Working Paper

QUALITY OF LIFE

Sture Öberg and Gilberto Gallopín

WP-92-21
February, 1992

IIASA International Institute for Applied Systems Analysis □ A-2361 Laxenburg □ Austria
Telephone: +43 2236 715210 □ Telex: 079 137 iiasa a □ Telefax: +43 2236 71313

QUALITY OF LIFE

Sture Öberg and Gilberto Gallopín

WP-92-21
February, 1992

International Institute for Applied Systems Analysis □ A-2361 Laxenburg □ Austria
Telephone: +43 2236 715210 □ Telex: 079 137 iiasa a □ Telefax: +43 2236 71313

FOREWORD

The Secretariat of the United Nations Conference on Environment and Development (UNCED) asked IIASA to provide scientific support to the conference by examining the usefulness of systems analysis in: 1) identifying some of the important linkages among population, development and the environment and; 2) in helping decisionmakers in formulating and implementing policies for sustainable development. Part of the work of the resulting Environment and Development Study involved the formulation of conceptual models describing the socio-ecological system in which we live. Quality of Life was a central component of these models; it was concluded that the aim of development was: i) to enhance the quality of people's lives, considering both material and non-material factors and; ii) to lessen disparities across social groups, regions and generations. Sture Öberg and Gilberto Gallopín, two members of the Study, prepared this paper on quality of life in support of our work. They presented it at the International Conference on an Agenda of Science for Environment and Development (ASCEND), held in Vienna in November 1991 and organized *inter alia* by the International Council of Scientific Unions (ICSU) and IIASA.

Paper prepared for the
ASCEND Conference
Vienna November 25-29, 1991
Revised version, December 1991

QUALITY OF LIFE

Sture Öberg and Gilberto Gallopin
International Institute for Applied Systems Analysis

"Quality of Life" is, by definition, a subjective concept, dependent on cultural perspectives and values. There is a broad consensus, however, on some of the factors essential for a good life like adequate shelter, security of the person, assured access to food, water, and medical care. Science can help by objectively defining and measuring these factors. Science can also clarify perspectives on less tractable aspects of Quality of Life, identify further areas of consensus, and devise ways to measure them.

This chapter is intended to link some of these concepts to problems dealt with during and after the United Nations Conference on Environment and Development (UNCED) in Rio de Janeiro in 1992. The basic question we address is what researchers can do to contribute to the improvement of the quality of life. As a background we discuss present knowledge on both a conceptual and a practical level. What do we mean by quality of life? How do we measure it?

BACKGROUND

One topic of the Conference in Rio is the environment. Both social and physical environment are of importance but often the physical processes are focused on. Different cultures have different depths of attachment to their natural surroundings, but for most people a good Quality of Life (QOL) is inconceivable without access to a productive and healthy environment. Regardless of cultural values, QOL suffers in an absolute sense when the environment is seriously degraded, as when heavy air pollution causes health problems. The need to rethink old attitudes towards the environment, in which nature and resources were sacrificed in the pursuit of economic growth and material wealth, lies at the heart of the Conference.

It is also important to broaden the definition of environment to include the man-made environment, both social and physical, in the discussions. So far natural science have been dominating the environmental debate. Since every second person on the globe live in a city, engineers, medical experts and social scientests must be more active in creating a livable environment for daily life in cities.

The other Conference topic is economic development, which, rightly or wrongly, is generally regarded as the key to a better QOL. This is especially true for the less developed countries (LDCs) where the goal of improving QOL is inseparable from the goal of increasing material wealth. However, the relation between economic growth and human development is not simple, either in less or more developed countries. This is where a discussion of the concept of "Quality of Life" becomes important in the UNCED process.

There is a fundamental difference between a "hard" measure like economic growth which to a large extent is oriented towards material consumption, and a "soft" measure of a good life, not included in economic growth, such as leisure time, a sense of security, social participation and other qualities that are values in any society. It is a cliché, but also a true statement, that a good life for people, in all countries, today and tomorrow, is the ultimate goal of the Conference. An improvement in the QOL of the global population includes economic development but with two main restrictions: first, that economic growth, which means increased production and consumption, on the global scale is made sustainable in the long run; second, that global wealth be distributed more evenly.

Social and Economic Inequality

Inequality between individuals in different positions, social strata or social groups, is characteristic of all nations. Individuals and groups enjoy differential access to socially valuable rewards of wealth, power and prestige. All complex social systems are hierarchically organized and leaders can, if they want, use their power to benefit themselves, their families, and their friends. Men and women usually have different roles and thus prestige. Inequality may be accepted or not, but it is a fact. The major social science views on the nature of inequality are to be found in functional and conflict theories. As we will show later, in some measures of QOL, inequality is neutral to the measure; in others an increased degree of inequality will lower the average for the population as a whole. Statistical and empirical studies both show highly uneven patterns of growth and distribution of material wealth; reduction of poverty and efforts to satisfy basic human needs are inadequate in most countries. In many countries, both more and less developed, the income gap between the rich and the poor is widening.

Inequality has an important role in the UNCED process; humanitarian arguments have long been used to address starvation and equity arguments applied to questions of development in the LDCs. Added to this is a new rationale for less inequality among individuals and between the North and the South. According to many scientists, a large number of poor people will use natural resources in a non-sustainable way. The contribution of the rich to the environmental degradation is well known; less well known is the fact that the poor are forced to do the same. Often they will do this at the expense of their immediate surrounding environment, thus later being forced to migrate to other areas and increase the population pressure in them. In the long run, the rich too will suffer from overpopulation and poverty.

Poverty and the Need for Development

Poor people are often hungry and unhealthy. The number of poor is increasing and the relative gap between the rich and the poor is widening, so poverty will become more visible. Only five or six generations ago there were less than one billion inhabitants on Earth. Today, out of the global population of nearly five-and-a-half billion, more than one billion consume for less than one US dollar per day. Around 25,000 children die every day from starvation or from easy-to-cure diseases. One billion people are illiterate and thus lack an important personal resource. In southern Asia and in sub-Saharan Africa, one out of two inhabitants is poor[1].

[1] See eg Mc Hale and Mc Hale (1979) or Durning (1989) for a further overview of poverty in the world.

Consumption and the Need for Environmental Protection

Poor people, in spite of their low consumption levels, decrease opportunities for future generations. Inhabitants of rain forests use fire to clear land, consuming the forest more rapidly than it can be renewed. Marginal land, vulnerable to erosion and drought, is destroyed for centuries to keep hunger away for a few months.

Every government on Earth hopes to improve QOL within its territory, a hope that is usually perceived in terms of economic growth. This is also true for governments in the more developed countries (MDCs). More than one billion inhabitants in North America, Europe, Japan and Australia have an average daily income of more than forty US dollars[2].

The effects of these high consumption patterns are well-known. There is ample evidence that it is already causing profound changes in the Earth's life support systems on all scales. The damage on soil and biota caused by logging of rain forests is one example. Another is the use of the atmosphere as a garbage can. The fact that we are changing the chemical balance of the atmosphere, with its complex role as a creator of a livable planet, makes many afraid of sudden large changes in the global heat balance to a new and very different equilibrium.

The present life style in industrialized countries is the goal of many inhabitants in the developing countries. But this life-style is based on non-sustainable consumption patterns and production systems. The planet cannot sustain present levels of consumption, let alone an increase.

The distinction between rich and poor countries simplifies reality in the sense that there are rich as well as poor inhabitants in both types of countries. Some researchers argue that the number of poor in rich countries is increasing as well as the number of rich. And of course rich people in poor countries can use as much energy and material resources as other rich people and thereby pollute for example the atmosphere.

Sustainable Development

Human behavior and human development inevitable change the environment. Environmental changes can be consistent with an improvement in the quality of life, provided they are sustainable in the long run.

Sustainable development is said to exist if each member of each generation inherits an equally valuable stock of capital - man-made and natural - as the member of the earlier generation. This definition raises two problems. One is how to define "valuable". The other is to define what qualifies as "capital". To be clearer we can define these concepts but in doing so we soon find that any attempt to be more specific about sustainability brings in value judgements on what is more or less important for a good QOL. It also brings in cross-generational values. How much should the present generation be concerned with the future?

It is important to stress this conclusion. Sustainable development is a value judgement which is related to how we define a good quality of life.

---

[2] GNP per capita in OECD countries in 1987 according to OECD National Accounts.

It is, however, possible to say something on the balance between material and non-material consumption without making a value statement. Sustainable development will ultimately require not only the stabilization of the total material consumption (for ecological sustainability), but also the approaching of a decent level of material consumption for all people (for social and political sustainability). Population growth and material economic growth will eventually have to stabilize. However, non-material economic growth has no inherent physical limits.

EXISTING IDEAS ON QUALITY OF LIFE

There is no absolute or universal consensus on how to define and measure quality of life. On a very general level it is possible to define some dimensions of a good life for individuals or for societies. There is less agreement on ways to measure QOL or policies to improve it. Nevertheless, the concept QOL has been extensively discussed in the literature. Usually authors try to obtain some generalisations across populations and cultures.

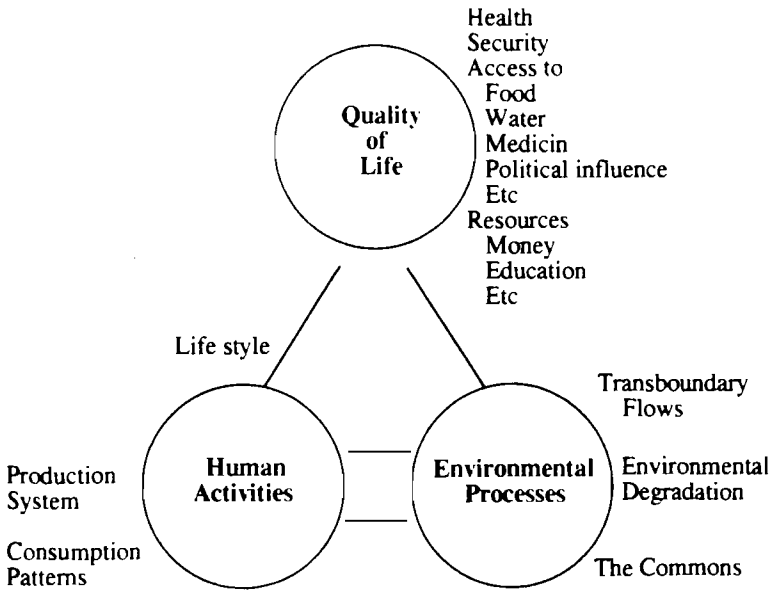

Figure 1 The performance of all global systems, human as well as environmental, should preferably be monitored by Quality of Life indicator

Objective and subjective perspectives on quality

In social science there is a clear distinction between objective measures and subjective ones. Objective measures are often defined in physical quantities or relations. An objective measure is often defined as a measure of a need or a norm, while a subjective measure measures attitudes, what people want or what they are satisfied with. Subjective measures are more important for the political processes and objective measures are more important in policy implementation.

Earlier attempts to define QOL involved partially overlapping concepts like "happiness", "well-being", "welfare", "standard of living", "living conditions", "way of life", etc. (Framhein 1975). Usually the concepts address both the objective conditions under which a person lives, including his or her health, and the person's perception, satisfaction or subjective evaluation of his or her life (Mallman et al. 1978).

Satisfaction is the evaluation of the degree of fulfillment of the desires and aspirations, and is determined subjectively by the person him/herself. Satisfaction is perceived fulfillment of desires and aspirations, based on an individual's perception and knowledge about adequate satisfiers and their availability, and by the person's internal processes and structures. They may therefore in some cases express false, neurotic, or displaced needs (Maslow 1970).

Desires and aspirations are defined as the concrete forms in which a person seeks to satisfy perceived needs, specifying the particular satisfier required; desires are immediate, aspirations are mediate. By satisfier we mean any element (material or non-material) whose use or consumption determines the fulfillment or satisfaction or a need, desire or aspiration. Most satisfiers are obtained from the person's environment, and some from the person's internal processes and structures.

As pointed out earlier, measurement of QOL usually include data on both the objective conditions (frequency of use and/or consumption of satisfiers, their quantity and effectiveness regarding each need), and subjective evaluations. The latter in particular involves various deep methodological problems related to the operation of different psychological mechanisms, and it requires further research, particularly in the case of cross-cultural comparisons (Hankiss 1976, 1978).

Quality of life is a concept of universal applicability, to all societies at all times, although in terms of which dimensions to emphasize and which standards to aim at, it may show variations along the social, cultural, and developmental dimensions. The concept as used here is not restricted, as it is sometimes implied, to amenities or conditions of comfort or well-being, but it embraces the characterization of situations of extreme deprivation[3].

Health is a central indicator...

The health of a person is important in most definitions. It is often understood as positive physical, mental and social well being[4], and it is evaluated objectively or intersubjectively. Health can be conceived as resulting from the fulfillment of human needs, and from the person's internal structure and processes, including e.g. age, genetic pattern, psychological, perceptual and cultural background.

[3] Including those leading to death (that is, to zero quality of life)

[4] This is the way health was defined originally by the World Health Organization

...environment is another

There are many definitions of an environment. Each person has his or her own environment, physical and social. The environment of the person influences the chance of satisfaction of the human needs, desires and aspirations and hence the quality of life. Each society has its own environment, consisting of the physical (natural and man-made) environment enclosed within the territory occupied by the society , plus the external environment, both social (international) and physical. The state of the societal environment influences the functioning of the society, ultimately reflecting on the quality of life of the persons of the society[5].

Needs and requirements

The phrase human needs is here used to describe the needs of an individual, while the needs of supraindividual human systems will be called requirements[6]. The following classification of needs[7] together with some of the satisfiers coming from the person's environment will give an idea of how needs are usually treated in the literature.

Needs for existence or identity (needs whose non-satisfaction results in the annihilation of the system) consists of three groups: a) Maintenance. Access to food, earnings, shelter and clothing, social and physical habitability, etc. b) Protection. Access to health services and to health protection; legal defense and protection against violence and repression; prevention and protection against disasters. c) Love. Ease of interpersonal contacts, attitude or mood of people in general (hostility, distrust, friendship); access to means to keep a family.

Needs for integration or completeness (needs whose non-satisfaction results in the system's inability to perform some of its functions) are here grouped into two sets: a) Understanding. Access to education and culture; access to information and communication; freedom to exchange ideas. b) Self-reliance. Possibility for participating in decisions; lack of manipulation, marginalization or repression, fulfillment of individual rights and freedoms.

Needs for optimal functioning (needs whose non-satisfaction results in disturbances in the system's performance of some of its functions) consists of: a) Recreation. Access to recreational services, and to leisure time. b) Creation. Access to creative work, and to individual and collective creative activities.

Needs for perfectibility or improvement (needs whose non-satisfaction inhibits the adaptive modification of the system's structure and functioning) are: a) Meaning. Access to religious, cultural, ideological, and political groups, activities, and freedoms. b) Synergy. Social encouragement of altruism, generosity, equanimity, solidarity, etc.; trust in persons and social

---

[5] The human environment is the environment of a human system (system can be defined at different levels of aggregation, from the individual person to the whole of mankind); it is therefore a complement of the considered human system, and meaningfully defined only in relation to the system (Gallopín 1981a, 1981b)

[6] The justification of needs for groups is given in relation to the fulfillment of the needs of the persons that are members of the group.

[7] Needs could be expressed for different levels of aggregation. A characterization of the human needs and requirements combining Sicinski's generalized concept (Sicinski 1978) with Mallman et al. (1978) classification of needs, adapting the latter to needs and requirements was proposed (Gallopín 1980, 1981) for a person, a society and mankind

institutions; access to beautiful cities and natural environments; social discouragement of aggressiveness, savage competition, discrimination, etc.

Some human needs are material (i.e., their satisfiers are material things like food, buildings, clothes, etc) and some are non-material. The concept of basic needs should of course never be restricted to a subset of the material needs. While some needs necessarily require some degree of material consumption, some can be satisfied through non-material means. There is often considerable scope to improve quality of life while stabilizing or even reducing per capita material consumption.

Global processes affecting the quality of life

It is common in the literature to refer to processes important for changes in QOL. Practically all processes in societies and in nature could be said to have substantial influences on QOL depending on the definition used and the author's disciplinary bias. Some examples of more commonly mentioned ones are:
- changes in settlement patterns, including urbanization
- ethnic tension and consequent displacements of populations
- increasing environmental pertubations which result in natural disasters
- shortage of capital for investments including debt crises in many countries which in turn usually result in declining investments in areas like education and health services

EXISTING MEASURES

In the literature, QOL is usually seen as a holistic measure, but still it should be possible, for analytical purposes, to measure different components adding up to the whole. The first two parts of the concept are usually (i) a value basket which is made up mainly of non-material culture goods, and (ii) a material basket which is made up of the material elements necessary for the sustenance of life[8]. The quality of life for individuals could be measured by "objective" or "subjective" data, but usually objective information is preferred. It is common to classify different measures after their importance, starting with basic needs (food, health, etc.)[9] and ending up with more sophisticated needs (like satisfaction with work, etc.).

Indicators should preferably measure in simple quantitative terms how systems performance over time is related to goals. These goals could be minimum levels or visions. The indicator and the performance should be easy to understand. The primary function of an indicator is simplification. It should, as is indicated by its name, give a clear indication of system performance and trends to policy makers.

While giving QOL a more precise definition, it is clear that it is possible to draw upon the rich literature on related concepts like welfare, standard of living, living conditions, social indicators or human development indicators[10]. Some of these concepts have a very long tradition, but the more lively scientific debate during the 1960s and 1970s could be seen as a reaction against a

[8] UNESCO 1978

[9] The basic needs approach has become an important idea in the UN-system.

[10] There are hundreds of books on the topic Quality of Life and several authors refer to related concepts, for overviews see eg UNESCO (1978) or Leipert, C. and Simonis, U.E. (1981).

use of simple economic measures, especially GNP/capita which was often misused as a welfare measure.

There are several well-known drawbacks with an economic measure as a welfare measure or as a QOL indicator. Let us mention only two of them: its simplicity and its failure to consider negative contributions. Because it is simple, easy to explain, and easy to find in statistical publications, it is bound to be used (and misused). However, as will be explained later, it has a low correlation to more sophisticated QOL measures. Another drawback with its simplicity is that internal conditions within countries do not show in the figures. Also countries with a fast growing GNP could have large population groups with a decreasing economic standard.

A second problem is its inability to identify economic activity that offsets the negative effects of production. For example, a factory built to produce scrubbers for smokestacks is essentially offsetting negative effects of other income-generating, or better welfare-generating, production.There is an ongoing discussion on how to consider this drawback in national accounting procedures. The first elaborate effort to construct a QOL-oriented GNP-measure was made by the Economic Council of Japan[11]. They measured the net national welfare index, NNW, in which negative costs, like environmental protection costs, were deducted from GNP and positive benefits, like the value of leisure time, were added.

Group Measures Addressing QOL for Individuals...

A well-known and simple measure for comparisons of "Quality of Life" in different countries, MDCs as well as LDCs, is the Human Development Index (HDI)[12]. It considers only three aspects: life expectancy, literacy and income, which makes it possible to find adequate comparable data[13]. For the first two indicators, a scale between 0 and 1 is constructed for the lowest and highest values. Life expectancy is today varying between 42 years (Afghanistan, Ethiopia, and Sierra Leone) and 78 years (Japan). Literacy among adults varies between 12% (Somalia) and nearly 100% (many countries). The third indicator, income, is a purchasing-power-adjusted GDP estimate. It varies between US$ 220 (Zaire) and US$ 4,861 (nine industrial countries). A scale between 0 and 1 for the logarithm of the indicator is also used here. Averaging the three scales[14] gives the HDI.

...their social environment...

Individuals living in social groups or societies that support their life-style are better off than others. The same is true for minor social and ethnic groups having harmonious relations with other more powerful groups. It is possible to measure the degree of shared value systems, social and political participation, and other community characteristics in QOL-measures.

Relations between groups are more or less problematic depending on for example group scale, degree of conflict and its historical context. Some pressures can unite families or ethnic groups, while large conflicts like persecution or civil wars will of course lower QOL for most people

[11] See Economic Council of Japan (1973)

[12] This index was developed in a collaborative effort by the UN Statistical Office, the World Bank, EUROSTAT, OECD, ECE, ESCAP, and USAID.

[13] The ideas behind this index were described earlier, see Morris (1979), under the name PQLI, the physical quality of life index.

[14] UNDP 1990

involved. In the large-scale social environment, some main political problems are related to unsolved fights between ethnic groups over power and territorial control. This is true for situations in several continents, including Africa, with a well-known difference between governmentally controlled territories, which are a colonial heritage, and territories that are the living space for different ethnic groups. Military expenditures in LDCs, on average around 200 billion dollars[15]per year, are on more than that for education and health combined. Technological development of atomic, biological and chemical weapons makes it easier every year for powerful leaders in all parts of the world to threaten others. One QOL measure related to social tension and armed conflicts is the teacher/soldier ratio[16]. This measure, like the HDI, compares the situation in countries and does not give any information on the distribution of costs and benefits of social conflicts among individuals within countries.

In the small-scale, social security for individuals will depend on several factors, including family ties and many other cultural, social and economic traditions. Information on public safety is usually given in statistics on violent crime and accidents. Lately, the frequency of drug crime has become both a threat and a cost for large groups. According to statistics, the value of trade in illegal drugs exceeds that of trade in oil.

...and their physical environment

A high quality environment, both natural and manmade, is an important objective in all societies. Practical measures on the natural environment could include a suitable topography and climate, clean air and water, low noise level, good soil for food production and a variety and amount of wildlife[17]. For the rural population in LDCs, access to farm land is an essential part of a good QOL. The manmade environment mainly includes so-called physical infrastructures, like dwellings and other buildings, roads and other transportation networks, telecables and other communication networks, utilities for electricity, gas, water, sewage disposal, and solid waste disposal, etc[18]. There is a scientific literature on how to measure access to these environmental utilities. Physical distance and so-called queuing principles, like money, queuing time or membership, will allocate these resources to the population[19].

Measures Addressing Equality

It is easy to see how average measures on QOL for large groups sometimes need complementary information on internal dispersion to make sense, e.g. an increased real total income in a country could hide increasing disparities. If one-fifth of the population earns ten times more than the rest (per capita), a total increase of, e.g. 4% could be consistent with a 10% increase among the upper fifth and a 10% decrease among the majority.

---

[15] Ibid

[16] For further information on this index, see Human Development Report 1990.

[17] UNESCO 1978

[18] A list of indicators and a proposed methodology for measuring them in order to assist in making public policy can be found in an article by L.W. Milbrath: "Indicators of Environmental Quality" (UNESCO 1978).

[19] It is possible to combine physical access measures with availability in terms of supply and demand, see Öberg (1976).

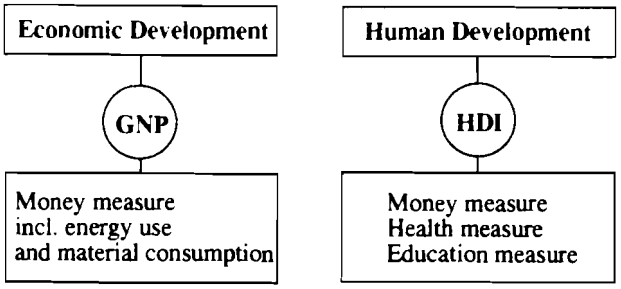

Figure 2 The main international comparisons between countries are today made by the Gross National Product (GNP) or by the Human Development Index (HDI). Quality of life is better measured by the HDI.

An Equal-Weight-Index (EWI) has been jointly constructed by the Institute of Development Studies at Sussex and the World Bank[20] to address the equality question. The index considers both that a majority is more important than a minority (like in democratic systems) and that an increase among the poor is more important than among the rich.

The well-known gender inequality is addressed by many researchers but there are few possibilities to measure and compare the QOL for women in different parts of the world because of data limitations. However, the UNDP has constructed two gender specific HDIs on the basis of existing and estimated data[21]. The UNDP concludes that as the QOL improves in countries, there is a tendency for the situation of women to improve and, eventually, become better than that of men. Among countries with a low or medium human development there is enormous variation in the female-male QOL disparity.

Measures for Individuals

Individuals endowed with high levels of personal "resources" like health and education are better off than others. In MDCs, where most people have their basic needs satisfied, income and economic wealth are usually added to these personal assets. In LDCs income and land ownership are some of the important additions. In all countries, the security dimension is one of the most important. First, security adds to QOL. Second, only secure access to food, medical help and basic knowledge will enable people to think about a shift of consumption patterns from energy and material wasting ones to more environmentally sustainable ones.

Most of the scientific literature on QOL-indicators deals with conceptual frameworks. Different scientific disciplines specialize on different aspects of life and they are thus more familiar with some indicators; economists on economic growth, geographers on physical access, political scientists on democracy and participation, sociologists on social networks, demographers on infant mortality, etc. Depending on how individuals are treated in theories, different indicators

[20] See Chenery et al (1974)

[21] UNDP 1990

become more central. Starting with a theory on economic growth, individuals are instruments for further production and their abilities to produce (health, education) become important. A welfare approach would concentrate more on perceived and real satisfaction with life. A basic need approach makes no allowance for how countries are governed, e.g. the degree of democracy, and could therefore more easily be used in an international context than a political science approach.

In the same way, economic indicators like GNP/capita and simple QOL indicators like HDI are easier to accept than more elaborate measures trying to capture many dimensions of human life. Experience also shows that it is easier to accept international cooperation on indicators of unwanted conditions, like high rates of crime or diseases, than to agree on positive indicators of the good life. To define a good life, the meaning with everything we do, goes too deep into our personal value systems.

There have been several attempts by researchers to develop interdisciplinary conceptual frameworks. Some of them, like the Scandinavian tradition of measuring QOL from a resource perspective and the Anglo-Saxon tradition with social indicators, have been implemented in large surveys in more developed countries.

Relation between development and income measures

A simple correlation between GNP/capita and HDI shows that rich countries usually have a higher QOL than poor. However, the quality dimension measured by HDI (life length, literacy, and income) can vary to a large extent between countries with the same level of production per capita. Some countries chose to translate larger parts of their income than others into an increased quality of life for their people. Countries like Sri Lanka and China do far better on their human development than on their income (see figure 3).

THE UNCED DIMENSION

The life-style and quality of life in one country has become more and more related to the quality of life in others. Interpersonal and international resource allocation are topics concerning the environment and development nexus. The question of how present resources, especially the commons, are or should be allocated is definitely on the UN-agenda. The life style in one part of the world is no longer only a local concern. Complicating the debate about the interterritorial distribution of rights and duties is the question of links between present and future generations. The concept of sustainable development, how to make it easier for every new generation to meet its needs, is targeted towards intergenerational resource allocation. Added to this there are arguments that fairer intragenerational allocation of resources is of importance to social and political stability and sustainability.

People and Their Numbers

A commonly used argument to explain environmental degradation, and slow or absent development, is that we are using too much energy and material per capita, and that there are too many of us on the planet. Resources like water, soil, land, forestry, and air are scarce or limited, and present population growth, 250,000 new individuals per day, will lead to an absolute shortage. This view is often implicit or explicit in both natural science studies and classical economics.

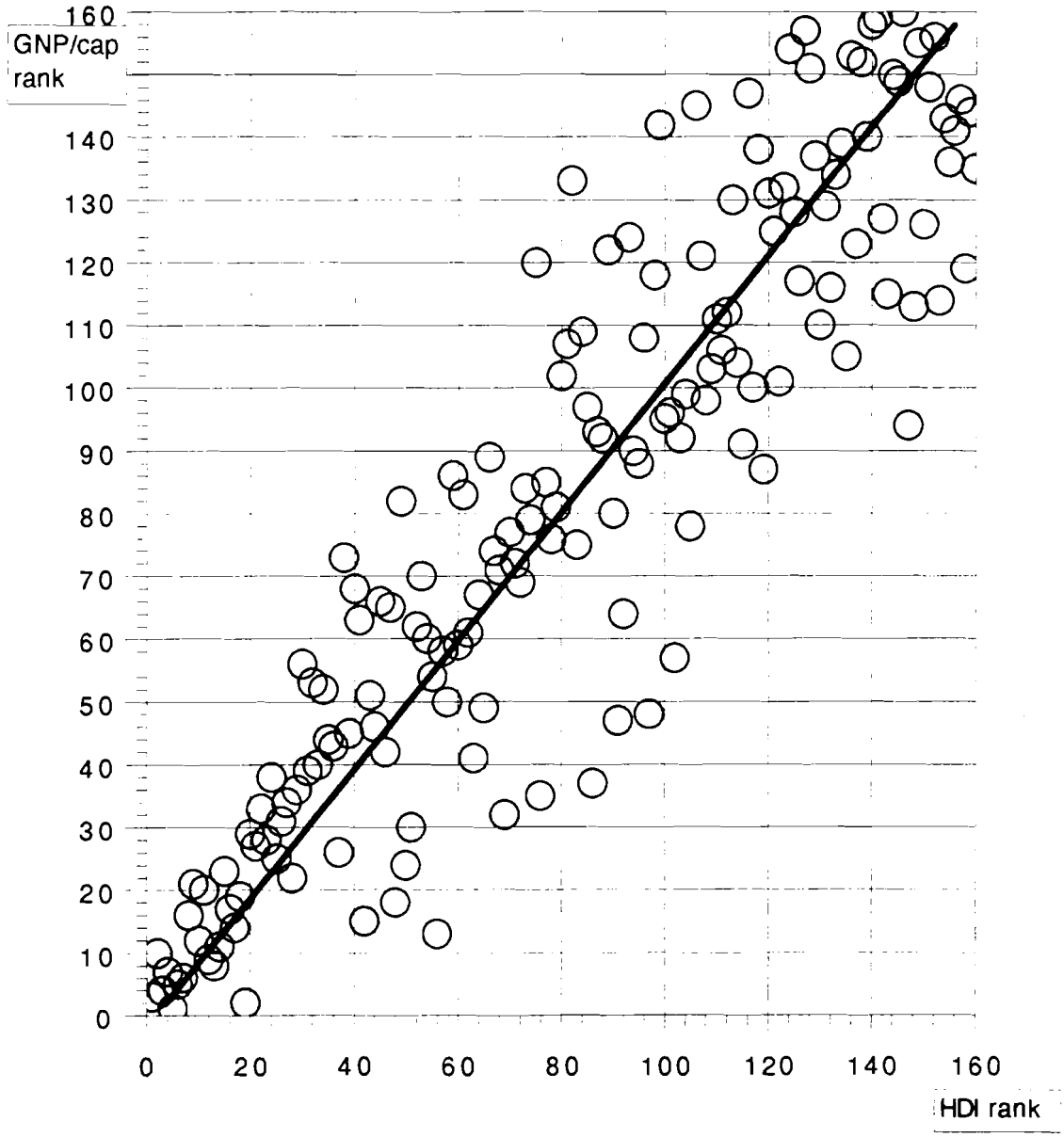

Figure 3 160 countries ranked according to Gross National Product (vertical scale) and Human Development Index (horizontal scale). Countries with good conditions in these respects are circles in the low left corner. Among poor countries (measured by GNP) there is a large variation in the quality of life (measured by HDI).

LDCs tend to emphasize that the life-style and per capita consumption in MDCs are the main cause of environmental degradation. A citizen in the US consumes 200 times more fossil fuel than his counterpart in Ethiopia. From this, it is not possible to conclude that two children in the US are increasing the CO_2 pollution of the atmosphere as much as 400 children in Ethiopia, but one can argue that birth control or birth restrictions should first be encouraged in rich countries.

In MDCs it is often claimed that family planning programs are needed in poor countries to break through the well-known "poverty trap." Nearly all population increases are now taking place in LDCs. Historically, large families are a new social institution. Thus there could be no old traditions or cultural bounds as a rationale for making this new type of family (with many children surviving) a permanent institution. According to many governments, family planning is a necessity in LDCs to overcome poverty and environmental degradation.

Population growth has also been interpreted as a neutral or positive factor behind economic growth. Some neo-classical economists argue that the basic problem with starvation, poverty, and overconsumption is not the number of inhabitants on the globe, but inefficient markets. The problem is that markets do not self-adjust to take care of the problems. A consequence of these ideas is that more governmental and international control and interference is needed to correct non-market behavior and to adjust price levels so that they include external effects of consumption patterns. There is thus no need for family planning programs. Every newborn child is looked upon as an investment for the future. Markets would allocate resources (and thus QOL) in an efficient way. Resource scarcity would be met by technological innovations, shifting consumption patterns and substitution of scarce resources with others.

Other perspectives on population growth include discussions on its effects on ethnic and social tension. Population growth is then often seen as dependent on other QOL factors like illiteracy, poverty, and inequality.

Transboundary Effects of Human Behavior

All environmental problems on the UNCED agenda are caused by human life-style in a broad sense, including our choice and use of technology. Many of them have to do with transboundary movements of, e.g.:

- CO_2 and other GHGs (the greenhouse effect).
- Freons, etc. (ozone depletion).
- SO_2 and NO_x (acid rain).
- Hazardous waste in the air (such as radioactive pollution).
- Hazardous waste in the waters.

Transboundary flows of chemicals are especially changing the QOL in densely populated, rich regions, like in Europe, where acidification and accumulation of heavy metals in soils and sediments is a problem. Countries which do not install cleaning devices for atmospheric pollution and thus earn money on exporting environmental problems to others seem less eager to put a price on the damage. Why not use one of the commons as a free garbage can when others pay the costs?

Let us once again repeat the main problem with present QOL measures in this perspective. A QOL measure in one country could not be taken seriously if it does not consider the negative effects it will cause in other countries.

Among the transboundary effects of human behavior or misbehavior is also international migration. The background behind many contemporary mass migration streams is poverty, starvation or civil wars between ethnic groups. The present number of registered refugees, 15 million, could increase dramatically depending on future changes in human development including ethnic conflict levels, redistribution of resources, including food and economic wealth. In the future migration due to different standards of living will probably increase. Migration from South to North is already taking place in small numbers.

Other transboundary flows could be physical, like arms, drugs and oil, financial or in the form of information. Through world trade countries usually improve their economic performance but they can also find themselves moving into structural conditions which will lower the QOL for their inhabitants in the long run.

The Commons

The air and the oceans are capital stocks owned jointly by mankind. Any positive flow to the stock like fresh water from the rivers to the oceans) or negative flow (like greenhouse gases from industrial processes to the atmosphere) change the value of the commons and could thus change QOL.

If one accepts the idea that there is a limited carrying capacity of or ecological capacity for (deleterious chemicals, e.g. a specific amount per decade, then it is possible to discuss who should have the right to use this amount. Which group of actors or which nations should have the right to pollute? The rich? The poor? The powerful? The nations who used to pollute? The nations who have not harmed the commons so far? The ones with a good or bad QOL?

One idea would be to give all inhabitants the same right to pollute. Nations with many inhabitants would then--irrespective of their military power--have more permits than small nations. The basic idea, one person, one polluting permit, is the same as in democracies. Individuals or nations with a good QOL - including a large consumption per capita - could then buy permits to pollute the commons from those who have (or choose to have) a lower consumption per capita.

Sharing

The life-style of a person or a group of people is only a fraction of a larger system of customs, values, beliefs, attitudes, and physical flows. Measures of life-style or quality of life for some cannot be understood in isolation from others.

Measures of life-style should avoid ethnocentric attitudes. However, transcultural impacts can and should be measured. Moral judgements could be made on life-styles that support or limit the quality of life of others. Improving quality of life for one group could degrade the quality of life for another. As a consequence, differing life-styles are one of the basic sources of conflict in the world. Another consequence is that a person's life-style only partly depends on his or her own choice and value system.

Man is social and cooperation is the cornerstone of survival. The need to cooperate has fascinated philosophers throughout the ages, so many of the ideas about how power should be shared between individuals and the collective have a very long history. Let us remind ourselves of two alternative streams of ideas in the scientific literature.

Some would argue that sharing power, which of course is a necessity in the real world, in the long run always leads to totalitarian societies. If we accept "social contracts" in order to avoid violence and anarchy, we support the creation of control systems and superpower that gradually become totalitarian.

Others would argue that cooperation and interaction produce prosperity. We should therefore forego a certain amount of freedom for the benefits of living in a civilized and secure society. There one enjoys freedom from hunger and fear, a greater freedom than in a society where every individual is free but insecure and afraid. With this view, societies are seen as advantageous social contracts in which there is a balance between rights and obligations.

Ideas on cooperation and on how power should be shared between individuals and governments have up to now mainly been discussed in their historical, social, and economic context on a local scale, within nations. Public participation is a key concept in some countries. The discussion now has to be extended to a global scale--forced by the physical and economic transboundary processes which tend to ignore national boundaries and territorial sovereignty.

QOL Measures Addressing Individuals in a Sustainable Global Society

The consumption of energy and materials has reached a level where environmental effects no longer are limited to the immediate surroundings of consumer groups. Costs and benefits have to be shared among people in space and time in a way that needs monitoring and approval. A sharing-perspective has to be added to the traditional wisdom of QOL measures.

In the UN system there is a new emphasis on QOL-related strategies for the coming decade. The UNDP[22] cites three objectives: acceleration of economic growth, reduction of absolute poverty, and the prevention of further deterioration in the physical environment. The departure from earlier development strategies lies in clustering all these objectives around the central goal of enlargening the set of choices available to people. Many will agree on these formulations. When it comes to deciding who should pay the costs there will be less agreement. Still, however, QOL-related questions will be directly or indirectly on the agenda both for the UN conference in Rio de Janeiro and for future work.

[22] UNDP (1990)

POLICY OPTIONS

In the drafting of any policy or declaration regarding management of environmental resources, including the UNCED process, quality of life aspects should be considered explicitly, including their interterritorial (spatial) and intergenerational (time) aspects. In general, considerations of QOL should have a more explicit role in policy formation.

What Can Researchers Do?

The question then is what can researchers do in this process? Seen from a pessimistic point, we already know more about human needs and sustainability than the present world order can make use of. There is often a lack of will among the rich to increase the quality of life for others. Even with good intentions, there is no organization with the necessary power to change present unwanted conditions. Seen from a more optimistic point of view, the UNCED-perspective, there are many ways in which researchers can contribute to change the quality of life of individuals.

New intra- and interdisciplinary knowledge

It goes without saying that policies intended to improve quality of life must be based on solid scientific knowledge. More knowledge in general about nature and culture, physical flows of material and chemicals, allocation mechanisms on global (and other) scales, human values, and consumption patterns is essential for an understanding of how sustainability could be obtained. The need for more research within most scientific disciplines cannot be overemphasized.

Research on quality of life and human needs must often have an interdisciplinary approach. Needs do not respect disciplinary boundaries. Often it could be of importance to encourage cooperation between existing disciplines within or outside present universities and research institutes.

How life-styles emerge and change

One of the most important topics within this context is to understand how life-styles emerge and change. This type of knowledge could be used, like all knowledge, for "good" and "bad" purposes. Business pay large amounts of money to understand how their products would sell better. For world leaders an understanding of life styles could be used to influence behavior in order to promote consumption patterns which are consistent with both increases in the quality of life and a long-run sustainability. Both "top-down" and"bottom-up" actions are needed to encourage sustainable behavior. Government measures as well as popular movements could be based on this type of knowledge.

How social values emerge and change

Behind human action we find value systems. We have already stressed that ideas on sustainable development are based on value judgements which are related to how we define a good quality of life. Thus the concept of sustainability is founded in social values. It is self-evident that more knowledge on how social values emerge and change is important for future actions within the environment-development nexus.

Material and non-material consumption patterns

Present consumption patterns in the rich countries can not be extended to the global population without placing severe strains on the environment, including the commons. The need for increased material consumption in less developed is evident, but unfortunately their plans to increase production are generally based on large increases in energy use, often by using fossil fuel. Technology transfer can reduce some of the pollution but the environment, including the atmosphere, will have to take new large amounts of CO_2 and other chemicals. A realistic scenario is that the present polluters, the rich countries, reduce their pollution to create space for others to pollute. Reduced material consumption and an increase of non-material consumption in rich countries could allow for improvement of the quality of life. A better understanding is needed of how different life styles are more or less dependent on the use of material and energy.

Granted that a continuous improvement in the quality of life of the human being is the central goal of sustainable development, the improvement could in principle be obtained by alternative mixes of satisfiers of needs, desires and aspirations, even implying the possibility of a continuous increase in economic (non-material) growth. The trend towards de-materialization of the industrial economy - the use of lower amounts of energy and materialsto produce a comparable product - is an expression of this possibility. Deliberate searches for alternative, less material-intensive satisfiers, as well as research into alternative social projects and socio-ecological configurations, should be an important part of future research agendas.

Nutrition and human health

In the quality of life discussion there are many topics and research areas which could argue that they shold be given priority. Nutrition is one of them and since the composition of our food is so important for human health, this area is one of the most selfevident candidates.

New development and economic theories

Progress on measures of development is evident during the last decades. The need for new theories on development is often stated in the literature. What are the factors behind changing living conditions? Why can some countries during some decades develop in several dimensions while others do not?

Also there is a need for theories on how to allocate scarce resources in the real world, a world of violence, crime, and bribery, a world in which ethnic groups hate each other and nations are often unwilling to cooperate on transboundary phenomena. Present economic theories have problems dealing with the real world and are thus used mainly as a background information by economists working with applied economics.

Monitoring quality of life

For international comparisons, measures of quality of life are fairly well developed. The lack of statistical information is more problematic. An improved coverage of known measures is essential for both research and policy-making aimed at improving the quality of life. Since urban life seems to be dominant in the future, new aspects on the relation between humans and their environment could be included in QOL-measures.

There is also room for research on how the behavior of individuals in one place influences the behavior of others elsewhere. Measures of this dilemma must in the long run be integrated in the concept of quality of life. More elaborated measures could link the quality of life discussion to ideas on how international relations should be organized in order to increase the sustainability.

New research tools for impact analysis

Conventional disciplinary research on dependencies between individuals in time and space should be supplemented with a development of scientific tools for synthesizing knowledge. While ordinary research is specializing and analyzing reality in more detail, politicians working with environment and development issues need overviews and integrated knowledge. They must know how different pieces of information are linked to each other in a coherent framework. Here, science should devote more resources to the development of time-space-specific conceptual framework models and tools for impact analysis. These models and tools would also often be suited for making best use of existing knowledge within different scientific fields. With these tools it will be easier to allocate resources where QOL can be most effectively improved with limited resources.

Advisory groups

Finally, scientific unions, like ICSU, could arrange independent scientific advisory groups, which could work on the international scene with important QOL questions. Monitoring change and policy impacts would be part of their tasks. The idea is to get the large investments right. A shortage of capital will dominate the international economic arena during the next decade. Investments in the MDCs, including Eastern Europe, will compete with investments in LDCs.

The advisory groups should be specialized in environment and development issues. They could, for example, evaluate the overall results of aid programs to different LDCs. Efficiency in improving quality of life, including economic growth and other values, should be a guideline for allocation of investment resources. The group could be used by the World Bank and other organizations to evaluate impacts on the quality of life of existing large investment projects.

In the MDCs there is a need for science to advise on how quality of life could be improved or sustained with less use of energy and material. What mixture of economic measures, such as pricing behavior, regulations, and restrictions on toxic chemicals, will be concordant with both improved quality of life and sustainability? How could we increase consumption in a qualitative way without increasing the quantitative use of energy and materials?

References :

Ahmad, Y. J. and Serafy, S. E. and Lutz, E. (1988): *Environmental Accounting for Sustainable Development,* The World Bank, Washington DC

Allardt , E. (1976): Dimensions of Welfare in a Comparative Scandinavian Study, *Acta Sociologia*19 227-240.

Chenery, H.B. et al (1974): *Redistribution with Growth.* London. Oxford University Press.

Drewnowski, J. (1974): *On Measuring and Planning the Quality of Life.* Paris: Humanities.

Dréze, J. and Sen, A. (1989): *Hunger and Public Action,* Oxford, Clarendon Press.

Durning, A. (1989): World Poverty, World Watch Institute.

Economic Council of Japan (1973): *Measuring Net National Welfare of Japan.* Tokyo: Government printer.

Erikson, R. et al. (eds.) (1987): *The scandinavian Model, Welfare States and Welfare Research,* London, M.E. Sharpe.

Framhein, G. (1975): *Round Table Meeting on Indicators of the Quality of Life.* Summary Report. Organized for UNESCO by the Vienna Centre. Budapest, 14-15 November 1975.

Gallopín, G.C. (1981a): Human systems: needs, requirements, environments and quality of life. pp 124-128 in: G.E. Lasker (Ed.). *Applied Systems and Cybernetics. Vol. I. The Quality of Life: Systems Approaches.* Pergamon Press.

Gallopín, G.C. (1981b): Planning methods and the human environment. *Socio-economic studies 4*, UNESCO, Paris.

Hankiss, E., R. Manchin and L. Füsfös. (1978): *Cross-Cultural Quality of Life Research.* Center for Quality of Life Research, Budapest.

Hankiss, E. (1976): *Quality of Life Models* (Hungarian experience in QOL Research). Meeting of Experts on Indicators of the Quality of Life and the Environment. UNESCO, Paris. SS.76/CONF. 629/5.

Kuik, O. and Verbryggen, H. (1991): ***In search of Indicators of Sustainable Development***, Kluwer Academic Publ., Dordrecht, The Netherlands

Leipert, C. and Simonis, U.E. (1981): Social Indicators and Development Planning. In *Economics 24*: 47-65.

Mallmann, C.A., M.A. Max-Neef and O. Nudler. (1978): *Notes on meaningful and practical measures of health, satisfaction and quality of life.* Fundación Bariloche, Argentina.

Maslow, A.H.(1976): *Motivation and Personality.* 2nd. Ed. Harper & Row, New York.

McHale, J. and McHale, M. (1979): *Basic Human Needs.* A Framework for Action. New Brunswick,N.J.: Transaction Books.

Morris, M.D. et al. (1979): *Measuring the Condition of the World's Poor. The Physical Quality of Life Index.* Oxford, Washington, D.C., Pergamon Press.

Oberg, S. (1976): Methods of Describing Physical Access to Supply Points, *Lund studies of Geography*, Lund. Gleerup.

OECD (1976): *Measuring Social Well-being.* A Progress Report on the Development of Social Indicators. Paris

OECD (1982): ***The OECD List of Social Indicators***, Paris.

Pearce, D.W. (1988): Economics, Equity and Sustainable Development. In *Futures 20*, 6: 598-605

Sachs, I. (1982): Environment and Development Revisited: Ten Years after the Stockholm Conference. In: *Alternatives 8 :* 369-378.

Sicinski, A. (1978): The concepts of "need" and "value" in the light of the systems approach. *Social Science Information 17(1)*: 71-91.

Simonis, U.E. (1990): *Beyond Growth. Elements of Sustainable Development*, Wissenschaftcentrum Berlin, edition sigma.

Titmuss, R.M. (1968): *Commitment to Welfare*, London, Allen and Unwin.

Todaro, M.P. (1977): *Economic Development in the Third World: An Introduction to problems and Policies in a Global Perspective*. London. Longman.

UNDP (1990): *Human Development Report 1990*. New York, Oxford. Oxford University Press.

UNESCO (1978): Indicators of Environmental Quality and Quality of Life, *Reports and Papers in the Social Sciences*, No 38.

United Nations (1978): Social Indicators: Preliminary Guidelines and Illustrative Series. In *Statistical Papers*, Ser. M 63.

World Commission on Environment and Development, WCED (1987): *Our Common Future*, Oxford. Oxford University Press.