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ECONOMIC DEVELOPMENT FOR AN EXPLODING POPULATION

Dr. A. Roukens de Lange\*

I could use this occasion to come up with lots of facts and figures on population explosion and economic development. Alternatively, I could expand on the nature and use of mathematical computer models of population or socio-economic development, which is my field of research. I am not going to do either of these. What I am going to do is to look at the development needs and problems of a country faced with an exploding population from my personal point of view, and on the assumption that Rhodesia, or if you prefer Zimbabwe, will emerge from its present political problems with a stable government, whatever its political flavour might be. I do believe that this symposium was organised in the spirit of this assumption, and with this hope, for where there is no hope there is no way.

BASIS OF MY VIEWPOINT

What is the basis of my personal viewpoints?

In the first place it is that of an engineer which, of course, is my basic training. As an engineer I have learnt to deal with real problems and to find the best possible answer under the given circumstances, not to provide a perfect answer to an idealized and unrealistic problem.

In the second place my viewpoint is based on my experience in mathematical modelling. I am at present busy investigating the socio-economic dynamics of South Africa by means of mathematical modelling techniques. Many of you have probably encountered mathematical computer models somewhere along the line. Many Operations Research investigations are based on computer models; econometric models are used by the treasury and financial models are used in making investment decisions. I am obviously a believer in the utility of computer models, otherwise I would not be spending my efforts in this line of research. However, I am aware that they cannot in themselves solve problems, and are only a tool to be used in planning and management.

In the third place my viewpoint is that of a social scientist. I do not possess any formal qualifications in subjects such as sociology and economics, but it is impossible to become deeply involved in my type of work without absorbing a great deal of knowledge and understanding of matters in these fields. I would say that the most important lesson I have learnt is that the sort of issues we are concerned with in this conference cannot be formulated into an exactly definable problem statement. Whenever human beings are involved, problems become open-ended, subtle and shifting in character with time and events.

In the fourth place I am speaking as a futurist. What first motivated me to go into my present field was the "Limits to Growth" report of the Club of Rome. This spelt out the threats facing humanity over the next 50-100 years. Between

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the different threats of over-population, resource exhaustion, pollution and famine, not much hope for man's future emerged. Further investigation of the mathematical model and its assumptions has shown up serious flaws in the validity of the conclusions reached, but I believe that just because the model is not totally valid, this does not mean that there is no threat. I believe that the threats pointed to by the Limits to Growth report can only be averted if our planning policies and life styles are adjusted to cope with these threats. This is the basic motivation for my involvement in future research, and my socio-economic models are designed to allow the effects of alternative policies for adapting to the imperatives of limits to growth to be evaluated.

In the fifth place and finally I am speaking as a concerned person. I am concerned about my own future, my country, your country, Africa. I am concerned about the happiness and fulfilment of each and every individual human being. I hate hate, and I love love. I am not concerned about who wins or who is in power; I am concerned to see the best solutions being found. I do not believe that one ideology or another has the solution for our future happiness, but that it is the attitude and goodwill of people which will allow problems to be solved.

#### PREREQUISITES FOR DEVELOPMENT

Having set the background from which I view the problems and needs of your country, let me proceed to give you my ideas on these crucial matters. I do not need to give the facts on Zimbabwe Rhodesia - Dr. Hanks has already done so. However, the overall picture is fairly clear. Apart from a small industrialized and urbanized core, the vast majority of people in this country follow a subsistence type of economy and life-style or live a squatter type of existence on traditionally White-owned farms. This is a relatively unproductive type of existence which, under conditions of overcrowding leads to erosion of the land, reduction in life-support potential, and ultimately starvation. Economic development must somehow be harnessed to provide a solution. But how is this to be done? Let us have a look at what has been happening around the world, and see what we can learn from the experience of other countries, and in particular that of rapidly developing countries faced with a continuing population explosion.

When one has a look at the progress of various countries, what strikes one is that both the socialist and the capitalist types of developing economies have their successes and failures. By all accounts, Cuba has developed successfully since Fidel Castro took over. On the other hand, Tanzania and Burma which have followed Marxist doctrines (though perhaps not sufficiently ruthlessly) appear to be swimming against the tide. Kenya and the Ivory Coast appear to be faring rather well, other countries such as Uganda and many other African and other Third World states are in very poor shape. If one looks for the hallmarks of success or failure, assuming one can express this in terms of economic criteria such as GNP, one must look for other correlating factors. As far as I can see the main factors which correlate positively with development success are -

- 1) Natural wealth, e.g. Oil in Iran and Venezuela.
- 2) Strong and stable government - I do not think that there is a single successfully developing country which does not share this characteristic although the converse is by no means true as, for example, in the case of Haiti or Salazar's Portugal.

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3) A sizeable pool of human skills.

Factors which correlate strongly with poor performance are -

- 1) Political instability.
- 2) Underdeveloped human resources.
- 3) Rapid population growth.
- 4) Dogmatic or unenlightened development planning.

Many African countries suffer from all or most of these shortcomings. That political instability, underdeveloped human resources and rapid population growth have a negative effect on development is fairly obvious, but let us look at the last item, that of dogmatic development planning. I believe that this is a strong factor in Tanzania's problems, and in the backwardness of Eastern Europe relative to Western Europe. Systems which negate the importance of basic human nature, or which are bound to ideological constraints will inevitably run into problems.

#### TYPES OF DEVELOPMENT

I have not so far given any indication of different types of development. Here I believe there are two main aspects to discern. In the first place, there are the Capitalist and Marxist approaches. In the second place, there is the question of whether the emphasis should fall on heavy industrialisation or on what is known as alternative or intermediate or appropriate technology.

Let us first look at the Marxist and Capitalist alternatives. The Marxist - Leninist philosophy has a basic tenet the concept of the dictatorship of the proletariat in which everything belongs to the people and every man has the right to work. Beautiful in theory, but in practice Marxist - Leninist countries remove all political freedom and usually most human rights as well. You fit in with the system or you suffer the consequences. Marxist development plans mobilize the entire work force in one way or another, but are not concerned with the individual. Development is pursued to benefit the system and the global revolution.

The Capitalist approach in a pure laissez-faire, Adam Smith style, is not really being pursued anywhere. However, capitalism with various levels of state intervention and socialist features, so-called mixed economics, is found in most non-Marxist nations. Although on the surface this approach is apparently successful in many countries, such as Brazil, Iran, Ivory Coast and Kenya, there are also many drawbacks. Typical problems which arise are vast disparities in wealth, uncontrolled urbanisation, breakdown in traditional social patterns and mores, corruption, political unrest resulting from both reactionary and revolutionary groupings, etc. Where development is successful, this is often at the cost of human rights.

The other major division in types of development is that of heavy industrialization versus the appropriate technology option. Over the past few decades the emphasis has come down heavily in favour of the former. Communication

networks are set up, and steel works and heavy chemical industry are built with development loans or capital obtained from the export of natural resources. The assumption is that with this input into the primary and secondary industry, further development into tertiary and service sectors will follow automatically. But there are problems. I have already mentioned some of these but there are others which I shall discuss briefly.

#### DEVELOPMENT PROBLEMS

- 1) Heavy industry requires large inputs of energy and non-renewable resources. As these are likely to become scarcer and relatively more expensive as time passes, the long term future of economies developed on this basis look threatened.
- 2) As I already indicated, but want to re-emphasize, development of this nature results in the breakdown of traditional social values and, at least in the capitalist type of LDC's, rising expectations and an insatiable lust for what are sometimes called "junk" goods which contribute little to the satisfaction of inner human needs. Also, the ostentatious luxury of the small elite sets up discontent in the mass of people whose expectations are not met.
- 3) Heavy industrialization is capital rather than labour intensive, which is the opposite of what is needed in a country facing a population explosion.
- 4) Capital intensive industry is sophisticated and requires sophisticated manpower to manage and run it. This sort of manpower will often not be available locally, and must be imported as expatriate labour.
- 5) Sophisticated industries require equipment, energy and intermediate goods which can only be obtained from outside the country, creating foreign exchange pressures, and an often politically dangerous dependence on international trade. Usually, this can only be paid for through the exploitation of natural resources whose prices are notoriously unstable and which sooner or later will be exhausted.

For many years, and still today, the type of problems I have just indicated have not been recognised. The general assumption has been that relief from poverty and ignorance will follow automatically from industrialization and growth of GNP. In 1974, in an editorial article in the Journal of Development Economics, Professor Irma Adelman, one of the world's leading authorities on development economics, recognizes this poor performance and the problems created in the development process and asks rhetorically: "Why the long lag in realization of these facts, and the even longer time lag in the willingness to concede that a fundamental re-orientation of the discipline is required?". One of the reasons she gives for this failure is: "... the implicit but completely unjustified view which permeates most of economics to the effect that a plausible model is obviously correct, and therefore need not be checked thoroughly against a large variety of empirical, historical and case study evidence ..." and she adds: "... when playing with the lives of millions of people ... such a cavalier approach to our discipline constitutes to my mind nothing short of criminal negligence." She gives a series of suggestions many of which concern the professional planner, rather than suggesting clearly defined policy changes, but a few important bits of advice she gives which are worth noting are that we must take a broad systems view of the development

process, avoid looking for panaceas and simplicity, and keep an open and sensitive mind, receptive to signals from the outside world.

#### FALLACIES OF DEVELOPMENT PLANNING

I am not quite sure what Professor Adelman had in mind when she referred to panaceas and unwarranted simplification, but I would like to air my own views on what I perceive in this respect.

In the first place, I see ideologies as such over-simplification. There is the Marxist-Leninist ideology which I do not think I need to elaborate on here. There is, however, also a body of capitalist dogma which I regard as falling in the category of panaceas and over-simplification. One such dogma which is prevalent among South African businessmen, and perhaps Zimbabwe Rhodesians as well, is that virtually all economic and social problems would be solved if only the government would stop interfering. Now I do believe that they have a case when they accuse the government of ponderous bureaucracy and trying to regulate prices and supplies in defiance of market mechanisms, but that a withdrawal by government from virtually all economic and social matters would solve all problems, from unemployment to inflation, from energy to education, I do not believe. The depression in the 1930's taught us that laissez-faire does not work. In today's complex social and political environment, it certainly would work even less well. It could perhaps work in the interest of businessmen, but they form only a small proportion of the entire population.

A related panacea is that if and when shortages in resources arise in the future, the free market price mechanism will allow supply and demand to balance so that there is no need to act to restrict our use of resources today. Also, problems created by exhaustion of resources, population pressure and food scarcity will be solved by technological and agricultural miracles in the future. Another prevalent panacea is that the population explosion will be halted by creating affluence through the process of economic development. This process has indeed had this effect in the developed countries, but I believe that the chances of this providing the key mechanism for solving the population problem in the less developed world is slight. Then there is a group of race-orientated thinkers. Their dogma is that by legislating for independent African homelands, the problem of large numbers of unemployed and poverty-stricken Africans can be eliminated.

#### POPULATION GROWTH

Although there may be some merit in many of these panaceas, I believe that the real problems need much more sophisticated answers than these. The famous and controversial British cyberneticist, Stafford Beer, has proposed what he calls the law of requisite variety. This law states that complex problems can only be handled by methods of equivalent complexity. As an example of this law, and considering the theme of this symposium, I want to take a brief look at the problem of excessive population growth and the sort of methods we can use to tackle it.

Without attempting to be exhaustive we can draw up a large list of factors known to influence fertility -

social customs, beliefs and taboos;  
 religious beliefs;  
 educational level;  
 adequate and assured food supplies;  
 security in old age;  
 proximity of family planning clinics;  
 availability of methods of contraception;  
 confidence in the authorities;  
 propaganda methods;  
 economic incentives;  
 rising affluence.

If a population policy is to be effective it must cater for all these aspects. Merely providing family planning clinics and spreading propaganda will not be adequate if almost any one of the other influencing factors is unfavourable.

This example illustrates not only the complexity of the population issue but also its interdependence with numerous other aspects of socio-economic conditions and development. In other words, it shows up the necessity for a systems approach to the development process.

Another aspect of the population as well as all other development problems which is not immediately evident from the foregoing discussion is that of dynamics. We are not dealing with a problem that will still be the same tomorrow. The longer we wait the more intractable the problems become. Even if we were to introduce the optimum set of policies today, problems would not disappear overnight. If we were to succeed in persuading all families to limit themselves to two children, the population of Zimbabwe Rhodesia would still more than double before stabilizing some fifty years hence. If Zimbabwe Rhodesia were to double the growth rate in employment as of today, this would not mean that suddenly twice as many jobs would be available. In fact for an increase from a hypothetical 3 percent growth rate to a 6 percent growth rate per annum, 23 years would be required before this would result in twice as many jobs being available.

#### APPROPRIATE TECHNOLOGY

I mentioned earlier an alternative to rapid industrialization, namely that of appropriate technology. I do not offer this as a panacea but as a new direction which is receiving a great deal of attention worldwide and which is certainly worth exploring. The father of the concept is Dr. Schumacher, author of the book "Small is Beautiful". The idea behind it is that in developing countries where labour is plentiful and capital and skills scarce, production methods should be carried out using simpler, less capital intensive and more labour intensive methods, and which can be run in villages rather than in big urban centres. Full use should be made of advanced technical know-how, as long as it remains simple in its practical applications. Intermediate technology would make fewer demands on natural resources and foreign exchange, and would reduce urban growth.

The country which has probably made the most effort in the application of appropriate technology is India. A recent issue of the Economist reports some interesting and hopeful signs that India is beginning to improve its food production potential and unemployment problem, even if not yet really

significantly its population explosion problem.

Although India invested much capital and effort in heavy industry in the fifties and sixties, in recent years much more effort has gone into cottage industries so that today the small-scale sector employs 2½ times as many people as factory industries. This effort has gone into policies such as tax concessions, protection from competition from large industry, research and extension services.

#### ZIMBABWE RHODESIA'S DEVELOPMENT POSITION

Let us now have a look where Zimbabwe Rhodesia stands in the development game. To the white man, Zimbabwe Rhodesia may seem relatively well developed and organized, but for the population as a whole, Zimbabwe Rhodesia falls squarely in the LDC category. The development that has been occurring has been definitely capitalist in orientation, but as a result of sanctions she has not had the opportunity of rapid industrialization. At the same time she has avoided the problems inherent in this type of development. She has had the very significant advantage of a well-educated, well-motivated and settled entrepreneurial elite. In this respect, she has had an enormous advantage over other African countries which, before the present bush war, undoubtedly also rebounded to the benefit of the majority of the black population.

I believe that, on balance and leaving the last few years of war out of consideration, sanctions have had a beneficial rather than detrimental effect on Zimbabwe Rhodesia. Living standards for the white elite may have taken a knock and many worthwhile ideas may not have seen the light of day but on the other hand many problems have also been avoided. On this issue I would like to quote Dr. Hugh Ashton, head of the Housing and Community Services Department in Bulawayo. As speaker in the 1978 Hoernle Memorial Lecture to the South African Institute of Race Relations he said: "... Such sanctions are more than a nuisance and deprive Rhodesia of much that would facilitate her economic development. But they are not an unmitigated disaster. They have challenged Rhodesians to use their initiative and ingenuity and to develop their own resources to a remarkable degree, and they have partially insulated the country from some of the world's problems such as inflation and a plethora of non-essential consumer goods." What about development in the future? At an earlier stage I pointed to various factors which correlate with success or failure in development. I indicated that there was a positive correlation with natural wealth, strong and stable government and a sizeable pool of human skills, and a negative correlation with political instability, underdeveloped human resources, rapid population growth and domestic or unenlightened development planning.

Natural wealth Zimbabwe Rhodesia has got in reasonable measure. In its white population and increasingly in its black population, skills and an entrepreneurial spirit exists. The big question is of course that of political stability. You know the problems there better than I do and I shall not dwell on them. I must be optimistic, otherwise what I have to say will be just so much wasted effort. What I want to go on to now are my suggestions for tackling the problems of developing human resources, halting the population explosion, and providing the most enlightened development plans and policy decisions.



ORGANIZATION AND IMPLEMENTATION OF DEVELOPMENT POLICIES

I first want to outline my proposals for the framework for planning on these issues and then make some more specific suggestions. I believe it to be absolutely vital that planning be considered the most important government activity. Not that it is not being taken seriously now, but I suspect that planning is being carried out independently in each government department, often at cross purposes and with different objectives in mind. I believe it is impossible to plan specific aspects without understanding the inter-actions with the whole.

In Holland, an Advisory Board for Government Policy (In Dutch: Wetenschappelijke Raad voor het Regeringsbeleid) was set up in 1974. This board is directly responsible to the Prime Minister and has very wide and independent powers, even to the extent of being able to call cabinet meetings. Its responsibility has been defined as follows -

- (a) to supply the Government with scientifically based information concerning developments which may in the long run influence society, and to point out timeously contradictions and expected problem areas; also to formulate problem statements with respect to important policy matters and to put forward policy alternatives;
- (b) to develop a scientifically based framework to serve the Government in establishing its priorities and the pursuit of coherent policies;
- (c) to make proposals with regard to the elimination of structural shortcomings, the encouragement of specific investigations, and the improvement of communication and co-ordination, specifically as these relate to activities in the area of future research and long term planning, both within and outside Government institutions.

Sweden has an institution with rather similar powers and objectives and I believe that Zimbabwe Rhodesia would be well-advised to pass legislation for this type of body. Certainly I believe such a body should take precedence and perhaps take over roles now fulfilled by economic and scientific advisers to the Prime Minister.

An advisory board such as I have outlined above should concern itself with issues such as the implications and problems of alternative growth patterns, population carrying capacity, what are realistic material standards that can be attained, how the necessary adoption of economic and social patterns can be effected and how social services such as education, family planning and mass medicine can best be catered for.

One very important aspect that the advisory board should be concerned with is that of mass education. Many essential concepts on matters such as family planning, and agricultural practices cannot be transferred through formal educational processes but must penetrate society through mass media, extension

services, direct example, constraints and incentives, and perhaps even some coercion. This is a subtle, sensitive and very essential process which must be thought out and implemented with great care and understanding. I believe that apart from executive staff, the advisory board should have representatives from government, the civil service, private enterprise, scientific and academic bodies and certainly also representatives from the mass media and advertising industry. I believe it vital, however, that the board should remain non-political.

#### RESEARCH FOR DEVELOPMENT PLANNING

An advisory board such as I have outlined does not carry out its own research but merely collects, digests and passes on information, ideas and experience. I believe that a separate research organisation should be created as a statutory body which is solely concerned with planning and development. I shall briefly outline the sort of research which I believe is needed.

#### Data

In order to carry out meaningful and quantitative investigations it is necessary to have reliable data and information about society and its environment. The most basic requirement of a development planning programme is therefore the collection and collation of data relevant to the further objectives in this field. Apart from the collection of data it is necessary to keep up to date with developments elsewhere in the fields of development economics, appropriate technology, birth control and family planning methods, subsistence farming techniques, etc.

#### Projection

In order to plan adequately for the future, it is in the first place necessary to know what the consequences of present policies and social patterns are likely to be in the long run. Furthermore, it is important to be able to make realistic assessments of the consequences of modified social, political and economic policies. Trend projection may be carried out at several levels of complexity. At the simplest level, projection is carried out by simply extrapolating past data into the future. At a sophisticated level we can use mathematical models which allow the projection of each quantity of interest for the future to be considered in relation to all other relevant factors. This is the sort of research that I am involved in. I have developed what is known as a dynamic input-output model of the South African economy. It allows the long-term effects of different economic policies on aspects such as energy usage, employment levels, the availability of consumer goods, skilled manpower and educational requirements, and many other aspects to be investigated. It is intended mainly for use in analysing industrial economies. Other types of models have been developed for the analysis of population dynamics and subsistence economies, but I have not personally been involved in this.

My feeling is that mathematical modelling techniques are very useful when we are dealing with sophisticated economies where the intuitive understanding of experts is inadequate to deal with the complexities of the interactions on the system and also where quantitative evaluation is required. My personal feeling is that in the case of Zimbabwe Rhodesia which has a rather simpler economic structure and less skilled manpower than South Africa, it is not

- warranted to get too deeply involved in sophisticated modelling and that more will be achieved by a sensitive understanding of the issues involved in combination with a rather simpler level of quantitative analysis.

### Strategies

It is not adequate to investigate alternative socio-economic directions and to select the most desirable one. It is also necessary to develop strategies for achieving the desired ends. For example, it is one thing to propose that birth rate be cut by x percent over the next 't' years; it is quite another matter to know how this can be achieved. The strategies which are decided upon must take into account the constraints imposed by social acceptability of proposed policies, the degree to which the lives of individuals can be controlled, the realities of international relations and many other factors. All such considerations are to a greater or lesser extent open to research.

### Agriculture, Appropriate Technology and Community Services

Much of the sophisticated technology needed for industrialization and intensive farming methods can be obtained from overseas. However, it is quite a different matter when we get involved in the development of techniques appropriate to unsophisticated rural communities. Hardly any technology or social innovations can be introduced without extensive investigation and adaptation to local conditions. It is absolutely essential that a great deal of effort be expended in making sure that technology is satisfactorily transferred and implemented. In the literature on appropriate technology, numerous case histories are quoted of apparently very good schemes which failed in practice because of specific local problems or because of some social problem that was overlooked or that was created by its introduction. This must be guarded against by keeping close and sympathetic contact with the points of application through the efforts of decentralised research stations and extension officers who enjoy the confidence of the local population.

### Other Areas of Research

I have only mentioned a few broad categories of research relevant to economic development. There is no need to go into further detail here but some obvious candidates would be research into education, environmental economics, ecology, land usage and soil conservation.

### CONCLUSION

In conclusion I want to make just one more point. The capitalist philosophy is based on the concept that if everyone looks after his own interest the best interest of the system as a whole will be served. Although there is a great deal of truth in this, I think the magnitude of the problems facing Zimbabwe Rhodesia demands more than that. It also requires more than the planning and research strategy I have discussed here. It requires more than an end to war, followed by strong government. What it requires above all is selfless men with a mission to do whatever is best for their country.



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