

Indicators of Development: The Search for a Basic Needs Yardstick

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Summary. — The measurement of development efforts in developing countries has generally focused on the growth of GNP per head and related concepts. Increasingly, development economists have become aware that growth of output or income by themselves are not adequate indicators of development, and that the reduction of poverty and the satisfaction of basic human needs are goals that should show up in a measure of development. There has been growing interest in designing better measures of development, including modifications of GNP, social indicators and associated systems of social accounts, and composite indices of development. A review of these approaches and concepts points to the conclusion that the use of social and human indicators is the most promising supplement to GNP, particularly if work on social indicators is done in areas central to the basic needs approach.

1. INTRODUCTION

Ever since economists have tackled the development problems of the less developed countries, the principal yardsticks for measurements of economic development have been GNP, its components, and their growth. Despite the many problems with national accounting in developing countries, the national accounts have continued to be the main focus of discussions of growth, the allocations between investment, consumption and saving, and the relative influence of various sectors in total value added. GNP per head is widely accepted as the best single indicator of development, both historically and for international comparisons, despite well-known serious problems.

The use of national accounting was inspired by the attention of Western economists to the broad aggregates of Keynesian economics, which was itself of major influence on economic thought at the time (1950s) when attention was being increasingly paid to the less developed countries. National accounting served to integrate, through a weighting system based on market prices or factor costs, such disparate items as agriculture and industrial production, investment, consumption and government services. In fact, national income accounting was a tool of analysis that other social scientists sometimes viewed with considerable envy.

The heavy emphasis on GNP, or GNP per head, and their growth rates, as the principal performance test (not normally as the 'objective') of development was based on doubtful assumptions. Either it was assumed that economic growth has a tendency automatically to 'trickle down' to the poor, or it was thought that, where there was no automatic tendency for the benefits from growth to spread to the poor, governments would take corrective action. Some authors insisted that concern with greater equality of income distribution, with alleviating poverty, or other social aspects of development is premature since it would reduce savings, investment and work incentives, and therefore growth.

In the light of the experience of the last 25 yr, neither of these assumptions turned out to be generally valid. Highly concentrated and unequal growth was observed in some countries for prolonged periods, so that there was no universal tendency for growth to spread. Nor did governments always show signs of correcting gross inequalities. Doubt was cast

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on the need for inequality to promote growth when no correlation between unequal income distribution or perpetuated poverty and high growth rates was established. Inequality and poverty were found not to be a necessary condition of growth and indeed were often an obstacle to it.

The disappointment with GNP per head and its growth led to greater emphasis on employment and redistribution. But it was soon seen, on the one hand, that unemployment in the sense in which the term is used in the developed countries was not the problem in the developing countries and that, on the other hand, redistribution from growth only yielded very meagre results. Furthermore, it is clear that mass poverty can coexist with a high degree of equality, and reductions in absolute poverty are consistent with increases in inequality. The concern has shifted to eradication of absolute poverty, particularly by concentrating on basic human needs. Meeting these needs in nutrition, education, health and shelter may be achieved by various combinations of growth, redistribution of assets and income, and restructuring of production. It is the composition of production and its beneficiaries, rather than indexes of total production or of income distribution that have become the principal concern. This new focus on meeting basic human needs requires an indicator or a set of indicators, therefore, by which deprivation can be judged and measured, and policies directed at its alleviation and eradication can be initiated and monitored. The problems inherent in using GNP as a measure of social welfare have been recognized almost since the inception of national income accounting. This paper identifies and reviews four different approaches to the measurement problem:

- (i) *adjustments to GNP*, through which modifications of standard national income accounting concepts are undertaken in order to capture some of the welfare aspects of development and to improve international comparability;
- (ii) *social indicators* which attempt to define non-monetary measures of social progress;
- (iii) the related *social accounting systems* which attempt to provide an organizing framework for some of these indicators; and
- (iv) the development of *composite indices* which combine various social indicators into a single index of human and social development or the 'quality of life'.

In addition to these four broad areas, considerable effort has been expended in defining an adequate measure of income distribution,

and the numbers living below a poverty line. We discuss this briefly under the 'adjustments to GNP' approach. The extensive literature on this subject could, however, warrant a separate review.¹

2. ADJUSTMENTS TO THE GNP MEASURE

Despite the overwhelming attention to growth, the deficiencies of GNP per head as an indicator of *economic* development became apparent to many even during the early years. Pigou already had pointed out that economic welfare comprises not only national income per head, but also its distribution and the degree of steadiness or fluctuation over time. Measurement problems become apparent when one attempts to make inter-country comparisons of GNP per head. Part of the problem arises from the fact that official exchange rates do not measure relative domestic purchasing power, since a large portion of marketed GNP does not enter into world trade. In addition, trade policies often create distortions in nominal exchange rates, so that they fail to reflect the true value of even that proportion of GNP which is traded.

Colin Clark (1940, 1951) was one of the first to attempt to convert national accounts using purchasing power parities, which means measuring the output of each country at some common price level, usually international prices. The most recent and complete work on purchasing power parities has been undertaken by Kravis *et al.* (1976, 1978). The results of this research suggest that the GNP of India, for instance, should be adjusted upward by a factor of 3.5, while most other countries would be adjusted by a somewhat smaller margin. Even these kinds of adjustment, however, cannot eliminate all the problems of comparing GNP across countries. For instance, because of climatic conditions greater expenditures may be required for clothing and shelter in the more temperate parts of the world in order to survive, while dry tropical zones require more expenditure on irrigation and disease control. Evaluations of non-tradables, particularly public and other services, are difficult and subject to conceptual problems. In addition, a great deal of work is necessary, covering hundreds of goods and services, in order to estimate accurately purchasing power parities. Unless a 'short cut' or reduced information approach is developed, it will be difficult to make wide use of this approach.

Nordhaus and Tobin (1972) attempted to

adjust GNP so that it would be a better 'Measure of Economic Welfare' (MEW). This approach entails subtracting from GNP an allowance for defence expenditures and other 'regrettable necessities', such as the 'disamenities' of urbanization (pollution, congestion, crime, etc.), while adding an estimate of the value of leisure and the services of consumer durables. At the same time, Nordhaus and Tobin reclassified health and education expenditures as investment, rather than consumption. The final result produced a MEW for the USA that was substantially larger than GNP (about twice), largely because of the high value imputed to leisure (the measure of which raises great difficulties) and other non-market activities. The growth rate of MEW for the USA between 1929 and 1965 was somewhat lower than that for GNP, mainly because of the larger value of leisure and non-market activities in the base year (1929), reducing the *proportionate* rate of growth, and partly because of the growth of defence expenditure and urban 'disamenities'. Denison (1971) and others have criticized this approach on the ground that GNP was never meant to measure welfare, and attempts to adjust it only confuse the concept.

It might be possible to incorporate some of the items captured by social indicators by GNP adjustments. Thus, life expectancy could be allowed for by using expected lifetime earnings instead of annual income per head or, more crudely, the product of average income per head and life expectancy. The consumption benefits of literacy could be allowed for by imputing the value of services from education as a durable consumer good, etc. (The benefits of literacy as a durable investment good already show in the form of higher productivity.) Distribution could be allowed for by taking the median or the mode rather than the mean income, or by multiplying the mean income by 1 minus the Gini coefficient, etc.

From the point of view of indicating the satisfaction of basic needs, the Nordhaus-Tobin corrections raise certain difficulties. 'Regrettable necessities' are subtracted from GNP, because, 'we see no direct effect of defense expenditures on household economic welfare. No reasonable country (or household) buys "national defense" for its own sake. If there were no war or risk of war, there would be no need for defense expenditures and no one would be the worse without them'. But similar reasoning could be applied to the components of basic needs. We do not want medical services from nurses, doctors and hospitals for their own sake. If it were not

for disease and accidents, we would not need to incur this expenditure. The same goes for shelter against the cold, for sewerage and, perhaps, for literacy. Even food for under- or malnourished people is a necessity to prevent hunger, disease or death. A logically consistent application of the Nordhaus-Tobin principle would lead to an *inclusion* in the national income only of those items that we do not really need, the inessentials and frills, which would be a paradoxical conclusion, contrary to the judgement of those who wish to *exclude* all frivolous luxuries from our national income accounts.

If it were possible to distinguish precisely between 'goods', 'bads', and 'anti-bads', we would deduct from national income all 'anti-bads': those that combat the 'bads' generated by potential enemies (defence), those that offset the 'bads' generated by nature (heating, shelter, medicines) – the narrowest definition of basic needs – and those that offset the 'bads' generated by the domestic economic system itself ('artificially' created wants through advertising, emulation and social pressures). In fact, it is not possible to distinguish between good and bad 'artificially' created wants without introducing value judgements (the desire for books, art and music is also 'artificially' created), and it is not possible to distinguish between 'anti-bads' (the need for deodorants or anti-dandruff shampoo created by the fear of social ostracism) and goods (the need for literature created by the desire to participate in society).

Adjustments to GNP for *distributional* value judgements can be made by weighting different components of the national income according to who receives them. Such a redefinition would, however, eliminate the distinction between the national income and its distribution. Ahluwalia and Chenery (1974) have suggested that the growth rate of GNP in itself is a misleading indicator of development, since it is heavily weighted by the income shares of the rich. A growth of 10% in incomes of the upper 20% will have more impact on the aggregate growth rate than 10% growth in incomes of the lower 20%. They suggest two alternatives: either the equal weighting of each decile of income recipients or the introduction of 'poverty weights' which would place more weight on the growth of incomes for the lower 40%. The result is a revised aggregate growth rate which makes an allowance for differences and changes in income distribution.

Another approach would be to use simply the absolute income level of the lower 40% as the appropriate indicator to which development

policies should be related. This has the advantage of shifting the focus away from the distribution of income, a politically sensitive subject in many countries, to the level of living of the poor. Progress in reducing poverty can be judged, however, only if the income level of the poor can be compared with some standard minimum which reflects a 'poverty line'. The general approach adopted by many is to calculate that level of income at which the average family consumes a nutritionally adequate diet, usually defined in terms of calories. Those families (or individuals) not having this income are therefore judged to be below the poverty line, and comprise the poverty target group.

The shortcomings of this approach are many, and will be discussed here only briefly. First, examination of family income and food consumption ignores the important problem of distribution of food and other amenities within the family. It seems clear that in many countries women (who, in some societies work harder than men) and children receive less than an 'adequate' amount of food despite the fact that the family's total consumption is judged to be 'adequate'. Poverty line measures do not consider how far families are below the poverty line. They do not show improvements that take place below this line and suggest a 'solution' for those brought barely above the line. They pay no attention to the distribution of food between different families below the line. They therefore conceal the efforts required to reduce poverty. Sen (1973, 1975) has proposed a weighting of individuals on the basis of how far they fall below the poverty line, thus combining poverty line and income distribution approaches.

In addition, the concept of 'nutritionally adequate' is difficult to define since caloric needs vary widely with climate, body weight, activity, and height, age and other factors, and even for the same person in the same conditions, from day-to-day. Household income surveys generally show that many families below the poverty line could consume an adequate diet by purchasing a different, and more efficient, basket of foods which are available but rejected on grounds of taste, variety, etc. Families living below the 'poverty line' are often found to undertake certain non-food expenditures which many would judge to be non-basic, such as on drink and entertainment. Even with an income above the poverty line, a family may not be able to purchase essential goods and services which are controlled and in inadequate supply or supplied by the public sector (such as health, education, water supply), or they may have to

rely on less efficient and more costly alternatives in the private sector (traditional healers, private water deliveries, private schools). The importance of the public sector in these areas derives from the view of these goods and services being 'merit goods', as well as from the external economies present in both consumption and production. The main basis of the basic needs approach, in fact, stems both from the view that raising incomes alone is insufficient in view of the inefficiencies in the consumption patterns of the poor and the lack of availability of essential goods and services. Thus, any measure of poverty income, no matter how carefully derived, will be inadequate for measuring basic needs.

3. SOCIAL INDICATORS

An alternative approach is to develop better indicators of human, social and economic development which cover areas and aspects that cannot be reflected in most income-based measures. These so-called 'social indicators' attempt to measure the development of health, nutrition, housing, income distribution, as well as other aspects of cultural and social development. A great deal of work has been undertaken by various agencies to compile a set of social indicators, including the UN (1975), OECD (1976), AID (1976), UNESCO (1977) to mention a few.

In theory, social indicators should be more useful in cross-country comparisons, since they avoid the exchange and valuation problem. In fact, the statistical basis for comparing these indicators between countries or over time remains very frail. The figures are often unreliable and not comparable, particularly because of different definitions used in collecting data. In addition, many data are based on limited sample surveys or other, highly inaccurate data collection methods. Differences observed in social indicators between countries often reflect these statistical and definitional variations in the indicators rather than real differences in social development. But this constitutes a challenge to collect better, more comparable data.

Unlike the national accounts which use the pricing mechanism to combine heterogeneous items, there is no obvious way to combine different social indicators. Consequently, problems arise in absorbing the content of a large number of socio-economic indicators and in any attempt to draw general conclusions. The

movement to develop social indicators, furthermore, has suffered from a lack of clear perception of purpose. The term 'social indicators' has itself been used very loosely to encompass a whole range of human, economic, social, cultural and political indicators. The need to supplement the GNP as an indicator of *economic* development has become confused with a search for indicators of other aspects of development as well as for an indicator of the 'quality of life'. The latter concept has generally been taken to cover concepts such as security, peace, equality of opportunity, participation, and personal satisfaction, all of which present difficult measurement problems. It has never been clear whether the search was for an *alternative* to GNP, or a *complement* or a *supplement*.

Although we do not as yet have a unifying conceptual framework for these indicators, and despite the problems mentioned above, social indicators do have certain advantages over GNP per head. First, they are concerned with ends as well as means, or at least with intermediate ends nearer to the ultimate end of a full and healthy life, than aggregate average production measures. Even those social indicators that measure inputs (e.g. hospital beds for 1000 population or school enrolment rates) rather than results (life expectancy, morbidity, literacy) attempt to capture inputs that are nearer to the desirable results than GNP per head.

Secondly, many social indicators say something about the distribution as well as the average, because skewness at the upper end is more limited than it is for income per head. (The mode or the median for income per head can, however, eliminate skewness and reflect some aspects of distribution in the average.) There is practically no limit to how much income a man can receive, but the maximum life span is limited. Any increase in literacy reflects also a distributional improvement, because the *proportion* of beneficiaries has risen.

Some indicators are better than others for showing also the distribution of basic needs deficiencies since they are constructed on an either-or, have-not basis. Thus, measures such as literacy, access to clean water, and primary school enrolment can be used to indicate the percentage of the population having basic needs deficiencies in each of these important sectors. Measures such as life expectancy, infant mortality, and average calorie consumption are less informative since they average the statistics of rich and poor alike. There seems

to be a clear need to develop more specific measures related to the poor, such as life expectancy or calorie consumption indicators for those in the lower quintile of the income distribution, for women, for rural dwellers, etc.

Thirdly, while GNP per head follows an ascending order from the poorest to the richest countries, some social indicators are capable of catching something of the human, social, and cultural costs of opulence (the diseases of affluence like heart disease, stomach ulcers or deaths in automobile accidents), as well as poverty. They can, in principle, register some of the shared global problems, such as pollution, cultural dependence or interdependence, etc., and reduce the false hierarchical and paternalistic impression that may be created by purely economic indicators. As a result, a different meaning can be attached to the 'gap' between the so-called developed and developing countries. The GNP measure points to 'catching up' and suggests a race. Social indicators can point to common and shared values and problems, to alternative styles of development, to the opportunities for learning from one another. Reducing or closing the international 'gap' in life expectancy, literacy, infant mortality, or morbidity would appear to be a more sensible objective, and can be achieved at much lower levels of GNP per head and therefore much sooner, than reducing the 'income gap', though we are perhaps even more ignorant about how to achieve the former than the latter.

4. INPUTS VS RESULTS

Whether social indicators should reflect inputs or results depends upon their purpose. For performance testing there is something to be said for the approach of choosing indices that measure results or outputs, since these are closer to what we are trying to achieve. Furthermore, measures of inputs can introduce biases toward certain patterns of meeting needs which may not be universal. For instance, a country with fairly acceptable health standards should not be encouraged to acquire the same number of doctors as one with serious health problems. We are back with the problem of 'regrettable necessities', which should not be counted as final goods or as social achievements. Moreover, the number of doctors does not measure the distribution of these doctors and medical services, or the degree of their specialization. Resources may be deployed in

inefficient ways, failing to benefit the poor. Measures such as infant mortality and life expectancy, however, indicate the degree to which basic needs have been fulfilled, rather than the resources expended. Likewise, literacy measures the effectiveness of the educational system, and is, in principle, a better indicator than the number of students enrolled or the student/teacher ratio. In general, output measures are better indicators of the level of welfare and basic needs achievement. Moreover, most outputs are also inputs. Health, education and even nutrition are valued not only in their own right, but also because they raise the productivity of present and future workers, though higher productivity is valued because it contributes to a better life.

Input measures, such as doctors or hospital beds per 1000 or enrolment rates in schools, on the other hand, also have their uses. They may reflect government intention, commitment and efforts to provide public services. For purposes of assessing policies and monitoring performance, both sets of indicators are necessary. Input measures are useful indicators of resources devoted to certain objectives (though these can be misdirected). To the extent to which we know how to link inputs to results, i.e. have a 'production function', we can trace the connections between means and ends. Even where we do not have knowledge of a 'production function' (e.g. linking expenditure on family planning to a decline in the fertility rate), the combination of input and output measures presents the raw material for research into the causal links between the two, particularly since, in a social system of interdependent variables, so many outputs are also inputs. In addition, where output measures cannot be readily found, it might be necessary to fall back on measures of inputs as useful proxies.

5. GNP VS SOCIAL INDICES

Several studies (McGranahan *et al.*, 1972; United Nations, 1975) have indicated a high correlation between economic indicators, including GNP and social indicators. This might suggest that GNP can be used as a proxy measure of social development. Morawetz (1977) found that there was a weak correlation between the level of GNP and indicators of basic needs fulfilment, and even less correlation between the *growth* of GNP and *improvements* in basic needs indicators. Sheehan and Hopkins (1978) concluded, however, that 'the most important variable explaining the average level of basic needs satisfaction is *per capita* gross

national product' (p. 95). These contradictory results appear to arise from the use of differing selections of indicators, sources of data, and country samples, as well as differing interpretations of results. Many scholars include in 'social' indicators non-monetary measures of economic performance, such as newsprint or energy consumption or the ownership of automobiles and radios. These economic indicators are almost always highly correlated with GNP, and at times, have been suggested as a shortcut to estimating internationally comparable income levels (see Beckerman, 1966). Some researchers exclude the developed countries, whose high levels of both GNP and social development might dominate the sample. Likewise, different results can be obtained based on the inclusion or exclusion of the centrally planned economies, the OPEC countries, and the very small LDCs.

Correlations based on 1970 data from the World Bank's Social Data Bank are shown in Table 1.² The results for 7 social indicators show a modest correlation with GNP (average $r^2 = 0.50$), while a sample of 5 economic indicators show somewhat higher correlation ($r^2 = 0.71$). However, when the social indicator data are disaggregated into samples of developing and developed countries, the correlation coefficients for both groups drop significantly ($r^2 = 0.25$ for developing countries, 0.18 for developed). Similar declines in the correlation coefficients are also found when the economic indicators are disaggregated. Consequently, it would appear that studies which examine only social variables for developing countries are apt to discover a poor relationship, while those that consider economic and social variables for all countries are likely to find better relationships.

One reason why social indicators are not more highly correlated with GNP per head is that the relationships are often distinctly non-linear. Indicators such as life expectancy, literacy, and school enrolment have asymptotic limits which reflect biological and physical maxima. It is impossible, for instance, to have more than 100% literacy. Furthermore, these limits are often reached by middle-income countries, so that further increases in income show little gains in social indicators. For instance, life expectancy reaches 70 yr of age for countries with income per head (1970) of \$2000, and does not increase even as incomes increase to \$5000. Most countries have attained close to 100% literacy by the time their income reaches the \$2500 level. Conversely, countries below \$500 GNP per head demonstrate a wide variety of social development which is largely

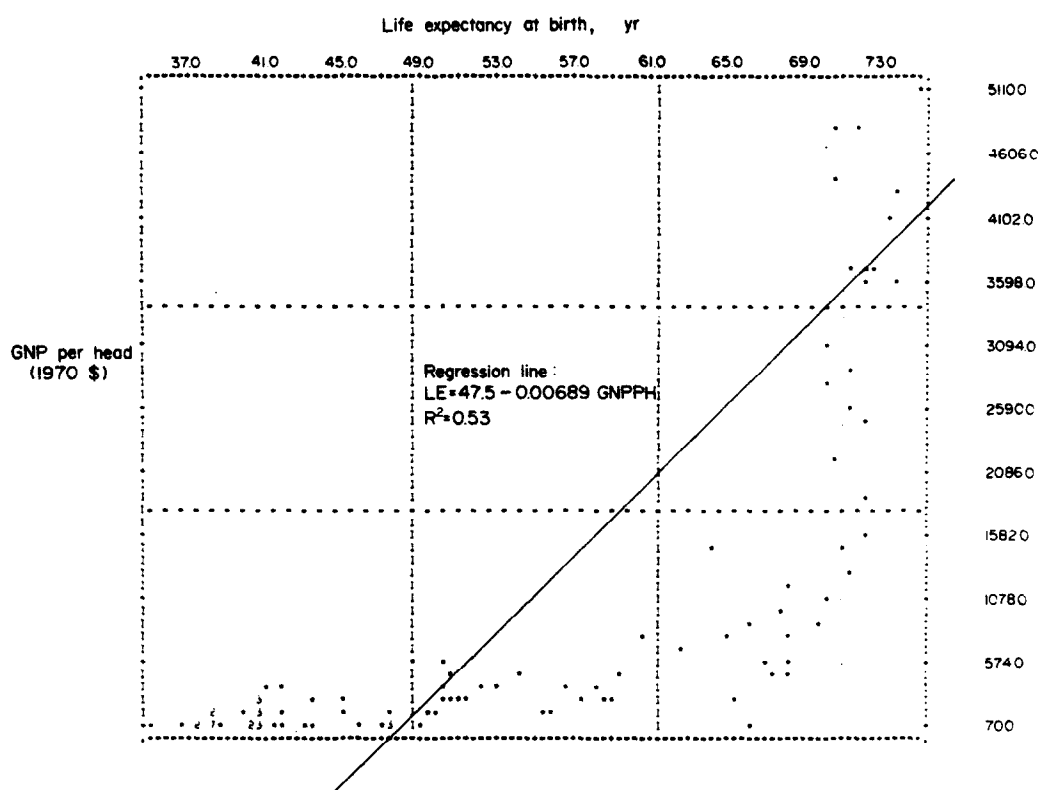
Table 1. *Correlation of indicators with GNP per capita (1970)*

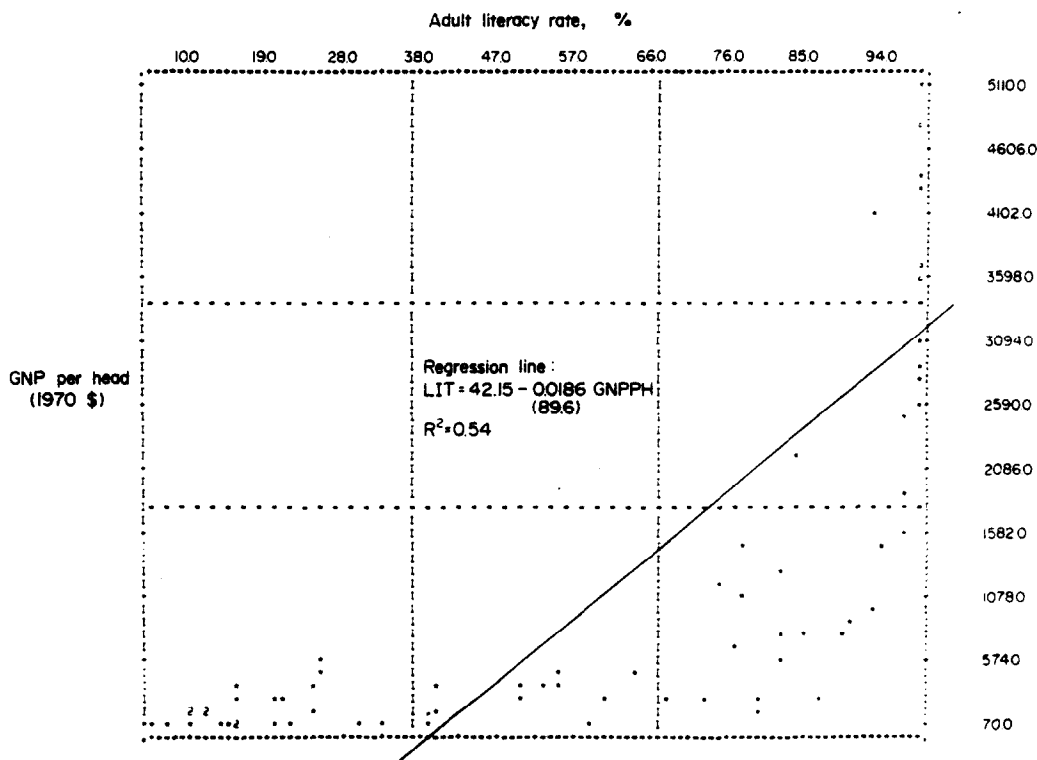
	All countries	Correlation coefficients (r^2)		Sample size
		Developing	Developed	
<i>Social indicators</i>				
Expectation of life at birth	0.53	0.28	0.13	102
Calorie consumption (as % of required)	0.44	0.22	0.02	103
Infant mortality	0.42	0.34	0.25	64
Primary enrolment	0.28	0.24	0.05	101
Literacy	0.54	0.47	0.16	70
Average persons per room (urban)	0.58	0.08	0.29	34
Housing units without piped water (%)	0.74	0.13	0.36	36
<i>Average</i> *	0.50	0.25	0.18	
<i>Economic indicators</i> †				
Newspaper consumption	0.79	0.20	0.46	85
Automobiles	0.85	0.59	0.46	102
Radio receivers	0.43	0.14	0.07	97
Electricity consumption	0.67	0.30	0.24	102
Energy consumption	0.82	0.28	0.49	99
<i>Average</i>	0.71	0.30	0.34	

Source: Based on data taken from the World Bank's Social Data Bank. Excludes centrally planned economies and countries with a population of less than one million.

* Simple unweighted arithmetic means of the r^2 .

† All economic indicators are on a *per capita* basis.

Figure 1. *GNP and life expectancy (1970)*

Figure 2. *GNP and literacy (1970)*

unrelated to the level of GNP. This can be seen more clearly from the two graphs on the following pages for GNP with life expectancy and literacy (other social indicators show similar patterns). The cluster of points along either axis indicates the lack of correlation at both the high and low income levels. It seems clear that a much better correlation could be developed using some sort of non-linear relationship.³ A non-linear function would obscure the fact that the correlation exists, however, only among the middle-income countries. GNP per head is likely to be a misleading indicator of social development and progress in meeting basic needs, particularly when used in some linear fashion. Yet rankings of countries by social indicators and GNP are likely to be very similar, because the ranking process obscures these non-linearities.

6. SOCIAL ACCOUNTING SYSTEMS

Some work has been done on developing a system of social accounts to provide a kind of national accounting framework for social

indicators. Stone (1975) and Seers (1977) have proposed the use of lifetime activity sequences calculated by dividing total life expectancy into segments. Such tables would show the average time a person could expect to spend in various mutually exclusive states. One such matrix could divide lifetime activity between school, work, leisure, retirement, etc., while another might be built on a marital sequence (single, married, divorced, widowed). Such tables would combine various important social statistics from different fields, and would be used to indicate changes over time, either actual or planned. The system presents many problems, however, not the least of which is its inability to incorporate fully all aspects of social development. Some indicators (income distribution, security, police protection, pollution) cannot readily be transformed into life expectancies. Furthermore, the system goes far beyond the data available in most countries, and is thus more suited for the industrialized countries. Nevertheless, it is a concept which has some future potential for integrating a large variety of social variables, and providing the basis for a theory linking policies to results

in the area of social planning. Other ideas have been developed for a more limited social accounting approach. The *Social Accounting Matrix* (SAM) of Pyatt and Round (1977) does not utilize social indicators, but expands the traditional input-output table into a matrix which details payments made by productive sectors to different income recipients. Recipients can be disaggregated in various ways so as to indicate the distribution of income between various factors, urban/rural households, or income classes. The power of the SAM approach is that it integrates production and income distribution data in a way that gives a better view of the economy, and the flows between sectors. It still relies, however, on the use of GNP as a measure of welfare and is limited in its application by the absence of good income distribution data. Terleckyj (1975) has developed a matrix framework for analysing the impact of government programmes on various social goals, as indicated by the appropriate social indicators. Since programmes affect more than one social goal, the approach develops a matrix of inputs and outputs, and suggests the possibility of defining the most efficient set of programmes for achieving a particular set of goals. While this approach provides a useful rationale for using different indicators, it does not provide a better measure of growth or development.

7. COMPOSITE INDICES OF DEVELOPMENT

Relatively more work has gone into developing composite indices that could be used to replace or supplement GNP as an indicator of social, economic or general development. A large amount of work was undertaken by the UN Research Institute for Social Development (UNRISD) during the 1960s to develop better social indicators, including composite indicators. For instance, Drewnowski and Scott (UNRISD, 1966) developed the 'Level of Living' index, which was defined as 'the level of satisfaction of the needs of the population as measured by the flow of goods and services enjoyed in a unit of time' (p. 1). The Level of Living Index itself, however, goes beyond the provision of goods and services, and considers 'basic needs', subdivided between physical needs (nutrition, shelter, health), and cultural needs (education, leisure, security). 'Higher Needs' or 'Surplus over Basic Needs' is taken as the surplus income over some minimum level. The 'basic needs' part of the index includes items which are very

difficult to obtain for many countries, such as the amount of leisure time available, the number of people in possession of private saving, and the quality of housing. This makes the application of the index very difficult, and Drewnowski and Scott were forced to use short-cut approximations even for their limited sample of 20 countries. Furthermore, the work, once begun, was not continued after 1966 in the same form.

McGranahan *et al.* (UNRISD, 1972) examined 73 indicators which covered economic and social characteristics, and found that there was fairly high inter-correlation between these indicators. Through a process of elimination, he constructed a 'Development Index' based on 18 'core indicators' which included 9 social and 9 economic indicators. The resulting index was highly correlated with GNP per head ($r^2 = 0.89$), although there were some countries (Venezuela, Chile, Japan) whose ranking was substantially different under the index. In general, the correlation of the index and GNP per head was somewhat lower for developing than developed countries. This study concluded that social development occurred at a more rapid pace than economic development up to a level of about \$500 *per capita* (1960 prices). Some of these results are themselves, however, a product of the method employed, whereby the selection of the 18 'core indicators' was based, in part, on their having a high inter-correlation with the other indicators. As a result of the high inter-correlation, the composite index was relatively insensitive to the choice of component variables. The UNRISD team found, for instance, that the country rankings remained virtually unchanged when the number of indicators was reduced from 18 to 10.

A study by the United Nations-ECOSOC (1975) sought to analyse development by ranking 140 countries by seven indicators other than GNP. These included two 'social' indicators (literacy, life expectancy) and five 'economic' indicators (energy, manufacturing share of GDP, manufacturing share of exports, employment outside agriculture, number of telephones). An overall rank for each country was calculated by giving equal weight to the ranks under each separate indicator. Arranging the results by quintiles, and comparing with GNP, the UN indicated that the overall index was closely associated with the ranking by GNP. It should be noted, however, that the UN index was heavily weighted by economic, rather than purely social, indicators and thus tends to replicate the findings of Beckerman (1966) and others that show that non-monetary

indicators are highly correlated with GNP. A similar study by the OECD Secretariat (1973) used regression techniques for six variables to establish a predicted GNP per head index for 82 developing countries. A more recent paper by the OECD/DAC (1977), however, concluded that '*per capita* GNP still appears to be the 'best measure' of the level of development.

A more recent study of the use of a composite index has been undertaken by the Overseas Development Council (ODC), under the guidance of Morris D. Morris. Morris's Physical Quality of Life Index (PQLI) uses three simple indicators with equal weights to attempt to measure the fulfilment of 'minimum human needs': life expectancy at age one, infant mortality and literacy. Morris argues that the use of indicators for judging performance under basic needs criteria should concentrate on indicators of outputs or results, rather than inputs. Input measures, he feels, do not measure success in meeting the desired goals, and may lend an ethnocentric bias to the means employed. The use of only three indicators permits the calculation of the PQLI for a wide range of countries and facilitates the examination of changes in the index over time. The term 'quality of life' is perhaps a misnomer, since what is really being measured is effectiveness in reducing mortality and raising literacy. Life expectancy measures the *quantity*, not the quality of life. (These aims also have an ethnocentric bias.) Most importantly, the weighting system of the PQLI is arbitrary and there is no rationale for giving equal weights to literacy, infant mortality and life expectancy at age one. It is not possible to prove that the PQLI gives a 'correct' index of progress on human needs, as opposed to some alternative index having different weights or a different selection of component indices. It is not clear what is gained by combining the component indices with a weighting system that cannot be defended. Analytical work can be undertaken using the component indices almost as easily as with the composite index, without introducing the biases of the PQLI. While Morris' index has received much attention in the popular press, most serious scholars find it difficult to accept the results of a composite index without a stronger theoretical foundation.

Despite the potential attractiveness of having a single index of socio-economic development, there is little theoretical guidance to govern the choice of indicators, the correct scaling of component indices, or the appropriate weights. Moreover, an index that relies only on ranking neglects the distance between ranks.

Scaling problems arise when raw data on social indicators are converted into component indices ranging from 0 to 100. For instance, reasonable values for life expectancy could be either 40–75 yr or 40–100 yr. A country with a life expectancy of 60 yr will obviously have a different 'score' depending on the the scaling chosen (57 vs 33), and this will materially change the composite index. Furthermore, the scaling system need not be linear. Drewnowski used 'expert opinion' to derive a linear scale system reflecting set levels of basic needs satisfaction. McGranahan *et al.* developed an elaborate system of 'correspondence points' to determine the appropriate scale range, and utilized non-linear (logarithmic) scaling for many indicators. Morris simply took the range of the data for each indicator with the 'worst' country being defined as zero and the 'best' as 100.

In addition, there is the even more difficult problem of the proper weights to be used in combining the component indices into the composite. Drewnowski tried both equal fixed weights and a system of sliding weights under which deviations from the normal were given more weight than indices close to the normal. The rankings of countries by sliding or equal weights were highly correlated with the rankings of countries by GNP per head or consumption per head, and the shift in the weighting system did not materially affect the rankings. McGranahan's weighting system gave greater weight to the component indicators that had the highest degree of inter-correlation with the other indicators, a somewhat dubious method. One would think that the absence of correlation would be an equally valid criterion, though one might then wish to know why there is no correlation, rather than integrate them. He also found that moderate changes in the weighting system did not affect the level of each country's index, or its ranking. The insensitivity of the general index to the choice of weights is a logical result of having high inter-correlation among the components, since the high correlation implies that any one component is a good substitute for any other. The UN-ECOSOC study gives equal weight to the country *ranks* of the social indicators, thus avoiding, in a certain sense, the scaling problem. As mentioned above, the PQLI gives equal weight to each of the three components without ascertaining if this implies the correct 'trade-off' between the various components. None of these studies indicates that much effort was expended in developing a theoretically sound rationale for the weighting system.

Because of these problems, it might well

be argued that a composite index is either unnecessary, or undesirable or impossible to construct. It is unnecessary if the components are highly correlated with one another, because then any one of the component indicators by itself will serve as an adequate index. If, on the other hand, the components move in different directions in cross-country comparisons and time series, averaging would conceal the important issues and would be undesirable. To have the same index for a situation in which mortality is high and literacy low, as for one in which literacy is high and mortality low, implies evaluating the 'trade-off' between literacy and life expectancy. Unless the basis for such an evaluation can be established, all weighting remains arbitrary and misleading, and composition is impossible. The case for considering the two indices separately is exactly the same as the case for having an index independent of GNP.

If the interpretation of basic needs were taken literally, so that all basic needs, being 'basic', would have to be met together and trade-offs between different basic needs were ruled out, a composite index would not be necessary. As long as the 'package' of basic needs has not been fully met, no amount of additional satisfaction of any one component could compensate for the slightest deficiency in any other, so that a composite indicator would be ruled out. Once all basic needs had been met, again no composite index would be required, for the indicator for any one need would show that all had been satisfied. But we are not advocating such a literal interpretation of 'basic needs'.

8. RECOMMENDATIONS FOR FUTURE WORK

This brief survey has reviewed four alternatives to GNP per head as methods of calculating some of the dimensions of development. The *adjustment to GNP* approach has focused largely on improving GNP as a measure of economic welfare. Attempts to introduce other costs and benefits of development, which would move GNP toward a broader welfare measure, lack a logical basis and tend instead to result in a confusion of concepts. Research on 'social' indicators has failed to produce an alternative which is as readily accepted and comprehended as GNP per head though they are useful for judging social performance. Systems of *social accounts*, which could integrate social indicators through some unifying concept, have not been able to overcome successfully all the difficult problems encountered.

Efforts to develop *composite indices* have ranged from a search for better measures of the physical production of goods and services, to a measure of the 'quality of life' of 'economic' or 'social' welfare, of satisfactions, 'happiness' and other objectives. The search for a composite index of social welfare, analogous to GNP as an index of production, has been a fruitless one so far, since it has proven virtually impossible to translate every aspect of social progress into money values or some other readily accepted common denominator. The great deal of work devoted to composite indices, however, suggests the need for a single number which, like GNP per head, can be quickly grasped and gives a rough indication of 'social' development.

The current discussion of basic needs oriented development focuses on the alleviation of poverty through a variety of measures other than merely redistribution of incremental output.⁴ Such a focus supplements attention to *how much* is being produced, by attention to *what* is being produced, in *what ways*, for *whom* and with *what impact*. Obviously, the rapid growth of output will still be important to the alleviation of poverty, and GNP per head remains an important figure. What is required, in addition, are some indicators of the composition and beneficiaries of GNP, which would supplement the GNP data, not replace them. The basic needs approach, therefore, can be the instrument for giving the necessary focus to work on social indicators.

As a first step, it might be useful to define the best indicator for each basic need. At present, the essential basic needs are considered to cover six areas: nutrition, basic education, health, sanitation, water supply and housing, and related infrastructure (see Streeten and Burki, 1978). This list is not exhaustive, nor do all needs listed have the same status. It is intended to be illustrative. A limited set of core indicators covering these areas would be a useful device for concentrating efforts. Once defined however, this set could then serve as a call for the collection of more adequate, standardized, comparable international statistics, and thus help focus data gathering efforts on only the most important indicators. It is not clear that because there are six basic needs, there need be only six core indicators. It may be that more than one indicator will be necessary to measure adequately progress in any one area of basic needs. Nevertheless, the basic needs concept serves as a useful device for integrating efforts of data gathering and analysis.

Once defined, these core basic needs indicators would have the potential for important

policy analysis relating, for instance, to international comparisons of performance and relative aid levels. Such indicators would be a more useful guide to the relative 'gap' between rich and poor countries, and offer a different view on the speed with which this gap was widening or narrowing. They would be useful in understanding which countries were meeting their basic needs, and how their policies are related to the growth of output, trade, investment, infrastructure, etc. Not enough is being done internationally to improve the capacity of developing countries to identify, collect and issue better primary data on a regular, systematic and comparable basis. Such data collection can be costly, but a substantially greater effort seems to be justified.

The problem of selecting the appropriate index in each field is best taken up by technical experts in each sector. To give an indication, however, of the indicators which might be included, the following have been identified as a preliminary set:

- Health:* — Life expectancy at birth;
- Education:* — Literacy
- Primary school enrolment (as per cent of population aged 5–14);
- Food:* — Calorie supply per head or calorie supply as a per cent of requirements;
- Water supply:* — Infant mortality (per thousand births)
- Per cent of population with access to potable water;
- Sanitation:* — Infant mortality (per thousand births)
- Per cent of population with access to sanitation facilities; and
- Housing:* — None.

The core indicators identified here attempt to follow the philosophy of the paper in stressing measures of results, rather than inputs. Infant mortality is assumed to be a good indicator of the availability of sanitation and clean water facilities because of the susceptibility of infants to water-borne diseases. Furthermore, data on infant mortality are generally more readily available than data on access to water. While literacy is a good general measure of progress in education, the per cent of the relevant age group enrolled in primary school is included to measure country effort. Input measures have also been identified for water supply and sanitation as supplementary measures. It has not been possible, however, to identify

a satisfactory measure of housing needs. The only readily available indicator is people per room, but this really does not capture much of the quality of housing, only the number of rooms, which in turn is a very rough index of crowding. Ideally, these indicators should be supplemented by data about distribution of c.g. calories per head, etc.

If an acceptable system of weights could be developed, it might be possible to combine the core indicators into a composite basic needs index. The chances of an acceptable system of weights being developed, however, are extremely small. Despite considerable research on composite indices, no one has come close to developing a rational weighting system. It is difficult even to suggest directions for further research. (Some may question the desirability of such a composite index, even if it could be constructed.)

Instead of attempting to develop a composite index of basic needs, a useful alternative may be to narrow the range of indicators from six to one or two, which correlate highly with basic needs development. This approach would serve the need of those who desire a single number for making quick judgements on social performance, without introducing the problems of weighted composite indices.⁵ The prospects for doing this are considerably enhanced by the fact that many of the so-called 'basic needs' are, in fact, inputs rather than ultimate goals. Certainly nutrition, water supply and sanitation are valued because they improve the health status of the population. To a more limited extent, this is also true of housing and education. All of these can be considered to be inputs into the health 'production function'. They may be valued for reasons other than their influence on health status, but a high association between the various core indicators can be traced to their impact on health. Therefore, it could be argued that some measure of health, such as life expectancy at birth, would be a good single measure of basic needs. In a sense, life expectancy is a kind of weighted 'composite' of progress in meeting physiological basic needs. It has the advantage of capturing the impact on individuals, not only of non-market factors but also of income net of taxes, transfer payments and social services, without raising all the difficulties of income per head measures, such as the appropriate unit (individual, household or family), the appropriate magnitude (capital, consumption income), the appropriate set of prices (market prices, international prices), what to value as final goods and what as costs, etc. For these purposes, it might be regarded

as superior not only to a composite index of social indicators but also to GNP and to indices of income distribution. It is possible for two countries to register the same GNP per head and the same ratio of income accruing to the bottom 20%, and yet to have different average life expectancies. For some purposes, e.g. for distinguishing between meeting the basic needs of men and women, or of rural and urban populations, or for additional information if life expectancies cluster very near one another, it would, however, be useful to add a measure of progress in education, such as literacy. It is, of course, possible to have a long and miserable life, and one might wish to put an upper limit to the desired life span. But at low income levels, there is a high correlation between morbidity and mortality.

In using a single indicator, it is, however, important to guard against two dangers: the danger to interpret the *result* in a uni-dimensional way, and the danger to interpret *inputs* in a

uni-dimensional way. Life expectancy can be increased by measures that affect different age groups differently. Improved nutrition, for example, may affect life expectancy above one year, whereas women's education may affect infant mortality. The second danger is that the improvement of a health indicator like life expectancy will divert attention to health measures generally, and doctors, clinics and nurses specifically, whereas the 'production function' for life expectancy may include a number of thrusts not obviously related to health, like improved jobs, earnings, environment, etc. Just as we now know that reductions in the rate of population growth are not simply functions of improved family planning, so improved health and longer life are not simply functions of improved health delivery systems. But as long as the indicators are not identified with uni-dimensional results or uni-causal remedies, there is much to be said for a simple system of recording and monitoring.

NOTES

1. A fifth method would be to interview a sample of individuals and to ask each to place himself on a 'happiness' or 'basic needs' scale between, for example, 0 and 10, and to say whether he feels his basic needs had been met more adequately than at some specified date in the past. But this kind of survey is still rudimentary and does not provide us with the kind of information we should need for monitoring a basic needs approach.

2. This sample excludes the centrally-planned economies and all countries with populations of

less than one million. While the total sample includes 106 countries, missing data reduce the sample size for each correlation (see Table 1).

3. For life expectancy, a semi-log function increases the r^2 from 0.53 to 0.75.

4. It is related to 'raising levels of living'. See UN (1954 and 1961).

5. This assumes that such needs are legitimate and should be met; some might argue that it would be better to ignore such requests.

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