the ability of explaining how these valuation systems are established, how they function and how this knowle ge can be made useful for further analysis. But there is no point in pretending that it cannot be done.

3.4. The aggregation procedure

The first step in the process of aggregation of the individual indicators into general level of living or level of welfare index consists in transforming the individual indicators expressed in their own particular units into indicator indices.

There are several ways of doing this, all based on the concept of "critical points" which was explained above. The distribution element must come in at that stage too.[1/]

Once we have the indicator indices the problem of integrating them into an overall level of living index becomes a problem of establishing weights to be used for that process.

1/There is no point here in discussing the details of these procedures. The reader is referred to UNRISD Report No. 4: The Level of Living Index, section 1.5 and to the recent UNRISD working paper The Level of Living Index - New version. Section 1.3

3.5. The problem of weights

3.5.1 General principles

It must be realised that by fixing critical points as explained above implicit weighting has already been introduced. The relative rates at which the indicator units are transformed into index points constitute weights between indicators.

After the critical points have been fixed we have to introduce weights at two more stages: for aggregating indicator indices into component indices, and for aggregating component indices into the overall level of living index.

The problem of weights should have been a simple one if some sort of objective criteria could be found as a basis for establishing the relative impact of particular indicators and components in creating welfare for the people. Unfortunately such criteria do not exist.[1]

1/ In principle it should be possible to apply objective criteria in the determination of critical points (which constitutes the first stage for the introduction of weights in the aggregation of the index). In Report No. 4 it was suggested that they should be fixed according to the objective human requirements. The experts in particular fields were supposed to be able to determine these requirements. This seems an acceptable solution, but it has proved difficult in practical application. The experts were very often reluctant to commit themselves and quote any definite figure that would serve as a critical point. And sometimes for very good reasons. For some indicators (e.g. daily calorie requirements) the survival and full satisfaction points can be established - it would seem - with no great difficulty. For some others, however, (e.g. school enrolments, or for that matter some of the health indicators) the problem is not so simple; there is no question of survival and who can tell what is full satisfaction?

It must be emphatically stressed that data on past patterns of needs satisfaction, i.e. the relative levels of components and indicators, or their relative increments, cannot serve as bases for a system of weights.[1] This is so because we cannot assume that what existed in the past was optimal, i.e. was the outcome of the maximization of welfare in perfect conditions. This can never be expected to happen in reality. The real situation is the result of conflicting actions of individuals and organized groups using the existing possibilities to promote their interests. It reflects to a great extent the relative monopoly power of these groups. On the other side the possibilities had been influenced by the course of past events which may not be significant for the present or for the future.

The weights of indicators and components have to reflect their relative contributions to welfare. The concept of welfare implies the existence of some consistent valuation system. Consequently the weights of level of living components must be derived from some preference function which is recognised as relevant for this purpose.

As is the case with all preference functions this function is influenced to some extent by the knowledge of "technical" properties of elements which are the independent variables (e.g. the relative significance of calories and proteins for the satisfaction of nutritional needs, etc.), but the shape the preference function takes is an expression of value judgments of the subject to whom the preference function "belongs".

The "preference origin" of the weights to be used in computing the level of living index is often a source of uneasiness. When this point was being raised in past discussions on the level of living index the response was sometimes a sort of bewilderment: could an index be based on elements so shaky?!

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[1] This approach has been tried for fixing some of the critical points in Report No. 4 and in other UNRISD work. Namely the "0 point" was fixed at the level of a nation that was in worst conditions and the "100 point" at the level of the most affluent country or as an average of a few countries belonging to the top group. This procedure cannot be considered correct. In fact all the principles about weighting should apply to critical point fixing in the same way as they apply to aggregation of indicator indices into component indices and of component indices into the overall index.

This reaction is completely misplaced. From the point of view of economic theory it is most appropriate that an index which is supposed to measure an aspect of welfare should use preference elements as weights. In fact any other course would be incorrect.

In plain language it means that it is not possible to measure welfare by any sort of absolute standard. The first thing to do if we want to measure it is to establish a standard from some scale of values and then to proceed to measure it in relation to that standard. No other way of doing it seems possible.

When it has been agreed that weights for the level of living index should be derived from some preference system, the obvious question arises: - what are the systems of preferences that should be used for that purpose and how can we come to know them?

There seems to be three practical possibilities of deriving weights from preferences. In addition a fourth one might be mentioned but only to be rejected as impracticable.

3.5.2 System of weights derived from explicit social aims

The first of the possible ways of establishing weights is by agreement among policy-makers on national or international levels. This may seem not a very realistic proposition, but it is closer to being put into practice than it may seem. When poverty levels are discussed internationally and some agreement is reached on them, weights between components of the level of living are in fact implicitly established by that very action. When plans are drafted outlining desirable development for the future and stating the priorities between social aims, this again determines weights for the social targets.[1] Of course a necessary condition for that to be true is that the social targets are stated explicitly in quantifiable

[1] It is not possible to enter here into all the details of the procedure for deriving weights from these data. In fact the procedure has not yet been properly elaborated or tested. Consequently, only a very rough outline of the problems in question can be given. For deriving weights from poverty lines an assumption has to be made, that the levels of poverty lines are equivalent for all indicators and therefore the distances between the "0 points" and "M points" are also equivalent. Once this is accepted the relative significance of the respective units of the indicators can be established. The relative significance of the increments of planning targets can be derived from the analysis of planning decisions at the margin. A unit of resources should bring the same yield at the margin in all fields in which resources are used. Therefore, the marginal increments of social targets obtained by a unit of resources can be considered as equally significant (having equal weights) in view of the planners. It must be noted that there is a distinction between weights referring to a steady flow of welfare expressed by the level of living indicators and those referring to increments in that flow as expressed by plan targets. That distinction is analogous to that between the average and marginal utility.

terms and are not missing or stated in very vague terms, as it happens in some of the plans. Once the social aims are included explicitly in the plans and the intended allocation of resources is clearly stated, the calculation of weights becomes possible. The position at present is not yet satisfactory. The poverty lines are not yet agreed on and the social aims are not given their proper place and expression in plans.

The recognition of the role of social elements in planning is, however, gaining ground. It is very important that this process should be accelerated. When social targets are given their proper place of final aims in the plans and when they will be expressed quantitatively in real terms, the basis for a weighting system of the level of living components will be created. The ultimate stage in this process would be reached when not only social targets but also priorities attached to them (or their relative weights) will be explicitly stated in the plans. But that should not be expected very soon.

If the exercise of stating social aims and assigning priorities to them is performed at the international level the weights derived from them can be used directly for international comparisons. Such ought to be the case with poverty lines internationally agreed upon, and world development social targets which so far have never been explicitly established, but which are being discussed in more and more concrete terms.

The statement of targets in national plans can have of course only national validity. When many plans are examined, however, some generalization may prove possible referring at least to some groups of countries and some stages of development. A system of weights could be based on this sort of generalised observation.

3.5.3 System of weights derived from implicit social aims.

The second way of establishing weights has to be used until the explicit statement of social minimum requirements and of social final targets in development plans becomes general practice. So long as social aims are not fully and explicitly stated it is necessary to extract them (or "reveal") from the statement of intent or actual actions of the authorities responsible for development. This is the way of "revealing" preferences which are analogous to the "revelation" of consumers' preferences by their market behaviour. It is made easier by the existence

therefore a strong argument in favour of using equal weights between indicators and components. That will make the index a simple average of indicators and components, which has by itself an obvious significance. There are also some merits, however, in introducing weights of a somewhat more complex type. An example of these will be a "sliding scale system of weights".[1] It is meant to express the principle of diminishing marginal utility and is applicable between components for their aggregation into the overall index. Weights are made dependent on the value of the component indices according to a simple formula, e.g. weight = $\frac{100}{I}$, where I = the value of the indicator index.

No attempt can be made here to list all the possibilities in establishing conventional systems of weights.

3.5.5 Individual preferences cannot determine weights

The fourth way is mentioned here only to be dismissed as impracticable. The weights could be based on some of collective utility function if that in turn could be derived from the individual preference functions of the population. This has been a very much discussed problem of welfare economics. Unfortunately, it is quite certain by now that the aggregation of individual preference functions is not a practical proposition. There is no need to repeat the well-known arguments which prove it.[2]

1/Cf. Report No. 4, p. 20 and Level of Living Index - New Version, section 1.4.4.

2/Cf. J. Tinbergen: Economic Policy, Principles and Design, pp. 14 - 15

of development plans which are statements of intent (non-existing in the case of consumers' preferences). When the plans, however, are formulated in the way they most often are at present (i.e. not oriented towards social aims) the task of extricating preferences which are behind them and which can serve as a basis for weights becomes a very difficult one.[1] Still it is worth undertaking. In fact it is a necessary exercise if we want to have a legitimate base for weighting.[2]

3.5.4 Conventional system of weights

The third way has to be used when the first and second are not practicable. This is exactly how things are at present. The weights have to be determined by the maker of the index. He must of course consult experts and get acquainted with the attitude of policy-makers. But in applying all this information to the establishment of a weights system he would have to rely on his own judgment. The weights determined in that way will have to be considered arbitrary and the index based on them will be a conventional construction, its validity being based on the agreement of those using it. It is certainly not a perfect solution, but the only one practicable at present. It is also wholly legitimate as long as the conventional character of the index is clear to everybody concerned. It must be remembered that the arbitrary and conventional element is contained in many of the agreed methods of measurement of economic and social variables and probably in all well established indices.

A conventional system of weights should be as simple as possible, for it is essential that its structure and the role of conventional elements in it should be clear to anybody using it. There is

1/ A cross-country analysis of development plans was undertaken at UNRISD with the aim of revealing policy-makers' preferences implied in them and finding a basis for weights to be applied in level of living indices. The difficulties proved to be very great. The project is not yet completed.

2/ As mentioned in a footnote to section 3.5.2 the methodology of revealing preferences latent in development plans requires much further study. Apart from the approach mentioned in that footnote, procedures such as the method of pairs comparison could be tried although it is difficult to tell at that stage whether they can be useful.

4. THE CRITIQUE OF MEASURING WELFARE IN MONETARY TERMS.

4.1 The need for a critical appraisal

This critical section is an indispensable part of the present study. The main reason for making an effort to quantify social variables is found in the fact that the economic variables expressed in monetary terms which are in common use do not and cannot represent properly the conditions in which people live. This section explains why this is so. It states, therefore, the case for the necessity of what was attempted in sections 2 and 3 above.

4.2 Flow of welfare vs. flow of goods and services

The level of living[1] is the degree of needs satisfaction as it can be observed through time, it can also be described as a flow of welfare which the population enjoys in a unit of time. It must be distinguished from the flow of goods and services which assures the satisfaction of needs or brings welfare. It is only the value of the flow of goods and services that can be expressed in terms of money. As the flow of welfare and the flow of goods and services are obviously two distinct variables[2] they have to be measured independently of each other. In spite of the obvious truth of the above statement there has been a persistent temptation to assume that the flow of welfare can be measured by the monetary value of the flow of goods and services that are supposed to generate it. Consequently it has become a common practice to identify the level of living with the monetary value of consumption per head. The procedure of measuring a magnitude difficult to measure by means of another one which is connected with it and is easily measurable may be admissible in some cases as a rough approximation.[3] It must, however, be emphatically stated that it is inadmissible in this particular case and

1/ Cf. Section 2.2 above.

2/ The two variables are in about the same relation as that existing between costs of production and the value of the product, or (to take a simple example) as between petrol consumed and distance covered by a car.

3/ To use the example mentioned in the previous footnote: it is possible to make a rough estimate of the distance covered by a car by measuring the consumption of petrol. But this procedure will be inadmissible if our problem is to know what is the consumption of petrol per mile under various road conditions.

for very good reasons.

4.3 The two concepts are not congruent with each other

We may start the argument by pointing out to the differences in the contents of these two variables.

There are elements affecting conditions in which people live which have no counterpart in the national product as conceived in national accounting and cannot be measured by the monetary value of it. Leisure and prevention of over-work are the most important elements falling in that class. For good reasons they were and are the main objectives of the labour movement but they do not find any expression in national income and expenditure accounts. The same is true of some elements that may come under the heading of security.

Sometimes an increase of product and income actually leads to a deterioration of social conditions, e.g. congested housing and deterioration of health following industrialisation and urbanisation. Alcoholism and drug-taking belong there too.

There are aspects of human life which are in some way reflected in the monetary values of national product items but in a very distorted way. Housing and health are the most striking examples of this case. The value of housing services as registered in national accounts does not give us any reliable information about what housing conditions really are. The rise or decline in that value does not necessarily reflect improvement or deterioration of actual conditions. The same is true of health: a major epidemic inefficiently handled may strongly affect people's well-being but it will not show as a decline of value in the section on health services in national accounts.

It is surprising indeed that the measurement of the level of living (i.e. of the flow of welfare) through the monetary value of consumption per head is still defended as an admissible method.

It requires several very questionable assumptions: first that all level of living elements are reflected by corresponding elements in the national product; secondly that all increases in national product elements imply increases in level of living elements; third that every value unit of national product brings about an equal increase in the level

of living. This last assumption implies the distribution of the national product through a market under perfect competition. None of these assumptions is legitimate. All taken together they mean that the increments in the national product are always proportional to the increment of welfare, and consequently that economic growth automatically brings optimal social results. In that reasoning all social problems connected with development have been assumed away.

4.4 The flow of welfare and the flow of goods and services must be set against each other in order to reveal deficiencies of development

There is an important problem of socio-economic development that requires an adequate presentation and deserves serious study.[1] It consists in the fact that resources created in the process of economic growth do not generate as much welfare as they are capable of doing. In developed affluent societies all the tremendous national product available does not prevent the level of living of a great proportion of the population remaining unsatisfactory. In developing countries the apparent advances in productive capacity and substantial foreign aid are often not bringing about the improvement of conditions in which people actually live. As it is generally agreed that the purpose of all development is the improvement in the welfare of the people, such factors are symptoms that something has gone wrong with development. This phenomenon has been variously called "imperfect development" or "welfare deficient development"[2] Perhaps it might better be called "frustrated" or "spurious" development. This deficiency in development may manifest itself in a more or less acute form. It is even possible that it may be absent altogether. But it certainly is a problem which should be given proper attention when development is examined.

The same problem may also be stated in a different form. So long as we see the results of development in terms of the monetary value of goods and services provided we take a purely economic view of it. We

1/ It must be stressed that this is a problem of real life which exists in practice and is neither created nor disposed of by whatever method of investigating it and measuring it is chosen.

2/ See UNRISD Report No. 3, pp. 25.

look at the resources provided but not on how they affect people's lives. As the aim of all economic activity is to improve the conditions in which people live, this means we stop half-way in assessing the consequences of development. To obtain a complete picture of development it is not sufficient to be aware of the amount of resources brought about by economic growth. It is also necessary to examine the impact of economic growth on the life of the people. By broadening the concept of development in this way we make an important step towards bringing the social elements into development. Indeed most of the social contents of development can be interpreted in terms of the relation which exists between the economic resources made available by economic growth and the conditions of human life actually achieved. Or, in other words, between the "value of consumption per head in monetary terms" and the "level of living in real terms". The study of that relation is concerned with the important problem of what the social consequences of development are. It is from this study we can draw conclusions about the quality of development, i.e. on whether it is genuine or spurious (welfare deficient).

Still another way of stating the same problem is to say that an important characteristic of development is the welfare effect[1/] of economic growth, i.e. the relation between the growth of social variables and the growth of economic ones. An insufficient welfare effect is a definition of welfare deficient development. Once it is understood that the examination of the welfare effect has a crucial significance for the assessment of the social achievements of development, the necessity of measuring the level of living independently of the monetary value of consumers' goods and services becomes obvious. These two are separate variables that have to be confronted with each other. In terms of their relative changes we can examine the social contents of the development process. When they are confused it is not only impossible to investigate the problem of the social consequences of development but even to state it clearly.

1/This is a concept developed in UNRISD Report No. 3 page 23

4.5 The existence of correlation does not make the two variables interchangeable

It has been argued sometimes that separate measurement of the level of living and of the consumed part of the national product is not necessary because a high correlation can often be discovered to exist between these two variables. This argument does not carry any weight at all. The correlation is certain to exist between them[1] as it is certain to exist between costs and revenues of a firm or between petrol consumed and distance covered by a car. What we are interested in is to examine the discrepancies between the two variables. Our problem would of course cease to exist if it could be proved that the two variables are always proportional to each other. But this is evidently not the case, as a high correlation between two variables does not imply an accurate prediction of the value of one variable when the other is given.

4.6 Perfect competition mythology prevents repudiation of the monetary measures

A question might be asked why the practice of measuring the level of living (the flow of welfare) with the monetary value of consumption per head has not been definitely abandoned and still can find its defenders.

The answer seems to lay in the deep-rooted attachment to reasoning in terms of markets and perfect competition. If all human needs were satisfied through market transactions (which is not the case) and if the market form was perfect competition (which is not true either) then all marginal utilities would be proportional to prices and it could be claimed that the increments in individual utility, and consequently in welfare, would correspond to the increments in the money value of products.[2]

1/ It should also be noted that when these two variables are observed through time they both become functions of time, and the correlation between them becomes spurious and devoid of any significance. To find a true correlation it would be necessary to eliminate the time element. An unpublished note by Mr. Subramanian (UNRISD) deals with that problem.

2/ The situation reached would have been optimal from the point of view of the satisfaction of needs, although it should be noted that it would have depended on the initial distribution of resources which might not necessarily be satisfactory.

This is the position when the "invisible hand" of the market mechanism assures the best possible satisfaction of the needs of the population. If this is taken to be true there is no place for any social problems to arise at all. The market mechanism assures both production at its optimal use. But that only means that all the social problems have been "assumed away", and that they cannot be examined within these terms of reference.[1]

The essence of the error in this approach can be pinned down in the following way. A highly simplified model has been constructed for the sake of explaining some aspects of the working of the economic system. This is the perfect competition market model. It implies simplifications referring to the characteristics of the system which are secondary to the problems the model is meant to clarify. This is all perfectly legitimate. But then the nature of the model is forgotten and it comes to be used as if it were a true picture of reality. The result is that the elements that were assumed away are treated as non-existent. If our interest is exactly in these elements a number of fallacious conclusions are bound to follow. Such is the case of social elements in development. They cannot be examined if perfect competition is assumed where marginal utilities are proportional to prices and an increase in the monetary value of national product reflects an increase in welfare.

1/ In terms of economic theory it might be said that the study of social problems within development is a study of imperfections in development. If we assume perfection the case is dismissed.

SCOPE FOR FURTHER RESEARCH

Measurement of social variables in real terms opens up wide field for the investigation into the social significance of development. The investigation of development acquires social contents where we are not satisfied with explaining how the national product came to be produced and in what does it consist, but start asking questions about how and how much does it contribute to the satisfaction of needs of the bulk of the population. In other words where we start exploring the area between the value of consumers' goods and services expressed in monetary terms and the satisfaction of human needs expressed in the level of living index points.

Quite a number of courses are opened for that kind of investigation. Once the level of living index is computed[1] and the consumption per head in monetary terms known, it is possible to study the welfare effect, i.e. the relation between economic growth and growth of welfare.[2] Various formulas for the welfare effect could be tried,[3] both sector-wise and on a national scale. A concept of "welfare generation function" could be elaborated in which a component of welfare (e.g. health) could be the dependent variable and economic factors would be independent variables.[4] Then the productivity effect of welfare could be assessed. To do this a production function will have to be constructed which, apart from the usual

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1/ The level of living index (based on UNRISD methods) has been so far compute for the period around 1960 for 20 countries (UNRISD's Report No. 4, Part 3) A through time computation (mainly for 1925-1965) has been prepared for Czechoslovakia (The Level of Living Index in Czechoslovakia by J. Krejci), Japan (The Japanese Level of Living by T. Sohara) the Netherlands and the United Kingdom (unpublished UNRISD documents). A study of the Level of Living in Poland is in preparation.

2/ Some attempts at determining the welfare effect were made in the Level of Living Index studies for the Netherlands and United Kingdom.

3/ Such as: Level of living/consumption per head in monetary terms ratio, the same incremental ratio, the same relative incremental ratio, etc.

4/ This "welfare generation function" would be parallel to the well-known production function with the difference that the place of product will be taken by a component of welfare and the place of factors by various consumer goods and services plus labour. The parameters in both functions are technical coefficients. The "welfare generation function" has been sometimes called "production function for a welfare component" (e.g. health, education, etc.) As it is, however, an expression of the welfare effect it seems desirable to describe it by a term different from the common "production function" which is an expression of the productivity effect. The "welfare generation function" should never be confused with what is known as "welfare function" where total welfare is made dependent on a number of goods and services and where parameters are utility coefficients.

economic factors would contain social factors (as independent variables and not as a residual).[1] The actual value for the parameters of these functions can be estimated from empirical data. The knowledge gained in the study of welfare and productivity effects may be presented in a table[2] of interdependence between the economic and social elements. The variations of the numerical values of these variables may be studied in relation to stages of development and other characteristics of particular countries.

Independently of these investigations further work on the improvement of the level of living and level of welfare indices should be carried on. It should be mainly directed towards establishing generally acceptable systems of weights for these indices through "revelation" of policy-makers' preferences implicit in the development plans.[3] A serious effort should also be made to make the list of indicators used in both indices fuller and more representative. This in turn calls for an improvement in the amount and quality of statistical data which are necessary for the computation of the indices.

All this should serve to make a policy aiming at the improvement of social conditions more effective, i.e. to increase the welfare effects of economic growth. The mere knowledge of the existing interrelations gives development planning more solid foundations. But what is more, the consequences of this approach to social problems in development ought to be reflected in the way development planning is conceived and conducted. National product per head or its rate of growth should no longer serve as final aims for development. That place should be taken by a set of social aims which appropriately weighted would constitute a criterion for the allocation of resources.[4] When development planning is based on such principles it would deserve the name of social planning.

1/ A paper A suggestion for an empirical production function representing the productivity effect of social factors has been prepared by the UNRISD (not published yet).

2/ Examples of such tables, but with blanks in places of numerical values, has been presented in UNRISD Report No. 3, pp. 41 sq.

3/ Tentative work on that problem has been undertaken in UNRISD.

4/ A study of a model of development planning based on these principles is actually in preparation at UNRISD.