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## FUTURE PRIORITIES FOR THE BALATON GROUP AND INRIC

This September the Balaton Group had its fifth annual meeting. That means the network has been operating for four full years now, and it is time to stop and reflect. What have we learned? Is our purpose still correct and valid? How could we achieve that purpose better? Should we go out of business? (a useful question for any organization to ask itself periodically).

On the Sunday before the Balaton Group meeting, the Board of INRIC (The International Network of Resource Information Centers), which was elected at last year's meeting, had a meeting in Budapest to consider these and other organizational questions. All members of INRIC who wished to sit in on the meeting were invited to attend, and several did. Bert DeVries, who could not attend the meeting, sent a letter instead. Before summarizing the ideas that emerged from the Board's discussions we will reprint Bert's letter, because it clearly expresses one member's image of INRIC's spirit and goals.

### A Note from Bert DeVries

1. INRIC and the Balaton Group have an important communication service: initiating and intensifying contacts between workers in the field of sustain-able resource use. For this purpose selective funding of exchanges and the annual meeting are proper instruments.
2. From this perspective INRIC would benefit from a large number of participants coming from many countries and representing a broad spectrum of professional backgrounds and personal and political values and experiences.
3. On the other hand, the concept of networking not only implies horizontal, loose structure and leaderless functioning, it also relies on a background of shared, though loosely formulated, values. Therefore the group cannot grow so fast that its members lose their vision and affinity with a common set of values.
4. The background of shared values among Balaton Group participants contains (as far as I have noticed) the conviction that the world is in trouble and will be even more in trouble if we go on like this, that a remedy is possible and desirable (sufficiency, equity, sustainability), and that the new tools of science (such as systems analysis and game theory) in combination with the emergent information technology can provide or at least guide the global society toward the remedy.

The first of these convictions is hardly challenged by anyone who is sensitive and willing to look at the signals. Unfortunately, many of us see different signals and give them different interpretations. I guess that most Balaton Group members would agree on the signals: environmental degradation, starvation, technological risks, wars. None of them is unique in the history of mankind, but sheer size and rate of change make the events more of a breathtaking collective experience (nightmare, if you like) than ever before.

The underlying concern or value might be called "caring for the whole", and that sets us apart. To paraphrase Marilyn Ferguson, many people will perceive the collective pathology not as our opportunity for transformation, but instead as the very essence of the opportunity to satisfy individual desires.

As to the second conviction, there is not one remedy for the world, just as there is neither one cause nor one remedy for someone who has cancer. As I see it, in the Balaton Group the remedial prescription, however vague, contains a female and a male part. The "male approach" is to design accounting procedures, increase awareness of problem structure, develop new concepts and models, and divert money and information channels to these purposes. The "female approach" focuses on empathy, emotional commitment, love, and it brings the problem and the remedy partly down from the abstract to the personal, the practical.

The third conviction, related to the possible contribution of new scientific tools, is for most Balaton Group members an implicit one. Up to now the roads taken by our group are more the outcome of personal enthusiasm and professional background than of a deliberate decision on the real benefit of these tools for the broader goals. This is not to disqualify that conviction: it has been and should be part and parcel of the Group's spirit.

Now why so many words? Not because I feel I know how and where to go. But in view of the above considerations, I feel that we should crystallize out some Balaton Group elements over and above the communication service. To formulate some general statements or intents does not work. To explore one's (shared) values and ideas more closely and intensely than has been done up to now may work. This may happen with or without explicit structure. To add some structure and at the same time evoke the Group's potential for production, I suggest that we form a number of subgroups around some important themes; that is, themes that arouse commitment among the participants.

Right now possible themes that occur to me are; the book on Resource Management, the setting up of a Resource Dynamics Workshop, the starting-up of communities that practice all we teach and talk about, a software exchange and applications group, etc. At this year's meeting subgroups could set up a detailed plan of research, training, and publication for the coming year and present it to all Group members. At the next year's meeting progress could be presented, along with problems, plans for the next year, etc.

(Bert's letter was distributed to all those attending the Board meeting, and his ideas were reflected in the discussions.)

#### Report from the Steering Committee

Present: Gerardo Budowski, Joan Davis, Wim Hafkamp, Mark Hanson, Dana Meadows, Dennis Meadows, Niels Meyer, Betty Miller, Jorgen Norgard, Chirapol Sintunawa

Dana Meadows called the meeting to order, summarized its agenda, and asked for additional agenda items. The Board of Directors was elected at the 1985 Balaton Group meeting; this was its first official meeting.

Dennis Meadows provided a summary of events since last year's Balaton meeting.

- INRIC received from the U.S. Internal Revenue Service a 501 (c) 3 status as a tax-exempt organization. This qualifies the Network to receive grants from US foundations, and it excuses the organization from payment of US income taxes. Two very important three-year grants have been awarded to INRIC, 550,000/year from the

Rockefeller Brothers Fund for general organizational expenses, and \$30,000/year from the Jessie Smith Noyes Foundation for education exchanges among centers. INRIC now has a bank account, a logo, letterhead stationery, a post office box (Box 250, Plainfield, NH 03781, USA) and a telex (4930372 RFC UI).

- A house in Hanover, New Hampshire, has been donated to INRIC. It will eventually serve as a superb guest facility for INRIC members visiting Hanover to study, write, or participate in special INRIC task groups. In addition it will house other activities that advance the cause of high-productivity, sustain-able lifestyles in the Upper Valley region of New England. Although the title is now in INRIC's name, the owner still lives there. The house will be turned over to INRIC whenever she has no need for it.
- The Resource Policy Center (RFC) at Dartmouth College, INRIC's administrative center, has effectively ceased operation during this past year. The last graduate students in Resource Systems and Policy Design have finished their studies. Tom Adler has left Dartmouth to become President of Resource Systems Group (RSG), a consulting firm that will continue the research of the RFC. Dana Meadows, Dennis Meadows, Betty Miller, and Barbara Ferraro retain their affiliation with Dartmouth, and they will be able for this coming year to perform the modest administrative duties required by INRIC.
- New centers represented at this year's meeting include the Institute for Environmental Studies at the University of Wisconsin, the Grupo de Analisis para el Desarrollo (GRADE) in Peru, the Institute of Resource Assessment at the University of Dar Es Salaam in Tanzania, the Institute for Energetics in Budapest, the International Union for the Conservation of Nature, and the Global Studies Center in Washington, D.C.

Here are some of the joint projects and exchanges that we know have taken place among INRIC centers this year:

- The Resource Systems Workshop developed by INRIC was presented for the fifth time in July. It was organized in Portugal by Antonio Camara and his staff and taught by Paula Antunes, Bert DeVries, Dana Meadows, Dennis Meadows, and Diana Shannon. Funding was provided by The Gulbenkian Foundation and by INRIC. The next session is scheduled for China in October 1987.
- Hartmut Bossel designed and conducted a workshop on environmental and resource systems in China.
- Main progress on the textbook has come from Bert DeVries, who has begun a draft of the energy chapter. Three publishers have shown interest in the book, the most enthusiastic of which is John Wiley S Sons. A grant has been received from UNEP to finance the preparation of the computer programs to accompany the book.
- The RFC has now sold about 200 sets of STRATEGEM-1, INRIC's management-training simulation on sustainable regional development. The Ministry of Energy in Ontario, Canada has purchased 25 sets of the game for a pilot project that will probably lead to dissemination of the game for use by all environmental studies and geography teachers throughout the high school system of the province.
- Bert DeVries has created a film on energy conservation in Dutch; INRIC provided the funds for its translation into English, so that it could be entered in the annual Czechoslovakian environmental film festival.
- Paula Antunes from Portugal spent last fall at Dartmouth, learning system dynamics and STELLA on the Macintosh. Yude Pan from INRIC's Chinese center will spend

this fall at Dartmouth. Then she will go on for additional study and research with personnel of the Institute for Environmental Studies in Wisconsin.

- The Danish, Norwegian, and Dutch centers organized a program for Laszlo Lovei of Hungary to tour Scandinavian energy facilities.
- The Danish center hosted two Hungarians to look at energy efficient appliances.
- Wim Hafkamp from one of the Dutch centers has called on Hartmut Bossel from the West German center and Antonio Camara from the Portuguese center to work on a program of resource accounting for the European Community.
- Two scientists from the Hungarian Institute for Energetics toured US energy facilities that illustrate the best current work on technologies for energy conservation.
- Dennis Meadows has been appointed as Director of the US team that will carry out an official US-USSR bilateral program on environmental education with the Soviet Union. Victor Gelovani, a laboratory director within the Institute for Systems Studies, the Soviet INRIC affiliate, will supervise one part of the project.
- Six Hungarian agriculturalists toured organic farms in the United States on an itinerary arranged by Betty Miller and Dana Meadows.
- A team representing the Portuguese, American, Soviet, and Mexican members of INRIC assembled in Budapest for three months over the winter to create a set of management-training games that will be used in future sessions of the IMRIC workshop.

Betty Miller summarized INRIC's financial condition. Between January 1 and September 1, 1986, INRIC has spent almost \$26,000 (not counting Noyes grant exchanges). Salaries paid to Dana and Betty have amounted to about \$15,000, including related taxes. The remaining \$11,000 covered a variety of administrative expenses, such as producing and mailing the Balaton Bulletin, telex charges, travel, the computer mail system, and arrangements for exchanges. Significant expenses that have been incurred but not yet paid include some costs of the Portugal workshop and the September Balaton meeting.

Dana described the original purpose of INRIC — to bring together into a formal network the people and centers of the world dedicated to sustainable resource use, to whole systems management, and to environmental quality, in such a way as to strengthen their work and to lead to actual, measurable improvements of resource use in the world. She asked the assessment of the group as to how the network is doing and how it could be more effective.

The ensuing discussion was long and occasionally passionate. The feeling of the group was that such a network is essential, that the one we have is already valuable on many measurable and unmeasurable dimensions, that we all get value from our meetings and associations with the other members of INRIC, and that the network certainly ought to continue. Since all the members present at the meeting experience intense demands on their time, and most of them had paid their own way to the meeting, the conclusions are probably a bit more objective than is often the case for deliberations of this sort. For all the enthusiasm, however, we recognized that several long-standing members of the group had chosen not to attend this year's meeting, and we identified many ways INRIC could be more effective.

High priority items for improvement include establishing ways for members to communicate with each other efficiently and inexpensively between meetings, identifying more systematically the specific areas in which members are already working, facilitating joint work that strengthens the individual projects to which we're already committed. Wim Hafkamp formed a working group during the Balaton meeting to work on the second of these

items, and its report comes later in this Bulletin.

It was also felt that, given its purpose, the Balaton Group ought to expand and to be open to more of the centers in the world who share its goals and methods. However, that expansion should take place at a measured pace, to be sure that the personal bonds of friendship and trust that presently hold the network together are not strained, and to keep the costs of central administration very low.

Discussion continued on more detailed administrative questions. There has been some confusion about the difference in meaning and useage of the two titles we have associated with our society. The Balaton Group and The International Network of Resource Information Centers. We concluded that "The Balaton Group" was a name more memorable and more accurately descriptive of the group than "INRIC." "Balaton Group" will be the preferred name in most of our publications (though INRIC will go on being our incorporated name in the United States) . The main reason for this choice is that our real members are people and not the centers within which they work. For example, this year major political and financial events have caused several centers, which were represented at past meetings, to disappear or lose their commitment to sustain-able resource management. However, our members from those centers remain committed to work on sustainable resources. In large measure they have simply gone to other organizations that can provide a base for their work. They remain members of the group, even though their former centers have been dropped from the list.

The Board members expressed a strong need for a short brochure and for a longer and more detailed explication of what and who we are. They are coming. More later in this Bulletin.

We discussed the need for more formal and structured Bylaws for the Balaton Group; we concluded they are not currently required. We discussed whether there should be a Board of Directors (our current bylaws and U.S. incorporation require them, but everything was up for examination at this meeting). We decided there should be an identifiable and fairly small core of people who are willing to take some responsibilities for the operation of the network, but that it should be called a Steering Committee, not a Board of Directors.

The Steering Committee should be made up, we decided, of whoever is acting as administrative director of the network, plus six other members, each to serve for a three-year term, two to be elected by the members at the annual meeting each year. "Members" for voting purposes are defined as anyone who has attended at least two Balaton Group annual meetings (all the way through from beginning to end) and who has not missed more than two in a row. Anyone who misses more than two meetings may requalify as a member by returning to a meeting, but loses voting rights for that meeting.

We immediately transformed the old Board of Directors into the new Steering Committee and drew lots to see when our terms expired. The results were as follows;

- 1987 Hartmut Bossel and Csaba Csaki
- 1988 Niels Meyer and Dana Meadows
- 1989 Gerardo Budowski and Chirapol Sintunawa

There will be an interim Steering Committee meeting, open to any interested members, at Joan Davis' house near the Zurich airport on April 25-26, 1987.

## THE FIFTH ANNUAL BALATON MEETING, SEPTEMBER 1986

We converged, for the fifth time, in Budapest, coming from many parts of the planet by bus, plane, train, hydrofoil, or car. To reduce the costs borne by our hosts, we had found a new, less-expensive, more central place to stay — the dormitory of the Karl Marx University overlooking the Danube. To welcome the group on its first evening in Budapest, Hungary's Minister of Industry, Laszlo Kapolyi, arranged for a reception, dinner, and traditional music on a ship that cruised the Danube beneath the illuminated spires of Budapest's palace district.

The next day some of us explored the baths of Budapest, others roamed the streets of the old town. In the afternoon was the Steering Committee meeting, reported just above.

Monday was a day-long seminar at the Hungarian Academy of Sciences. This was the second, international scientific program organized by INRIC for the Hungarians as a symbol of our appreciation for their continuing hospitality. The theme this year was "Institutions and Technologies for Drastic Energy Savings." Speakers included Dennis Meadows, Joan Davis, and Jorgen Norgard of the Balaton Group, Ferenc Horvath of the Hungarian Ministry of Industry, Jozsef Halzl of the Institute for Energetics, Andras Levai of the Academy of Sciences, Jon Veigel, President of the North Carolina Alternative Energy Corporation, and Jack White, President of the New York State Energy Research and Development Authority. The meeting brought together about 150 Hungarians from all the important organizations that influence the country's use of energy.

After the seminar we boarded the OKGT bus, with Bela our chauffeur of the past four meetings, which took us to Lake Balaton, the town of Csopak, and the resthouse of the Hungarian Oil and Gasworkers. The resthouse has been our meeting place for each of the five meetings, and we regard it as home. A gracious buffet and our old friends on the resthouse staff were patiently waiting our arrival.

We were missing some members who could not join us this year — Tom Adler, Hartmut Bossel, Bert DeVries, Hilde Jervan, Victor Gelovani, Carlos Quesada, Enrique Campos-Lopez. But others rejoined the meeting after a year or more of absence — Janusz Kindler, Malcolm Slessor, Jaswant Krishnayya. There were new participants from centers in Hungary, Peru, Tanzania, and the USA. We had our first participants from Down Under — Australian Alison Gilbert who is currently working with Wim Hafkamp in the Netherlands, and David Pitt from New Zealand, who is working at The International Union for the Conservation of Nature (IUCN) in Switzerland. Colleagues joined us from other international institutions working on issues of interest to us — Gerald Barney from the Global Studies Center in Washington D.C., Frederic Romig from the Economic Commission of Europe, and Nicky Beredjick, Director of the Natural Resources and Energy Division of the United Nations office, Technical Cooperation for Development.

Our meetings always have four parts - formal sessions focused on a specific theme, informal plenary meetings that disseminate information about the current work and interests of our members, task groups that involve three or more members in development of a report to INRIC on some issue of special interest. Finally, and most important, are the informal discussions on the beach, in the sauna, over coffee, after volleyball which give individuals the opportunity to explore and criticize each other's ideas and to explore for areas of potential collaboration.

The formal theme of our meeting was "Resource Indicators": indices, measuring techniques, and publication modes that can inform policy-makers and the public about the state of their resource base and about the sustainability of its use. The remainder of this bulletin is largely devoted to reflections on that theme.

In the afternoons we broke into a diverse set of small task groups - to plan our work on joint projects like the INRIC books and the resource workshop, to discuss members' current projects within substantive areas like energy and water resources, and to identify the basic themes that can provide some unifying foundations to future work and meetings. Reports from several of these task groups are provided below.

Of course some time was devoted to less intellectually-demanding tasks. There were excursions to a biodynamic farm in Keszthely and to the fishing chalet of OKGT on the Tihany peninsula. Some members found time to swim, to windsurf (one of the major working-groups did much of its thinking on a windsurfing expedition), and to play volleyball games in which the score was always 7 to 8. (Janusz Kindler was awarded the much-coveted Annual Volleyball Prize for high spirits and Polish sound effects. We hope that next year he will face last year's winner, Li Wenhua, on opposite sides of the net, for a match that should be spectacular in both sight and sound.)

In the evenings we showed each other slides of our home regions. They revealed many of our local resource problems and portrayed a variety of our members' successes. We sang songs in many languages and pondered the national philosophies the songs revealed. (Why do the Danes sing about coffee? Why have the Hungarians always lost their loves? Are all Dutch and Scottish songs profane, or only the ones Bert DeVries and Malcolm Slesser teach us?) We played with STELLA on the Macintosh computer and wrote up reports on the NEC portable microcomputers. We passed the hat to collect enough money for Chirapol to purchase environmentally-benign toilets for six Thai villages. We had the long talks that good friends have when they have not seen each other for a year. Many late nights were also spent in discussions by new acquaintances who were working intensely to share their thoughts on subjects of mutual concern.

Throughout all these activities we were cared for superbly by the staff of the OKGT, the Ministry of Industry, and the resthouse, a group that Janusz Kindler, in his closing acknowledgement, aptly referred to as angels. They make us feel welcome and supported every year, but this year they outdid themselves.

To commemorate our fifth meeting the staff of the OKGT surprised us with a wonderful tree-planting ceremony in the resthouse garden. They unveiled a huge rock (won from a nearby bauxite mine) with a bronze plaque commemorating the first meeting of the Balaton Group on that site in 1982. Behind that monument we planted (with expert technical assistance from our tree man, Gerardo Budowski) a five-year-old Atlantic cedar tree. We watered the tree and blessed and toasted it. We hope it will grow and flourish, along with the Balaton Group, our home centers, and the concepts and the practices of sustainable resource use everywhere on the globe.

## RESOURCE ACCOUNTING: THE STATE OF THE ART: EXCERPTS FROM A PAPER BY ALISON GILBERT

(To open our considerations of resource indicators, Alison Gilbert from the Australian Department of Resources and Energy summarized the State of the Art of Natural Resource Accounting. The following is an excerpt from her presentation. Copies of the full paper are available from her at the Institute for Environmental Studies, Free University of Amsterdam.)

In "The Hitchhiker's Guide to the Galaxy" series by Douglas Adams a central concern is in finding an answer to the question, "What is the meaning of life and the universe?" In the series, an advanced civilization builds a computer called Deep Thought to find the answer. After a runtime of a few million years, the computer gives the answer, "42." The programmers are unimpressed, so the computer suggests that the problem might lie with the question.

Just as "42" was offered as the answer to the question about the meaning of all life and the universe, Natural Resource Accounting has been put forward as the answer to many intractable questions in areas related to economics, environment, and sustainable development. But what is the question? What does the answer mean? That is what this paper attempts to address.

### Definitions

Natural Resource Accounting (NRA) is defined as follows by the first environmental accounting workshop sponsored by UNEP and the World Bank in 1983:

systems...(which) systematically keep track of the levels of stock resources and the vitality of natural systems, determine useful aggregate environmental indicators for the purposes of national planning, and begin to unravel the relationships between economic activities, resources, and environmental services.

The second environmental accounting workshop in 1984 gave the following ultimate objective of such accounts:

to provide information to decision-makers on the true nature of development choices.

This goal was recognized as unattainable in the short term, so three intermediate objectives were defined:

1. to develop inventories of resources, to document levels of services provided by environmental systems, and to monitor key environmental relationships,
2. to understand better resources and environmental systems at the macro level,
3. to understand better the relationships between economic activity and the environment at the macro level.

### Deficiencies of Economic Accounts

The rationale for NRA is usually couched in terms of deficiencies inherent in economic accounts, notably the System of National Accounts (SNA). These deficiencies are well

known and of concern to many economists.

The SNA documents some stocks. But mainly it focuses on flows of goods and services, generally expressed in monetary terms, and it generates aggregate indicators of economic activity. A major deficiency is that transactions that occur outside the marketplace are not recorded; for example, activities in the black market, services provided by housewives, activities that cannot easily be expressed in monetary values. Omitted transactions include many stocks of natural resources on which most economies ultimately depend, and environmental services that are responsible for regeneration of natural resources, dispersal of wastes, provision of recreation, and life-support in general.

Therefore SNA cannot monitor all activity relevant to economic management, and it provides a poor basis for the management of natural resources and the environment. It cannot distinguish between activities that deplete an economy's resource base and those that reduce resource dependence. It mixes together activities that reduce the availability of environmental services, programs that invest in environmental systems, and efforts to compensate for lost services.

A second deficiency is that the SNA has been constructed to place a strong emphasis on short-term economic growth. It does not balance that emphasis with information on the costs of that growth, growth's long-term sustainability, distribution of benefits or costs throughout the community, or the existence of non-monetary benefits or costs.

The final deficiency, frequently cited in the literature, involves the aggregate indicators employed by SNA, notably Gross National Product (GNP). GNP was designed only as a measure of economic activity; it does not equate to economic or social welfare; it says nothing about sustainability.

### Rationale for Resource Accounts

NBA is seen to be potentially an important tool in monitoring economic activity from a broader perspective than SNA does, and so to serve to guide economies toward sustainable development. In short, the rationale for NRA is the need for wiser economic management.

If that is the goal, it is necessary to distinguish between the key steps that have a direct influence on the quality of management strategies, and the supporting steps that have a more indirect influence.

The key steps are:

1. estimation of future conditions resulting from a decision or policy, and
2. generation of decision or policy alternatives.

The tools required for these key steps are models, or any representations of the real world that describe the relationships among variables.

Supporting steps include the vast range of data collection and analysis. These steps identify key variables, confirm cause-effect relationships, and monitor the existing state of the economy, the environment, etc. These activities help in the development and validation of models and in the identification of problems, but in themselves they do not provide any key

to the solution of problems or help in establishing the best direction for development.

The SNA is more a supporting step than a key one. It generates indicators of present economic activity and facilitates modeling activity, but it does not in itself estimate future conditions.

Better accounts that include natural resources and the environment can have only an indirect effect on the quality of management. Greater success would be likely, if effort were concentrated on tools for policy analysis. However, accounts are an established input to economic management, and their improvement should produce some benefits, particularly if they help identify problems and establish relationships.

### The Role of Resource Accounts

Policy analysis involves three steps: 1) evaluation of the problem, 2) development of alternative strategies, and 3) evaluation of the costs, effects, and probable success of different strategies. Accounts serve both evaluation steps by translating "raw data" into "information," that can be assimilated by policymakers. (An example of the difference between data and information is the concentration of particulates in the air — data— versus the visibility — information.) Accounts should also serve in preliminary identification of relationships between variables, which is necessary for steps 2 and 3.

The decision-making process is driven by policy needs and fed by information. It generates a demand for information, which, if the information is not available, stimulates efforts in data collection and analysis. If the accounts are effective, these activities will be more acutely focused on identifying relationships, and not just on data accumulation. The important point here is that accounts must be designed to satisfy existing as well as potential information demands, that these demands are driven by policy needs, and that those needs are in turn driven by issues.

### Accounts at What Level?

The SNA was developed to assist national economic planning, and it addresses issues of national importance, such as inflation and trade deficits. The resulting policies ideally provide decision-makers at smaller spatial levels with guidelines consistent with a national plan and with incentives to take the broader national viewpoint into account. In this way national economic planning influences public decision-making at the regional level.

Similar national strategies, and data bases, have been developed during the last decade for energy resources. However few exist for forests, fish stocks, soil, or water. Management of these resources and of the environment tends to be dominated by regional issues with little formal incorporation of national objectives, particularly non-economic ones. Sustainable development requires firstly greater coordination between economic and resource management at the national level, and secondly more links between national and regional decision-makers, to facilitate the coordination of national and regional interests. That is one role for NRA.

Another role is the identification of resource and environmental issues that occur at spatial levels larger than the region. There are three types of these issues. The first is the "shared resource" issue, in which a number of regions are exploiting and competing for the same

resource. Examples are herring stocks in the North Sea or river systems used by different political entities. The second is the "shared market" issue. An example is land degradation, nutrient enrichment, and loss of wooded ecosystems resulting from overproduction of agricultural products in the European Community. Another is the undervaluing of nonrenewable resources that can result from competition between regions for international markets. The third kind of issue is the "shared problem," in which an environmental or resource problem is common to a number of regions or nations. An example is desertification.

### Necessary Elements for an NRA

The preceding discussion helps to identify the key elements in designing and constructing an NRA. First, information must reflect the strong interdependencies between effective economic managements and effect environmental management. Multi-objective and multi-disciplinary approaches must be possible. This will make the accounts cumbersome, so a modular approach would be advisable.

Second, the accounts must be capable of responding to existing issues, as well as being flexible enough to accommodate new issues.

Third, their role is the translation of data into information, and they must incorporate some facility, so that links between key variables can be identified.

### Economic or Physical Accounts, or Both?

Some attempts at NBA have concentrated on modification of existing SNA, to make resources and environment explicit within traditional accounting frameworks, and to adjust familiar economic indicators, so they reflect more accurately social and environmental welfare. Proponents of this economic approach argue that decision makers respond to economic information, and that resource information therefore must be delivered in that language.

Examples include various attempts to adjust GNP negatively to reflect social damage cause by pollution (Olson 1977, Herfindahl and Kneese 1973); to include environmental decline as a negative term in National Income (Huetting 1979); to generate alternative measures of well-being such as NNW, Net National Welfare (Economic Council of Japan 1974). Other efforts have modified SNA itself, so that it incorporates the environment and its uses. For example, the environment can be included as a stock of depreciable capital that generates income (Peskin 1981).

To my knowledge, most emphasis has been on modifying SNA and not on developing an alternative accounting system. However, other accounting frameworks have been developed, often in response to the perceived deficiencies in SNA. The best examples is the Social Accounting Matrix (Pyatt and Thorbecke 1976), which attempts to redirect economic management, so that issues such as income distribution are considered together with economic growth.

The advantage of the economic approach is obvious — it is acceptability. The disadvantages are partly practical (SNA is so entrenched in so many countries that it may be hard to change; resources and therefore resource accounting may be quite different in different

countries) and partly theoretical. Valuations of resources and the environment are partially subjective; for example in the use of proxies and the selection of discount rates. Furthermore, economic theory cannot at present describe resource dynamics and the provision of environmental services. These processes are best described in physical, not economic, terms, which leads to the physical approach to resource accounting.

The purely physical approach attempts to document all stocks and flows in physical units. Its rationale derives more from the recognition that the market is imperfect, prices and monetary values are elastic, economic efficiency tends to be irrelevant in a global sense, and different commodities with the same economic value may have very different welfare values — for example a gram of heroin versus a ton of rice.

This approach has the advantage that units of mass or energy are more universal measurements, unaffected by the vagaries of inflation, exchange rates, and government interference. It also leads to measures of economic activities that conform with physical laws.

Odum et al. (1983) present an "energy systems procedure" to represent a nation in an energy network diagram. A mass balance approach has been presented by Ayres and Kneese (1969), which has been reformulated and presented in a general equilibrium framework in d'Arge et al. (1972). Input-output models can also be extended to include environmental links (Ayres 1978).

The physical approaches have two important drawbacks. First, data collection poses many difficulties. It was attempted by the Norwegians in the 1970's, but data constraints brought about a contraction of the activity. Second, physical approaches are limited in an economic management sense. It is extremely unlikely that economic managers will accept an accounting system with no economic information.

The obvious alternative is a mixed accounting system with both physical and economic units to describe stocks and flows. This approach is characterized by some combination of the following:

1. modification of the SNA so that monetary flows associated with maintenance of resource stocks and environmental quality are explicit,
2. construction of accounts describing environmental processes and interactions in physical units; and
3. linkage of the two accounting frameworks via quantification in both economic and physical units of flows in the economic-environment interface.

France and Norway have devised such accounting frameworks, while Canada has undertaken work preparatory to the construction of NRA. Elements common to these approaches are: provision of data on stock availability and economic value of current resource use, and evaluation of resource and environmental quality. Further information on these systems can be found in the references below.

## Conclusions

Natural Resources Accounting has a wide variety of approaches, few of which have actually been operationalized. Part of the reason for this is the large effort involved in design and construction. This, in turn, requires a high momentum in the political arena, parallel to that which produced the System of National Accounts. This momentum is building in many countries, but it is necessary to demonstrate the potential usefulness of expanded accounting frameworks.

Indicators are mentioned but briefly here. It is generally assumed that accounts will generate indicators, but there has not been much clear thinking on the link between them.

In all approaches to date there has not yet been any evaluation of the accounts and their usefulness, nor any proposal to attempt such an evaluation.

The recent emergence of the political trend toward "leaving it to the market" and de-emphasizing government activity is likely to stall development of expanded accounts and to make incorporation of resource and environmental considerations in economic planning even more difficult.

Accounts per se are still not closely defined, and this is evident in the wide variety of interpretations of Natural Resource Accounting. Associated with this is the problem of definition of Sustainable Development.

I began this paper by referring to "Hitchhikers Guide to the Galaxy." The characters eventually gave up searching for the question and diverted their activities to finding God's last message to creation. They succeeded. The message, which also applies to NRA, read:

"We apologize for the inconvenience."

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## RESOURCE INDICATORS — REFLECTIONS BY DANA MEADOWS

During the discussion of resource accounts inspired by Alison Gilbert's paper and by the many other thought-provoking presentations at the meeting, a number of observations, burning questions, dilemmas, and objections kept arising. There was not enough time in the meeting to discharge them all. Since the discussion we began at the meeting is far from finished, I offer the following reflections. Rebuttals will be welcome and will be published in future Bulletins.

1. I am much more interested in simple indicators than in complex accounts, models, or data bases. I think there is nothing we can do as resource analysts that is more important than to come up with new, compelling, appropriate indicators, widely publicized, that draw the attention of society to the issues we think (or know) are suffering from lack of attention.

A negative feedback loop can only work to bring an actual state to a desired state if the actors in the loop know, accurately and quickly, what is the gap between the actual and the desired state. If that knowledge is absent, delayed, or inaccurate, the system can only produce wierd, unsatisfactory behaviors, as many real-world systems are doing right now.

There is no clear information shared widely in society about the state of the environment, the state of resources, the sustainability of current practices, or the real welfare of people. Therefore decisions simply do not revolve around those matters. Almost any semi-reliable information would be preferable to the current absence of information and prevalence of misinformation.

2. Decision-makers — by which I mean both the elites and the general public — will only absorb simple, potent, meaningful information. We scientists traffic in information and have an abnormal tolerance for it. Therefore we produce too much information, and information that is too hedged and qualified and abstract to be understandable, except to other scientists. We do not produce potent information, information that makes a difference. We have not been trained to do that.

When I was asked how many people are hungry on this planet, I used to deliver quite a lecture about the difficulties of measurement, the definitions of hunger, the inadequacies of nutrition surveys, etc., etc., etc. I was concerned, as a good scientist should be, to reflect all the knowledge and all the known weaknesses in the knowledge, and not to say more than the knowledge base really permits. My lectures moved no one to take any action to end hunger. They put people to sleep.

Finally I was confronted by a group that really wanted to use information to move people to end hunger. They pushed me to give specific figures until I finally concluded that somewhere between 13 and 17 million people die of hunger in the world every year. They

took the middle of the range, did some simple calculations, and came out with "28 PEOPLE DIE EACH MINUTE FROM HUNGER! AND 21 OF THEM ARE CHILDREN!" They made mock newspapers with screaming headlines "41,000 KILLED TODAY BY HUNGER." They compared the number of deaths from hunger with the number of deaths from the Hiroshima atomic bomb explosion and proclaimed "A HIROSHIMA EVERY THREE DAYS!"

Now any scientist recoils from such tactics, and notices all the simplifications of those numbers. But the numbers are not really wrong. They are within the range of what we know to be correct; they're as good as any other numbers; they are certainly of the proper order of magnitude. And, above all, they have been rendered understandable, memorable, effective, which all my scientific hedging was not.

3. There were several comments at the meeting to the effect that resources are very diverse, and so is the environment. Therefore we need to have many numbers, maybe even hundreds of numbers, to summarize the state of the resource base. I agree with that and I think we should have all those numbers somewhere, for the scientists. But out of them we have to draw a very small set of numbers to publicize.

Data on the GNP and unemployment and inflation reflect the flow of many diverse economic products and services. They are gross oversimplifications, composites of thousands of numbers. If the economists had had as many scientific scruples as we do, and if they had insisted on delivering 100 numbers instead of just a few, there might be fewer economists advising governments today, and fewer governments bent on economic growth as their main goal. Our few numbers may be just as unsatisfactory as the GNP has proved to be (though I hope not), but we do not have the luxury, in the policy arena, of using hundreds of numbers.

4. There were heated discussions at the meeting about the wisdom of creating indicators that fit the current economics-dominated mindset (such as slight modifications of national economic accounts) versus creating indicators that reflect what we think is truly important. The trade-off is obvious; you can speak a language others are prepared to hear, or you can speak a language that says what you really mean.

I don't think we can solve that dilemma or dictate to each other about it, since we should definitely do both, and some of us are better at one while others are better at the other. We should all concentrate on what we do best.

But I would argue strongly against leaning too far, in our eagerness to be heard, toward accommodating the current economic mindset. If we keep our message and our indicators clear and truthful, people will understand, and we will be heard. If we say, for example, the population of songbirds in North America goes down by 5% every year, we don't need to put that in dollar terms to be understood. People everywhere understand that some of the most important things in life are not measured in money. Many, many people are more interested in leaving a varied and beautiful world for their children than in discounting the future at 7%. If we talk about what is really important, in simple, understandable, but not necessarily economic terms, we will be heard. We shouldn't abandon economics, but we should keep it in its proper place.

5. We have an intractable problem in finding proper indicators, because we are primarily interested in quality, not quantity. Quality, by its very nature, cannot be measured precisely or even defined clearly. We are talking about the Good, the Whole, the Balanced, the

Healthy, the Beautiful, the Appropriate, the Sustainable, the Equitable and those words cannot be expressed in kilograms or joules or 3% more of something each year than the year before.

That is the main difference between our mindset and the one that currently runs the world, and it is a profound difference. The fixation on quantity is one of the base reasons for the unsustainable, inefficient, and unjust management of current systems — the feedback loops are adjusting themselves to quantitative goals instead of qualitative ones, so what we are getting is more of everything, instead of satisfaction of real, qualitative goals.

I do not know any easy way to deal with this problem, other than to point to it and discuss it. Though we will certainly continue to use numbers and quantities, we must never be beguiled by them and lose sight of the qualities that are really important. We have to keep ourselves and everyone else focused on the qualities. We have to become comfortable talking about quality, quality of life, quality of the environment, quality of resources, quality of our society.

To give an example, a health magazine in the U.S. once tried to assemble a list of indicators of health that were not just measures of the absence of sickness. The medical profession was stumped by the task; they had come to define all their activities in terms of absence of sickness, not in terms of true, vibrant, feeling-good health. Finally they came up with a very mushy, but thought-provoking list. You are healthy if you:

- heal quickly from minor wounds,
- very much enjoy regular, strenuous physical exercise,
- wake up in the morning happy and full of energy,
- frequently sing, or hum, or whistle,
- regularly try new things, new ideas, new ventures, and
- love someone, preferably several someones.

Interesting indicators! What would be analogous indicators of the health of the economy, if we could express economic goals as positive indicators, rather than as the absence of inflation, unemployment, and low growth rates for GNP?

6. My guess is that we will find the best indicators of sustainability in the most ignored but vulnerable places, namely sources and sinks. Mineral scarcity is revealed first not in the prices of finished goods, but at the leading edge of discovery of new ores (which are declining in quality). The unsustainability of the discard of hazardous substances is seen first in the nearest sinks; the groundwaters and the estuaries. I don't know how to make these indicators potent and meaningful, but for the scientists who know how to interpret the numbers, sources and sinks are the most important places to monitor.

7. It's also helpful to find "canaries" like the ones in the mines that warned the miners about impending bad air quality. Supersensitive species that reveal environmental problems include certain salamanders that are the first species to die when lakes are acidifying; lichens that can survive only in the cleanest air; and the spiderwort plant that is reputed to be a good indicator of low-level radiation.

It would be helpful to assemble more information about "canaries" for the purpose of scientific monitoring. But we have to be careful how the information is presented in the policy arena, or there will be a temptation to subvert the signal instead of dealing with the

real problem. I can imagine great efforts to restock salamanders rather than to reduce acid emissions; or to breed a less-sensitive spiderwort rather than clean up the radiation!

8. We have to be sure to choose indicators that measure real performance, not effort or cost. The confusion between the two concepts is endemic in policy, and it leads to massive inefficiencies. We measure national security by the military budget, which is its cost, not its effectiveness. We measure the quality of education by school budgets. I know of family planning programs that measured their success by IUD's implanted, not by reduction of birth rate. If we design feedback loops around indicators of expenditure, we will get expenditure, not results.

In designing or promoting indicators, we are taking on an admittedly difficult scientific task, and we are also intervening in society in a powerful way. We should approach the job with the greatest sense of responsibility. But we should also get on with it quickly, because the current set of indicators is so inadequate. Almost anything we can come up with is likely to improve the information available to decision makers at all levels, and to move society toward efficiency, sustainability, and justice.

#### RESOURCE INDICATORS — AN EXERCISE FOR BALATON GROUP MEMBERS

We are seeking a way to inform a nation or region about its resource base, about its rates of change, about progress or deterioration, enhancement or loss. In addition to theoretical discussions, we want to move forward and put some resource indicators into practice, no matter how preliminary, no matter how primitive. One way to learn is to go ahead and try, make mistakes, learn, and then do better.

Therefore we propose to begin forthwith a Balaton Group list of resource indicators, that we all can collect for our own nations or regions.

To initiate such a list a long sheet of paper was put on the wall of the meeting room, and participants were invited to write their suggestions of important indicators of sustainability, quality of life, environmental health, the real welfare of the people of a nation. Forty-three suggestions were put forth in all. Mark Hanson took them in hand, eliminated duplications and boiled them down to 18. They are as follows.

#### INDICATORS OF SUSTAINABILITY/NON-SUSTAINABILITY

(in no particular order of importance)

1. desertified area 1986/desertified area 1970
2. species lost per year/total ft of species in 1970 (or # of endangered species/total ft of species)
3. mean annual ground level carbon monoxide concentration for largest urban area
4. % of total energy use derived from nonrenewable energy sources
5. energy efficiency of the national fuel provision system (commercial energy out/commercial energy in)
6. energy imports/total imports
7. natural area per capita (include "undeveloped" area such as forests, open land, natural desert, exclude lands damaged by past exploitation)
8. % agricultural self-sufficiency (monetary units)
9. % of cultivated area with mean annual soil loss per hectare of less than 10 tons, 10-

- 20 tons, 20-40 tons, over 40 tons.
10. cultivatable land per capita
  11. ratio of recycled materials to virgin materials in manufactured goods
  12. infant mortality (deaths before age 1 per 1000 live births)
  13. fertility (crude birth rate — births per 1000 persons per year — and also total fertility rate — average number of live births per woman over her lifetime, assuming she lives through her reproductive years)
  14. % population with access to sufficient drinking water uncontaminated either with pathogens or with hazardous chemicals
  15. protein consumption per capita
  16. ratio of international debt payment due/total exports
  17. ratio of military expenditures/education expenditures
  18. for the major minerals mined in the country, average grade of newly discovered ore/average grade mined in 1970

We invite all Balaton Group members to do the following:

- Comment on the above list, criticize, suggest clarifications, additions, corrections (comments sent to Dana Meadows, P.O. Box 58, Plainfield N.H. 03781 USA will be included in future Bulletins).
- Collect these statistics for your own nation and prepare a short report, including comments on numbers that proved unattainable or inconclusive or unclear. Add other indicators if you like. Please send your list to Mark Hanson, Institute for Environmental Studies, University of Wisconsin, Madison WI 53705 USA. He will combine these reports into a compendium to be discussed at next year's Balaton meeting.
- Bring the list up to an even 20 numbers, adding two indicators that reflect the more difficult to quantify, but very important, quality of life. Many suggestions for such indicators were made at the meeting (# of hugs per person per day, % of the people who really like their jobs, % of people who think they live in a beautiful place, suicide rate, divorce rate, % of people addicted to tobacco, alcohol, coffee, or other drugs). All were rejected as being either culture-dependent or inherently unquantifiable. We are reluctant, however, to give up the attempt to measure the important, just because it is difficult. Therefore, please suggest your own two "quality of life" measures and add them to your list, with your attempt to quantify them for your country.

## REPORTS FROM WORKING GROUPS

### Resource Accounts and Resource Accounting

1. We clarified the distinction between resource accounts and resource accounting:
  - Resource accounts detail stocks and flows of natural resources within an economy and may be expressed in more than one numeraire.
  - Resource accounting is a procedure for expressing all activities, economic and non-economic, in a single numeraire.
2. A list was compiled of known practitioners in both areas. This list is rather brief. No information was known of Eastern Bloc activities.

3. The two approaches are sequential, not parallel, though they may tap the same data base in many instances.
4. Resource accounting lends itself to dynamic modeling.
5. The methodology of use of resource accounts is still to be developed, but is Likely to be of the input/output type, pursuing "what if" questions.
6. The majority of the group felt that resource accounting had more to do with strategy than tactics, whereas the reverse is the case for resource accounts.
7. There was in the group a feeling that resource accounts and accounting must be associated with traditional economic analysis, and that to be useful labor should be incorporated.
8. We agreed on a unanimous, if minimal, conclusion: resource accounts and accounting provide a guide to improving in the long term the productivity of resource use, thereby assisting in the goal and identification of a sustain-able economy.

### Publications

We discussed three Balaton Group publications and worked out procedures for finishing them — a printed brochure to inform people about the Balaton Group, the Good-News Story book, and the Resource Dynamics textbook.

We laid out the basic design for a short brochure in our working group. A copy, with preliminary wording, is included along with this bulletin for all Balaton Group members. Please review it and send comments or suggested changes to Dana Meadows by December 1. On that date the brochure will go to press and any further comments will be too late. Several copies of the brochure will be sent to members of the Balaton Group with the January Bulletin; more will be available upon request.

A longer brochure with more detailed information about our activities, members, and centers is being updated from the version distributed in draft form at the Balaton meeting last year. This longer brochure provides a better statement of our activities and our capabilities; it is appropriate for distribution to people with a serious interest in the group: prospective members, funders, advisors, collaborators. It will also be available in January to all members.

The two books we have discussed and planned at previous meetings, one of which is about half finished, have seriously bogged down over the past year. Only 3 groups submitted good-news stories for the Story Book, and only Bert DeVries has pushed forward the textbook, by drafting a new chapter on energy. (Dana Meadows also did a little pushing by finding an interested publisher, John Wiley 5 Sons, and by raising some money to finance further book preparations .)

Before we made any further plans for these books, we had a long talk about why we are stuck. We felt that until we got to the bottom of that question, it was futile even to decide whether the books should go forward or should be abandoned as nice ideas that just did not get accomplished. There are a lot of easily-identified reasons why our progress has been so unimpressive:

- we are all already tremendously busy and committed to the activities at our own centers and in our own regions — which we should be,
- everyone does short-term pressing things before long-term things, and books are long-term,
- no single person has taken the responsibility to push the others to fulfill their commitments; no one especially likes the job of nagging others, and since nearly everyone was delinquent, no one really had the moral authority to do so,
- during the intervals between meetings communications within our group are not easy, delays are long and expenses are high, it is hard to maintain the enthusiasm and the flow of good ideas that come so easily when we are physically together,
- most of us make promises without adequate integrity:
  - we promise out of niceness and out of hope rather than out of true commitment;
  - we promise when we do not really quite mean it;
  - we consistently underestimate how long it will take to do things ;
  - we do not like to say "no" to friends;
  - when it becomes apparent that we are not going to keep a promise, we do not announce quickly that the promise will not be kept, so that others can accommodate to the disappointment; rather we stop communicating on the subject.

We have the choice either of correcting the conditions that create Stuckness, or of not producing the books we had intended. The working group contemplated that choice seriously, and we discovered that in fact we are very committed to both books. So, promising very carefully, we worked out a new plan.

The Resource Dynamics textbook will continue under the direction of Dana Meadows. She will not worry about moral authority but take on the task of requesting, reminding, and hassling everyone else to contribute whatever is necessary so that the book gets done. For the two- and three-person work groups that are necessary to keep things moving, she will spend the month of February, 1987, at IIASA in Vienna; several other Balaton Group members have already planned to be there to work with her for a week or two during that month. Anyone who is interested and can join the group is welcome; there is some money to cover expenses of the participants. Many of you will receive queries and requests from Dana during the coming year. Her general request to everyone is: put requests for cooperation on the top of your pile; respond as soon as you can; if you can not do it, say so quickly.

David Pitt indicated that IUCN may be interested in helping with and publishing the Good-News Story Book, and he strongly urged us to go ahead with it. After some discussion we decided to do so, with only one change from our basic plan made last year. That change is that every story in the book should be personally known to, and preferably participated in, by the Balaton Group member submitting the story. Therefore previously-published newspaper or magazine stories will not be included (though they may be included in the textbook) . We want each member to write a story he or she is personally connected with, both to assure the verity of the story, and to get a personal touch into its telling.

The Good-News Story book is now in the hands of Joan Davis. Members at the Balaton meeting made specific arrangements with Joan to send their stories to her. Other stories are welcome; please send at least a rough draft to Joan soon. We devised various punishments she is authorized to inflict on us if our stories are late (collect calls from her at 3 A.M. was

our favorite), but better than a punishment is the incentive of contributing to an important and wonderful book.

Stories can be of any length, but they should be detailed enough to include the technical details of the sustainable resource management project you are describing, and also the personal details. Somewhere between 5 and 20 pages is probably right. Write the story as you would like to read it if someone else were writing it. Answer the questions you would be likely to ask. Please send stories to:

Joan Davis  
EAWAG  
CH-8600 Dubendorf/Zurich  
Switzerland

### Themes for the Balaton Network

As a result of a decision made at the Steering Committee meeting on the Sunday before the Balaton meeting, a task force headed by Wim Hafkamp conducted a survey of Balaton meeting participants, to ask what they are working on and what they plan to be working on in the coming years. The purpose of the exercise was not so much to select long-term themes, but to find out what the themes already are, to further vitalize the network by pointing out areas ripe for joint efforts. Another purpose was to use the funds of INRIC better, by directing them to projects of interest to many centers, and to point out areas where further funds might be raised.

Five clusters of interest were found in which there is already a lot of activity and in which further activity could be developed. These clusters are discussed below. It is up to the people and centers in the clusters to further indicate what they can do in the network (need/share/offer working meeting/visits/exchanges/publications), and what will be the product (if applicable).

#### 1. Sustainable Agriculture

Participants: RPC (Meadows), EAWAG (Davis), Kassel (Bossel), Institute for Study of the Food Complex (Popov) , Karl Marx University (Csaki) , Hungarian Academy of Science (Harnos, Rajkai, Valyi), UN University for Peace (Budowski).

Activities: This group has already initiated several studies and Balaton presentations, a unit in the Resource Management workshop, a Hungarian Academy of Science seminar from which a publication is forthcoming, and an exchange tour that produced slide and video shows, both of which were presented at this Balaton meeting. A national Hungarian research project on adaptive agricultural systems is operating. Observing the great array of activities already underway, the group did not identify potential new initiatives. But demonstration sites for the research and teaching of sustainable agricultural methods would be a logical next step.

#### 2. Energy

Participants: ECE (Romig), Physics Lab III (Meyer, Norgard), IVM (Hafkamp, Klaassen), IVEM (DeVries), GRADE (Arevalo), IIASA (Alcamo), Institute for Energetics (Lontay),

Technical University of Budapest (Jaszay).

Activities: The West European centers will jointly set up a "low-energy, no-nuclear electricity scenario" for Europe. They plan to meet twice before April 1987 and to publish the results as a Balaton report and also to enter their results into the IIASA acid rain scenarios.

### 3. Management Training Technologies

Participants: Karl Marx University (Csaki), RPC (Meadows), SRI (Krishnayya) , IUCN (Pitt), IES (Hanson), Global Studies Center (Barney), IIASA (Alcamo).

Activities: The assembly, testing, use, and dissemination of comprehensive, innovative, integrated teaching technologies - games, videos, workshops, etc. on sustainable resource management. The completion of the Resource Dynamics Workshop and its packaging into a suitcase (or a trunk) combined with a vigorous dissemination program. The goal is to bring the final INRIC workshop into routine use in the continuing education centers of at least twenty nations. Through, or around, SRI a new center for teaching and training will be started, which could play an important role for INRIC. There may also be a new INRIC training center in Budapest.

### 4. Sustainable Resource Management (research, modeling)

Participants: Institute for Human Ecology (Slessor, King), IVM (Hafkamp, Gilbert, Janssen), Mahidol University (Sintunawa), Hungarian Academy of Sciences (Lontay), GRADE (Arevalo), IES (Hanson), SRI (Krishnayya), Group for Analysis of Environmental Systems (Camara), Institute of Environmental Engineering (Kindler), IIASA (Alcamo).

Activities:

a. Validation of existing resource accounting models, in Thailand, Peru, Scotland, Mauritius (Sintunawa, Slessor, King, Arevalo). This group could organize a meeting, sponsored by IUCN and INRIC, possibly leading to a publication.

b. Preparation of a Balaton paper on resource accounts, accounting, indicators, modeling for ecological and economic sustainability (Gilbert, Hafkamp, Slessor, King, Hansoh, Alcamo). The paper could be discussed and updated at the 1987 Balaton Group meeting. The work could also be of use by Budowski at the UN University for Peace.

c. Share information on decision support systems, artificial intelligence, expert systems, management information systems for resource analysis (Kindler, Janssen, Camara, Krishnayya, Hanson). Circulate updatable floppy disk on PC-Wordstar (extremely common) on which members announce, describe, and discuss experience with the above.

d. Environmental and resource analysis of North-South Trade (Sintunawa, Hafkamp, Norgard). Communicate material and reports of our respective projects on this subject. Take a joint proposal to EEC, maybe IIASA's agricultural trade model could be expanded with environmental and energy aspects.

e. Alcamo offers to conduct a lecture/workshop on acidification and air pollution in INRIC

centers.

f. Evaluate "Balaton Indicators for Sustainability," make a final selection and circulate results.

#### 5. Books on Resource Management (textbook and storybook)

Participants: RFC (Meadows, Adler), RPG (Jervan), EAWAG (Davis), IVEM (DeVries), UN University for Peace (Budowski), Physics Lab III (Meyer, Norgard), VNIISI (Gelovani and many others), Technical University (Jaszay), Karl Marx University (Csaki), Hungarian Academy of Sciences (Rajkai, Valyi).

Activities: Meet, write, and get those books out!

### NEWS OF THE NETWORK

#### The Portugal Workshop

The fifth session of the Balaton Group's workshop, "Dynamics of Sustainable Resource Management," was given in Portugal in July under the auspices of INRIC, the Gulbenkian Institute, and the Environmental Systems Analysis Group of the New University of Lisbon. Paula Antunes, Antonio Camara, Bert DeVries, Dennis Meadows, Dana Meadows, and Diana Shannon were the instructors, with help at all levels (planning, organization, recruiting, computing, and cleaning up) from other members of the Environmental Systems Analysis Group.

The participants were mostly young professionals, many of them Antonio's colleagues or former students, who are now employed in resource and environmental management positions throughout Portugal. There were also five participants from Spain and one from the Netherlands. Several senior members of the Environmental Ministry participated on the day we played STRATEGEM-1 — they had their own table and managed not to collapse their country!

The participants were a well-trained, enthusiastic, lively group, a number of whom already had some experience with system dynamics and other kinds of resource modeling. They were also full of ideas and energy concerning Portugal's environmental future, at a very propitious time in Portugal's political commitment to such matters. It was enlivening and uplifting to work with them.

Several changes were made in this workshop: the opening production-distribution game was changed to a fishing game designed by Dennis Meadows, Paula Antunes, and Diana Shannon. Films on resource management were shown in the evenings, followed by causal diagramming assignments. It was our first opportunity to do the computing with Macintoshes and the simulation language STELLA, which proved outstanding for teaching purposes. We think most of these changes were steps in the right direction. After five sessions - in East and West Europe, Africa, and Latin America - we now have a clear idea of the content and process for the workshop. A concerted effort will be made before the China session in October 1987 to put the workshop in final form.

## A Tour of Organic Farms in the United States

In August Dana Meadows and Betty Miller hosted six Hungarians on an INRIC-sponsored, two-week, cross-country tour of organic agriculture in the United States. The Hungarian delegation consisted of:

- Andras Madas, former Deputy Minister of Agriculture
- Zoltan Kiraly, director of the Plant Protection Institute of the Hungarian Academy of Sciences
- Zsolt Harnos, Deputy Director, Computer Center, State Office of Planning and former Director, of the Academy of Science's study of biomass production capacity for Hungary
- Janos Sarkadi, Research Institute for Soil Science and Agricultural Chemistry
- Zoltan Izsaki, Professor of Plant Production, Agricultural University, Debrecen
- Sandor Striker, Information Institute for Public Education

This prestigious delegation visited the Rodale Research Center and the Brubaker farm in Kutztown, Pennsylvania, operating organic farms (corn, soybean, livestock) in Iowa and Nebraska, the research stations of the University of Nebraska and the Universities of California at Davis and Santa Cruz, and many organic farms of all types in central California. The tour ended with the four-day international meeting of the International Federation of Organic Agriculture Movements in Santa Cruz.

The trip was captured on video tape by Sandor Striker, and in slides and voluminous notes by the rest of us. The Hungarians have written a formal report of the trip for submission to the Academy of Sciences, and it is also being documented through a number of newspaper columns by Dana Meadows. Here are a few summary observations participants in the tour made about the state of sustainable agriculture in the United States:

1. There can be no question that at least with some soils, crops, and climates, organic agriculture works beautifully. We saw some large farms (100-300 hectares) that had used no chemical fertilizers or pesticides for 12 or more years and that were producing reliable crops at high yields while reducing soil erosion and re-establishing natural wildlife populations. Labor and machinery inputs were not notably different from neighboring conventional farms, though some of the machinery was especially altered for organic practices such as ridge-tilling.
2. There are only a few research stations supporting these organic farmers, and there are few hard data on the performance of organic farming systems. The best comparative experimental plots were at Rodale (five years of comparison) and the University of Nebraska (ten years). In those two cases the organic plots do at least as well as the conventional plots, and over the long term they do significantly better. Organic methods seem to perform more evenly than those based on intensive use of chemicals; less well in good-weather years but better in bad-weather years.
3. None of the farms we saw could be called truly sustainable over the very long term, though all were unquestionably less environmentally-disruptive than their conventional-farm neighbors. All used fossil fuels, many used imported manure, seaweed, and other soil

amendments, some were drawing down groundwater for irrigation. Some may have been mining (though slowly) the soil's supply of phosphate, potassium, or other minerals. Some fruit and vegetable farms used harsh insecticides like rotenone, pyrethrum, and elemental sulfur, which are called organic because they are not synthetic, but are nonetheless disruptive to natural ecosystems. Nonetheless, it is remarkable how far toward sustainability these farmers have been able to go, with very little support from government, industry, or the formal research establishment.

4. Very much more research is necessary to work out organic methods, especially methods of weed and pathogen control. A high level of scientific understanding will be necessary to make organic farming possible on a very large scale.

5. Some of the farms we saw were only starting, their procedures were not yet well-developed, and the farmers were in some cases young and ideologically committed, but not really skilled. These farmers will need a great deal of education and information, if they are to succeed. Like conventional farming, organic farming will work best with farmers who are knowledgeable, careful, and hard-working, and will fail with farmers who are *lazy*, ignorant, or sloppy.

6. There is a rising level of interest, enthusiasm, and organization among U.S. organic farmers. Their neighbors are becoming interested as the conventional systems break down economically. Organic farmers' associations are forming everywhere to train people and spread ideas. In California state money has been appropriated for organic research, and the growers have an effective certification and marketing program, so produce marked as organic really is organically grown. This market protection is a tremendous support for organic growers.

7. The organic farmers we met were enthusiastic, committed, talkative, and friendly. Many of them switched over "cold turkey" from conventional farming. All of them were glad they had switched and felt they were healthier, richer, and more personally satisfied since they had given up chemicals.

## ANNOUNCEMENTS

### Help from the Global Studies Center

Balaton group members may know of persons or institutions who would like to do a long-term, multisectoral study of alternative futures for a particular nation. The Global Studies Center is a link to approximately 30 such studies already completed or underway, for such nations as Iceland, Mexico, Korea, Japan, and China.

The Global Studies Center provides help with study design and training. It also helps groups and individuals spread the word about software they have developed to aid long-term, large-system planning and forecasting. The Center is now preparing a second edition of Managing a Nation: the Software Sourcebook, a catalogue of computer programs that can be helpful to those interested in long-term planning for their region.

If you have software that could be useful in long-term studies or in management and administration of a nation, send a review copy with documentation to Gerald Barney, Director, Global Studies Center, 1611 N. Kent St., Suite 600, Arlington VA 22209, USA.

### Availability of STRATEGEM-1

Dennis Meadows, Betty Miller, and Diana Shannon have refined and mass-produced the kit of materials, software, and literature required to operate STRATEGEM-1. Improvements include:

- Improved error checking with more extensive error messages to assist those operating the computer program.
- A new set of 52 slides for introducing and debriefing the game.
- Modifications to the computer program so that intermediate results can be saved in a data file. One can turn off the computer between rounds or recover easily from a crash in the system.
- A color-coded game board that presents much more clearly the flows of goods, energy, food, and money on the board.

Revised role descriptions and data sheets.

Individual pieces of the game set and complete kits are available from Dennis. It is also possible now to purchase from Dartmouth a NEC PC-8201A with 32 K of ram. This is a small, \$300, battery-powered, self-contained computer that requires only a standard printer to operate the game for 5-10 boards.

Analysts within Bert DeVries' institute have modified the STRATEGEM-1 program to add a variety of extremely useful features. Their version is programmed in IBM PC PASCAL. The input routines have been made more efficient, and there are a variety of plotted output options. The manual and disk for this version can be obtained from Bert.

### Seminar on Sustainable Agriculture S Appropriate Technology

The present draft of INRIC's textbook on resources is being used in a college-level program that may be of interest to INRIC members. The New Alchemy Institute and the National Audubon Society Expedition Institute cooperate to provide an experiential college program in sustainable agriculture and appropriate technology at the New Alchemy Institute in Cape Cod, Massachusetts, USA, each spring. The semester program integrates academic studies and hands-on work within the context of the Institute's ongoing research and demonstration projects in ecological food production, energy-efficient design, and resource conservation. All participants in the program take four courses. Biological Agriculture and Appropriate Technology, Ecosystem Design Seminar, Regional Resource Systems, and Applied Studies in Ecological Design. The semester begins January 26, 1987 and ends May 15, 1987. For more information contact Wendy Marshall, Semester Manager, New Alchemy Institute, 237 Hatchville Road, East Falmouth, MA 02536, USA. The phone numbers are 617/563-2655 and 617563-2219.

### Fifth Congress of the European Association of Agricultural Economists

Csaba Csaki, a Hungarian member of INRIC, chairs the national organizing committee for the Fifth Congress of the EAAE. The meeting will focus on linkages between agriculture and

the macro economy, agriculture and the environment, supply management and resource use. Specific working sessions will be arranged to address twenty topics; included on the list are: agriculture and national resource conservation, information and communications systems and computers, teaching of agricultural economics, evaluation methods and problems of natural resources. The meeting will be held on Lake Balaton August 31 -September 4, 1987. Three optional study tours offer visits to many interesting sights of Hungary August 29-30 or September 5-6 - just before the Sixth Balaton Group meeting. If any readers of this Bulletin are interested in attending the meeting, they may obtain a detailed conference schedule along with full registration information and a call for papers from Dennis Meadows or from the conference secretariat: EAAE Congress (Mrs. Zsuzsa Gorog), Hungarian Society of Agricultural Sciences, H-1055 Budapest, Kossuth ter 6-8, Telephone: 36/1/530-651, Telex: 227791.

#### Free reports from the Resource Policy Center Archives

The RFC is distributing free copies of over 100 technical reports that summarize the results of its work on factors governing resource productivity. A catalogue and order form are available from Dartmouth.

## A POEM ABOUT RESOURCES AND PEACE

(This poem was written by Wendell Berry, a farmer and writer in the USA, after looking at some pictures about Siberia in a magazine. It is published in a book of Berry's poems called Openings, Harcourt Brace Jovanovich, San Diego, 1968.)

### To a Siberian Woodsman

1.

You lean at ease. in your warm house at night after supper, listening to your daughter play the accordion. You smile with the pleasure of a man confident in his hands, resting after a day of long labor in the forest, the cry of the saw in your head, and the vision of coming home to rest. Your daughter's face is clear in the joy of hearing her own music. Her fingers live on the keys like people familiar with the land they were born in.

You sit at the dinner table late into the night with your son,  
tying the bright flies that will lead you along the forest  
streams.

Over you, as your hands work, is the dream of the still pools.

Over you is the dream  
of your silence while the east brightens, birds waking close by  
you in the trees.

2.

I have thought of you stepping out of your doorway at dawn, your  
son in your tracks.

You go in under the overarching green branches of the forest  
whose ways, strange to me, are well known to you as the sound of  
your own voice

or the silence that lies around you now that you have ceased to  
speak,

and soon the voice of the stream rises ahead of you, and you take  
the path beside it.

I have thought of the sun breaking pale through the mists over  
you

as you come to the pool where you will fish, and of the mist  
drifting

over the water, and of the cast fly resting light on the face of  
the pool.

3.

And I am here in Kentucky in the place I have made myself  
in the world. I sit on my porch above the river that flows muddy  
and slow along the feet of the trees. I hear the voices of the  
wren

and the yellow-throated warbler whose songs pass near the windows  
and over the roof. In my house my daughter learns the womanhood  
of her mother. My son is at play, pretending to be  
the man he believes I am. I am the outbreathing of this ground.

My words are its words as the wren's song is its song.

4.

Who has invented our enmity? Who has prescribed us  
hatred of each other? Who has armed us against each other  
with the death of the world? Who has appointed me such anger  
that I should desire the burning of your house or the destruction  
of your children?

Who has appointed such anger to you? Who has let loose the thought  
that we should oppose each other with the ruin of forests and  
rivers, and the silence of birds? Who has said to us that the voices of my land shall be  
strange to you, and the voices of your land strange to me?

Who has imagined that I would destroy myself in order to destroy you,  
or that I could improve myself by destroying you? Who has imagined  
that your death could be negligible to me now that I have seen  
these pictures of your face?

Who has imagined that I would not speak familiarly with you, or laugh with you,  
or visit in your house and go to work with you  
in the forest?

And now one of the ideas of my place will be that you would  
gladly talk and visit and work with me.

5.

I sit in the shade of the trees of the land I was born in.  
As they are native I am native, and I hold to this place as  
carefully as they hold to it.

I do not see the national flag flying from the staff of the  
sycamore,  
or any decree of the government written on the leaves of the  
walnut,

nor has the elm bowed before monuments or sworn the oath of  
allegiance.

They have not declared to whom they stand in welcome.

6.

In the thought of you I imagine myself free of the weapons and  
the official hates that I have borne on my back like a hump,  
and in the thought of myself I imagine you free of weapons and  
official hates,

so that if we should meet we would not go by each other looking  
at the ground like slaves sullen under their burdens,  
but would stand clear in the gaze of each other.

7. There is no government so worthy as your son who fishes with you  
in silence beside the forest pool.

There is no national glory so comely as your daughter whose hands  
have learned a music and go their own way on the keys.

There is no national glory so comely as my daughter who dances  
and sings and is the brightness of my house.

There is no government so worthy as my son who laughs, as he  
comes up the path from the river in the evening, for joy.

## REMINDERS

THE NEXT ANNUAL BALATON GROUP MEETING WILL BE SEPTEMBER 7-12, 1987, IN CSOPAK, HUNGARY.

THE NEXT MEETING OF THE STEERING COMMITTEE WILL BE APRIL 25-26 IN TOESSRIEDERN, NEAR ZURICH, SWITZERLAND.

SEND YOUR GOOD-NEWS STORIES TO JOAN DAVIS.

ALL CONTRIBUTORS TO THE RESOURCE DYNAMICS TEXTBOOK, PLAN ON COMING TO IIASA DURING FEBRUARY 1987.

Please prepare for the Balaton Meeting next year (some of these will be needed in advance, to duplicate and distribute to all members):

- a special rock from your native country, to make a collection around our Atlantic cedar tree.
- a list of resource indicators from your country or region (see page 20).
- a short description of your center and its activities.

comments, news, quotes, stories  
and other items for the next Balaton Bulletin  
should be sent to  
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