

options

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The IIASA Conference '80 Review and Outlook

Contents

The IIASA Conference '80 Review and Outlook	p.1
World In Transition An Interview	p.3
New Books from IIASA	p.6
News from IIASA	p.7
Conference Report	p.8

From May 19 to 22, IIASA for the second time in its history organized an "IIASA Conference", which is required by the Institute's Charter. *"The Conference of the Institute is the major forum for providing broad scientific and technical advice to the Council and the Director; for encouraging the programmes of the Institute and linking them with the research efforts of other national and international institutions; and for fostering understanding of the work of the Institute."* (Article VIII, Section 1, of the IIASA Charter.)

The IIASA Conference '80 provided an opportunity to review the progress of the Institute since the first such conference was held in May 1976, and to discuss the Institute's plans for its future. In the coming years, as I reported to the Conference, the Institute expects to devote its attention to problems falling within four themes.

Global Transition

We are now roughly halfway through the 300-year period from 1800 to 2100 during which the global population will increase 10-fold, from a stable level of somewhat less than one billion persons to a potentially stable level of roughly ten billion persons. This increase, and the consequent shift in the distribution of global population toward the developing countries and the cities, is the underlying driving force of the "global problematique." As a consequence, over the coming decades all of the world's support systems — those providing energy, food, industrial products, materials, water — will be subject to severe

shifts and stresses as the distribution of demand and supply alters. Are there feasible paths or strategies that will enable the world to achieve, late in the next century, a system that will support 10 billion persons in a way that is sustainable, equitable, and resilient?

IIASA has investigated the global energy system with this basic question in mind; it is in the middle of a similar study of the global food system. In coming years it will undertake studies of other global systems and their interactions.

National Interdependence

While the driving forces of change are global and know no political boundaries, nations are still the highest level of true political authority and action. Each nation must chart its course, in cooperation or competition with other nations, toward the society it seeks. Yet, to an ever increasing extent, the choices of individual nations are constrained by and affect those of other nations, so that autonomy and autarky have become unrealistic goals. In the presence of this high degree of interdependence, ways must be developed for national decision-makers to understand and respond to the external forces that affect their possibilities so strongly, and processes must be designed by which nations can concert their actions in the interest of all. IIASA has studied agricultural, energy and general economic policies on the national scale in the context of interdependence, and

Continued page 2

The IIASA Conference '80 Review and Outlook

Continued from page 1

will extend its studies to other sectors. It will also develop its work on questions of fair division and allocation of common property resources, which can provide a theoretical underpinning for international collaboration.

Regional Integration

The impacts of global change and national interaction are felt directly at the places where high-level policies and decisions are generally implemented — the subnational regions. These are also the points where the need for coordinated action in different sectors is most evident, although generally not evidenced. Thus, at the regional scale, there is a close linkage among the agricultural, human-settlement, water-supply, urban, industrial, and environmental systems, for example — even though in most regions there is little or no ability to plan for or achieve integrated development.

Effective and equitable uses of the world's resources, as well as the need to increase regional well-being, require that techniques for integrated regional development be advanced. IIASA has been developing such tools and testing them in a series of case-study regions; in the future, this work will be extended to a wider range of regions and new techniques will be added.

The Craft of Systems Analysis

The three themes I have just discussed provide the motivation and framework for most of IIASA's applied analyses. Through them we seek to contribute to understanding the problems they encompass and to design strategies to alleviate or overcome them.

However, there is a fourth theme to which the Institute devotes attention: to advance the methods and practices by which these problems are addressed.

The activity of applying scientific and technical knowledge and procedures to assist in the process of decision and policy making has many of the characteristics of a craft: its goal is to produce a useful product; it relies heavily on the skill, judgement, and experience of the practitioner; it draws on knowledge from many fields; and it has a repertoire of practical tools and procedures. This craft is a relatively new one; indeed, its application to problems of global importance is quite recent. Too, its levels of achievement in various contexts and uses vary widely.

From its early days, IIASA has sought to gather and distill the lessons of systems analysis as learned by its scattered practitioners, to review these lessons critically, and to disseminate them widely by a variety of means: The *International Series on Applied Systems Analysis* has published eight books so far and some two dozen additional volumes are in preparation; a three-volume *Handbook of Applied Systems Analysis* is in preparation, with the first volume in draft form; and other papers on the craft of systems analysis appear from time to time. In order to strengthen and broaden the international basis for applied systems analysis, this work will be continued and extended in coming years.

An Interview

Our Conference was attended by many distinguished scientists and decision makers from all our National Member

Organization countries as well as from a number of non-NMO countries. We were particularly pleased, however, to be able to welcome at this meeting some of our founding fathers, including of course the Chairman of our Council, Academician Jermen Gvishiani from the USSR, and the President of the US National Academy of Sciences, Professor Philip Handler. This rare get-together provided an opportunity for an unusual radio interview, in which Academician Gvishiani and Professor Handler together talked about the problems we are facing today and how they could be tackled by international cooperation. Rather than publishing a detailed account of the IIASA Conference '80, we have decided to publish the full text of this interview in *OPTIONS*, since in some sense it is what IIASA is all about.

R.E. Levien
Director of IIASA



"In my farewell speech at IIASA in 1975 I said that if the idea for the creation of an IIASA-type institution had not been started in 1968, the idea to start such an institution in 1975 would be compelling. And I think there would have been a modest chance for a successful start at that date in 1975. I say modest because so many little things can go wrong in protracted negotiations. The creation of any new kind of institution — especially an international one, especially one that is non-governmental but requires the blessing of governments, especially one that tries to reach over the east-west divide — the creation of such an institution has only a modest chance of success despite the best of intentions. Now I would claim, and practically all my scientific friends would concur, that there is more need for IIASA now in 1980 than was the case in 1975 or in 1968. And the tragedy is that in 1980 we could not create IIASA if it did not exist. We have something precious here; something vastly different from other institutions. My fervent hope is that we

will not lose perspective, that we will continue to nurture IIASA, despite the troubling time in the world. IIASA, being non-governmental, being *multi-national*, should remain a fixed point within a turbulent sea.

IIASA has a mission: to continue to be; to continue to look ahead and to anticipate the problems of the future; to identify what the real problems of the globe are, and not to get caught up in the hopefully ephemeral disputes of the super-powers. I must confess that I am not sanguine about the future — I am talking now about the world, and not about IIASA. We seem to be in a world of tribal confrontations and now in 1980 most of these tribes can only hurt each other. But technology marches on, and in 25 or 50 years, almost a blink of an eye in an evolutionary time scale, these tribes will be able to create devastating damage not only to each other but to the world onlookers. There just is not enough time to get our world house in order; to learn ways for more amicable, rational, conflict resolution.

It is ludicrous to think that any single institution like IIASA could solve these problems. But still IIASA may make a difference. IIASA is now, at this very minute, making a difference. Just the very fact of our being here and having this conference is important on the international scene. So let's not falter."

Professor Howard Raiffa,
IIASA's Founding Director, in his
After-Dinner Address on May 19,
1980.

World in Transition
An Interview

Global problems and how to tackle them, international scientific cooperation and political frictions were in the focus of an interview given jointly by Professor Philip Handler, President of the US National Academy of Sciences, and Academician Jermen Gvishiani, Chairman of the IIASA Council and Deputy Chairman of the State Committee for Science and Technology of the Council of Ministers of the USSR, both among IIASA's founding fathers. This interview, which was part of a one-hour radio program on the IIASA Conference '80, was made by Ms. Dolores Bauer of the Austrian Radio.

Question: May I ask you what in your opinion will be the main problems we face in the next 20 to 50 years and which we shall have to solve somehow or other.

Academician Gvishiani: I think the increasing anxiety over unexpected changes which might take place is an important fact in today's society, and the International Institute for Applied

Systems Analysis is trying to work out methodologies to penetrate deeper into the essence of those qualitative changes that will inevitably take place."

Systems Analysis is trying to work out methodologies to penetrate deeper into the essence of those qualitative changes that will inevitably take place. Basically this is what used to be called by, for instance, the Club of Rome, the "Global Problematic". I would not say that there is an agreed list of problems, but these concerns are related to the increasing population, the increasing scarcity of natural resources, problems of energy, problems of water, problems of atmosphere pollution, and possible climatic changes. All these things reflect



that the power of man, the increasing impact of human activities on the natural habitat, has reached such large proportions that it really can lead to possibly irreversible changes in the life of the planet. That is why it is important not only to understand some of those potential perils in isolated form

but also to see the interrelationships and interdependencies, because all these problems are truly complex. They cannot be understood on the basis of traditional methodologies; rather a more complex approach is necessary. That is why the founders of this Institute decided to create such an international, interdisciplinary, and at the same time non-governmental institution, to have an independent expert assessment of what these decisive processes are. Everybody today agrees that changes are already taking place. But to understand the dramatic consequences of those changes and to direct the activities in the proper directions is, I think, a decisive factor in the activities of the Institute in Laxenburg.

Question: Professor Handler, would you say that man today is mature enough to solve these problems or to even face them?

Professor Handler: I don't think anyone can answer your question. Whether we are mature or immature, we are here, and the time is now and the problems are those that Professor Gvishiani has laid out. It is not so much the fact of change that is so important to us, but the realization that the rate of change has been accelerating. The growth of the human population has been going on since the beginning of human beings,

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but it proceeded at very low rates for thousands of years. Only for a few hundred years has the rate been turning up and it is at its maximal historic rate at

"... we are going through a period of transition."

this very time. Until relatively recently, the activities of human beings made relatively little impact on the physical nature of the planet Earth. Very suddenly we realize, because it has only suddenly become true, that man's activities are determinants in what the Earth

is and what it may be. What is clear therefore is that we are going through a period of transition. When we leave this transition period, and if we have been successful, then there will be a planet Earth on which the total population of human beings can live in equilibrium in a steady state that must go on indefinitely after that or the human race will disappear. That is an enormous challenge and some of the pieces of that challenge are exactly those laid out by



Dr. Gvishiani. I cannot tell you whether or not we are sufficiently mature, but the process is certain to impress maturity upon us or we will fail.

Question: During recent years, there has been an ongoing discussion between two extreme positions: on the one hand, the argument is that "industrial growth" is possible and should be continued, and on the other hand there are cautioning voices arguing that this kind of growth has to be reduced, even to a zero-level. As representatives of industrialized nations, do you believe in any of these two extreme positions, or will we have to try to find a middle path?

Handler: I would deny that that is a fair analysis. The use of the word "industrialization" misrepresents the nature of the process. We are already in the group of nations beyond the original industrialization process, because now we have learned and are still learning very rapidly how to accomplish many kinds of fabrication processes and service

Continued page 4

World in Transition

An Interview

Continued from page 3



"The problems that the world is facing today have not become smaller since the time of the Institute's foundation. The worldwide cooperation to objectively understand the problems and to present possible solutions, is a command of scientific and political wisdom. The findings that IIASA provides to those making important decisions for man's history — and these are by no means only the representatives of the two super-powers — are indispensable decision tools to avoid catastrophes and for a happier future of mankind."

*Dr. Rudolf Kirchschräger,
President of the Federal Republic
of Austria, at the inauguration of
the Laxenburg Conference Center,
May 19, 1980.*



"There can be no doubt that IIASA's scientific achievements ultimately are a result of the active collaboration of its National Member Organizations, which on their part take care of a quick and intensive information exchange between IIASA and the various member nations.

The embedding of the Institute's scientific activity in a worldwide information and communication network represents, in my opinion, the real outstanding and novel "Systems Quality" of IIASA.

This is what distinguishes the Institute — in the sense of its charter — from almost all other large national and international research institutions".

*Dr. Hertha Firnberg,
Austrian Federal Minister for Science
and Research, at the opening
of the Second IIASA Conference,
May 19, 1980.*

processes by means that are increasingly more efficient in the use of energy and in the use of materials. As we do this, we turn down the curve representing damage done by human beings in the search for amenities; and therefore I think that we neither have to retreat to some primitive time in the past, nor to stop the industrialization process; we have to take the industrialization process towards its next stage, which will be efficient, effective, cheap and clean. If we succeed in doing that, then neither of the ugly alternatives you offered becomes necessary.

Gvishiani: I would add that sometimes people treat industrial growth and industrial development like synonyms. My own thoughts are very much in line with what Dr. Handler has said; I think we are in real need of some new patterns for future industrial development. The confusion over terms has created in some circles the radical and extreme views you mentioned yourself, that we have to think of stopping or limiting growth. I think these considerations are naive, because even nowadays, there are still so many economic problems in underdeveloped societies that they have to be developing; even in developed countries not all the problems are solved

"... we are in real need of some new patterns for future industrial development."

yet. This is why I would say it is utopian when people think that we should go back to nature, as Jean Jacques Rousseau suggested in another historical period. Inevitably, development will take place, but on a qualitatively new basis. This is why, when talking about the rate of development, it is extremely important to understand the consequences to be expected from decisions made today, and this is why certain of our visions might change: a new international economic order will inevitably be envisaged. I think serious changes are going to take place within each nation, because we are functioning or starting to function under new conditions. That is why, from my point of view, extremes are not justified. The solution is actually somewhere in between. We have to see these two possible shifts to one extreme or to the other as a warning. More scientifically based policies have to be established to provide guidelines for the management of societal development rather than — as was historically possible — to initiate everything and not to care much about the consequences. Today this will not be permitted. Therefore rational management based upon deep comprehensive studies of trends — although we

will never get the absolute truth — is an absolute necessity and this is why it is extremely important to have international cooperation around these issues that have significance for the whole of humanity.

Question: Professor Gvishiani, you have mentioned new patterns; do such new patterns already exist in this field?

Gvishiani: I do not think that, even if we specifically looked for such patterns, we would expect to find universal patterns. We live in a world that has different values, different orientations, and therefore I do not think that it will simply be a process of working out certain standards which will be strictly followed throughout the whole world. However, there might be much more in those standards, which will reflect a specific society or a specific socio-economic system. At the same time, certain parts of these norms will be really universal, insofar as they take into account global aspects. And I mean that this creates the necessity to cooperate not only in understanding these problems, but also in setting out our goals and objectives. For example, we all realize very well today that the problem of pollution is something that cannot be left solely to local decisions. Already, in Western Europe, in a special conference on environmental problems, decisions have been made about transnational pollution problems. Nevertheless, there are specific features in each nation. For instance, the scales of industrial production, even the impacts of wind directions are always specified within an individual nation, within an individual region; but an increasing number of these specifications will inevitably have to be standardized. The same is true of the world economic order and with the order of economy in each country. I do not think that we shall be in a position to jump to some system that can be considered to be perfect. But the interaction of human beings with nature, of society with the environment, will lead more and more to similar, agreed approaches. So I do think that the solution might be rather pluralistic; there will not be a single model that will justify itself and that will realistically be implemented.

Question: Professor Handler, today it seems obvious that the experts have for a long time been aware of certain dangers and developments; but opinions of research scholars and their scientific findings are one thing, political realization is something different. Do you think that we will be able to find a political decision framework that will

actually be able to offer global solutions? After all, today we are still facing not only personal but also national egoism.

Handler: Well, in his analysis, Dr. Gvishiani has pointed to the global nature of every major problem before us: energy, food supply, soil fertility, pollution, resource distribution, climate, weather. All of these are global problems that cannot be managed by any one nation, not even his or mine; even our two large nations cannot contend with these problems alone. Nothing will work but international cooperation. This is becoming so obvious that this fact itself must in time lead to an equitable world order which is stable enough to cope with these problems because they can only be coped with in a stable

"Nothing will work but international cooperation."

world order. We have had a few demonstrations that this can be done: for example, the conference, that Dr. Gvishiani mentioned culminated in an agreement signed just the other day, about management of pollutants into the entire Mediterranean. The group of nations that signed includes political entities that, on other occasions, will not speak to each other: the Greeks and the Turks put aside their differences, the Israelis and the Arabs put aside their differences, and they sat down and agreed on how to manage the Mediterranean to prevent it from becoming more polluted. It is exactly this drive which I hope will lead to political stability, because political instability is not compatible with the problems.

Question: Professor Gvishiani, as has just been pointed out, it is difficult to discuss and solve global problems in a politically unstable world. Today we are living in a time of tension — at least this is the superficial impression of today's world politics — and some people paint a picture of a third world war. One sometimes gets the impression that we may be a little too optimistic when talking about international cooperation on global problems — or are the others too pessimistic?

Gvishiani: I think, first of all, that it will be very important to consider the problems of the future and future developments on the agenda of international problems. I have to say that inevitably the attention of decision makers and politicians is drawn to the rather acute everyday problems that deserve all their attention. What scientists have to do — and from my point of view, it is a sort of social responsibility that they have to take on themselves — is to get to these problems of the future, and learn about the continuity of the world's development and the different rates of development. Today it is impossible to deal

with the acute problems and minor crises arising in the political arena, without taking into account the dominating developmental trends. Unfortunately this problematic is not yet sufficiently tackled by politicians. However, although the situation is not quite favorable for cooperation at the moment, I nevertheless strongly believe that the seeds of goodwill and cooperation already sown, with definite acknowledgement of the fact that there are differences in the world, will help to solve our problems. One cannot expect the solution of all the problems at once; this would be unrealistic, but it is of particular importance today to cherish all those cases where any agreement has been reached, whether in the purely scientific, technological, economic, cultural, or political arenas. One cannot predict what will happen, because a slowing down of societal or political development is different from reduced natural development. Such developments are also supposed to be objective but they are driven by subjective factors, that means people, and here we also have to understand the dialectics of necessities and accidental events. So we may have to be prepared to face the fact that, if too emotionally tackled, some of these possibly political confrontations might further aggravate the situation. But I strongly believe in the wisdom of people, people who will after all

". . . what is a great pity and what we cannot permit anymore, is the disagreement on the assessment of facts."

be convinced that they have a responsibility for the survival of humanity. I strongly disagree with those who think that a possible third world war, a nuclear war, might only have limited effects, maybe for only parts of the population. I think this would be a disaster. If this is understood by everybody and if people understand that we have to do everything to avoid these disastrous consequences, then one of the most important global issues will be to prevent any explanation or interpretation that may lead to war, even considering the most acute and difficult problems that we face today or might be facing tomorrow. So here again some sort of reorientation which, I believe, is a deeper sense of responsibility, is necessary and a good combination of scientific interpretation will at least help to charge facts the way science used to do. Many disagreements result from different ideologies and political orientations, but what is a great pity and what I think we cannot permit anymore, is the disagreement on the assessment of facts; science normally excludes such disagreement. That is why, just summarizing your very difficult question, I must say I am optimistic; I do believe that rationality and wisdom will prevail and that we shall avoid these disastrous consequences.

Question: Professor Handler, sometimes one cannot help feeling that the problems of our world in this 20th century are being tackled with the political ideas of the 19th century.

Handler: It is true that while scientists think about tomorrow, politicians are forced to think about today and since many of them are lawyers, they reason from precedent which comes from the past. But I would like first to indicate, concerning Dr. Gvishiani's answer (he and I are personal friends) that I would endorse everything that he has just said. I have to assume, as he does, a basic goodwill among those who lead the political apparatus of all countries. I have to assume that all of them understand that nuclear war is a forbidden instrument of policy and no nation can turn to it, no matter what the reasons might seem to be that create problems with which politicians feel themselves unable to deal. Nuclear war is so great a catastrophe that it must be avoided at any cost. That does not make it easy. To say it must be avoided does not solve problems, unfortunately; it merely says that that is something you must not do. But this is the way most of us have lived anyway — there are many other things we know we must not do and mostly we do not. We shall have to find ways to learn how to solve these problems. But we have communications that work, we can talk to each other, and we can, if we do not solve a given problem today, come back and try again tomorrow. Most importantly we have no choice.

I see the tensions building, the news-media seem to want to impress all of us with the rate at which the tensions are growing, and in so doing they raise the level of tension, which places a great responsibility on the news-media. However, world war III must not happen, and all of us will be better off if we turn our attention to this other set of problems that Dr. Gvishiani has just delineated. The one thing that neither he nor I have spoken about, though he mentioned it very briefly, is the fact that the world is changing, in the sense that the already industrialized nations have almost ceased their population growth, whereas the populations of developing nations — those whose mean per capita income is only a small fraction of ours — are still growing very rapidly. This is going to put very great strains on the entire world community. Once those people are here, they are as fully entitled to an equitable share of the planet's goods as all the rest of us are. Somehow we have to arrange for this, and reestablishing this equilibrium and finding a world order which is equitable and harmonious, is an immense challenge. War is not a solution, it does not solve the problem at all; it merely aggravates it. And I trust that on those days which are most difficult, our politicians will have the wisdom to avoid it.

New Books from IIASA

Beware the Pitfalls

A hopeful message comes through clearly from reading a short report just published by the Institute.

IIASA Executive Report 2: Beware the Pitfalls catalogs dozens of traps along the road to good systems analysis results. Contrary to what wary decision makers may believe, sidestepping them rarely involves much extra time or money.

Instead, systems analysts and the decision makers they serve need merely to be alert to where and how trouble starts and take special care at those points.

The authors of the IIASA report should know what they are talking about. For more than seven years, scientists have been journeying to IIASA from all over the world to fashion new ways to use systems analysis. In applying it to environmental management, resource allocation, energy, food distribution, and other of man's most serious problems, IIASA researchers have seen a unique broad spectrum of systems analysis successes and failures.

Some of these IIASA scientists have long felt that their science (or craft, as many of them now prefer to call it) has been kept from reaching its full potential by its failures. Would-be users hear where an analysis went wrong and listen no further — when some form or other of the approach could in fact be the most direct and safest route to a difficult policy decision.

So, as part of IIASA's efforts to advance the field, a small group of experienced systems analysts gathered in Laxenburg, Austria, in 1977 to discuss the most common mistakes made by analysts and users and ways to avoid them. The result of that conference was a book, *Pitfalls of Analysis*, published recently in the International Series on Applied Systems Analysis by J. Wiley and Sons, and IIASA then distilled the book into a 23-page Executive Report.

The report is true to its subtitle, "A Short Guide to Avoiding Common Errors in Systems Analysis". It starts by noting what systems analysts and users are supposed to do and then runs through the whole process twice — first to tick off pitfalls on the way to technical adequacy, then to point out those on the way to overall effectiveness. Both types of errors can happen all along the process from beginning to end. When setting the problem, for example, users often consider only the alternatives falling within their own jurisdiction. If the analyst accepts such a problem-formulation uncritically, the project lands in a hole with its first tentative steps.

Gathering data is a well-pocked stretch because the people who build the models are not usually the people who collect the primary data. The report notes that "Social and economic statistics are often collected not by logical classification schemes but by expedience — the availability of data, the feasibility of making estimates, or the operating procedures of the data-gathering office. The *ad hoc* nature of much economic accounting is seldom publicized, and it can be overlooked by the data users."

IIASA's booklet of pitfalls groups them in stages — setting the problem, gathering and refining data, developing tools and methods, constructing the argument, and using the conclusions. It has a chapter on getting a good model and another on a topic that rarely gets its due in the literature of the field, the importance of costs. In passing, neither systems analysts nor decision makers get kid-gloves treatment.

For instance, of their professional colleagues, the IIASA researchers note: "The scientific worth of a field is sometimes assumed to be proportional to its mathematical or statistical content. Too much may be expected of the numbers. Under such assumptions, quantification and algorithmic elegance can become ends in themselves, at the expense of whatever cannot easily be quantified. This can prevent a deeper understanding of the substance of the problem".

And in a final chapter devoted to implementation games users play: "Some bureaucrats invent ways not to work very hard while appearing to do so. More debilitating to policy implementation, though, is working hard but only within convenient, habitual modes. If the policy requires a break with practice, it can be thwarted by such individuals".

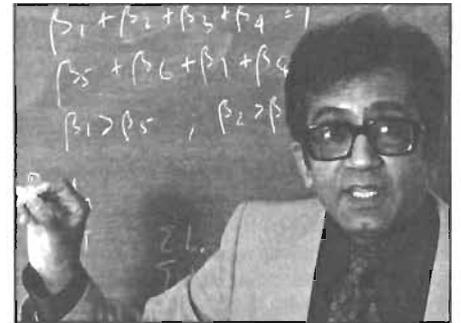
Single copies of the *IIASA Executive Report 2: Beware the Pitfalls*, International Institute for Applied Systems Analysis, A-2361 Laxenburg, Austria, can be ordered free of charge from the IIASA Publications Department.

PITFALLS OF ANALYSIS

Edited by
GIANDOMENICO MAJONE
EDWARD S. QUADE

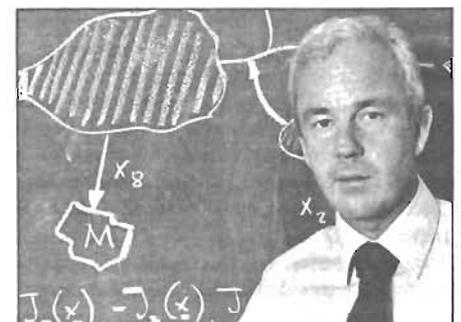
Pitfalls of Analysis, edited by G. Majone and E.S. Quade, ISBN 0471 27746 0, may be ordered from John Wiley & Sons Ltd., Baffins Lane, Chichester, West Sussex PO19 1UD, England. The price is US \$34.90.

Professor Ferenc Rabar of Hungary, who has been Program Leader of IIASA's Food and Agriculture Program (FAP) for five years, recently returned to Budapest. Although no longer physically located at the Institute, he will nevertheless formally remain Program Leader, returning for short stays from time to time, to oversee completion of the work he initiated at IIASA. Fortunately, Budapest is not too far from Laxenburg and he will be able to keep in close contact. In his absence, however, there is a need for someone to maintain the momentum of ongoing research in FAP and help guide its progress. Professor Kirit Parikh from India has agreed to assume this responsibility in the capacity of Acting Program Leader. Professor Parikh is no



stranger to the Institute. From April 1976 to September 1978, he worked with FAP on the development of the Indian model. Having begun his career in structural engineering in India, he spent nine years in the US as a graduate student and as a Research Associate at MIT. He was Professor of Economics at the Indian Statistical Institute in New Delhi from 1967 to 1980, and was Director of the Programme Analysis Group at the Department of Atomic Energy, Bombay, from 1970 to 1972. Professor Parikh was a member of the Government of India's National Committee on Environmental Planning and Coordination from 1972 to 1974 and was a member of the National Committee on Science and Technology from 1974 to 1976.

Since September 1976, Dr. Janusz Kindler from Poland has been a member of the Institute's Resources and Environment Area. Coming from the Warsaw Polytechnic University's Institute of Environmental Engineering, he was in charge of the Area's regional water management task and Deputy to Area Leader Professor Oleg Vasiliev from the Soviet Union. After Professor Vasiliev's recent departure from the Institute, Dr. Kindler



News from IIASA

A Prize for IIASA



On March 30 this year at a ceremony in the town hall of Milan, Italy, IIASA was awarded the "European Biancamano Prize 1979", which is sponsored by the Italian National Committee "Premio Umberto Biancamano". According to the Committee, IIASA was awarded this prize for being an "institution of singular significance", for the research carried out by the Institute, and for its contribution to Europe's cultural unity. On behalf of the Institute, Dr. Roger Levien (right), Director of IIASA, accepted the prize which was handed over by Professor Francesco Ogliari (left).

has been appointed Chairman of the Resources and Environment Area. He intends to continue addressing selected resource and environmental problems of both universal and global importance. "All our studies focus on the physical, technical, economic, and social issues related to the mutual interaction between humans, their environment, and resources exploited by them", says Dr. Kindler. "We recognize that development is more than economic growth; it is a human-centered process which should be sustainable within resource and environmental bounds at local, regional and global levels. The choice of strategies for achieving this sustainability is becoming one of the major issues on our research agenda." In addition to his new responsibilities as Chairman of the Resources and Environment Area, Dr. Kindler will continue to lead the regional water management task within his Area.

IIASA's Management and Technology Area has a new leader: Alec Lee from Canada. Before joining the Institute, he was corporate adviser to the management of Rolls Royce Ltd in the UK and North America on future applications of information technology. Before that he was Director of Operational Research and Coordinator of Information Systems for Air Canada. He is also a former President of the Operational Research Society in the United Kingdom and of the International Federation of Operational Research Societies. As Chairman

of the Institute's Management and Technology Area, Mr. Lee not only intends to continue the work already underway in the fields of innovation and risk management, but also to add a new task on information technologies and their future impacts. "Although quite a lot is being done in this particular area of research, I feel that IIASA could make a distinctive contribution by capitalizing on its special characteristics", says Mr. Lee. "There seem to be few organizations which offer the possibilities to study the future impacts of the new, emerging information technologies in such a truly international and interdisciplinary way as IIASA. I will therefore make special efforts to further improve the links between the various research tasks within my own Area as well as to tasks within IIASA's other Areas and Programs". Mr. Lee assumed his duties as Area Chairman on 1 July 1980.



... and one for a scholar

Dr. Rudolf Avenhaus, IIASA alumnus and in fact the first research scholar to join the Institute back in 1973, was awarded the Océ-van der Grinten Prize 1979 for scientific work in the area of environmental protection for his monograph *Material Accountability: Theory, Verification, and Applications*; it was published as the second volume of the Wiley-IIASA International Series on Applied Systems Analysis in 1977. Dr. Avenhaus' book is concerned with the concept of accountability for highly valuable goods used in an industrialized society. This includes basic materials, production materials and waste materials. The book develops the mathematical theory of material accountability and its verification in a unified way, gives a detailed example of its application to nuclear materials and shows how it can be applied to other situations.

The award was presented to Dr. Avenhaus in a ceremony on June 3, 1980 in Bonn, FRG, by FRG Minister of the Interior, Mr. Gerhart Baum. IIASA expresses its congratulations.



The inauguration of the Laxenburg Conference Center and opening of the IIASA Conference '80 was attended by many distinguished guests, including the Ambassadors from IIASA's NMO countries and high-level representatives of the Republic of Austria. Our picture shows (from left to right) Austrian Foreign Minister Dr. Willibald Pahr, the President of the Austrian National Assembly, Mr. Anton Benya, the President of the Republic of Austria, Dr. Rudolf Kirchschläger, and Austrian Minister for Science and Research, Dr. Hertha Firnberg. All in all some 350 scientists, policymakers and journalists participated in the IIASA Conference.

Conference Report

Conventional and Unconventional World Natural Gas Resources

Some 60 experts from 15 countries — both East and West — got together to work out common methodologies and standards for the assessment of gas resources and to review the possible future role of natural gas, both conventional and unconventional, at a conference on "Conventional and Unconventional World Natural Gas Resources", held at IIASA in early July.

As was pointed out at the meeting, natural gas might play a major role in the forthcoming period of transition from the present energy system based on nuclear power, solar, and renewable resources such as biomass. In this context, investments into an infrastructure for utilizing natural gas — such as additional gas pipelines — would be an investment in the future: in fifty years or so we can expect to produce methane on a very large scale from coal and biomass. It would then be possible to make use of the existing infrastructure originally built up for the utilization of natural gas.

The increasing importance of natural gas was also illustrated by the fact that natural gas consumption is already approaching 20 percent of world primary energy consumption. And while oil has almost reached its maximum production level, gas has still a strong potential for growth. In addition, there appear to exist vast deposits of natural gas still undiscovered — they might equal or even exceed the world's oil resources.

However, although the general conclusion of the conference participants was reasonably optimistic, it became clear that additional efforts in research and development will be necessary. "The growing consumption of natural gas and the necessity to tap unconventional gas resources in the future as well as the technical problems involved will force us to take a new look at these resources", said Professor Michel Grenon from IIASA. He added, "This is why a part of this conference was devoted to gas in tight formations, gas in coal seams, gas in oil shales, gas in geopressure zones, and even to the mysterious gas hydrates. To my own deep regret, however, only US and Soviet speakers presented their work in this field. I have the impression that in Europe — which is so short of energy resources — no or only very little time and work is invested in this important field of research. It seems unlikely that almost all the big and important unconventional gas resources should

only be in the United States and the Soviet Union. We hope that this Conference has contributed to a better appraisal of this energy resource in Europe and that it will stimulate research". Professor Grenon's view was seconded by Dr. Harry Kent of the Colorado School of Mines, who pointed out that "unfortunately this Conference has once more dramatically emphasized our poor knowledge on world gas — and energy — resources. There is no doubt that organizations such as IIASA and the Colorado School of Mines, who co-sponsored this meeting, must — and hopefully will — help to improve this situation."

The proceedings of this meeting will appear in the IIASA Proceedings Series, published by Pergamon Press.

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