HUMAN NEEDS AND DEVELOPMENT

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> Though there is sufficient food for everyone, 500 million people are still suffering from hunger and disease and even die because they are too poor to buy the food that is already there. In some countries mountains of food are stockpiled, while in others hunger and poverty persist. The obese are seeking new cures and the malnourished are offered no remedies. Many pets are pampered while hungry children are forgotten. Is this not a strange phenomenon that historians and economists of future times will undoubtedly consider mysterious and inexplicable?"
>
> *Director-General FAO, 1982*

1. INTRODUCTION

It is well known the scarcity of natural resources (1). It has been said elsewhere (Tobar-Arbulu, 1985a) that technology is concerned with the means by which some given ends may be best obtained.

In this work we deal with the notion of 'needs'. An elucidation of the concept of 'basic needs' is developed taking into account the difference between *needs* and wants (desires, wishes, aspirations) since human beings are

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(1)   While "A small number of states equalling some 20 percent of the world's population, controls over 80 percent of the world's wealth" (Ward, 1968, p. 11), "the strongest among developed nations for political influence, markets, sources of raw materials, and military bases in less-developed nations is a continuous threat to world security" (Ackoff, 1974, p. 211), since "the development of every advanced nation derives at least in part from the exploitation of less-advanced nations" (Ackoff, 1974, p. 213).

not satisfied by attaining what they need, they also try to satisfy some of their wants (2).

The term 'needs' has been, since the beginning of the 1970s, referred to in many United Nations programs for developing countries. (It has been a central topic in socialist countries.) Although some authors doubt the suitability of a needs approach for any serious kind of social research, social action and societal development, we retain the needs concept for its potentiality as a constant reminder of one of the most important goal of any individual and social activity, focused on human existence and development. This potentiality derives from the affinity to human motivation and self-fulfillment inherent in the needs concept. In order to exist and develop man must constantly appropriate and absorb certain things from his (natural and artificial) environment.

A challenging problem of needs research is how to define a need. "Needs" are theoretical constructs. The truth of those needs cannot, therefore, be proven in a direct physical way. The existence of a need can be concluded indirectly either from postulation or from the respective satisfiers that a person uses or strives for, or from symptoms of frustration caused by any kind of nonsatisfaction.

There are two main schools of perceiving and interpreting a needs concept. One postulates the universal and objective character of needs (Masini 1980, Galtung 1980). The other holds as decisive the historical and subjective nature of needs. Thus Roy (1980) and Rist (1980) favor a universal and objetive notion of needs call 'desires', what the historical and subjective group of theoreticians call 'needs'.

Whether one distinguishes between desires (or wants) or regards the needs themselves as variables, the problem of human satisfaction (3) depends on culture, at least to a certain extent.

In the following we shall deal with the notion of "basic needs", the universality of needs, some methodological considerations, and the system of human needs proposed.

(Once the notion of human needs is clarified, one should deal with the application of some techniques —Operations Research, Systems Analysis, and Systems Engineering— to fulfill them, as shown in Tobar-Arbulu (forthcoming) and partially shown in *Appendix A).*

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(2)   As Ackoff (1981, p. 63) remarks, "Humans are more that ends-seeking animals; we are *ideal-seeking".* According to Ackoff (1981, p. 63) these are the types of ends that people pursue:
      "1.   *Goals:* those ends that we can expect to attain within the period covered by planning.
       2.   *Objectives:* those ends that we do not expect to attain within the period planned for but which we hope to attain later and toward which we believe progress is possible within the period planned for.
       3.   *Ideals:* those ends that are believed to be unattainable but towards which we believe progress is possible during and after the period planned for".

(3)   As Ackoff (1977, p. 65-66) asserts, "quality of life derives from two aesthetic aspects of living. The first involves the satisfaction one receives from doing what one does while it is being done, and the second involves the satisfaction one receives from a sense of progress about ideals". (On *ideals* see previous *Note 2.)*

2. SYSTEMS OF HUMAN NEEDS

Some of the most controversial issues of needs research are:

(i) Who defines what is needed?
(ii) On behalf of whom?
(iii) With what legitimation?

While needs are universal, desires or wants are temporal, spatial, and personal. Thus, desires can be or actually are manipulated by perverted applications of needs approaches.

If this distinction is acceptable, the term 'needs' would stand for general principles of human existence. Accordingly, a list of human needs could serve as a guideline for monitoring conditions adequate to human conditions, irrespective of cultural differences all over the world.

Galtung (1980) outlines four classes of human needs that are combined from (i) the kind of dependency of need satisfaction (actor-dependent and structure dependent), and (ii) the kind of satisfiers ("material" and "non-material"). The more detailed list of human needs delivered here —see below— is a working hypothesis. Other approaches, and more debates are necessary for the working out of a universal system of needs.

The postulation of needs proposed here —following UNESCO— is not purely ideological. Underlying theoretical assumptions and evaluative influences can be examined and refined to the extent that they are exposed. On this basis, it might even be possible to work out a generally acceptable system of needs, particularly since such a system of needs does not define a priori temporal, spatial, and personal details of adequate need satisfaction. Such generally acceptable systems of needs 'do not define a priori "granted" desires. Desires have to be investigated empirically —with identifiable references to a needs concept, of course.

As for methodology, the market behavior analysis tends to descriminate against the less experienced, less educated, and the less articulate. In other words, it discriminates against those who are probably already the most disadvantaged in social life, against those whose needs satisfaction would perhaps be the most urgent task. There is, for the time being, a methodological gap in needs research. (Some methodological considerations can be seen in Galtung 1980, Mallmann and Marcus 1980.) Some of the proposals might be elaborated further, and above all, they will have to be tried out in future empirical research projects.

Needs methodology, as Galtung states (1980), "would be to inspire [people] into awareness, not to steer and direct them into well-structured needs sets". Rist (1980), on the other hand, points out that needs concepts prevent rather than promote social development by disregarding cultural differences and mechanisms of reproduction of social wealth when imposing allegedly universal needs concepts on a target group. This objection, however, can be challenged if one takes into account that there is no intention of defining a priori desires ("needs" in the historical terminology) for any socie-

ty and that a more general needs system referred to could serve as a back-
ground for reflection rather than as a prefabricated and unchangeable guide-
line.

In fact, the outcome of political processes —as they actually are, not as
they could be ideally— discriminates against the needs of certain social
groups. Thus, political processes alone will not guarantee a satisfaction of
needs at a level higher that it already is, at least for the time being. (Thus,
Heller, (1980) holds that the manifestation of radical needs —those aimed at
changing social institutions— might considerably broader the chance for dull
need satisfaction. And Rist (1980) asserts that some kind of reautonomiza-
tion of the cultures could provide better chances for the identification and
satisfaction of their "authentic needs".)

Mallmann (1980) outlines a conception of human needs based on a sys-
temic view of society. He postulates that "the goals of development should
always be expressed in terms of needs satisfaction aimed at as compared as
need satisfaction as it is".

Galtung (1980) discusses the validity of needs concepts within develop-
ment planning, describing the characteristics of a "basic" human needs, wor-
king out a typology and a tentative "list" of basic needs, and debating the
hypothesis of a hierarchy among needs.

We support Galtung's view (1980), according to which needs are basic
by definition; thus the attribute "basic" is meaningless. (See also Mallmann
and Marcus 1980.)

2.1. Needs and wants

One way of creating an image of man is through an image of the needs
of man. This immediately brings in a vision of short or long lists of needs,
possibly divided into material and "non-material", basic and less basic. The
next problem we have to tackle then is the problem of the universality versus
geographical and historical specificity of needs.

What are the criteria that something has to be satisfied in order to be
classified as a human need? What are the meta-criteria according to which
such criteria are selected?

In our view, wants or desires (and satisfiers), not needs, differ according
to space, time, and culture. They are subjectively felt and they do not neces-
sarily have to correspond to a need (Galtung, 1980; Mallmann, 1980; Mall-
mann and Marcus, 1980; Masini, 1980). I claim that the general system of
needs does not define a priori granted desires. Desires have to be investiga-
ted empirically —with identifiable referents to a need concept.

Since every human being is in some social environment or other, two
criteria are used to designate something as a need:

(i)   If it is a necessary condition for a human being to exists, then it is a
need. I.e., if the non-satisfaction leads to the disintegration, destruction, or
non-existence of the human being;

(ii)   If it is a necessary condition for a society to exist over longer time, then it is a need. Le., if the non-satisfaction leads to disruption, disintegration, non-existence of the society, for example through the non-participation, or apathy.

At the first level one is concerned with the existence of human beings as such. Since any society can be studied as composed of different systems (biological, political, cultural, economic), the needs of humans-in-society are biological, political, cultural and economic. At the second level, then, needs should be derived from social behavior and the sciences that deal with it. The following criteria have to be taken into account when trying to characterize human needs :

(i)   basic human abilities: the more developed these abilities are and the higher the level of skill achieved, the more refined the needs are;

(ii)   objects and human individuals in their natural and social environment: in a condition of pronounced scarcity, as it is the case in many countries nowadays, human needs remain unsatisfied, stunted; in a condition of abundance, the filling of need becomes a natural state and their psychological dimension —feelings of tension and hunger— recedes, while new wants of a higher and different level emerge.

The first criterion requires the promotion of scientific and technological knowledge, which in terms presupposes unrestricted communication. The second one reminds us the technology is not given in a social vacuum. In modern societies technology has become one of the most dynamic factor of social change. Some people even consider that technology determines the amount and types of objects and products through its extraordinarily rapid development. In our view, however, this statement is false. In fact, technology is nothing but a body of knowledge. Since neither technology (Tobar-Arbulu, 1984a-b, 1985b) nor needs are autonomous, —there are no needs apart from human beings—, the amount and types of objects and products created are under control. Even the most dangerous nuclear missile is nothing but a thing under control. It behooves us, humans, to decide about the means, the goals, and the amount of things (goods or "bads") to be produced.

True, some humans have more power for decision than others. But this is another question, very important no doubt, which needs a clear elucidation, but different from the point of whether "technology determines the amount and types of objects and products" or not. The amount of gadgetry that we are offered in daily life —through the different media— is not determined by technology, but by concrete and specific people in control of some technology or other. Therefore, if blaming anybody, if asking for responsibilities, let us blame and ask the decision-makers, i.e., people in charge of deciding what to produce, responsibilities. Only in very particular circumstances the technologists themselves will be the decision-makers: usually they are mere "means". This fact does not mean that we are saving the half a million scientists and technologists involved in the big economic business of the arms race. One must analyze the relationship between economy and politics,

and between both and culture to clarify the notion of 'power' (Russell, 1938; Galbraight, 1983a). An analysis of power among the different social subsystems of society and its environment, i.e., the economic, politic, and cultural constraints to which is subjected by other(s) so that technology keeps being a means for the satisfaction of human needs through the realization of some human abilities. Otherwise, we should face a complete inversion of the relation between technology, needs, and manufactured goods. Instead of producing goods to satisfy human needs, technology would help producing human wants in order to create artificially a demand for goods. This brings us to an important problem: how to distinguish between basic authentic needs and false or artificial ones.

There are several methods for establishing the distinction between basic needs and artificial ones:

(i)   critical exploration of the origin and development of various needs;

(ii)   examination of the role of these needs in the lives of the individuals of the community;

(iii) research in the psychological consequences of long-term satisfaction of these needs.

Genuine needs are those whose satisfaction leads to the recognition and development of basic human abilities.

False, artificial needs are those that are irrelevant to the development of human abilities and thus (directly or indirectly) hamper and block this development. The above distinction, however, needs a further analysis on basic needs and gadgetry.

2.2. "Basic" needs

A world made to a single need pattern would be poor and its uniformity could probably be maintained only through controls and dictatorship. From a biological point of view also, diversity would appear to be invaluable in preserving the human capacity of adaptation to changing conditions. The maintenance of cultural diversity, however, would not mean a retreat into parochialism and mini-nationalism or the preservation of static and archaic social systems. What we envisage is the encouragement of a wide variety of value systems and cultural patterns, interacting and reinforcing one another with a world of mutual interdependence. As far as development is concerned, respect for such a vision would demand a self-reliance approach which blends economic betterment with appreciation of human needs, cultural, economic, political, and social.

The conceptual model of human needs and the suggestions for meeting these needs are best made by each individual country. Solutions to the local, regional, or national problems should not be imposed from outside, because both needs and solutions are sensitive to local conditions and cultural values. Politically defined national development goals in terms of population policy, socio-economic status, and environmental quality should indicate the quanti-
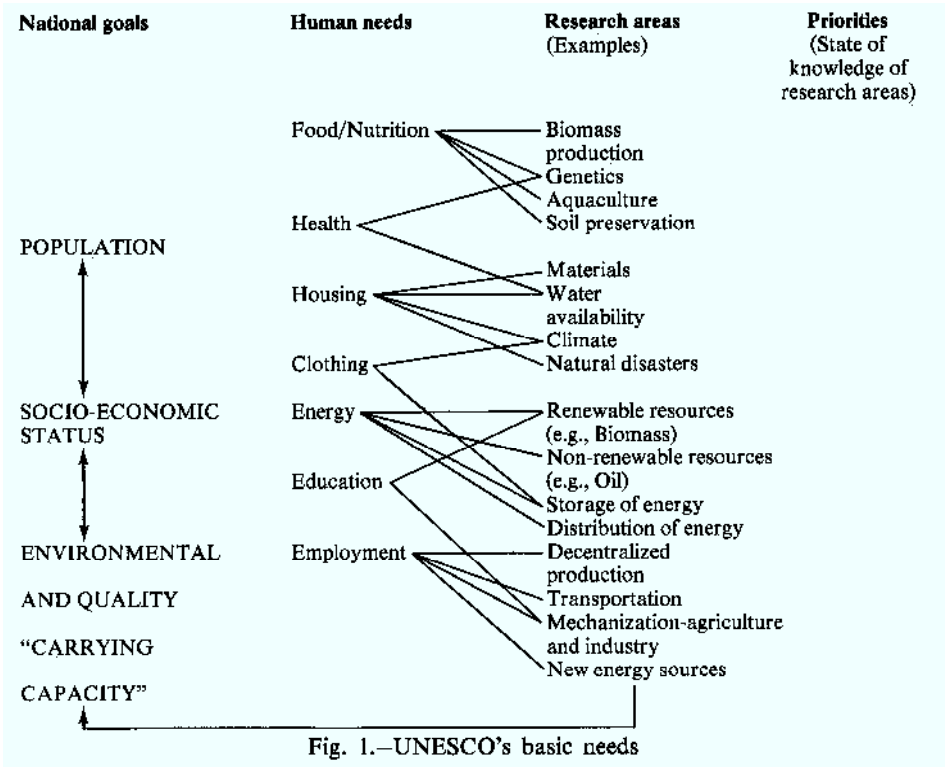
tative and qualitative needs of food, health, housing, energy, education, and employment.

Since we support a systemic view of the person-in-society, an ascription of fundamental needs to the person, and a way of deriving culture-specific set of needs therefore will be introduced in the list of "basic" human needs as a working hypothesis. As to politics —since the matrix for general need categories is in a social framework— ultimately, the most important question is how to improve the process of social decision-making so that all people have equal chances for need satisfaction. (This is something else than ascribing the same desires to everybody.) From a systemic point of view, since man is *homo oeconomicus* and *politicus, faber* and *sapiens, artifex, ludens* and *loquens,* the basic material needs most often emphasized are food, clothing, shelter, health, and education (4).

We do not think that there is any solution in the sense of a stable, universally agreed-upon list of human needs. The list of needs is itself a part of the development process, in constant need or revision. However, for the time being, as to 1985, we accept UNESCO's approach (see Figure 1 below). In this approach a conceptual model is suggested that might be used by any local community or nation as a basis for mobilizing research on human needs problems:

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(4)   According to Green (1979, p. 29ff) basic human needs as a development strategy comprises five main elements:

1. Universal effective access to basic personal consumer goods —food, clothing, housing, household furnishings.

2. Universal effective access to basic public (communal) services —primary and adult education, preventive and simple curative health services, pure water, communications, habitat (environmental sanitation, urban and rural community infra-structure).

3. The physical, human and technological infrastructure and the level and growth of productive forces necessary to secure (directly and indirectly through external trade) the capital and intermediate goods and the surplus necessary to provide the personal and communal basic goods and services.

4. Productive employment (including self-employment) yielding high enough output and with equitable enough remuneration so that individuals, families and communal units earn (including production for their own use) enough to ensure them adequate access to basic consumptions goods and to have a power base from which to insist on participation.

5. Mass participation in decision-taking and review and in the strategy formulation and control of leaders as well as in implementation of projects and carrying out of decisions".

National goals	Human needs	Research areas (Examples)	Priorities (State of knowledge of research areas)

Food/Nutrition — Biomass production
Genetics
Aquaculture
Health — Soil preservation

POPULATION

Materials
Housing — Water availability
Climate
Clothing — Natural disasters

SOCIO-ECONOMIC STATUS

Energy — Renewable resources (e.g., Biomass)
Non-renewable resources (e.g., Oil)
Education — Storage of energy
Distribution of energy

ENVIRONMENTAL   Employment — Decentralized production

AND QUALITY   Transportation
Mechanization-agriculture and industry

"CARRYING   New energy sources

CAPACITY"

Fig. 1.–UNESCO's basic needs

Remark

A concept closely related to self-reliance is that of "carrying capacity". This is a measure of how large a population a country can sustain at a given quality of life within the limits of its human and natural resources, capital, and environmental quality. Few countries, if any at all, are today completely self-reliant or have a "carrying capacity" that suffices for the demands of their populations. Self-reliance can, of course, be strengthened by exchange and trade with other countries. (See Tobar-Arbulu 1985c for the notion of 'self-determination' within interdependent societies. The notion of 'collective self-reliance' has been introduced recently by some less developed countries (LDC) to indicate that these countries could reduce their one-sided dependence on industrialized countries by closer mutual co-operation in science, technology, trade, and economic development.)

Galtung and Wirak (1976 p. 44) list the following flexible maxi-list, divided into four categories —from the more to the less fundamental (5)— which has to be checked against man's behavior:

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(5)   Needs at a lower level have to be satisfied at least to some extent for need-satisfaction at a higher level to take place. One has to be alive for feeding to take place, one has to be fed for politics to take place; some kind of politics are needed for the last ten needs.

	Category	Needs and/or rights	Goods/Services
SECURITY	Security	Individual (against homicide)	SECURITY
		Collective (against attack, war)	
WELFARE	Physiological	Nutrition, air, water, sleep	FOOD, WATER
	Ecological	Climatic (protection, privacy)	CLOTHES, SHELTER
	Somatic	(against disease, health)	MEDICAL CARE
	Cultural	Culture (self-expression, education)	SCHOOLING
FREEDOM	Mobility	Right to travel	TRANSPORTATION
		Right to expression	COMMUNICATION
	Politics	Right of consciousness formation	MEETINGS, MEDIA
		Right of mobilization	PARTIES
		Right of confrontation	ELECTIONS
	Legal	Right of due process of law	COURTS
	Work	Right to work	JOBS
	Choice	Right to choose occupation	
		Right to choose spouse	
		Right to choose place to live	
IDENTITY	Individual	Need of self-expression, creativity	HOBBIES, LEISURE
		Need for self-actuation	
		Need for joy, happiness	VACATION
		Need for a purpose	IDEOLOGY
	Collective	Need for affection, love, sex, spouse	GROUPS
		Need for roots, belonginness	GROUPS
	Social	Need to be active	
		Need to understand what conditions one's life	
		Need for challenge, new experiences	
	Relation to Nature	Need of some partnership with Nature	

Remarks

1. The last ten needs are usually seen as "intangible", or "nonmensurable". There is less consensus about them because it is not obvious that the two criteria mentioned earlier in this section are satisfied. A problem, therefore, is how to evaluate these needs (6).

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(6) Can food be reduced to proteins and calories, or is there also a quality of food? Can shelter be reduced to square meters of covered space per person, or does one have to take into consideration the entire habitat of the individual? Can health be reduced to longevity and access to medication, or does one to take into account quality of living? Can education be reduced to schooling, to number of years and levels passed at school, or does one have to take into account capacity for understanding the human and non-human environment? Can work be reduced to alienating jobs, and employment, or does one have to take into account the level of challenge and opportunity for creativity and self-expression? Can freedom of expression be reduced to access to mass media and communication in general, or does one also have to take into account the quality of the communicated culture and cultural creativity? Can freedom of movement be reduced to transportation according to job requirements, or does one have to take into account quality of experience? Can politics be reduced to parliamentarism, or it is a deeper sense involving more participation?

2. Under what conditions a large sub-set from this list of needs would be satisfied?

3. What are the inner and outer constraints to development? (7).

2.3. Planning and development

Definition 1.   'Planning' consists of the design of a desirable future and invention or selection of ways of getting there.

Remark

The planning problem is not how to improve the quality of life of others but how to enable them to improve their own quality of life (Ackoff, 1977, p. 69).

Definition 2.   'Development' is the people's capacity to do with whatever they have to improve the quality of life of their own lives and that of others.

Remarks

1. Development is a matter of learning, and of production —learning how to use oneself and one's environment to better meet one's needs and those of others.

2. Development is not, therefore, a condition or a state defined by what people have (Ackoff, 1977).

3. Wealth is relevant, of course, to development. How much people can improve the quality of life of their lives and that of others depends not only on their motivation and knowledge, but also on what instruments and resources are available to them.

4. The principal benefit of planning is participation in the planning process. Effective development planning can be helped by professional planners, whose proper role is to provide information, instruction, motivation, and the resources that can increase the effectiveness with which people plan for themselves.

Definition 3.   The 'quality of life' that an individual can realize is the joint product of his development and the resources available to him.

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(7)   An study of the dimensions of exploitation, penetration, fragmentation, and marginalization, as mechanisms of structural violence, and when operating transnationally, as mechanisms of imperialism —whether that imperialism is economic, military, political, cultural, or social— can be seen in Galtung (1977). (For the "protection" of the so-called "market of free-enterprise" see Chomsky and Herman, 1979; Chomsky, 1982, 1985; Herman, 1981, 1985.)

Remarks

1 .   The quality of life that can be obtained at any stage of development
—i.e., the product of development— depends on the resources that are
or can be available.

2 .   Limited resources may limit improvements of quality of life. They
do not imply limits to development.

3 .   Quality of life has to do with the satisfaction or dissatisfaction we
derive from what we do, and the satisfaction one derives from a sense
of progress towards some ideals.

Definition 4.   A 'limit' is a quantity that a variable cannot exceed.

Remarks

1 .   The limiting effect of physical limits on individuals can be removed
either by changing desires or by technological development which
remove or raise the limit.

2 .   Limited resources limit us only if we want to do something that
requires more of that resource than is available to us and there is no
suitable substitute in greater supply.

3 .   Constrains can be cultural, biological, political (see Chomsky and
Herman, 1979; Chomsky, 1982, 1985; Herman, 1981, 1985), econo-
mic, social, moral, environmental, technical, legal. A key point about
constraints is how to remove or relax them in order to get a global
development.

Definition 5.   An idealized design or redesign of the system planned
for is a design that is subject to only two constraints: (i) it may involve any
technology that is known to be feasible; and (ii) the system designed must be
operationally viable, i.e., capable of surviving if it were brought into exis-
tence.

Growth and development are not the same thing (Ackoff, 1981, p. 34),
an issue that confused the prophets of the Club of Rome. Limits of growth
do not limit development. Development "is not a state defined by what a
person has. It is a process in which an individual increases his ability and
desire to satisfy his own desires and those of others. It is an increase in capa-
city and potential, not an increase in attainment" (Ackoff, 1981, p. 35). (For
the notion of 'development' as a process see *Appendix B..)*

As for the quality of life, I claim with Ackoff (1981, p. 44) that, "what
is required is that individuals be able to evaluate their own quality of life, that
they have the opportunity to improve it, that they be encouraged to do so,
and that their efforts to do so be facilitated. Therefore, the planning problem
is not how to improve the quality of life of others, but how enable them to do
so for themselves and to learn continually how to do so more effectively.
This reformulated problem can be solved by encouraging and facilitating the

participation of the others in the design of and planning for organizations and institutions of which they are part". (On indicators of quality of life see *Appendix C.)*

It is not the point to imitate the "developed" countries, particularly the United States and/or the Soviet Union, when dealing with development. Every society, big or small, should be free to formulate their own policy of development (Ackoff, 1970, 1974, 1978, 1981; Ackoff *et al.,* 1984).

A model of development should indicate some steps on the path toward a higher level of satisfaction of needs. Since the constrains and the lower and upper limits of each and every need are rather different, it belongs to social technology the study of the means to achieve the given goals. Needless to say, there has to be a minimum of economic production for material things to be satisfied. Although we do not endorse a Marxist view of the economy, we do maintain, however, that the development of the economic system (together with equality and social justice) is a necessary condition or condition *sine qua non* for development. However, a high Gross National Product (GNP) per capita by itself is not an accurate indicator of economic development, for the GNP (per capita) identifies development with economic growth, and the latter with processing and trading.

Development is a complex process and will have to be reflected through a set of indicators rather than by means of a single one. As for social indicators, they are tools that have been built into them assumptions about how development is to be conceived taken into account the following limits:

(i)   inner limits: limits below which human needs cannot be satisfied without fundamental damage being made to man;

(ii)   outer limits: there is a limit to how for we can pollute and deplete. (Nature sets these outer limits.)

If development is to be identified with such components as satisfaction of human needs for all, equality and social justice, level of autonomy —of self-reliance— with participation of people and ecological balance, then development indicators will have to reflect this, as exactly and accurately as possible. Indicators of development (8), hence, should also include indicators of human rights situation in a country.

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(8)   An indicator supposed to reflect something as basic as the level of development should be easy to calculate and easy to understand for everybody with a minimum of education. It should also be the object of continuing debate and reappraisal.

       A good deal of the published work done in the name of 'social indicators' during the late 1960s and early 1970s was undisciplined and eclectic. Social scientists concentrated on the development of data systems which would address the new social concerns while maintaining high standards of statistical quality. In particular, the OECD (1973) sponsored a Social Indicator Program which began in 1970. Several years of complex development work (Rao *et al.,* 1978) ensued on designing indicators to measure these concerns. *The OECD List of Social Indicators* (1982) is the result. *(See Appendix C* on OECD's list of social indicators.)

       A suggestive classification in terms of 'quality of life' can be as follows:

       (i) physical health: fitness, life expectancy, health care services;

       (ii)   nutrition and nourishment: consumption of foodstuffs, variety of foodstuffs:

       (iii)   personal safety: security of self and property;

       (iv) housing and shelter: shelter from weather, space for personal activities, privacy;

As for the aspects of *satisfaction* of human needs, Galtung and Wirak (1976, p. 61f.) suggest:

(i) the level of need-satisfaction to be the percentage of the population above an agreed upon social minimum;

(ii) the distribution of need-satisfaction to be the percentage of the population above a social minimum mentioned above and below a well-defined (if not necessarily agreed upon) social maximum;

(iii) the structure of need-satisfaction.

2.4. Need and value scale

A scale of measurement for a particular need to which a scale of values is associated should be defined. This scale measures the degree of "goodness" or "badness" in achieving the concept of value involved. (See Figure 2.)

(v)   basic skills: cognitive and intellectual abilities (e.g. literacy), schooling services;

(vi)   advanced learning: specialized knowledge and training;

(vii)   information media: dissemination of news, information about environment;

(viii)   leisure time: quantity of time from involuntary obligations, services to free time;

(ix)   recreation and aesthetic facilities: sport and leisure activities and facilities, artistic productions;

(x)   disposable resources: wealth, possessions that may be relinquished voluntarily;

(xi)   household equipment: facilities for carrying out maintenance of property;

(xii) community resources: publicly owned tools and instruments, skilled persons;

(xiii) goods quality and service: range and convenience of consumer goods, repair und redress services.

(xiv)   aesthetic annoyance: obtrusive features of environment (e.g. noise, pollution, ugliness).

(xv)   pluralism of culture: variety of culture open to experience;

(xvi) occupational mobility: openness of occupations to entrance and departure;

(xvii) spacial mobility: local and long-distance, transportation and accommodation facilities;

(xviii) occupational quality: comfort, challenge, sociability of occupation;

(xix)   physical environment: preservation of natural environment;

(xx)   family relations: interaction between couples, parents and children, relatives;

(xxi)   social integration: interaction with neighbors, members of community;

(xxii)   communication facilities: development variety of mass and private media;

(xxiii)   civil liberties: tolerance of self-expression, alternative life styles;

(xxiv)neighborhood and workplace control: structure and power of influence on decisions made concerning local issues (housing, amenities, job, ...).

(xxv)   community decision-making: structure and power of influence on planning and decision-making for community, region, nation;

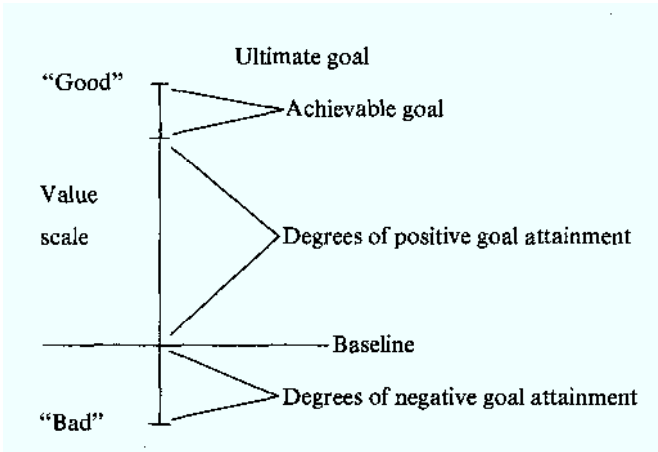(xxvi)   social mobility: openness of various social groups (defined by culture, class, age, or race) to association.

Figure 2.- Values and goals for a need related through a value scale.

This way we can define the ultimate "good" of a value scale for a specific need as well as the ultimate "bad" on the other limit of the scale. Thus a value scale can be associated with each need to which a value is attached according to the degree of achievement of the concept involved.

A *goal* is a point on the value scale for a particular need for which achievement is desired and sought. Thus a goal is an assigned value on the value scale that may or may not correspond with the maximum of the value scale. The maximum value on a value scale may indeed be an ultimate level or *ideal* (2) that is unobtainable. Therefore, a realistic goal can be set below this level, as illustrated in Figure 2.

A *baseline* on a value scale is the level of value that exists at a given time, designating a starting point from which one works to achieve a goal in terms of the value for the particular need involved. Having set a goal and a baseline on a value scale, the actual measure of the degree of attainment of that goal is found to lie between the baseline and the goal.

3. BASIC NEEDS AND TECHNOLOGY

Given the type of basic needs presented above, what would be the criteria that could and should be used in order to achieve them? What would be the questions that should be asked of any technology, the guidelines that should steer the work of technologists concerned with real development?

One such proposal is presented below:

Economic:

(1) *Basic needs satisfaction:*

(a)   Does it directly or indirectly (over short time) contribute to the satisfaction of such basic needs as food, clothes, shelter, health, education, transportation, communication?

(b)   Does it produce goods and/or services accessible to those most in need?

(2) *Factor development:*

(a)   Does it use local factors optimally over time? Generating employment? Developing medium and high level skills and engineering and R & D capabilities and using them for the purposes of further technological development? Saving/generating capital? Saving/generating raw materials including energy? Generating more appropriate technologies?

(b)   Does it increase the capacity to produce on a sustained, cumulative basis, over time?

Social:

(1) *Structural development:*

(a)   Does it reduce dependence and promote self-reliance (autonomy combined with selective exchange on an equitable and solidary basis and with people participation) at the local/national/regional levels, enabling the society to follow its own path of development?

(b) Does it reduce inequalities? Between occupational, ethnic, sex, and age groups? Between rural and urban communities? and between (groups of) countries, especially in the field of scientific and technological capabilities?

(2) *Cultural compability:*

(a)   Does it make use of and build on endogenous technical traditions?

(b)   Does it blend with/enhance valuable elements and patterns in the local/national/regional   culture?

(3) *Human enrichment:*

(a)   Does it lead to creative involvement on a people basis by being accessible, comprehensible, and flexible?

(b)   Does it liberate human beings from boring, degrading, excessively heavy dirty work?

Environmental:

Ecological balance building:

(a) Does it minimize depletion and pollution by using renewable resources, through built-in waste minimization, recycling and/or reuse and blending better with existing eco-cycles?

(b)   Does it improve material and man-made environment by providing for a higher level of complexity or diversity of the eco-system, achieving a balance and reducing the vulnerability of ecological systems?

The above list may derive its rationale from current thinking and practice in the tiled of eco-development (see Glaeser, 1977), where development is

seen as development of human being, not only of things, interpreted as the satisfaction of material and "non-material" needs, and the 'eco-' stands not only for counteracting depletion and pollution but for building a safer environment. (See more in Singer, 1977, in particular see, p. 129ff on the recommendations of the Group 77 strengthening national enterprises to enable them to take the necessary steps with a view to preventing the negative effects of transnational corporations.) These are broad criteria that have to be taken into account in arriving at decisions not only dealing with the selection of technologies but also with the processes that generate these technologies. (It needs to be emphasized that the weights assigned to each criterion or combination of criteria will have to be determined in each individual case with as wide a participation as possible of people directly involved in implementing them or being affected by their implementation. See more on this in Tobar-Arbulu (1986) within the framework of 'Technology Assessment'.)

The thesis supported here, then, is that technology, as a body of knowledge, is not given in a vacuum but in a social, political, cultural, and economic context. Technologies are accompanied by these social structures which eventually can and will decide what kind of technology will be researched, developed, deployed, and implemented.

4. LONG-, AND SHORT-TERM ISSUES

How to tackle the long-term problems of a society is a major difficulty. The parliamentary circle of four of live years between elections is a feature of all democratic governments and this means that both governments and opposition parties have to respond rapidly to the issues which seen most immediate to the electorale. Governments, like individuals, tend to ignore problems which can be put off till tomorrow. This has probably mattered little until recently, since the long-term problems were indeed for away in effect and apparent importance. Today, however, with the rapid rate of change, what could formerly be regarded quietly as long term, tends to race into the period of five to ten years ahead —that is, possibly to the time of the next administration. As a consequence, the problems tend to become compounded and governments find themselves falling into a rhythm of crisis management, staggering from one emergency to another —monetary, social, balance of payments, unemployment, inflation and the rest— and then back to the next monetary flurry. At each crisis, remedial measures are applied, which seldom reach to the roots of the difficulty. The fundamental and long term is too easily sacrified for cosmetic measures of less importance.

A farther aspect of this malaise is that efforts to patch up policies and institutions in the face of new and complex problems may result in increasing rigidities in the machine and a loss of resilience to adjust to fundamental and permanent changes.

This problem is recognized in some quarters and some interesting experiments have been made in recent years. The present interest in world future

studies (9) has given an impetus to the creation of new mechanisms to prepare for long-term needs. (This is, of course, particularly important with regard to military preparedness, where it is necessary to attempt to foresee the technological and strategic thinking of potential enemies.) Thus we have seen the creation of bodies, which have done forward thinking, but have been organized outside the government bureaucracy to make possible hiring and firing in accordance with changing needs, and able to pay the rate for the job. Another innovation has been the arising of a rash of "think tanks", official, semi-official and private, able to work for government or industry by contract. Some governments, finally, have themselves create internal mechanisms for looking at the long-term problems.

A problem closely related to the general criticism of the power and size of the bureacracy is that of decentralization. While the number of emerging problems of a global character is increasing and would appear to demand attention on a world scale, there is at the time an increasing demand of decentralization, regional autonomy and greater participation of the individual in decisions which concern him. Ethnic and regional groups are in many places demanding autonomy —from the Mohawk Indians (Blanchard, 1980) to the Basques. (See Sagasti, 1979, for the notion of 'self-reliant development'.) It seems that the need for central and even universal considerations of the global problems and that for a genuine devolution to power toward the province, the region, the district and the individual are really two side of the same coin. The main issue is how to establish in an harmonized manner a system in which there will be many more layers in decision-making than at present, in which the basic principle will be to ensure that in each case consideration and decision takes place as near as possible to those who will enjoy or suffer the results. For global problems we need a global forum, for local matters, the town meeting. (Yugoslavia seems to be the best example in decentralization nowadays.) There is, therefore, a great need for experimentation and innovation in the structures, policies, attitudes and procedures of governments. Future institutions should be more pluralistic, with more participation by the public, and with built-in mechanisms to generate innovation to meet changing need and circumstances.

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(9)   The world models set by Forrester (1971) and Meadows et al. (1972) have had the merit of attracting attention to world problems. But as Marie Jahoda (Freeman *et* al., 1973) has pointed out, the solution to these problems does not lie solely in the technocratic applications of instruments which would reduce history to its physical constraints. The energy crisis in 1973-74 was not an outcome of these analyses. One must look somewhere else to find its causes. Further, the scenarios of the Limits to Growth (Meadows *et al.,* 1972) were particularly disturbing for the poorer countries for whom they implied the need of stopping economic development in order not to deplete finite resources or self-destruct with environmental poisons. This ideas could be telling the Third World to "stay in its place, for the sake of the planet's survival" (Chichilnisky, 1977, p. 278). But Third World scientists were will aware that 85 percent of the world's resources were actually being used by less than 20 percent of the world's population, and that this 20 percent was in the North. As Sábato (1979, p. 43) puts it, "the real limits to growth are sociopolitical limits".

5. BASIC NEEDS AND GLOBAL DEVELOPMENT

International tensions result mainly from problems of inequalities in the international economic system. Economy and political power go hand in hand (Galbraith, 1983a). At present almost seventy five percent of all export of Third World countries are primary products while almost ninety percent of world export of goods are generated in the developed countries. While the growth of the so-called South is viewed as dependent on the growth of the so-called North (U.S.A., Europe, and Japan) by some international organizations and policy-makers *(Brandt Commission Report,* 1980, p. 33 & 67), a growing group of Third World people are questioning this point (Palma, 1978; Sábato, 1979; Herrera *et al.,* 1976), for as Ackoff (1974, p. 220) asserts, "Developed nations do not know how to tackle the mess [problematique] we call underdevelopment". The question of non-renewable resources, politico-economico-cultural dependency, and the basic needs issue are related in the model of development proposed by some of them. Thus the so-called "Bariloche model" of development is based on a discussion of basic needs.

In 1974 a group of Latin American scientists (Herrera *et al.,* 1974) came up with the so-called "Latin American model of global development", or the "Bariloche model". (A more accurate model can be seen in Herrera *et al.,* 1976.) The concept of development does not make any sense unless it focuses on the satisfaction of certain basic requirements by all. These needs contain minimum standards of food and shelter (biological development), education (cultural development), participation (political development), and economic parameters (Chichilnisky, 1977). The satisfaction of human needs is seen, in the Bariloche work, as a changing concept through time and with different aspects for different situations and cultures (see above). Its main aim is to find ways of achieving "satisfactory living conditions" for the developing countries. The model divides the world into four regions: Asia, Africa, Latin America and the developed countries (East and West) (10). The model assumes that it is possible to control the development of the regions through centralized redistribution of capital. The authors assert that the crisis predicted in other models —such as those of the Club of Rome (9)— is already affecting most of the developing countries whose people are suffering from hunger, high infant mortality, illiteracy and bad housing conditions. This crisis has been brought about not by depletion of nonrenewable natural resources, environmental pollution or excessive population growth, but by the une-

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(10)   The Latin American model does not take into account any difference between "capitalist" and "socialist" countries, while prominence is given to the difference between the so-called "rich" and "poor" countries. This division between rich and poor nations is also supported by Galbraith (1983b). (For a review of the different global models proposed during the seventies —Forrester, Club of Rome, Leontief, Sarum, Moira— see Gvishiani. 1980.) The naive assumption of most systems models is that "the world of human affairs behaves like a machine". Churchman (1983) ascribes the failure of implementation of large scale world models such as those sponsored by the Club of Rome to their neglect of politics, morality, and aesthetics.

qual distribution of wealth and power between countries and their system of values. Two basic scenarios of interaction of the regions are used to explore the possibilities for achieving the "satisfactory living conditions", i.e., a certain level of nutrition, education, housing, and medical care.

The first scenario did not assume any economic aid from the advanced countries to the other regions. Calculations show that in this case the population of the Latin America region would reach the "satisfactory living conditions" in about 40 years, while Asia and Africa, even with optimal management, would be far below that level. Moreover, they would find themselves in a steadily deteriorating situation as regards all the main life-supporting parameters.

The second scenario envisages aid from developed countries to the Asian and African regions. In the 10 years beginning from 1980, aid has to grow from 0.2 percent of the annual gross product of the developed countries to the 2 percent, whereupon it is to remain at that level. That would offer an "acceptable solution" for all the regions, so Asia and Africa would reach the level of the "satisfactory living conditions" within 57 years and 65 years respectively.

6. BASIC NEEDS AND ETHICS

Any social behavior and morality must recognize the basic human needs. We think that ethics is not biologically determined, for human behavior is an ultimate expression of the combination of innate propensities and environment (Fox, 1980, p. 126). At the individual level it is sound to ask whether there is a neural center for moral judgments —since only human being are responsible for what they do or fail to do— and whether it is inborn or educated.

I claim, following Fox (1980) (11) that every organism, and humans in particular, is born with a certain propensity which can be developed (or inhibited) by environmental inputs (or lack of them). To define our humanity, we must, therefore, explore our evolutionary history to ask what our inbuilt potentialities are, and what the necessary environmental input for the realization of this humanity is.

All human action and all social policy should operate within human parameters, hence avoid the inhuman. This assumes: (1) that we can indeed truck down the essentials of human social nature through a needs conception and approach, (ii) that having done so, we can act on this knowledge to produce an environment congruent with those needs.

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(11) As Fox (1980, p. 128) asserts, "we are equipped with [...] innate *propensities* that require environmental input for their realization. Thus, what we need to look for is a combination of the innate predispositions and the range of environments compatible with them. Any prescriptions would take the form "We are programed to do X and this requires environment Y; if we wish to see the maturity of X [to prevent the realization of X] we must provide Y [we must avoid to provide Y]".

Recent works on human needs (Chenery, 1977; Ghai *et al.,* 1977; Galtung, 1975; Hopkins, 1977; Macpherson, 1977; McHale and McHale, 1977; UNESCO, 1978) have been taken into account in order to explore models of development (Aguirre *et al.,* 1978; Cifuentes Espinoza, 1976; Herrera *et al.,* 1976; Mallmann, 1975; Sagasti, 1979) which in turn provide the needed conceptual framework for the realization of these potentialities. As Fox (1980, p. 132) puts it, "If we know firmly what range of social context is required for each and every human to realize his humanity, then we can strain in that direction". A code of ethics should then build up "not in terms of utopian expectatives, utilitarian formulas [...] or theological vistas, but in terms of what we know to be the repertoire of evolved behavior of the species *Homo sapiens* (Fox, 1980, p. 131).

Since this *homo sapiens* is *oeconomicus* and *politicus, faber* and *artifex, ludens* and *loquens* his code of moral behavior should be related to his economic, political, cultural, biological, and social needs rather than to wants promoted by some vested interest (12).

As far as universal basic needs, as a framework, is taken into account, the moral code of ethics will prove a kind of universal morality. Within this universal morality, taking into account specific environments, cultures, and modes of life, human groups should develop, and adopt their concrete moral codes. This, however, can only be done from an perspective where participation of people is the key point (Ackoff, 1970 Ch. 7, 1974 Ch. 3 & 4, 1977; Alexander *et al.,* 1975, 1979).

In a period where total material resources are sufficient to fulfill the needs of all human beings (FAO, 1982) —provided a basic reorganization of present socio-political structures (13)— as proved by the Bariloche model, a claim for zero-growth development for the poor countries of the Third World is not only technicaly unsound (14) but morally evil.

Acknowledgments

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(12)   As for wants and needs in their relation to ethics, according to Fox (1980, p. 129), "Our problem is that because of the dominance of wants —wishes, desires, aspirations, and utopias— we have lost touch with our needs; lost touch to the extent that we constantly sacrifice needs to wants".

(13)   In economic policy both the inner and outer conditions determine the role of the economic system in the model of development. Thus, superpower *A* will have an imperialistic external economic policy to feed its own domestic economy; nation *B* will see restricted its model of development both because of its belongingness to a specific block as for its particular inner conditions of human and material resources. *See Appendix B* for the notion of 'development'.

(14)   As Weisskopf (1970, p. 350-351) says, "Altogether thanks to technological achievements, it would be possible to feed, clothe and house the present population on earth without undue exploitation and suffering. Clearly we are far from this desirable state of affairs [...] but the reasons for this shortcomings are no longer technological but social and psychological. Therefore, the problem of the improvement of the human condition must be attacked today on the political, sociological, and economic level with the help of technology".

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Appendix A

OPTIMIZATION

Needs analysis usually identifies the most important set of characteristics for the needs. The needs must be formulated into a statement of goals. The quality of needs analysis is essential to the establishment of guidelines and criteria for later optimization when more is understood about the set of alternatives available.

Definition of criteria

Criteria must emerge from the needs analysis and the formulation of the feasibility study. Every criterion, x_i, should be accompanied by its relative weight, a_i, where $\Sigma\, a_i = 1$.

We define the 'criterion function', *CF*, as follows:

$$CF = \text{def } \Sigma\, a_i x_i.$$

Parameters

Usually a particular set of parameters, $\{y_k\}$, can relate to the set of criteria defined for the evaluation. (y_k may have a different functional relationship from each x_i, and a particular y_k may not relate at all to some of the x^i.) Each criterion can be viewed as a function of some set of parameters, $x_i = f(y_k)$.

Range of parameters

Having defined each x_i, the next step is to identify the range of each parameter, y_k. This range is important since the designer-planner is in fact defining the acceptable or the allowable spread of each of the parameters. (This is for inner constraints. There also are some external constraints that depend on the environment.) Any planning yielding values of a parameter outside is defined range is then considered to be technically not acceptable —or not feasible.

The planner must carefully consider the significance of the values assigned to be limiting values for the y_k.

parameter	minimum	maximum
y_1	$y_1 \min$	$y_1 \max$
y_2	$y_2 \min$	$y_2 \max$
(i.e., percentage of GNP in R & D)	1%	4%

Regional and functional constraints

There are three kinds of constraints that have to be taken into account:

(i) external constraints due to environmental conditions;

(ii) regional constraints or the type of constraints resulting from planner decisions, typified by the minimum and maximum values of x_i, and y_k. They are always introduced artificially into the planning;

(iii) functional constraints of the type of constraints resulting from the relationship that may exist among y_k and x_i, which are identified from the resulting analytical functions. These serve to provide performance indicators and act as transform functions.

Combining criteria into one function

At this point the planner is ready to synthesize a function that includes all the criteria. This function should somehow show the performance of a certain plan for its parameters in units that are consistent for all criteria.

Optimization

Formal optimization requires the planner to provide a synthesized criteria function, *CF,* which can be used to evaluate each of the candidate systems. An algorithm should be developed to provide the theoretic best value of *CF* for each candidate system to satisfy the optimization *within* systems requirement. Then, optimization *among* candidates is accomplished by choosing the "best" (highest or lowest value, depending on value system) value and the associated candidate system. Formal optimization requires then:

(i) a program which optimizes the *CF* for each candidate system respectively (optimization within);

(ii) a program which selects the "best" *CF* according to the value scale used (maximize or minimize as previously determined) (this is optimization among candidates).

Optimization within a candidate system

Usually a given candidate system will have an acceptable range of performance of each y_k (see Figure A-1 below).
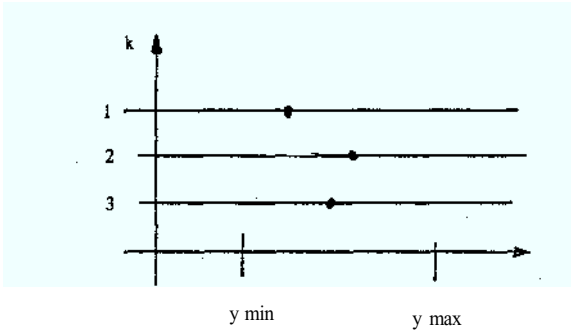
Fig.A-1.- Schematic of relationships among *m* planning parameter for a candidate system.
* = optimim value.

That is, a given parameter can have any value *within* some allowable range for the candidate (with a y_k min and a y_k max). The optimization for the candidate in question consists in identifying the $\{ y_k | 1\ k = 1,2,3,...m\}$ such that the corresponding *CF* is optimized. (When the value scale established is increasing with increased value of *CF,* then the optimum value will be the maximum *CF* possible.)

This optimum requires the use of computer techniques (given the large number of candidate systems and the large number of parameters).

Optimization among candidate systems

When the *CF* has been determined for all the candidate systems, the planner can then, and only then, consider comparisons *among* candidates.

Since each candidate system has now yielded a value of *CF* which can- not be bettered, the choice among candidate systems is simply to pick the one having the "best" value of *CF*.

When the planning-space is formed from the set of parameters $\{y_k | k = = 1,2\}$, *CF* can be visualized as in Figure **A-2,** below:
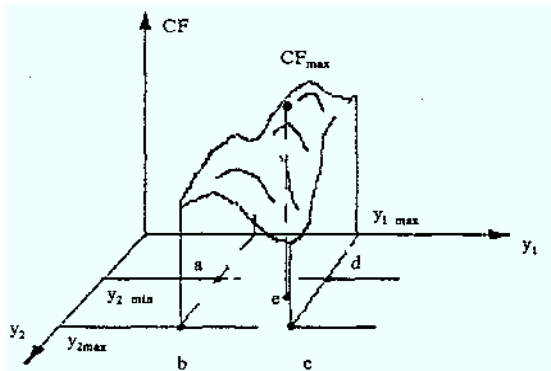

Fig. A-2

When the number of parameters, *m,* is greater than two, the vector $\{y_1, y_2, ..., y_m\}$ represents a "point" in the hyperplane of the planning space that is the projection of a value CF. For an increasing value scale, the projection of CF_{max} upon the hyperplane identifies the respective values of y_k that are optimum in combination.

Appendix B

DEVELOPMENT AND THE STATE SPACE APPROACH

Every social system, in particular every society, is in some state or other in a given reference frame or environment and at a given time.

We can draw the list of all (known) properties of the society concerned and represent each property by some mathematical function. The state function of the society is the *n-tuple* $F = <F_1, F_2, ..., F_n>$, which represents the society. As time goes by, the value of *F* at the instant t moves in an abstract space, which represents the changeability of the society: The space is called the *state space* of the society σ, or S (σ) for short.

Any event or change occurring in σ can be represented by an ordered pair of points in S (σ) and visualized as an arrow joining these points. The collection of all such pairs of states is the *event space* of σ, or E (σ). Not all the conceivable pairs of states are really possible: there are laws characteristic of social systems that restrict the possible states and events of such systems. The set of all really possible events in (or changes in) society σ, E (σ), is a subset of the Cartesian product of S (σ) by itself. The statement that event e happens in or to society σ is abbreviated; e ∈ E (σ). A *process* in society σ is representable as a sequence (or list) of states of σ or else as a list of events in σ. A convenient representation of the sets of all changes occurin in a society σ during a given period of time is obtained by forming all the ordered pairs $< t, F(t)>$ of instants of time and the corresponding states of the society concerned. Such a set, or H (σ) = $\{<t, F(t)> \mid t \in T\}$, can be called the *history* of σ during the period *T*.
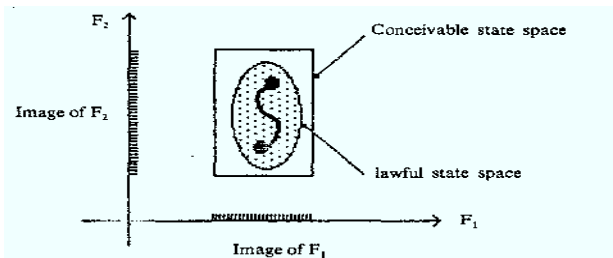

Fig.   B-1.- State space

Consider now tow different societies, or parts of a society, *a,* and *b* with h (a) and h (b) their respective histories over a certain period of time.

Call h (b/a) the history of *b* when *a* acts on *b.* We say that *a acts* on *b* if, and only if, h (b) ≠ h (b/a), i.e., if a induces changes in the states of *b.*

The *total action* (or *effect)* of *a* on *b* is defined as the difference between the forced trajectory of *b,* i.e. h (b/a) and its free trajectory $\overline{h}$ (b) in the total state space of *a* and *b,* i.e., A (a,b) = h (b/a) ∩ $\overline{h}$ (b), where h-(b) is the complement of h (b) in the given space. Likewise for the *reaction* of *b* upon *a.* The *interaction* between societies a and *b* is the set theoretic union of A (a,b) and A (b,a).

Consider a change c (event or process) in a society a over a period of time T_1, and another change e (event or process) in society b ≠ a over another period T_2. (The changes and periods are taken relatively to one and the same reference frame.) Then we can say that c is a cause of *e* if, and only if, (i) *e* begins later than *c,* and (ii) the history h (b/a) of *b* over T_2 is included in the total action A (a,b) of *a* on *b* over period $T_1 \cap T_2$. In this case, e is called and effect of *c.*

Appendix C

THE OECD LIST OF SOCIAL INDICATORS (1982)

The OCDE list of Social Indicators is reproduced in Table C. 1 below. It includes 33 specific indicators grouped under eight major headings:

— helth
— education and learning
— employment and quality of working life
— time and leisure
— command over good and services
— physical environment
— social environment
— personal safety

The 1982 OECD report recommends that five standard disaggregations be used in presenting nearly all indicators:

— age
— sex
— household type
— socioeconomic status
— community size

It suggest optional 'standard' disaggregations by ethnic group and citizenship in countries where these distinctions are relevant and also by region (i.e., by geographical location within a country) according to the classifications customary in each country. The OECD report lists other disaggregations applicable to several indicators: branch of economic activity, occupa-

tion, type of activity, working hours, level of education, tenure status (home owner versus tenant), and age of dwelling.

Each of its 33 indicators is treated as a distinct entity. Even within groups (e.g., health), the various indicators involve different units of measure and there is no obvious way to assign 'relative importance' weights to these units. Similarly, there is no obvious way to weight the relative importance of the eight major groups or social concerns.

SOCIAL CONCERN	INDICATOR
HEALTH	
— Length of Life	— Life Expectancy
	— Perinatal Mortality Rate
— Healthfulness of Life	— Short-term Disability
	— Long-term Disability
EDUCATION AND LEARNING	
— Use of educational facilities	— Regular Education Experience
	— Adult Education
— Learning	— Literacy Rate
EMPLOYMENT AND QUALITY OF WORKING LIFE	— Availability of Employment
	— Unemployment Rate
	— Involuntary Part-time Work
	— Discouraged Workers
— Quality of Working Life	— Average Working Hours
	— Travel Time to Work
	— Paid Annual Leave
	— Atypical Work Schedule
	— Distribution of Earnings
	— Fatal Occupational Injuries
	— Work Environment Nuisances
TIME AND LEISURE	
— Income	— Distribution of Income
	— Low Income
	— Material Deprivation
— Wealth	— Distribution of Wealth
PHYSICAL ENVIRONMENT	
— Housing Conditions	— Indoor Dwelling Space
	— Access to Outdoor Space
	— Basic Amenities
— Accessibility to Services	— Proximity to Selected Services
— Environmental Nuisances	— Exposure to Air Polutants
	— Exposure to Noise
SOCIAL ENVIRONMENT	
— Social attachment	— Suicide Rate
PERSONAL SAFETY	
— Exposure to Risk	— Fatal Injures
	— Serious Injures
— Perceived Threat	— Fear of Personal Safety

Table C.1.—(Adapted from OECD 1982, p. 13)

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