

One Possible Line of Further IIASA Research
"THE DEVELOPMENT OF A REGIONAL/INDUSTRIAL COMPLEX"

Hans Knop

Irving Lefkowitz

May 1975

WP-75-51

Working Papers are not intended for distribution outside of IIASA, and are solely for discussion and information purposes. The views expressed are those of the author, and do not necessarily reflect those of IIASA.

FOREWORD

The ideas in this paper have been discussed with A. Cheliustkin, J. Hatvany, H. Swain and F. Rabar. There was a general consensus of opinion on the main ideas expressed in the paper, but each and every point has not been agreed upon.

The form of a working paper was chosen in order to provoke discussion and invite comments.

One Possible Line of Further IIASA Research:
"THE DEVELOPMENT OF A REGIONAL/INDUSTRIAL COMPLEX"

DESCRIPTION:

One possible direction of further IIASA research among other possibilities (e.g. optimum utilization of natural resources of the world, international sharing of the resources of the open sea, energy options etc.) should have a certain concentration of IIASA research on the above mentioned theme.

This theme includes the possibility of bringing IIASA research into closer contact with "clients" (international organizations, national organizations and authorities) to strengthen the applied part of IIASA research, and to continue the conceptual generalized research work on this basis.

In selecting this theme, we had to ask:

- (a) what contributions can IIASA bring to bear on the problem that would not merely repeat what has already been done or is being done;
- (b) what are IIASA's peculiar strengths (present and potential) in this regard?
- (c) what are IIASA's limitations?

All scientific problems to be solved in this field are somehow subordinated to the general problem of determining new patterns of growth for the next 30-40 years, for each country and for the world as a whole.

The main problems to be solved in the general theme of the development of a regional/industrial complex are:

- goal setting and evaluation under conditions of changing human values and objectives;
- identification of growth patterns (maximum productivity, minimum pollution, resource conservation);
- elaboration of economic and social strategies for the transition from the present mode of growth to the future pattern;
- technological changes of production and services, ways and consequences of development of resource conserving technologies;

- management and control of production;
- combination of all factors (production, services, living conditions) in settlements and regions;
- planning, management and organization of complex, regional systems: methods of systems integration of information processing, decision-making and control functions as means of satisfying design objectives under time-varying conditions and uncertainty;
- methodology for incorporating the dynamics of the system evolution (adaptation).

II. EVALUATION:

For the evaluation of this suggestion, for one possible main direction for IIASA research, the following criteria can be used:

1. Integration within IIASA:

This direction of research suggested allows us to combine the activities of almost all present IIASA Projects (ORG, IIS, URB, MET, COM, WAT, ENE, ECO/ENV, FAG) and it also needs a combination of skills which are supposed to belong to the whole area of applied systems analysis (managerial scientists, economists, technicians, applied mathematicians, social scientists, computer scientists, lawyers, sociologists, ecologists, behavioral scientists etc.).

The degree of participation differs from project to project and will change during the lifetime of this theme. The main contributions will come from ORG, IIS and URB.

The contribution of ORG could be focussed on management, planning and organization of a regional system. The contribution of IIS could be planning, management and control of production systems (not only industrial systems) and its technological changes. The contribution of URB could be the planning and management of urban settlement systems under conditions of technological change (resource conserving urbanism).

2. Problems of common interest to the N.M.Os

The problems of complex large-scale planning, programming, management and organization of different types and different sized regions of the world is of common interest to all the countries represented at IIASA and for many other countries, particularly of the third world, and also for international organizations. IIASA could help to collect and to provide

the necessary know-how and could give direct assistance to the national institutions and the authorities responsible for the design and realization of the respective programs.

3. Combination of applied and basic research:

The suggested research theme provides the opportunity for us to come closer to the real problems of the world and to become more closely connected with the decision-making bodies and procedures. On the other hand, the underlying general problems are scientifically challenging and the cooperation of scientists within IIASA provides the opportunity of finding new, valuable ways for a solution and results.

4. Feasibility of space and time:

All planning and programming efforts of the described type need much stronger teams of scientists, planners and managers than IIASA can ever provide, and the elaboration and implementation of such programs normally takes much more than 2-3 years, the possible time in which IIASA can deal with such a project. Under these conditions, the only solution is to have a fully responsible national institute or authority ("IIASA satellite") dealing with the respective program. We should form a certain kind of inter-project group at IIASA, which could cooperate with the national institute or authority and could be responsible for the fulfillment of the contract with it and with related international institutions. The institutional scheme is shown in the attached figure. This organizational solution would also protect IIASA from becoming involved in the internal political problems of the respective country.

The national (local) institutions should have sufficient competence and know-how to carry out the regional design. In collaborative relationship with these institutions IIASA could provide (informal) guidance on systems methodology, experiences in other countries, etc. in return for information concerning the particular real-world problem, data, models, constraints, priorities, economic, sociologic, political factors, etc.

IIASA's prime interest in such a collaboration lies in the advancement of the state-of-the-art of design of industrial and regional complexes, e.g. extend applicability of systems analytical tools and concepts, more effective integration of the total system with respect to overall goals of resource conservation and non-pollution of the environment, explicit evaluation of the trade-offs in design of the complex with regard to size and location, mix of industries, operating policies, etc.

III. OPERATIONAL CONSEQUENCES:

In order to make possible, by 1976, the start of the suggested IIASA inter-project theme, it is necessary to speed up the negotiations with international organizations and possible national "clients" and to finalize contracts by the end of this year. As a guideline for further negotiations, the "ideal client" can be described as follows:

- (a) he should be a partner with governmental power and responsibility;
- (b) all necessary information about the project should be made available to IIASA;
- (c) there should be a competent and responsible national scientific partner ("satellite");
- (d) the area of the project should be well bounded;
- (e) the problems to be investigated and the project to be dealt with should be of interest to all IIASA member countries;
- (f) a limitation in time and man-years for the IIASA contribution should be possible;
- (g) the IIASA part of the research should be somehow unique and scientifically challenging;
- (h) the project should be highly complex and should require inter-disciplinary work;
- (i) the project should relate to existing work particularly in ORG, IIS, and URB in order to allow continuous scientific work;
- (j) from Vienna, the distance of the project to be investigated should be "optimal", and,
- (k) the "client" should be able to provide additional funding for IIASA.

Of course, such a client does not exist, and we have to find a compromise which guarantees the maximum fulfillment of the requirements mentioned before.

ORGANIZATION OF OUTSIDE APPLIED RESEARCH

