P-18/I/2-1/82

# Food and Energy Demands on the Global Research Agenda

by Soedjatmoko
Rector, United Nations University

Symposium on Energy and Agriculture Futures:
Policy Implications of Global Models
Paris, France
22 February 1982

Your Excellency, Minister of State, Mr. Chairman, Ladies and Gentlemen.

It gives me great pleasure to welcome you to this first major scientific meeting to be held in France by the United Nations University since I first took office as Rector. France, with its brilliant scientific and humanistic traditions, is very important to the intellectual development of the University and I am certain that this is but the first of many meetings we will have together in this country.

We are met here, from many parts of the world, to explore how global modelling can be used in improving our ability to understand and deal with the agricultural and energy systems which are so important to the daily lives of people everywhere in the world. The essential core question before this symposium is: Will we be able to provide sufficient food and energy to the globe's swelling billions as we move towards an increasingly crowded, competitive, and perilous 21st century world?

The food and energy problems are deserving of the label "global" in four major respects:

First, the regular and continuing availability of sufficient food

and energy in a condition sine qua non of human survival, posing a formidable challenge of supply and demand that must be met simultaneously;

Second, the future course of human progress and quality of life will be determined largely by the availability of food and energy;

Third, food and energy loom large in the North-South confrontation as potential weapons and tools of domination; and

Fourth, food and energy production both affect and are affected by the state of the environment. The patterns of energy, land and water use and manufacturing industry, for example, will increasingly influence the climate in ways that could sharply alter global agricultural systems. All these four will be affected as world population grows from 4 billion to at least 6 billion by the year 2000.

Both agriculture and energy problems are thus tightly interwoven and they interact at many different levels.

One such level, for example, would be instances where food and energy production either compete for the same land or seek to ensure its more meaningful use through their complementarity. Under certain conditions, scarce crop land may be shifted to the production of biomass energy -- for instance, if production of food proves less attractive to a market-controlled economy than production of automobile fuel.

At another level is the question of food and energy production competing for the same scarce resources of capital and foreign exchange. This will be particularly true in the Third World, posing difficult policy choices for national planners and aid agencies alike with regard

to allocation of resources between these competing yet essentially interrelated claims.

There is also the relationship between food and energy at the input level. Food prices have become highly sensitive to oil prices because of fertilizers and other related fossil fuel inputs. There are also obvious links between oil prices and attempts to increase agricultural production through desalinisation and use of hydroponics.

Another food-energy interaction results from the rapid exploitation of fuel wood by the poor, who increasingly lack the income to buy kerosene. This makes this energy source more scarce and food production more expensive, difficult and ecologically hazardous.

There is also linkage at the global level. Rising fuel prices have dramatically shifted the comparative advantage in favour of food-production technologies which are less dependent upon fossil energy in the developing countries. Over time, this could produce a major shift in food production and trade patterns. Also on a global level is the difficulty of establishing a pattern for food and energy security as any solution must take into account both key factors.

There has been a tendency so far to search for separate solutions to food and energy problems, but clearly this no longer makes sense. Such an approach may, at best, offer partial solutions or, more likely, no solution at all because of the failure to understand the essential linkages between these two inseparable factors.

We thus need to explore systematically and scientifically these linkages between food and energy issues in order to clarify policy

options at national, regional and global levels and to strengthen institutional capabilities to deal in more multidisciplinary fashion with these problems.

The growing interactions between food and energy problems -- which are already beginning to lock some of the poorer and most populous countries into seemingly implacable loops of negative synergy -- would seem to call for a research agenda for the global scientific community, on which the following items should have high priority:

First, improving our understanding of the linkages between food and energy at various levels. In particular, co-production systems for food and biomass energy need to be developed to transform a potentially competitive relationship into a positive synergy.

Second, an analysis of the policy trade-offs of pursuing in isolation solutions for increasing food and energy production, with particular emphasis on the impact on the poor.

Third, identify the policy implications for national planning, if optimal solutions are to be found simultaneously to the food and energy crises.

Fourth, underline the implications of these analyses for global negotiations on food and energy.

Global models, I believe, could play a very valuable role in helping to tackle the immensely complicated interplay of elements on this research agenda. The theory and practice of modelling constitutes a highly useful analytical tool of modern science and scholarship. If properly applied, it can do much to help the decision-maker and the

policy-planner see more clearly through the swirling mists of interweaving concerns whose urgencies and dimensions seem to be constantly shifting and changing. I look forward very much to the presentations and discussions of various modelling experiences over the next few days which I am sure will be greatly enlightening.

However, if global models are going to be truly useful to us, I think we need to be frankly realistic about their possible limitations and recognize that there is certain fine tuning which we simply cannot expect of them. We must not let global models become an end in themselves; what interests us here is in what ways and to what extent they might serve national planners in various countries and particularly in the Third World.

In this connexion, it is important to keep in mind that modelling has generally developed in the industrialized world whereas the starkest dimensions of the food and energy problems are now, and will continue to be, in the poorest and most populous countries in the developing world. Modelling is based on assumptions, and the validity of those assumptions frequently hinges on the data we have available. It is precisely in the poorer, more populated countries that reliable statistics can be the hardest to come by.

Because of this dearth of reliable statistics in so much of the Third World, the assumptions and aggregations of global models can mask vitally significant regional variations, local dynamics, structural disparities, value shifts, and changing power configurations that are intimately linked to the process of development -- or lack of

development.

We need to recognize, therefore, that modelling assumptions run the risk of ignoring or obscuring factors of great relevance in the Third World. Much larger populations, even cities of 15 to 30 million, vast population movements, urbanization and modernization, much lower levels of income all affect production and consumption patterns and expectations and can lead to different systems.

A further complication is that all of these factors come into play in different ways and to differing degrees in the individual countries of the Third World -- which are at widely varying stages of development. This speaks forcefully to the need to develop ways to build in inequalities. Which, in turn, recognizes the importance of disaggregating data -- however difficult a modelling task that may be.

A linked concern is the fact that too many models and scenarios tend to assume stability in institutions and social units -- when their erosion and breakdown is a more normal modern reality. All developing countries must take into account the likelihood of major structural and systemic discontinuities. These stem in large part from the inabilities of present institutions and strategies to answer the needs of the poor and marginalized who are now rightfully demanding to be heard. The developing countries cannot escape the fact that experience has shown how ineffective their national policies have been in reaching the poor. Development strategies must be rethought to find ways to stress development from below. The modeller could be of great service to the national planner in helping him to better understand the dynamics

of such development.

It is clear, therefore, that the models that we create for the developing countries, will need to be quite different from those used for industrialized nations in many respects. Consider, to take just one example, the different variables at work in models of electrical energy use in the industrialized and the developing world. In the former, one could assume a normal increase in population and total access to electricity. In the developing countries, however, we would need to build in a larger than normal population increase. Another important variable would be potential new customers for electricity either through expansion of the electrical grid or through migration from areas without electricity into areas offering this service. One can see how quickly complicated and uncertain such a modelling attempt becomes.

Another important variable in the developing countries is expectation which, fed by advances in communications and transport, is increasing rapidly throughout the Third World. Total expectations are often much higher than any possibility of delivery and a model should take this into account.

Yet another important difference between industrialized and developing world models concerns reliability of food and energy systems. In the industrialized world, a street lighting system that works only 90 per cent of the time would be considered totally unacceptable, but such a level of reliability could be a vast improvement in many parts of the Third World.

Food and energy models will further need to build in the political

considerations that these two vital resources will increasingly invoke. Food and energy have already become political weapons -- their future use in this capacity, unfortunate as it may be, will have to be taken into account in modelling efforts.

A tragically important concern is that the factors being calculated in models involve the lives of people living on the bare edge of subsistence, for whom a sudden crop failure, drop in income, or loss of resource can literally mean the difference between life and death. They have no margin for error in their lives.

This lends particular urgency to the search for modelling concepts and theories which will give us a more precise picture of the fine structure of the future -- few advances in science could be more important to the planner. We now have models in which we can build in what might happen if war, famine, crop failure or other catastrophe strikes. What are needed, however, are models that enable us to have a far better sense of when things might break apart.

We intend at this symposium to give particular attention to the bottom-up approach in modelling, which may help us in our search for more relevant and more effective models for understanding the interactions of food and energy problems, particularly as they impact on the Third World. Most models to date have tended to start from a global view and as they get down toward the national level become less meaningful and useful to planners.

We want to explore the implications of starting at lower levels -- national or even sub-national -- and from there beginning to piece things

together, linking models to other models and progressively introducing wider linkages among them. On a country-by-country basis, of course, the date will vary widely -- in some instances, we might have to work with only 50 per cent of what we would ideally like to have, in others far less. Even with these and other shortcomings, however, we believe that the bottom-up approach could have great value for planners and others who need far more information about the shape of the future.

The bottom-up approach is important, I believe, if for no other reason that it puts the emphasis where it must be -- at the local level. For all their global dimensions and implications, the problems of the converging paths of food and energy supply and demand will ultimately have to be solved at the national, and indeed the local, level. Whatever insights we might gain from models, the information will only be meaningful if we are capable of translating it into positive, concrete actions that villagers and small farmers can take themselves, within the context of their own cultural values and perspectives, to improve their own lives.

In the long run, new patterns of food distribution and consumption and new allocations of energy will depend on countless millions of decisions by individuals around the globe. It will be these small day-to-day decisions by individuals that will ultimately count the most -- whether another tree must be cut down for cooking or heating purposes. We must find ways to incorporate the reality of such decisions -- ones that touch intimately on daily human existence -- in our scientific and technological planning. Any discussion of

improving our understanding of food and energy interactions must inevitably be concerned with better understanding of the problems of the poor.

We have made this very much our angle of vision at the United Nations University. The food and energy nexus is an important new area of concern to us, although it is obviously linked to past work we have done in the field of world hunger, energy and resource systems, and on appropriate use of technology. What is new is our attempt to study these and other related concerns together and explore their interplay. I am certain that the discussions here this week can shed much valuable light on the directions that our future work in this area might take.

Clearly a concerted and collaborative global effort is needed, drawing on the best of our scientific creativity and thought, if we are to hope to come to terms with the centrality in all our future lives of the interactions between the agricultural and energy sectors. The "crisis management" approach that has brought us such unsatisfactory piecemeal solutions in the past will no longer do.

I have put before you what seem to me to be some of the most important challenges we face in taking on the enormously complicated task of relating the global food and energy problem to its manifestations and impacts at the national and local level -- where the problem ultimately must be solved. In attempting to meet these challenges, we will no doubt find that a combination of approaches will serve us best -- drawing on models, scenarios, and country-specific studies. Such a combination, I believe, could be the basis for a creative, innovative, and realistic response to a problem now threatening the

very survival of many millions of our fellow human beings.

It may therefore be useful to emphasize at this point that we have not gathered here to discuss how to improve global modelling in terms of its own stated objectives or in terms of long wave or the Kondratiev cycle. Nor to discuss the relative merits or demerits of the various global modelling approaches.

Our purpose at this seminar, it would seem to me, is to see to what extent and how existing global models might help us to illuminate the policy options planners in Third World countries have to face, especially in the food-energy nexus. Also what kinds of linkages they have to bear in mind in planning towards greater local, national and regional food and energy security systems or schemes.

Focusing on these questions may help to bring out more sharply the adequacy or inadequacy of the economic, social and political assumptions on which these models are based, and at the same time force us to identify more sharply the assumptions that underlie the modelling efforts at the national level in developing countries that have to do with the different conditions, dynamics and different perceptions of desirable societies, but also with the effects of the political instability and the high incidence of discontinuities of various kinds that are inherent in societies in rapid and profound social, cultural and economic change, when established institutions, as well as society's capacity for community formation and cohesion are seriously eroded by the pervasive impact of modern communications.

While the need for more sophisticated assumptions on which to base

the various scenarios at the global and national level is obvious, I hope that our discussions will also bring out how these assumptions at the global and national -- as well as sub-national -- level relate to each other.

And even if this symposium will not provide us with clear answers to these perplexing questions, I do hope that the discussions will at least suggest the directions in which we should continue our search for models capable of accommodating both the global and the widely varying national dimensions of models that will provide us with better conceptual and operational tools to deal with the food-energy nexus. Or, failing that, that our discussions may suggest at least a tentative research agenda that might bring us closer to that goal. Our analytical tools seem to be incapable of keeping up with the pace, urgency and complexity of our problems. Let us not leave from here without making the next concrete step.

Thank you.

* * * * * * * * * * *