

2066 and all that...

by Bruce Mackay*

In an address to the recent IDS Research Conference, Jorgen Randers, Systems Dynamics Group MIT, provided an interesting new angle on the 'Growth versus Development' argument which has increasingly concerned development specialists in recent years. The thesis that the rate of growth of per capita G.N.P. is an adequate indicator of progress for developing -- or indeed developed -- countries is usually challenged on two fronts. First, it is pointed out that per capita G.N.P. is a mere average which may hide extreme distortions in the distribution of income. Secondly, and more radically, it is argued that G.N.P. alone, even if well distributed, is not a sufficient indicator of development: something we may loosely call 'the quality of life' should also be included when determining policies for development, and when assessing their impact.

Funded by the 'Club of Rome', a group of businessmen planners and scientists, the MIT specialists have produced a mathematical simulation model relating population, food production, natural resource use and 'material' economic development, all on a global scale. Randers argues, logically enough, that since the Earth is a finite body it cannot support indefinite growth of any of the above factors. It is thus worthwhile considering the physical limitations which define the 'carrying capacity' of the planet. This would be worthwhile anyway, but is made more urgent by the fact that the world is now in sight of several of these limits.

The most straightforward of these is the balance -- or lack of it -- between food production and the

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calorific requirements of the population. If present rates of population growth continue, then even with a doubling of the amount of land now cultivated -- such a doubling would exhaust all potential cultivable areas -- and a doubling of land productivity, the MIT group calculate that the physical limit of food production will be reached by the middle of the next century at the latest.

These calculations make no allowance for political or social factors which might delay such a quadrupling of food production, but they are made more poignant by the FAO Indicative World Plan for Agriculture. This points out that in Asia the availability of virgin land is slight compared to Africa or Latin America, and that the cropping intensity in Asia is already close to 100 per cent. (The average for the less developed countries is 68 per cent). The increase in food production which must be forthcoming by 1985 will have to stem from massive inputs of fertilisers, irrigation, pesticides and the new seeds. Even in the case of irrigation one comes up against the physical lack of water. For example, India currently irrigates about 28 per cent of its cultivated land; only 41 per cent of its maximum cultivable area could be irrigated, and this figure is a theoretical maximum.

Randers would argue, however, that there is also a 'pollution absorption limit', and would treat the massive inputs of fertilisers and pesticides anticipated by FAO as at least semi-pollutants. In the MIT model, pollution occupies a somewhat confusing place, until one reminds oneself that it is the extreme physical limits, rather than mere irritation at empty beer cans on beaches, that are the basis of the calculations. Thus the production of energy is treated as a pollutant, since whenever a prime source of energy, such as petroleum or uranium, is converted into usable work, most of the energy ultimately ends up as heat. Randers is not one to scoff at warnings of melting polar ice caps, and points out that man's production of energy is approaching one per cent of the total incoming solar radiation -- in localised areas it is already far above that level. The one per cent figure is not itself thermodynamically critical, but it will produce a $\frac{3}{4}$ degree Centigrade rise in the global ambient temperature, and the

fact that it is doubling every 15 years will become that much more apparent. At some point, energy production will have to stabilise.

The MIT group employed a fairly straightforward methodology. They estimated the critical limits of such factors as food production and heat loss, and then proceeded to run simulations of the future through a computer. The model uses the terminology, theories and data of 'leading professionals' in the various fields covered. This may be a source of criticism of the whole approach, for they have relied on conventional wisdoms which might well be challenged by others. Again, however, Randers would argue that it is rates of growth, particularly of population in the LDCs and of resource consumption in the DCs, which are the major influences which determine how quickly the critical limits are being approached, rather than the precise levels of, and relationships between, the various factors. By using a computer, the group were able to explore very quickly the effects of a change in one or other of the variables, and the impact which new technologies might have on the ultimate result.

Their conclusions were startling in their simplicity. There is absolutely no possibility of 'sustaining' a world population of 14 billion -- an arbitrary figure, but a logical one beyond the 7 billion we are almost sure to have by the year 2000. More important, there is no possibility of bringing the standard of living of the LDCs up to that currently enjoyed by the USA, unless the world population is reduced from its present level of 3.6 billion. If the population is not reduced, either international maldistribution must continue *ad infinitum*, or the standard of living of the USA, and of most of the developed world must itself be reduced.

The precise figures and dates presented in the study are not important, for the model only shows in a mathematical form what must be evident to most readers of this *Bulletin* -- that sometime over the next fifty years an extremely rapid transition to much lower rates of population growth must take place, if not to a stationary or declining global population. That this must take place in the developed as well as the developing countries is not so apparent, though

it becomes more so when one looks at the resource consumption rates of the developed world, and the projected demand for such resources over the next fifty years.

How far have such apocalyptic visions affected the activities of development agencies? USAID, having allocated a mere \$4 million for population activities in 1967, increased this to \$34 million in 1968, to \$45 million in 1969, and to \$71 million in 1970. This dramatic increase in official US Aid to curb population growth has been complemented by increased private efforts by such organisations as the International Planned Parenthood Federation -- 1962 budget \$325,000, 1970 budget \$17 million -- and by increased allocations of official European Aid in the same direction. In 1966 the so-called 'breakthrough' occurred in the United Nations, when the General Assembly finally agreed that population control was a legitimate activity for the UN and its agencies. This led to the establishment of the Trust Fund for Population, set up in 1967.

This surge of activity on behalf of the world's over-fertile poor was the result of a long and uphill struggle by, in the main, two unlikely allies. Several Asian countries had raised the problem of their high rates of population growth in the UN throughout the fifties and sixties (the earliest formal proposal was in the World Health Assembly of 1950, by the Minister of Health for Ceylon). It was rejected by 30 votes to 1. WHO gradually came round to the idea that it should involve itself in such problems, but there was always concerted action by the Catholic countries in opposition to any proposals. The Soviet Union generally argued that population growth would slow as and when economic development took place, while the personal opposition of the Brazilian Director-General, Dr. Candau, played a vital role in the organisation's rejection of 'active intervention'. Over the years the opposition of the Catholic countries became less monolithic, and changes in the membership of the UN provided greater support for the less developed Asian countries.

At the same time, pressure groups were at work in the developed countries, and their impact on official policies, particularly that of the USA, provided the vital support needed for the Asians' efforts.

Since 1952, the Rockefeller Foundation and other private groups have been funding research and generally propagating the need for active government involvement in population affairs -- both for the less developed countries and for the poor in the developed world. In a report prepared in 1957 for an Ad Hoc Committee of various foundations, including Rockefeller and the Population Council, it was stated that in the USA, "Excessive fertility by families with meagre resources must be recognised as one of the potent forces in the perpetuation of slums, ill-health, inadequate education, and even delinquency".¹ But Eisenhower totally rejected any involvement in such activities, and though Kennedy permitted an offer of US money to the UN for family planning activities, he was basically cool to pleas for major action. It was not until the White House Conference on International Cooperation in 1965 that official US policy swung firmly behind population control as a legitimate, indeed major, aspect of its aid programme and foreign policy. Much the same process took place in many European governments, particularly those of Britain and Sweden. The financial results of this involvement have been noted above.

The speed with which the population issue has become of such major import, after a run-up reaching back far beyond the World Health Assembly's first refusal to even consider the matter, may be a guide to what is likely to happen to propositions such as those of the MIT group. A very real problem was recognised early on by those most involved -- particularly India and Pakistan -- and by those in the developed world who saw a threat to the stability so necessary for the furtherance of their own interests. (This is not to say that all the private agencies involved are just scheming robber-barons, but that it is the realities of economic interest which effectively determine official policies.) At the same time, the presentation of hard data by the statisticians has steadily eroded the position of those who see no wrong in an ever-expanding population, and has forced planners and policy makers to accept a much longer-term view as the basis for their decisions. It is the failure of planners to see the realistic options available which gives greatest cause for concern.

¹ Frederick Osbourn (ed.), *Population: An International Dilemma*. Population Council, New York, 1957.

At the risk of presenting yet another version of well-known population growth statistics, it is worthwhile looking at an example of such growth in terms of the time margins available to policy makers. Suppose, for example, that the powers-that-be in Indonesia (current population about 120 million) decided that the population should be stabilised at 240 million, and that they wanted to resort to measures no more draconian than limiting family size to an average of two children, they would have to enforce such a measure within the next nine years, so that by 1980 the net reproduction rate would be 1.00. The population would then continue to increase until the year 2045, when it would achieve a stationary state of 240 million. Now the prospect that such a measure could be enforced by 1980, and remain in force, is obviously a little slim. If we extend the time margin to the year 2000, then with the same conditions the stable population level is achieved in the year 2060, with 336 million people, nearly three times the present size. Other LDCs face, or are failing to face, similar decisions about the size of their populations.

These figures are based on two assumptions. First, that the planners in our illustrative example do consider the future population an important variable in their development planning. Secondly, that they are not willing to resort to any more forceful measures than limiting family size to two children. The important point is that however one regards population control programmes -- as unwarranted interference with the liberty of the individual; as deceitful efforts to hide the effects of the maldistribution of income; or as conspiracies by the white to hold down the numbers of the coloured world -- the process is already under full steam. Because of the age distribution of the population in most LDCs, any policy decisions taken now will take decades to show their full effect. And all of this begs the question as to whether governments are aware of these facts, and if they are, whether or not they want their populations to double or treble in size.

The MIT group are now saying, in effect, that a similar need for long term planning to avert a future crisis is apparent in the developed countries. The depletion rates of natural resources is a field of study fraught with pitfalls, but it is sufficient,

in this context, to say that certain resources -- most notably petroleum -- are certain to be in very short supply in the near future -- say, fifty years. The increased cost of essential raw materials extracted from lower grade deposits, and the substitution either of synthetics or of 'high technology' alternatives (such as nuclear power) will both work to the detriment of the LDCs. Randers' thesis is that so long as the average individual in the USA, and to a lesser but still extreme extent his counterpart in the other developed countries, demands and obtains a per capita energy consumption some fifteen times that of the average individual in the LDCs, and at the same time demands an ever-increasing material standard of living, and the right to 2.7 children per family -- so long as this process continues, the less developed countries simply cannot achieve a similar standard of living. There is just not enough to go round. And if substitute technologies were to be effectively transferred, the world's climate and ecology would be totally disrupted by the waste products of an affluent population no larger than the current 3.6 billion.

Now population statistics are one of the more easily understood projections of the fifty year future. The implicit assumption behind the current drive for population control, based largely on the UN's simple extrapolations, is that a population of, for example, 1.4 billion for India must be 'a bad thing' -- the full argument for an optimum population rarely rises above this sort of level. (1.4 billion would be the steady state population in the year 2060 if the net reproduction rate dropped to 1.00 by the year 2000). The work being done in that loosely defined field of futurology gives little guide to the policy alternatives, even in population matters, now facing development planners. Mostly it concerns itself with the 'post-industrial society' and its attendant social and political problems, or with the strategic implications of continued economic growth by Japan, China, U.S.S.R. etc. There is little on the implications of population growth for conflicts such as may be emerging now between India and Pakistan. Also, most work is based upon the methods of technological and economic forecasting, and in both areas of research the method has tended to determine the problem, rather than *vice versa*. Thus much of the literature on scenarios of the future is concerned with how to control the 'problems' of developed

societies with per capita incomes of \$50,000 plus. Political action is seen only as 'impinging' -- usually in an aberrant way -- on the process of growth.

What is so obviously needed in the LDCs, faced as they are by pressing short term problems and by great uncertainty as to their long-term situation, is a set of 'alternative futures' which will encourage the planner to perceive not only today's problems in their long term light, but to consider also the social and political measures necessary to achieve even a limited rate of economic growth. The MIT group are saying that a similar need for political measures will soon be necessary in the DCs also.

Apart from the factors working within the LDCs themselves against a more equitable distribution of income, the aid and trade policies adopted by the DCs also tend to have the same effect. Even in a crisis situation, which according to Randers we are facing right now, the short term interests of the DCs are likely to play a paramount role. For instance, the much-vaunted Green Revolution seems likely to reinforce, if not actually increase, the maldistribution of incomes in the rural sector. But in this connection it is worth noting that during the Indian famine of 1965-66, which preceded the wide-scale introduction of the 'miracle crops', the allocation of US Food for Peace supplies to India, which had always been done on an annual or multi-year basis, was in this case done on a three-monthly basis. (It continued to be annual for other countries). Under this pressure, the Indian government liberalised its import restrictions, gave the oil companies permission to build their own fertiliser plants, to fix their own price levels, to handle their own distribution, and to maintain a higher than normal share of management control.¹ As the New York Times put it in an editorial on April 28th, 1966: 'Call them strings, call them conditions, or whatever one likes, India has little choice now but to agree to many of the terms that the United States, through the World Bank, is putting on its aid. For India simply has nowhere else to turn'.

Michael Tanzer, *The Political Economy of International Oil and the Underdeveloped Countries*, Temple Smith, London, 1969.

The point is this. The population explosion, and its likely impact on the LDCs, could have been more widely recognised as being a crucial factor as far back as, say, 1950. At that time certain interest groups were aware of the problem. But the conventional wisdom of development economists, the failure of policy makers everywhere to put a sufficiently long time scale on their deliberations, and the still-evident inadequacy of demographic theory to cope with the situation peculiar to the LDCs, all combined to delay recognition of population growth as a determinant of both income growth per head and of development in the wider sense. The MIT study is an important step towards suitably long term considerations of the population-resource equation, and comes from a recognition of what exponential rates of increase can really mean, namely, a change from a situation of plenty to one of scarcity in the course of one generation. Over the next few years we can expect a number of increasingly sophisticated simulations along the lines of the MIT study. More detailed analyses of land and resource shortages, at the regional or national rather than the global level, will produce the same sorts of pressures for action as did the relentless logic of the UN's population projections. Such analyses are likely to harden rather than soften DC attitudes towards the less developed world, particularly as regards the 'strings and conditions' about which the New York Times was so concerned.

The ultimate logic of Jorgen Randers' argument is an economy characterised by a 'blessed' steady state. 'Ultimately it would lead to an equitable distribution of wealth throughout the world -- because one would no longer be able to accept inequalities in the present under the pretext that they would be removed through future growth'.¹ But before the government of that Mecca of growth and progress, Australia, starts planning its transition to the stationary economy, it could do worse than cast a glance at the projected population density of those islands off its North West coast.

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Jorgen Randers, "The Carrying Capacity of Our Global Environment", address before the Working Committee on Church and Society, World Council of Churches, Nemi, Italy, June 1971.