

# THE BALATON BULLETIN

A quarterly newsletter  
of The Balaton Group

October, 1989

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### **MARK YOUR CALENDAR NOW!**

NEXT BALATON STEERING  
COMMITTEE MEETING  
December 2-3, 1989

THE 1990 BALATON  
GROUP MEETING  
August 30 - September 4, 1990

Joan Davis' House  
Zurich, Switzerland

Csopak, Hungary

1990 CONFERENCE OF IFOAM  
(INTERNATIONAL FEDERATION OF  
ORGANIC AGRICULTURE MOVEMENTS)  
August 26-29, 1990  
Budapest, Hungary

### **The Eighth Balaton Group Meeting - 1989**

"My name is Bert De Vries and I work at the Center for Energy and Environmental Studies at the University of Groningen in the Netherlands. I'm concerned with sustainable energy use, and I've just completed a thesis trying to define what is sustainable development."

"Mark Hanson, Institute for Environmental Studies, University of Wisconsin. I'm interested in the nature of sustainable urban land development and the causes of sprawl. I've been working on a study of the visible and hidden social subsidies to the automobile system in the United States. I've calculated that hidden subsidies add up to at least \$1.30 per gallon of gas!"

"My name is Leonardas Kairiukstis from the Institute of Forestry in Kaunas, Lithuania. I work with forest ecology as a way to measure the quality of the environment, and I am interested in the idea of sustainability at the regional level."

"I am Aromar Revi from Development Alternatives in India. We work on technologies related to basic needs, to water, shelter, sanitation, textiles, food. We also do environmental impact assessments and planning for local development projects. We have defined five broad indicators of sustainable development -- it must be economically efficient, equitable, endogenous, ecologically sustainable, and environmentally sound."

And so the introductions went around the room, to open the first session of the 1989 Balaton Group annual meeting. It was the largest group ever -- 50 people, old friends and new -- and the most internationally diverse -- representing 21 countries. We met, as usual, at the Hotel Petrol, the resthouse for oil and gas workers on the shore of Lake Balaton in Csopak, Hungary.

In the morning we held plenary sessions, this year on the subject of the greenhouse effect. In the afternoons working groups formed around joint projects and topics of mutual interest. Between scheduled sessions and in the evenings there was swimming, walking, volleyball, singing, slideshows and videoshows. And -- the most important part of any meeting -- there were the conversations. At coffee breaks and meals, over good Hungarian wine in the evenings, were conversations, serious and otherwise, on the liberation movement in Lithuania, the ban on forest cutting in Thailand, the relative merits of durians and mangosteens, the new East European environmental center, the bureaucracy of the World Bank, the latest events in our lives, and other matters of major and minor importance.

Mike Derzon enhanced the gathering this year with his guitar and his rich knowledge of inspiring songs. At the final awards ceremony Janos Hrabovszky and Lew Feldstein won the coveted Balaton Volleyball Awards. The annual Balaton Prize -- which started as a joke and has evolved into a symbol of deep appreciation for members whose consistent participation and service sustain and enrich the Balaton Group -- was awarded, by unanimous acclaim, to Niels Meyer.

This issue of the *Balaton Bulletin* summarizes for posterity, for those who couldn't be there, and for those who were, some of the most important points of the meeting.

### **Low Electricity Europe**

For many of us the Balaton meeting began a day early this year, with a seminar at the Karl Marx University in Budapest given by the Balaton Group's Low Electricity Europe (LEE) project. The seminar marked an important point in the project -- a public presentation of the work so far, and the launching of East European participation in the effort.

**Thomas Johansson** led off with a description of the Energy for a Sustainable World project he led for the World Resources Institute (jointly with Jose Goldemberg of Brazil, Amulya K. Reddy of India, and Robert Williams of the USA). World energy use has increased by a factor of 10 in this century, he said, and the annual growth rate is still 2-3% per year. If it continues at this rate, doubling in 30-40 years, it would require bringing on the equivalent of a new Alaska pipeline every 30 days, or a new 1000 megawatt power plant every 2 days. That simply will not happen, for economic, logistical, and geological reasons, as well as environmental ones. If an alternative is not found, energy will be a major constraint on development.

The alternative is a less energy-intensive form of development, and that is what the WRI study has worked out. Energy use by energy use, for developed and developing countries, it suggests what the highest attainable efficiency could be. For example, U.S. space heating requires on average 160 kilowatt hours per square meter per degree day. With the best technologies now available that can be reduced to 15. **Per capita energy use could be cut in half in the developed countries, without sacrificing energy services**, said Johansson, from 4-5 kilowatts per person to 2-3. **In the developing countries the level of economic activity could be raised to that of Europe in all sectors, while raising per capita energy use only slightly** -- from the present 0.85 kilowatts per capita to about 1.

Johansson spelled out some of the details of this transition to efficiency for Sweden -- a tough case, since the country is already one of the most energy efficient in the world. It has to become more so, however, because it has decided to phase out all nuclear power (upon which its electricity sector is currently 50% dependent), AND the Parliament has decided that because of the greenhouse effect there can be no increases in carbon dioxide emissions, AND there is a plan to reduce oil imports. All these goals can be met, with a continued GDP growth rate of 1.9%, with high energy efficiency, and with heavy reliance on hydroelectric and biomass energy sources. The resulting energy system will be less expensive than today's.

(For details see Electricity: Efficient End-Use and New Generation Technologies, and Their Planning Implications, eds. Thomas B. Johansson, Birgit Bodlund and Robert H. Williams, Lund

University Press, Box 141, S-22100, Lund, Sweden. The book also has a chapter by Niels Meyer and Jorgen Norgard on similar calculations for Denmark.)

**Jorgen Norgard** introduced the Low Electricity Europe project, which began right after the Chernobyl accident with the question: do we really need nuclear power in Europe? At the same time acid rain and global warming were becoming major worries, and therefore another question was added: can we do without fossil fuels? The project, funded by the Balaton Group through a grant from the Jessie Smith Noyes Foundation, plus contributions from the participating countries, has so far encompassed the 14 major nations of West Europe, where 350 million people live.

The project looks at the electricity system of each country -- from primary fuels through conversion technologies to electricity production and then through end-use technologies to final energy services delivered. It emphasizes particularly the end-use technologies (all the appliances and machines that use electricity), because little attention has been paid to that link in the chain, whereas much work has been done on electricity conversion efficiency. A matrix is set up for each country, with economic sectors down the columns and end uses -- ventilation, refrigeration, motor turning, heat, etc. -- across the rows (see Table 1). End-use needs can then be forecast, based on both economic growth and technology change. Future electricity demand can be calculated, for current, best-available, and possible future technologies.

For instance, ventilation systems in Denmark currently use 500 KWatt-hours/capita/year. With best available technology that number could be reduced to 75 KWatt-hours/capita, at the same comfort level -- **and that would cut the nation's total electricity use by 15%**. The average refrigerator in Denmark uses 350 KWatt-hours/year. The best on the market uses 90.

With advanced technology that could be further reduced to 50. If every refrigerator in the country were that efficient, it would **cut household electricity use by 20%**.

So far the LEE project has been able to do complete and detailed calculations for only a few European countries, because data, particularly on end-uses, are not readily available. In fact one of the most important results of the project so far has been to get the questions asked, the concepts defined, parallel research teams formed, and data collection started.

Less detailed preliminary results have been calculated, however, for all 14 countries for the year 2020, assuming no lifestyle changes and a continued 3%/year GNP growth for all countries. (That assumption was made not because it is necessarily probably or even desirable, but because it reflects the official planning goals of the nations. Other scenarios can and will be calculated.) Other assumptions were that populations will stay roughly stable, that most of the economic growth will be in the service sector, and that the best available technology will become the average technology in the year 2000; that the most advanced technology now known will become the average in 2010; and that there will be no further efficiency improvements thereafter.

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## Development of Electricity Consumption - All Countries

Figure 1: Total electricity consumption for the scenario with high economic growth and strong efforts towards efficiency. The population of the 14 countries considered is 350 millions.

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Results for the 14 countries are shown in Figure 1. Under this scenario it is possible to achieve declining electricity demand for 20 years, while delivering all required end-use services to rapidly growing economies. After that point, because of the assumption that efficiency options will be exhausted while economic growth continues, electricity demand rises again. Further reductions, or faster ones, will depend on lifestyle changes, and in making Europeans happy through means other than increasing economic throughput.

Many other scenarios are possible, and it is the point of the project to get the nations of Europe to think through alternative scenarios. It should be emphasized that the efficiencies assumed will be cost-effective. Many of them will actually save money -- although, as Jorgen Norgard pointed out, it's a ridiculous question to ask whether saving the life-support systems of the planet is cost-effective.

**Bert De Vries** pointed out that just because energy efficient scenarios are economic, that does not mean they will actually happen without a strong push. Not only do they oppose many strong vested interests, they also are based on a completely different mentality than exists in most governments. Official energy forecasts are made in a mode of prediction, not choice. They assume they must forecast what the market will do and then make the electricity available. A "green" scenario assumes the inverse -- that people should choose what they want to do and then get the market to do it.

Therefore "green" forecasts have to be explicit about implementation, whereas government forecasts do not (except for the difficult task of coming up with the capital to fulfill the forecast.) "Greens" are relieved of the burden of finding all that investment capital for new plants (because new plants are not needed), but they do not assume that their preferred options will develop on their own -- they must be implemented. They require political leadership.

**Niels Meyer** developed that theme further with a strongly worded statement about implementation and leadership. According to the Brundtland Report, to be responsible toward the great global environmental problems, West Europeans have to reduce their fossil energy use by at least 50%. There are overwhelming advantages to doing that -- more local employment, less drain on foreign exchange, a better local environment as well as a global one, greater energy price stability, higher supply security, and lower costs.

But there are also strong barriers -- vested interests, ignorance, incomplete economic accounting systems, market shortcomings, departmentalized planning, unsystematic taxes and subsidies, and the political and economic distortions of the EEC Inner Market.

To move forward Europe needs integrated planning of energy supply and demand with environmental quality goals. It needs readily available catalogs of environmentally benign technologies with realistic prices and information on how to procure them. It needs how-to manuals on installing energy-efficient systems. It needs alternative energy choices, not just one choice presented by experts. The people themselves should be involved from the beginning in thinking through those choices.

(Involving the people will actually take less cost, time, and effort in the long run, because it will eliminate protests, demonstrations, lawsuits and strikes when the government presents an unacceptable plan.)

Niels made a list of the general policy directions the governments of West Europe should take, in order of increasing strength:

<u>POLICY</u>	<u>EXAMPLES</u>
information, education	energy efficiency manuals, product labelling
demonstration	demonstration houses
active consultancy	energy audits
economic incentives	subsidized research on solar technologies, cheap loans for efficiency investments, progressive
tariffs (lower	costs if less energy used)
regulations	building and product codes

The alternative to taking these measures is a rapidly declining environment, Niels said. If we do not choose our own changes, nature will impose them -- or other nations will. Poor and populated nations like India and China will fight for their fair share of the increasingly rare "pollution space" of the planet. Ecological warfare could develop, by which one nation deliberately makes choices that interfere with the ecological systems of other nations. "Eco-fascism" could arise -- totalitarian forces could use environmental threats as an excuse to suppress weaker social groups, or stronger nations could use them as a new way of suppressing weaker nations.

Compared to those alternatives, a rational, cost-effective energy policy seems an obvious choice. "Eco-solidarity" makes for a much happier future than "eco-fascism."

**Tamas Jacsay** outlined the present energy situation of Hungary and its possibilities for energy efficiency (which are enormous). He expressed the intention of Hungarian experts to do a low-electricity analysis for their country -- Hungary seems to be one of the few countries in East Europe for which the data may be available for a careful, in-depth analysis.

### The Heat Trap

**Jim Hornig** led off by summarizing for us the scientific foundations of debates about the greenhouse effect. He described the greenhouse gases (primarily carbon dioxide, CFCs, methane, nitrous oxide), their rates of change, and the causes of those rates. There is absolute certainty that the greenhouse gases are increasing in the atmosphere (exponentially), that their increase will trap heat and cause global warming, and that human activities are the direct cause of their increase. The USA, USSR, and EEC together contribute about half the greenhouse gas emissions of the world, China contributes 7%, Brazil 4%, and India 4%.

Though the fact of the global heat trap is not in doubt, its extent and rate of impact are hard to estimate, because so many feedbacks in natural systems are poorly understood. They could greatly enhance or greatly retard global warming. Among the uncertainties are:

- the rates and absolute limits governing carbon dioxide uptake of the oceans,
- possible changes in ocean currents,
- changes in cloud cover,
- changes in the earth's reflectivity,
- possible melting of permafrost, releasing large amounts of stored methane, a greenhouse gas,
- increased photosynthesis, absorbing more carbon dioxide, and
- increased respiration, releasing more carbon dioxide.

There are two typical philosophical reactions to the threat of the global heat trap, said Jim. One is to assume that the earth's biogeochemical systems are very resilient. They have already adjusted to a 25% increase in the heat output of the sun; surely they can adjust to a change in greenhouse gas concentrations. The other reaction is to assume that the earth's systems are fragile and/or chaotic, that a very small change could lead to a very large effect. There is some scientific evidence to support both reactions. Only if we go ahead and do the experiment with the whole planet, will we know for sure which is correct.

Climatologist **Sergei Pitovranov** said that given the noise of the weather and the lags in the climate, climatologists will not be able to prove a global warming for a few more years -- by about the 14th or 15th annual Balaton meeting. It will take even longer to know the exact effects on local climates in different parts of the earth.

Computerized climate models are now used in attempts to understand the detailed effects of global warming. They are hampered by low spacial resolution, poor parameterization of solar and heat radiation, and oversimplified representations of oceans and clouds. Said Sergei, the models probably give dependable predictions of possible future global average temperatures and their variation by latitude. The model results are less reliable for precipitation averaged over latitude, and even less reliable for local temperature predictions. For local precipitation they are absolutely unreliable.

But they are the only tools we have to envision the long-run results of our short-term decisions. We are stuck with uncertainty that is probably unresolvable. During the discussion Janos Hrabovszky quoted a great Russian weather proverb that sums up our state of knowledge. "When the cock crows while standing on the manure pile, either it will get warmer, or it will get colder, or it will stay the same."

**Dana Meadows** discussed the possible effects of a global climate change on human systems and ecosystems. Even with the uncertainties in rates of change and exact local effects, she said, we know enough to be sure that continued release of greenhouse gases at their current rates will eventually lead to a complex climatic catastrophe with many features:

- precipitation changes and temperature changes, up in some places and down in others, will disrupt agriculture and change the flows of rivers and groundwaters:

- navigation channels may become unusable (as the Mississippi was in the drought of 1988),
  - virtually all existing irrigation systems, dams, and reservoirs will lose effectiveness because they will be too large or too small for the new surface water flows,
  - pollution will be less diluted in some places,
  - industrial cooling water systems will be disrupted,
  - crops may have to move to inappropriate soils -- for example, if the corn belt weather of the U.S. Midwest shifts north, it will move from rich loam to the poor, glaciated soils of Canada.
- equatorial seas will get warmer, causing tropical storms to be more frequent and more intense,
  - sea levels will rise because of the expansion of the oceans and maybe also because of the melting of polar ice:
    - vast amounts of coastal capital -- ports, cities, shore properties -- will be lost, and/or
    - large sums of money will have to be invested in dikes and other protective constructions,
    - saltwater will infiltrate further into coastal groundwater systems and further up river mouths,
    - estuaries and wetlands will be inundated, reducing breeding habitat for wildlife and many commercial fish populations,
    - higher storm surges will erode beaches,
    - hundreds of millions of people will have to be relocated from low-lying coastal areas (up to 20 million in Bangladesh, 10 million in Egypt, 5 million in South Florida).
  - ecosystems will be exposed to changes that could be 50-200 times faster than have ever occurred before:
    - every plant, animal, microbe of each ecosystem will respond to temperature and moisture stresses differently, and will move at a different rate; ecosystems will not migrate as a whole; they will be taken apart as systems, and will come together in new combinations,
    - pests and diseases may move faster than their natural controls,
    - some migration routes may be completely blocked by human settlements,
    - national parks that have been established in the 20th century to protect particular species will not be able to serve their function,
    - population surges and extinctions will occur.

People talk of "adapting" to the greenhouse effect, Dana said, but if they could do a complete cost accounting for preventing global warming, as opposed to adapting to it, they would see that greenhouse prevention is the best investment on the planet.

**Thomas Johansson** began the discussion of how not to carry out this gigantic global experiment by talking about human energy use, which accounts for 60% of the greenhouse problem.

Carbon dioxide emissions have to be decreased by at least 50% worldwide. Thomas elaborated on the example of Sweden (see the discussion above under "Low Electricity Europe"), especially the politics that have led the Swedes to decide to close down their nuclear power plants and also reduce their fossil fuel use.

Sweden can be powered entirely by local renewable energy sources, Thomas said, especially by biomass and photovoltaics (which will be cost-competitive with coal in the 1990s), but only if Sweden uses energy with utmost efficiency, and if the economy as a whole does not grow -- or at least does not grow in a way that multiplies energy end-use demand. Sweden is not quite ready politically to contemplate a no-growth scenario. People are still asking for more. They agree that the economy as a whole needn't grow, but they still think their share should grow.

In an energetic and fact-filled talk **Wilfrid Bach** said we have to do much better than a 50% cut in fossil fuel use. Given the devastating effects of a climate change, the world should decide quickly, he said, not to allow a change of more than 1-2 degrees C. (about 0.6 degrees of warming is "already spent" from gases already emitted). We should then come up with a carefully calculated operational plan, that such and such a gas can only be emitted in such and such amounts by whom and by what date. A complete global agreement is not necessary. If the 10 major countries that contribute to the heat trap are included, that will be enough.

Because of the gases already emitted, their exponential pattern of increase, and the inherent delays in the climate system, there is little time to come up with this plan. Remember, said Wilfrid, time did not start in 1980 and it will not stop at a CO<sub>2</sub> doubling. It will take at least 100 years just to restore the earth's system back to the way it was, if we start now. If total CO<sub>2</sub> emissions are cut 37% by 2000, 70% by 2020 and 90% by 2050, atmospheric CO<sub>2</sub> will still continue upward until 2020 and will still be above the present concentration in the year 2100. This is such a big, slow-moving problem that we will only get one chance to solve it. We have to get it right the first time.

Wilfrid's priority list of steps to take is:

1. raise energy efficiency,
2. phase out all CFCs,
3. switch to renewable and hydrogen energy,
4. rely during the interim adjustment period more on natural gas and less on coal,
5. reduce air pollution emissions at the source,
6. stop deforestation and soil destruction,
7. switch to low-input agriculture,
8. (last and least) switch to nuclear power.

(Several members of the Balaton Group suggested removing Wilfrid's Step 8 -- to which he agreed -- and replacing it with "use materials and water more efficiently and recycle wherever possible" -- and added a Step 9 -- reduce population growth in the poor countries and consumption growth in the rich countries.)

Exact changes necessary to meet stringent greenhouse targets would have to be worked out in detail, country by country. Wilfrid has made these calculations for his own country at the request of an Enquete Commission of the West German Parliament. They would require that the nation cut its CO2 emissions, for example, by 36 million tons per year over the next ten years. The first year 26 million tons of reduction can be achieved simply by putting a speed limit on the Autobahns; the other 10 million tons by improving the insulation of buildings. 149 million tons of CO2 emissions per year could be saved by a 20% improvement in end-use efficiency in the nation. A 90% reduction within the next few decades is definitely possible for Germany.

**Jorgen Norgard** described the Nordic Integrated Energy and Environment Planning process, a new way of holding a political discussion to come to agreement about how to balance the desire for energy services with the desire not to load nature with more pollutants than can be absorbed without enduring damage. **Niels Meyer** pointed out that the climate models do not give the dynamics, transients, or frequency of extreme events in a greenhouse future -- all of which will make the political questions even more difficult. In addition to the questions of social justice, there will be tradeoffs such as the fact that more efficient refrigerators could reduce CO2 emissions but require the production of more CFCs. Or that pollution control devices often require more energy. He advocated that to make such tradeoffs, there needs to be some sort of catalog about every product, from production to use to scrapping, about the economic costs, energy use, pollution produced, noise, smell, and health and environmental hazards.

This comment sparked a discussion about what the Balaton Group could do to make such information available in our home nations -- or even to compile a list of what information is available where. We could list several such compilations. Amory Lovins' Competitek service does an exhaustive job of listing energy efficient devices on the American market, but it is too expensive for most of us. The Danish government put out a supply catalog for heating-system planning (in Danish), which totalled 1800 pages and had to be revised in 1983, 85, and 88, because technology was changing so fast. Development Alternatives in India has established an international network to compile information on low-cost shelter technologies.

(Anyone who would like to use the Balaton Bulletin as a medium for exchanging information on catalogs for wise environmental decisions-making, please send announcements and queries to Dana Meadows.)

**Bert De Vries** floated the big questions before us. Should we personally accommodate or resist? Settle for marginal change or admit that a revolution is required in the way human beings do things? Compromise or stand firm? (Each of us came to our own conclusions; some of us came to the meeting already emphatically decided -- more on this topic later.)

**Gerardo Budowski** said the removal of forests has many effects on climate. Intact forests:

- increase rainfall downwind (there has been much confusion in the literature about the effects of forests on climate. It has now been proved by radioactive tracer that forest soils do absorb rain better, thereby enhancing evapotranspiration, thereby increasing rainfall about 200 km further inland),

- reduce the earth's reflectivity, therefore contribute directly to warming,
- serve as condensation sites on high mountains (the presence of cloud forests can double condensation and rainfall in the immediate watershed),
- sequester carbon dioxide into biomass, lock methane into swamps and soils, thereby combating warming,
- act as windbreaks, prevent soil erosion, provide flood control, moderate temperature, increase humidity, preserve biodiversity.

Deforestation is believed to be responsible for 10-20% of global warming, just through its effects on CO<sub>2</sub> absorption. That does not mean that all forest clearing adds to the greenhouse problem -- some crops also sequester considerable carbon for long periods (sugar cane, oil palm, rubber). Probably the greatest net carbon release comes when tropical forest is cleared for pasture, especially where there is a dry season.

The main causes of deforestation in Africa and Asia are commercial logging and shifting cultivation; in tropical America the main cause is cattle ranching. Underlying causes are poverty, population growth, low agricultural yields, and inequitable land distribution.

If the full burden of compensating for the present imbalance in carbon emissions (5.9 billion tons of carbon/year) were placed upon reforestation, it would require a new forest about 80% of the size of the United States. That much reforestation is certainly impossible, but a great deal is possible, especially on deforested areas that now have no other use. Marginal lands can be forested; cultivated lands can be put into profitable agroforestry.

Gerardo ended on a note of optimism: there has been an important shift; there are now growing political support and financial resources to deal with problems in this field. Reforestation is costly; it requires good management and good maintenance. Early experiments in plantation monocultures have had trouble, but we are learning how to manage them. There are also many good schemes for using wood more efficiently, especially as fuel, so that cutting rates can be reduced. There have been some strong and excellent policy statements in world gatherings, the EEC, the World Bank. The world is finally getting determined to protect and enlarge its forests. As with energy efficiency, there's a lot that can be done.

If Gerardo was optimistic, **Janos Hrabovszky** was very sobering on the possible effects of climate change on agriculture. Agriculture itself contributes to the global heat trap by releasing organic matter from the soil and by contributing to methane emission. Much good soil is still under forest; it will almost certainly be turned into crops, releasing not only the carbon in the trees, but the carbon in the soil.

But agriculture is more likely to be a victim of the greenhouse effect than its cause. Climate change will affect not only temperatures but moisture availability, pest and disease pressure, irrigation systems, soil formation and breakdown, and the suitability of land for specific crops. Farmers and governments can adjust in many ways -- by changing cropping mix, production technologies, farming systems, price relationships, consumption patterns. But the most difficult adjustments will have to come

where there is the least ability to carry them out -- the less developed countries -- which will also be doubling in population at least once, maybe twice, over the time the climate change may be occurring.

These are the countries most dependent on agriculture, with the fewest technical resources, and the most debt. Especially hard-hit will be the semi-arid countries, especially small countries entirely semi-arid. Their boundaries will probably have to open to mass migration; they are already above their carrying capacities, and those carrying capacities will go down. Coastal and heavily populated countries -- Bangladesh, Egypt, Thailand -- will also be affected greatly. If 100 million people or so have to relocate because of rising seas, it will make the pressure for forest clearing all the stronger.

Most problematic of all is that it takes years of experience or tradition to learn to farm in a certain climate with certain soils and pests and rainfall patterns. It takes years to pick the right crops and plant them in the right combinations and to learn techniques that guard against all expectable variations. What if the variations go outside the expectable? In a rapid climate change, farmers would be trying to adjust to conditions that are continually changing. Their whole mindsets will have to evolve, and keep on evolving. As they scramble to learn the new conditions, crop failures will be far more frequent than they are now.

I'm shaking in my boots, said Janos. These people already have such problems.

**Alfred Schmidt** offered a solution from agriculture, but a limited one -- biomass energy. Fossil fuel use with its consequent greenhouse emissions is only a short transient in human history, he reminded us. But we have fusion energy as a known, sustainable source -- 93 million miles away from the mischief of humankind, in the form of the sun. It's an enormous source, but most of it is not and never should be available for human use. Half the incident sunlight at the earth's surface is needed to power the hydrological, nitrogen, oxygen cycles that are our life support systems. We should not tamper with that.

But even the small percent of solar energy that is trapped by photosynthesis is enormous. All the known fossil fuel reserves in the world add up to only about 10 years worth of photosynthesis. Photosynthesis-trapped biomass energy has a definite limit, but there is room for expansion, and the limit could be enhanced. Total annual human food requirements amount to 30 exajoules of biomass. Total annual fossil fuel consumption is 300 exajoules. Total photosynthesis every year is 6,000 exajoules. (See Figure 2)

Biomass resources that could be more utilized for energy include wood wastes, crop residues, wastewater, and municipal wastes. Burning biomass produces no sulfur dioxide emissions, no net carbon dioxide emissions, and no ash problem, since the ash is a fertilizer. There are possible emissions of NO<sub>x</sub>, carbon monoxide, and particulates, which can be technically controlled.

And the photosynthetic rate could be greatly enhanced -- with short rotation forestry, energy farming, aquaculture. Under very controlled conditions (under a greenhouse, everything optimal) yields of biomass could be 10 times greater than they are today -- even ten times greater than European yields. That means 90% of cultivated land could be turned back to nature.

There are great changes ahead, said Alfred, that we cannot even imagine.

Should the Thai farmer care about the greenhouse effect? Yes, said **Chirapol Sintunawa**, for many of the reasons given by other speakers. Thailand has a dense population, a lowland seacoast, a rapidly developing economy, a large foreign debt (per capita income \$806, per capita debt (\$456). Thailand contributes to the global heat trap in every way from fossil fuel use to -- until recently -- deforestation.

Because of recent floods and landslides commercial forestry was banned in Thailand this year for at least five years (or longer -- until the forest can regenerate). The ban was done quickly, politically, and with little forethought -- sawmill industries, for example, were not shut down. Therefore logs for those industries are now imported from Burma and Laos -- from the upper watersheds of Thailand! Thailand does have several forest reserves and national parks, and it is working hard to reduce poaching and noncommercial woodcutting in them, to preserve some of the country's rich biodiversity.

**Genady Golubev** brought to us years of experience in international service discussing global environmental issues with national governments through UNEP. He talked about the "no problem with the ozone layer over my country" syndrome -- and the ozone problem is simple, compared to climate change.

- The greenhouse effect could be the largest and most rapid climate change in human history, and it could disrupt human life in many sectors.
- Its possibility requires people to act under great uncertainty.
- There may be time lags of 40-50 years before they see the definitive results of their actions.
- There are risks of acting too late, of being caught by "surprises" either positive or negative -- and there is the risk that the consequence of not acting will be devastating.
- The problem is incredibly complex, with many causes, many possible solutions, new discoveries coming all the time.

International discussion on an issue of this complexity takes time, Genady said, and there is no time.

However, the greenhouse effect is gaining priority in peoples' attention. Public concern about it is nearly equal to concern about nuclear war -- which may be an unfortunate analogy, because even when faced with the possibility of nuclear destruction, humanity has not exhibited a great common will toward peace.

In the West there is the highest awareness of the problem, such that all leaders have to give at least a show of their own attention. The public is becoming well informed. The Greens and the NGOs are increasingly coordinated -- they will be the most effective pushers for change. In the East immediate economic and political problems are so enormous that there's little time for anything else. In the South the problems are basic human needs and debt. The general attitude is that the West created the problem, let the West solve it. The South cannot possibly act on global warming, unless its own vulnerability in other areas is reduced.

Political leaders are at least joining in global discussion of the greenhouse effect. An Intergovernmental Panel on Climate Change (IPCC) is preparing a report -- due next year -- with three parts, on the science, the impacts, and the policies called for. Next will come an attempt to draft an international convention. If all goes well, the convention could be signed at Stockholm-2, the next United Nations global conference on the environment, which will be held in 1992, probably in Rio de Janeiro.

Figure 2: Solar Radiation at Ground Level

A great new international movement is needed, said Genady, to build awareness, to compile and dissemination scientific findings, to build political pressure to prevent global warming. There will be no winners in this climate change. Scientists need to speak out.

**John Peet** from Aotearoa-New Zealand reported on his own government's response to the global heat trap. The New Zealand government held a seminar in 1988 that came up with a range of findings, including a little-noticed recommendation to reduce all greenhouse gas emissions. The government set up three working groups with missions identical to the three IPCC groups -- science, impacts, policy -- with reports due in late 1988, late 1989, and mid-1990 respectively.

The Ministers for the Environment and for Conservation have been saying some inspiring words on the topic, such as:

"We must not take stances based on national or regional self-interest. We cannot afford to divide into camps, each shouting instructions on what to do. This is a global crisis. Our salvation lies in cooperation and collective action. For everyone, the emphasis has to be on prevention."

"It has been suggested that we have a "Window of Opportunity" within which to take action to avert global disaster. That may be true. We do not know for certain. In the process we are talking of, cause and ultimate effect are separated by centuries. No one in this room will ever know -- in this life at least -- whether our efforts have been successful or whether we started too late and did too little. We must assume that it is not too late and act accordingly. Delay is not an option. Action is essential. There will be no winners, and the solutions must be global."

"Sustainability must become our keyword. This is not to say that all development must cease... But it does mean that waste and destruction of resources must be checked. Our wasteful use of energy and other scarce or nonrenewable resources must be halted. The very survival of our species depends on it."

"The greenhouse effect and ozone depletion are two symptoms of the deeper malaise which we must learn to cure."

John Peet believe that these sentiments are quite sincere, though no really difficult policy decisions have been made based on them.

He quoted one contributor to the climate change seminar who warned against four unconstructive responses to the heat trap problem:

- Being trivial. Talking about loss of ski opportunities, for example, as opposed to the truly major disruptions to be expected.
- Being parochial. This problem cannot be solved without thinking globally.
- Thinking in terms of a single issue. Climate change is only one of a suite of interlocked issues related to the sustainable management of resources. Solutions and responses to any one of them must take all the others into account.
- Believing we are shifting from one steady state to another. The possible carbon dioxide doubling in 50 years is not an end state -- at that point the climate could still be in rapid motion. The prospect is for continuous change, if we don't stop emitting greenhouse gases.

The New Zealand government has introduced legislation to phase out the use of CFCs and halons at a rate faster than that specified by the Montreal Protocol. It has also set up a new Agency for Environmental Protection. There is no sign of any change in energy policy, except for the disestablishment of the Ministry of Energy, which may mean there will be no energy policy that is not dictated by conventional economics and the market.

John Peet had a good deal to say about problems with those market-based decisions -- a subject to which the next Balaton Bulletin will be devoted. You will hear more from him in that issue.

**Francisco Sagasti**, who is now the World Bank's first strategic planner, gave us a crash course in the operations of the Bank and its new "green" policies. The Bank is limited, both by its financial obligations (to be able to borrow \$10-\$12 billion a year on the open credit market, for example) and by its mandate to loan to and work through national governments. The Bank now has 40-50 people on its environmental staff. Among their tasks is to prepare a report, soon to be complete, on the greenhouse effect and its implications for economic development and Bank policy.

The Bank is changing -- slowly -- in reaction to the very different international context now as opposed to the 1950s and 1960s when the Bank's policies and practices were formed. The three main thrusts of the Bank are now coming to be:

- Mobilization of much greater resources, internal and external, to meet the increasing problem of financing the Third World in this period of rising indebtedness.
- Building each country's total internal capacity, which means not only economic capital, but human resources, institutions, technological capacity, and good governance.
- Environmental sustainability at both national and global levels -- the Bank now sees that environmental protection is central to development strategy, and that there is a clear linkage between poverty and environmental destruction.

But the World Bank can't do everything, Francisco warned. It is only one actor on the international scene, and one with a very limited role and mandate.

**Dana Meadows** summarized the main points of all the speakers at the meeting and made a strong plea that Balaton members communicate these points in public and to policymakers at every opportunity.

1. Global warming is a scientific certainty. There is no doubt about the existence of the greenhouse effect; it is as well understood as anything in physics; its basic features have been known and predicted for almost 100 years. Where scientists disagree, it is about the details of when, where, and how.

2. Global warming has been clearly measured. We see change in atmospheric gases and in the warming of the oceans; its effect on climate cannot yet be clearly detected, because climate is by its very nature a long-term (several decade) average of noisy short-term weather phenomena.

3. We cannot wait for more certainty before we act. Its effects are time lagged and it is coming on exponentially.

4. Human activities are its cause.

5. Its consequences, if it is allowed to continue, will be catastrophic to the human economy and to most ecosystems. There will not be winners and losers; there will only be varying degrees of loser.

6. Only a small warming is now inevitable. The extent of future destruction is a matter of human choice.

7. There are concrete, feasible, effective measures that can be taken now to counter global warming. The following are, in order of effectiveness and priority, the measures that can be taken to ameliorate or prevent the warming:

- use energy efficiently,
- use energy efficiently,
- use energy efficiently,
- phase out chlorofluorocarbons,
- shift to solar-based energy sources,
- use materials, water, food efficiently,
- shift the fossil fuel mix away from coal, toward gas,
- reduce all kinds of air pollution emissions,
- stop deforestation; start reforestation,
- practice sustainable agriculture; buy organic food, and
- control population growth; pursue economic growth that gives equity and satisfies real human needs.

8. All measures on the list above have many other benefits. They are worth doing anyway.

9. In any complete economic reckoning, they pay handsomely. There is no sacrifice required here, only long-term, whole-system self-interest.

10. However, they will greatly redistribute the costs, benefits, wealth, and power of actors in the current system; there will certainly be corporate, national, and individual winners and losers, great resistance from current entrenched powers, and a need for just compensations from winners to losers.

11. We are all in this together; no one on earth, no country on earth will be unaffected.

12. The greenhouse threat is not trivial, it is not a luxury to talk about it or deal with it; it is not a second priority concern, it is no joke.

Whereupon **Bert De Vries**, unwilling to admit that anything is outside the range of humor, complained that there were 12 points there, but there should have been ten. He promptly supplied them:

### **The Ten Commandments of Global Warming**

1. Don't worry, act.
2. Don't adapt, prevent.
3. However, keep cool.
4. Don't go to expert meetings, go bicycling instead.
5. Love nature -- you will need her.
6. Plant trees, not confusion.
7. If you are rich, do less with less; if you are poor, do more with less.
8. Don't fool yourself; you have to change too.
9. Learn to swim, just in case.
10. Just in case, don't build a dike just for yourself; share it.

A recent newspaper cartoon provided a different set of ten commandments:

The end of our discussion was an animated brainstorming session on what the Balaton group could do, as a whole and as individual members, with respect to the greenhouse effect. Here are some of the suggestions offered:

1. Use the Bulletin more as an information disseminator -- send it to more people, bring it out more often, all members send hot news to it more regularly.
2. Involve the Balaton Group directly and officially in the international movement on this issue -- joining whatever movement now exists, or, at Genady's suggestion, in organizing one (see working groups below).
3. Each member speak out and spread the word -- people can only make choices when they know about them.
4. Use language carefully when you speak out. For example, remember there's a choice; don't say "the greenhouse effect will," but "the greenhouse effect would (if we let it happen." For that matter the words

"greenhouse effect" sound too benign, like a nice warm, moist, fruitful environment. Call this phenomenon the "global heat trap."

5. Don't let politicians get away with avoiding progress by making comforting noises and pretending that they're making progress.
6. Over 80% of the people in the world think this is not their problem. Show them, concretely, that it is their problem too.
7. Each member can change his or her behavior patterns immediately, without waiting for a bureaucracy. The first people to take those steps listed above should be us.
8. We could design a game to teach people the greenhouse dynamics and the 100-year results of present-day actions (see working groups below).
9. We could become a clearinghouse for greenhouse-friendly catalogs of technologies.
10. Sorry, there aren't ten items on this list either!

### **Reports from Working Groups**

#### **A Heat Trap Game**

Working group: Joe Alcamo, Janos Hrabovszky, Dennis Meadows, Erling Moxnes, Aromar Revi, Chirapol Sintunawa, Ferenc Toth, Bert de Vries

Better to experiment with a game than with a whole planet! Inspired by the plenary session, a working group chaired by Dennis Meadows met to discuss the possibility of constructing a strategic decision-making exercise (a simulation game) on global warming.

There was discussion on what type of game, whom to address, short term negotiations vs. long-term dynamics, etc. There emerged some consensus that the most promising approach is to take a Stratagem-type game, extend it for four to five different countries that represent the principal sources of greenhouse gas emissions (US, ECE, USSR, Brazil, India, China) and provide it with a climate model (e.g. the Neth-US IMAGE model) to link the countries' dynamics. The game would then focus on exploring negotiations between countries within the context of global climate on the one hand, and their own development goals and strategies on the other. An advantage is that we can start with the experience and reputation of STRATEGEM.

This exercise would be extremely valuable for those who must actually represent their own country in international climate change negotiations. It would acquaint them with the major long-term short-term tradeoffs and sensitize them to the constraints operating on other participants in the discussion. The simulation would also be a valuable teaching tool in universities.

In the exercise the players would represent regions of the world, some rich, other poor, some with large endowments of coal or oil, others with none. They would make decisions about energy use, population growth, economic growth, and the exploitation and sale of their resources, and engage in negotiations to try to come to some agreement about controlling greenhouse gas emissions. Their actions would be coupled to a simplified climate model that would accumulate their emissions and feed back information about weather, sea level, etc.

The goal would be to take the players through about 50 years of simulated time within a few hours, to give them a sense of the long-term dynamics of the greenhouse effect, and to make explicit the gains and losses and political pressures affecting the various actors in the global situation.

About how to initiate the project, we have agreed upon the following:

1. Bert de Vries will see whether the Dutch government/research institute are interested in funding a first step; Dennis Meadows will explore possibilities with the German Marshall Fund; Erling Moxnes will explore the possibilities for Norwegian participation/funding.
2. If funding can be found, the first step is a 3-4 day intensive workshop in The Hague to explain the idea and make a first set-up. Invited experts will be Wilfrid Bach, Genady Golubev, Dennis Meadows and others. The intended outcome will be some concrete ideas about what gaming can do for the global warming, and possibly formulation of a game design. A convenient date would be the week before the Steering Committee meeting (11/28 to 12/2).

### **The Regional Environmental Center in Budapest**

President Bush recently promised that the United States will provide \$5 million to help start a regional institute on environmental problems. The center would address issues in Eastern Europe (outside the USSR) and be housed in Budapest. The Hungarians have committed to the venture a wonderfully-restored old factory complex with gardens in the heart of old Buda. Now the only problem is to figure out what the institute should do. A number of Balaton Group members spent an afternoon addressing this question in a session chaired by Dennis Meadows.

Several facts must govern the final plan:

- Officials in East Europe are extremely sensitive about environmental problems; they do not wish to call them to the attention either of their own citizens or to the world. Most active concern with these problems lies with the people, not the government.
- The infrastructure of laws, instrumentation, and technical sciences that have evolved in the West to cope with environmental damage is still in very early stages of development in the East.
- The above two statements are less true of Hungary than of the neighboring East European nations.
- There is not a well-developed friendship and collaborative spirit among Hungary and its neighbors, at least at the official level.

- Five million dollars is not a great deal of money, but it is in hard currency, and thus it can and should be used to lever investment of large sums in local currency.
- For political reasons, the US is not willing to associate this new institute formally with IIASA, the Vienna-based international institute that has 17 years of experience in conducting international projects on environmental problems. Nevertheless, the experience and the resources of IIASA should be considered in formulating the program of this new institute.

After much discussion the group developed a set of guidelines for the programs of the proposed center.

- Use half of the initial \$5 million as endowment to give some stability to the programs of the Center.
- Develop a center that can tap into the West's enormous resources of scientific, engineering, and economic literature. Make this available in a highly decentralized fashion.
- Do not create a management structure that permits any national government to veto the programs of the center; it must be an autonomous organization with its own, independent, self-perpetuating governing board. Perhaps the Academies of Sciences of the participating nations could nominate candidates for membership.
- Make access to the information of the center available through individual initiative, not through formal government action.
- Establish English as the working language of the Center. (Even the Hungarians in the discussion group strongly supported this recommendation).
- Develop a system that is based on microcomputer databases, programs, and texts.
- Do not carry out basic scientific research at this center; use it as a conduit into the technical resources of the West.
- Do not focus on transboundary problems, like pollution of the great rivers. Concentrate on problems that can be addressed within national boundaries, like soil erosion.
- Secure apartments near to the center, so that foreign scientists can easily come to the center for longer periods of time.
- Use the center as a facility that displays industrially-available technologies from the West.

Of course these ideas fall far short of a specification for the programs of the center, but they do provide guidelines for action.

Discussions within the United States about this center will begin in Washington, DC in November, and Dennis Meadows will be a participant in the planning committee.

### **A New International Movement**

Another group took up an issue brought up in the plenary sessions. Chaired by Genady Golubev, they discussed various types of international movements that already exist or that need to be encouraged, to move governments to action on the greenhouse effect (and on other important issues in ensuring a sustainable biosphere) while there is still time. The group felt strongly that not enough is yet being done, and that there is no time to lose.

The group asked itself what it could learn from other movements, particularly the peace movement, which takes its own form in each nation but manages a loose global coordination, primarily through nongovernmental organizations. The Hunger Project was brought up as a model of educating and involving large numbers of people in a global issue.

In terms of what WE could do, the group felt that we could act most readily at the level of concerned scientists, politicians, and writers -- the idea-people who help frame issues, label them as important, and speak with authority in public or to government in their various nations. We thought of calling a planning meeting, at Bellagio or IIASA or some other international conference center, to bring together important members of the "invisible college" -- those who are already leaders in global warming science and politics -- to challenge them to think through a more deliberate, concerted plan to get information out publicly without giving the impression of a divided scientific community. This meeting need not be hosted by the Balaton Group; the idea could be passed on to WRI or other appropriate organizations.

A small steering committee, consisting of Genady Golubev, Gerardo Budowski, Dana Meadows, and Bill Moomaw will investigate the possibilities for sponsorship and will work together over the coming year to bring the idea to fruition.

### **Environmental Accounting and Incentives**

Bill Moody reporting for Nick Briones, Gerardo Budowski, Marianne Ginsburg, Evalyn and Jim Hornig, Ulrich Loening, Leonardas Kairiukstis, Erling Moxnes, John Peet, Aromar Revi, Alfred Schmidt, and Megan Ryan.

Considerations:

1. Current national accounts are artefacts of the past and do not relate to current needs and problems.
2. There are no balance sheets for natural resources at the national (or any other) level; therefore growth figures and other economic figures are distorted and incomplete.
3. A well-considered environmental economic theory is highly relevant to -- probably essential for -- sustainable resource management.

4. Environmental economics is also needed by international development aid agencies such as the World Bank.
5. Resource accounting is especially needed by the developing countries, which are highly dependent upon forestry, minerals, soil, and water for development.
6. Environmental economics is very relevant to the current economic transformation in East Central Europe -- there is now an opportunity for new economic principles to embrace a sustainable resource management approach.
7. Considerable work has already been done by economists, ecologists, and others in many countries (Norway, France, USA, Japan). The Brundtland Commission specifically calls for resource accounting.
8. Environmental economics should also relate to issues of equity and ethics.
9. The range of economic devices wielded by government to influence individual and organizational behavior -- subsidies, taxation, price controls, etc. -- could also be used to advance sustainable resource management.
10. The Balaton Group has considerable expertise and interest to focus on this subject.
11. It could easily be coordinated with the agenda of the IFOAM meeting on sustainable agriculture.

Recommendations:

1. The Balaton Meeting in 1990 should have a session or full conference theme on "Environment, Economy, and Ethics," which highlights natural resources in national income accounts, analyses incentives for sustainable management of resources, and addresses equity issues.
2. An ongoing Balaton working group should be formed on natural resources in national accounts, or, more broadly, on environmental economics. Many members listed above would like to participate. Case studies could be prepared for Austria (Schmidt) and Norway (Moxnes) -- or at least reports could be presented on the activities underway in these and possibly other countries.
3. A handbook could be prepared on resource accounting or environmental economics (which would be a several-year project). The book would address the need and opportunity for such an approach in advancing a sustainable future, the tools available to undertake it, and the limitations in this approach for decision makers.

A note from INRIC coordinators:

When a group this large and this excited makes a request, the Balaton Group does its best to accommodate it. The Steering Committee will be considering this proposal as the plenary theme for next year's meeting. A final decision will be made at the Steering Committee's interim meeting December 2-3 in Zurich.

If you have strong feelings pro or con, and particularly if you have ideas about how to structure this vast subject, and who would be an excellent speaker to help us understand it, please communicate to Dennis or Dana Meadows or any Steering Committee member (listed later in this Bulletin) **before December 2.**

### **Sustainable Agriculture**

Working group: Peter Aven, Samir Ghabbour, Mark Hanson, Janos Hrabovszky, Mieczyslaw Gorny, Ginger Gyene, Zsolt Harnos, Erich Loening, Dana Meadows, Chirapol Sintunawa, Jozsef Toth,

This group, already well in motion from past working meetings, had considerable results to report to each other, and therefore they met often during the Balaton week.

First there were those who had conducted preliminary farm surveys, testing the availability of measures of agricultural sustainability:

**Chirapol Sintunawa** and his students have completed 7000 interviews of Thai farmers and are now doing engine tests for fuel consumption of agricultural equipment. Chirapol has found a laboratory willing to help with soil and water tests. He has had no trouble getting farmers to take enough time to complete a 19-page questionnaire.

**Jozsef Toth** and **Ginger Gyene** reported on visits to one large Hungarian state farm (Balbona) and one large cooperative farm. They found soil data and much other data readily available (but this may change as Hungary is about to cancel its compulsory soil testing). They also found that our questions in their present form did not make complete sense to the farmers -- How can this information be evaluated? How can it be compared to other farms? The University of Agriculture in Godollo is willing to set up teams to help with a larger survey.

**Mark Hanson** reported on 3 existing surveys in Wisconsin, which cover about half the questions on our indicator list. Soils data are not easy to get, and soil tests are expensive. (Mark also reported a survey in which residuals of the herbicide atrazine were found in 18% of the 600 farms tested.)

**Peter Aven** has 5 years worth of socioeconomic data from several regions of the USSR. People are willing to be interviewed for 3-4 hours. There are absolutely no environmental data, and no real soil data. 300 indicators are regularly collected, including yield data, but only a small fraction are published and all are discarded after 3 years.

Though we were all frustrated by the uneven availability of information, we did find that even verbal descriptions of the very different farms in our various countries are fascinating and thought-

provoking. It is also interesting to note what data are and are not available to the farmers -- that in itself says a lot about the possibility of sustainable agricultural practice. We agreed to write informal descriptive accounts of the farms in our regions, with whatever information we could get from our pre-test results, and to send them to Dana for compilation by December 1.

On the computer modeling side, Jozsef Toth has translated Hartmut Bossel's model into Hungarian. After a week's work to figure out Hartmut's elegant German macros, Jozsef has gotten the model running. In its current form it requires a level of detailed data that cannot be obtained in Hungary. There will be problems of disaggregating and reaggregating data from Hungarian counties to agroecological zones. Mark Hanson also has successfully implemented the model at Wisconsin, and also considers that it will be extremely difficult to load the model with a full set of data.

We also spent time going over a draft proposal to fund the next stage of the project, which will involve full-scale farm surveys and modeling. We plan to have an interim meeting shortly after Earth Day 1990, either in Kassel or in Vienna. At that meeting we will complete the list of indicators for our questionnaire, and we will have done our best to enter data from a prototypical farm or two into the computer model.

In addition to the five countries represented in the original group, we had the enthusiastic and helpful participation of new members from Poland, Scotland, and Egypt, all of whom are embarked on sustainable agriculture studies of their own. They will be returning to their home organizations to report on our work. We will learn soon about the possibility that each of those centers will formally participate in this project.

### **Sustainable Forestry**

The group reported the following conclusions to the plenary session:

1. There is competition between land for forestry and agriculture nearly everywhere, but the picture is complex -- details are very different in different countries.
2. Sustainable forestry means simply that the output from the forest equals the input, with no economic discounting.
3. When one imports tropical timber, one is exporting a debt.
4. Sustainability is less likely to be achieved as the land ownership is fragmented, because different age stands are likely to be split -- putting great pressure on smallholders to harvest unsustainably.
5. There are success stories in the sustainable use of tropical forests.
6. The forest should be thought of as the good farmer thinks of soil, not as the farmer thinks of the crop.

## **Low Electricity Europe**

The present state of the project is:

1. Analyses of various green scenarios for West European countries have been completed (by Bert De Vries).
2. The methodology and concepts for a homogeneous analysis of the potential for electricity conservation through efficient end-use has been developed and tested on a high-economic-growth scenario for 14 West European countries.

During the fall and winter 1989 all this plus the results of various other scenarios for the West European countries will be written up in a final report for the first phase of the project.

Furthermore, some East European countries will join the project using the same method of analysis. Contacts have been established with Victor Gelovani and Igor Zimin in the USSR and with Tamas Jaszay and Zoltan Szirmai in Hungary. Attempts will be made to include other East European countries. Ideally they will start by providing a breakdown of electricity consumption according to end-uses and economic sectors, if possible. If this is not possible for all East European countries, a split-up into economic sectors should at least be established. From there on we can then estimate the end-use distribution based on experiences from some West European countries. By the end of September 1989 Hungary and the USSR will report to Denmark about the initial outlook for getting the data. Jorgen Norgard will try to contact ECE in Geneva about data for East European countries, and Bert De Vries and Igor Zimin will try the same at IIASA.

In the course of setting up scenarios, it will probably be useful for there to be a visit from Denmark to the USSR and Hungary, as well as the other way. For the USSR some funding remains; for Hungary it will be applied for.

## **Exploiting Environmental Disasters**

Lew Feldstein reporting for Gerardo Budowski, Joan Davis, Jim Hornig, Nic Briones, Annaliese Bach, John Peet, Erling Moxnes, Steen Jensen.

Objective: To use the immense press interest generated by disasters such as Chernobyl, Bhopal, Valdez to focus public attention in other countries on comparable situations and the longer-term underlying causes.

Disasters focus public attention. Issues long ignored suddenly become news. The press looks for local "hooks." Public opinion polls show that public concern goes way up immediately after a disaster hits the news.

The story we want told is not the disaster, but what it represents, its full magnitude, its significance and context. Many vested interests, and sometimes governments too, work very hard to minimize these stories. They spend vast amounts for advertising, special seminars, consulting, press conferences to tell the story their way. Our side does not do nearly so well as they do.

What is needed? Timeliness is everything here. Seize the moment. There is a very small window before the press and public lose interest -- and a great opportunity for teaching the lessons of sustainability.

We need to assemble information rapidly in a disaster in one country and get it to persons in other countries who will tell the story to the press. Among the points of information are: specifically what went wrong, harmful consequences so far and over the long term, links between that disaster and large issues, the history of the problem including attempts by scientists and others to warn against it.

FAX numbers or E mail contacts for persons in host country that others can call for updates and more information are necessary. The one specific next step recommended by the group was to survey members on their access to electronic communications networks in order to learn how we could communicate quickly. (Note: this Bulletin is accompanied by our data base on all receivers of the Balaton Bulletin, including FAX and telex numbers. Please check yours to see if it is correct and complete, so we can keep this information updated!)

Other points:

- None of us knew what networks are already in place. There are some small, informal ones, like Ecoropa, to which Joan belongs, and some formal ones through UNEP.
- We should view the news alert as a leading point on a time continuum that also includes college curricula, workshops and seminars, articles, slide/videos, etc.
- It's not at all clear that the Balaton Group is the right vehicle for this, but we are an existing network. Maybe we would need more standing staff capacity to implement it. We do offer worldwide coverage, access to good data quickly in many countries, and respected spokespersons who will be listened to when they come forward.
- A slightly different role would be for Balaton members not to be the spokespersons themselves, but to get the information to the appropriate experts who would take the story public.
- It might be worthwhile to review the articles in business and advertising and the press about crisis management to see how they do it and what could be learned.

## **Indonesia 2020**

Working group: Karyono, Jorgen Norgard, Nic Briones, Chirapol Sintunawa, Bert de Vries

At the 1988 Balaton Group meeting a proposal for a Taiwan-2000 type study for Indonesia was drafted by Otto Soemarwoto, Malcolm Slessor, and Bert de Vries. Since then contacts about possible funding have been established; as yet there are no definite commitments to fund this effort. The proposal was to start with a System Dynamics workshop for staff and students of the Institute of Ecology at Bandung. For a variety of reasons that workshop has not yet been organized.

The working group decided that:

1. Karyono will inform Otto Soemarwoto about the present BG meeting. Then it will be decided at the Institute of Ecology whether a group of dedicated researchers/decision-

makers can be found to coordinate an Indonesia 2020 project (as did the Steering Committee of Taiwan University in the Taiwan 2000 project). It appears crucial to explore the basis for such local support for the project before further steps can be taken.

2. A System Dynamics workshop will be organized at the Institute of Ecology after April 1990. Chirapol Sintunawa will be invited to be the instructor.

## **Report from the Steering Committee**

**The next meeting of the Balaton Group Steering Committee will be held December 2-3 at Joan Davis' house in Zurich, Switzerland. Please notify Joan if you plan to attend. All Balaton Group members are invited.**

The Balaton Group is governed -- insofar as it is governed -- by a Steering Committee of six members elected by the attendees on the last day of each annual meeting. Qualifications for Steering Committee membership are (a) you must be present on that last day of the meeting, and (b) you must have attended at least one other meeting in the past two years. Committee members are elected for a term of three years; two members' terms expire each year.

The members of the Balaton Steering Committee as of August 1989 were:

### **Term Expires 1989:**

Chirapol Sintunawa (Thailand) Gerardo Budowski (Costa Rica)

### **Term Expires 1990:**

Tomas Jaszay (Hungary) Victor Gelovani (USSR)

### **Term Expires 1991:**

Bert De Vries (Netherlands) Joan Davis (Switzerland).

At the 1989 annual meeting the two new members elected were Chirapol Sintunawa (Thailand) and Genady Golubev (USSR). Their membership will expire in August 1992.

In fact Steering Committee meetings are open to any interested member, and typically quite a number show up and actively participate.

In its August meeting, which took place at the 1989 Balaton Group meeting, the Steering Committee discussed (as always) finances, dates, themes, and locations for the next annual meeting, and membership policy.

### **Date, Location, Theme of the Next Annual Meeting**

All during the Balaton meeting we collected suggested themes for the next meeting. Here is the list we came up with:

Environmental accounting  
Redefining economic growth and quality of life  
The debt crisis: causes, consequences, cures  
Economic incentives to promote sustainable resource management  
Control of transboundary pollution flows  
Formulating a blueprint for a sustainable community  
Visions of a sustainable future  
The revitalization/restoration of degraded environments  
Managing municipal waste  
Deforestation and reforestation  
Urban resource systems and sustainable cities  
Global climate change again -- an update  
Environmental defense as an alternative to military defense, in an economic, social, and psychological sense  
Methods and experiences in informing individual and corporate choices

As you may have noticed in the working group reports, there was special enthusiasm for some combination of the first four themes on the above list -- something about alternative economics for a sustainable world. The Steering Committee is concerned that that topic may be too broad and unstructurable for us to make any headway on it over the short period of one meeting. Therefore the Committee will not make a final decision until its interim meeting in early December. Meantime Committee members will gather reactions from members, and specific suggestions about possible ways to organize the theme and possible speakers. If it looks possible, next year's theme will be alternative economics -- and the other suggestions on the list above will be held for future meetings.

### **Membership Policy**

This year's annual meeting produced enough attendees to fill the resthouse and to overfill our budget. Therefore the issue of the right size for the Balaton Group came up in full force before the Steering Committee. We have never had a very clear membership policy -- we have never had to. Now we do.

Dennis Meadows wrote the following proposal for membership policy, which was posted at the meeting for comments:

Given the goals of INRIC as expressed in its brochure,  
Given that our collective resources can only support at most 20-25 centers,  
Given that this is a period of explosive growth in interest in environmental issues all over the world,  
Given that INRIC now has more demand for participation and support than it can accommodate,  
Therefore I suggest:

A maximum of 21 INRIC centers be admitted. After that point, a new center may join only if an old one is dropped.

Approximately 1/3 of the centers will be in countries of East Europe, 1/3 in the industrialized West (including Japan), and 1/3 in the South.

There is no limit to the number on the Balaton mailing list. This includes all past participants in the annual meeting plus funders and friends.

The annual meeting will have an upper limit of 50 participants. They will come from the centers, preferably 2 from each. In addition there will be people from 2-3 new centers at each meeting, either because their research is relevant to that meeting, or because they are being considered for membership,

Ten people not connected with an active center will be members because of their personal qualifications.

Membership will be evaluated based on the influence the center has on its own region's resource policies, and the contribution the center makes to training and research in the other centers. A brief, informal report each year would permit each center to summarize its accomplishments in both areas of qualification.

This suggestion drew surprisingly few comments, either because everyone agreed with it, or because no one read it. **Be warned.** The Steering Committee will decide on this proposal in its December meeting. If you have comments, revisions, suggestions, or revulsions, please call or write a Committee member or come to the meeting and express your opinion.

## **News from the Members**

**Samaresh Chatterji** writes from the Maharashtra Institute of Technology School of Management:

As I went through with great interest the June 1989 issue of the Bulletin, I realized that communication has been very much a one-way channel for a long time. So I'm turning on the transmitter, if only to say, "Hey, this node of the network is alive and functioning."

The institution I joined last year, the new MIT School of Management, has gained some degree of stability. It has been a busy year, but most of the effort has gone into bread-and-butter issues -- deciding curricula, appointing faculty (mainly visiting professors from local industry), attracting students. There has been little time or infrastructure for pursuing research.

But issues of sustainable development have never been far from my thoughts, and I would like to offer a suggestion -- that the Balaton Group consider taking up as a theme subject for a future meeting "Human and Organizational Aspects of Sustainable Development." Obviously it would not be correct to say that the group is not concerned about these aspects, but they have not been taken up as a central focus. Perhaps this is because of a desire not to be led far away from the group's scientific and technological strengths into too much of philosophizing and speculation. But as someone involved in education, and hence directly face-to-face with the narrow and short-term outlooks of most of my students, I find myself "groping in the dark."

I won't be physically present at Csopak in 1989, but certainly present in spirit. Warm regards to all the Balaton Group.

**Carlos Quesada**, from the Costa Rican Ministry of Natural Resources, Energy, and Mines, sent for the growing Balaton Group videotape library a copy of a beautiful National Geographic tape on the tropical rainforest. He writes:

Sadly, I could not make it to the Balaton meeting this year. Just two weeks ago I had to prepare a trip to Venezuela with one day notice to represent Minister Umana in a high level meeting

organized by UNDP to set the agenda for a Latin American response to the Brundtland report and to set the guidelines for a Latin American version of Our Common Future. It was quite an interesting exercise, but it messed up my plans.

I have found the hard way that wearing too many hats is not healthy for people and families. I am missing the best of my teen age daughters growing up, now 14 and 16, and some of the most important professional gatherings, such as the one in Balaton. I had really looked forward to this meeting, since I wanted to strengthen closer links with the energy group.

Here are some of my main activities this year. I am still environmental advisor to the Ministry of Natural Resources, Energy, and Mines, and director of the National Strategy for Sustainable Development. At the University of Costa Rica, I am head of the Water Resources and Environmental Engineering Department.

Last March I was appointed by the Director General of IUCN to the Programme Planning Advisory Board of the organization. Last May I was honored to be appointed vice president of the Organization of Tropical Studies, in charge of Costa Rican affairs. I have also been doing a lot of traveling. I was invited by **Jerry Barney** to the World Future Society meeting in Washington in July as part of the program of the Institute for 21st Century Studies. There I had the chance to see **Victor Gelovani** and **Otto Soemarwoto**. The three of us participated in presentations dealing with sustainability issues of our respective countries in the next century.

Right now I am finalizing a couple of publications dealing with the Conservation Strategy and trying to prepare materials for important meetings to come in September and October. There are so many things happening in Costa Rica now! This administration is trying to finish up things and we are getting ready for presidential elections next February.

Please give my regards to everybody at the meeting; may it be a happy and fruitful one. I really hope to make it next year.

From Portugal we learn that **Paula Antunes** recently married. **Antonio Camara** has just returned from a sabbatical year in the United States where he developed new mathematical methods for modeling of water systems and supporting resource policy.

## **Announcements**

### **The Biomass Users Network**

Representative of 17 developing countries meeting at a workshop in Manila in March, 1983, realized that properly managed biomass programs catalyze rural development and contribute to resource conservation. However, developing countries have no formal means to share research results or practical experience in managing biomass resources sustainably. They decided to organize the Biomass Users Network (BUN). The Network's formal inauguration took place at a meeting of more than 20 developing countries in Bangkok in October 1985.

The goals of BUN are to:

- develop and manage biomass production and utilization systems more effectively,
- capitalize on developing countries' biomass production potential,
- catalyze rural development,

- integrate bioenergy into overall development strategy,
- increase cooperation among developing countries.

It will achieve these goals through:

- developing improved technologies and systems designed for the specific resources, needs, and conditions of developing countries,
- identifying and promoting successful integrated agriculture, energy, and forestry programs,
- establishing a skills resource bank and conducting training sessions to facilitate direct interaction among program personnel,
- organizing and coordinating cooperative research, development, and demonstrations projects,
- providing planners and technicians with improved biomass management skills,
- creating a uniform system for information exchange among developing countries, international organizations, donor agencies, research institutions, consulting and manufacturing firms, and environmental groups.

BUN full members are the designated agencies of developing country governments that have or are considering national biomass programs. Associate members include national and international assistance agencies, regional development banks and organizations, and foundations. Affiliate members include other agencies from member countries, research institutions, corporations, and individuals.

BUN puts out an interesting newsletter "BUN Network News," which in its May 1989 issue features the National Conservation Strategy of Costa Rica, coordinated by Carlos Quesada and his colleagues -- under the headline "Watershed Management at the Heart of the National Conservation Strategy of Costa Rica." It also contains an update on debt-for-nature swaps in Costa Rica, which now total over \$75 million, the equivalent of 5% of the country's commercial foreign debt.

For more information, write Biomass Users Network, P.O. Box 960 4050, Alajuela, Costa Rica (telex: 7040 ICAE CR, telephone: 506-412255)

## **Stories, Quotes, Jokes, Statistics**

### **The Imperative of Social Innovation**

(The following is an excerpt from a 1989 declaration from the U.N. Advisory Committee on Science and Technology for Development. It was signed by Francisco Sagasti, the current chairman of the committee, by former chairmen Essam El-din Galal of Egypt, Umberto Colombo of Italy, and M.S. Swaminathan of India, and by 42 present and former committee members. Francisco read it at the 89 Balaton meeting, and at the request of the group it is reproduced here. It sounds to us like a wonderful statement of what the Balaton Group is all about.)

Humanity approaches a new century confronting a fundamental paradox: we have never had so much power to influence the course of civilization, to shape the way our species will evolve, and to create an ever-expanding range of opportunities for human betterment -- but we remain unwilling or unable to use this new-found power to achieve our full potential as human beings.

Throughout most of history, nations and societies have been compelled to behave as though some groups could only progress at the expense of others. Today, advances in science and technology have created new possibilities for all of humanity to prosper, if we could but summon the collective will and wisdom to employ the new means available to us.

The now enormous potential for human advancement coexists with gross inequalities, possible ominous threats to the global commons (such as the greenhouse effect and stratospheric ozone depletion), and with the diversion of a significant proportion of the world's highest intellectual talent to develop technologies of destruction. This paradox puts in sharp relief the critical problem of our age: our scientific knowledge and technological mastery have outstripped our collective capacity to manage advances in science and technology so as to enhance the opportunities and reduce the threats they create. A bold and imaginative effort in social and institutional innovation at all levels -- from local to international -- is now essential for survival and progress.

We propose three guiding principles for a renewed mobilization of science and technology in the service of development. The international community of statesmen, scientists, policy makers, scholars, professionals, managers, workers, and citizens must in our view:

- (a) Evolve a broad new strategy to ensure equality of access for all people to modern scientific and technological knowledge essential to alleviating poverty, reducing population pressures, achieving minimum standards of health and nutrition, improving educational opportunities, and promoting economic growth.
- (b) Undertake a concerted effort to build the human and institutional capacities developing countries need to make independent decisions on the critical science and technology issues that will confront them.
- (c) Forge new international partnerships to achieve environmentally sustainable development. The times when humanity could act on the physical and biological environment with impunity are forever gone. New approaches in which humanity and nature jointly enhance each other's capacities are imperative. This will demand a re-evaluation of the many ways in which different cultures relate to the natural world, using science to build constructively on this diversity, rather than seeking to universalize some single over-arching view of the interactions between human activities and the environment.

We reaffirm our belief in international co-operation as the most effective way to transcend the conditions which deny the power and benefits of science and technology to those most in need. International co-operation and development assistance must evolve beyond charity, or narrowly conceived national interests, into expressions of collective responsibility for the well-being of all humanity in present and future generations.

### **The Farmer, Speaking of Greenhouses**

(Excerpted from a speech given by Wendell Berry at the dedication of the new research greenhouse at the Land Institute, Salina, Kansas, March 26, 1988).

"The goal is a harmony between the human economy and nature that will preserve both nature and humanity, and this is a traditional goal. The world is now divided between those who adhere to this ancient purpose and those who by intention do not, and this division is of far more portent for the future of the world than any of the presently recognized national or political or economic divisions."

"The remarkable thing about this division is its relative newness. The idea that we should obey nature's laws and live harmoniously with her as good husbands and stewards of her gifts is old.... And I believe that until fairly recently our destructions of nature were more or less unwitting -- the by-products of our ignorance or weakness or depravity. It is our present principled and elaborately rationalized rape and plunder of the natural world that is a new thing under the sun."

"But we have come here today to celebrate the addition of strength and capability to the old cause. And we have further reason to celebrate in that this addition is not unique. The signs are now everywhere that the traditional side is gaining strength. Though we should beware of optimism, I think we may be permitted to see great hope in our gains. We are slowly acquiring a capacity to know where we are and what we're doing and what we ought to do, such as humans may never have had before. We are learning to return to nature from farther away than we have ever been.'

### **What Scientists Can Do**

(excerpts from a speech by Canadian Ambassador Stephen Lewis to the 2nd International Conference on Climate Change, held in Washington D.C. in October, 1988. The speech brought the audience of several hundred scientists to their feet in a standing ovation)

"What we need for the environment is a grand coalition -- of scientists and environmentalists and non-governmental organizations and policymakers -- to save this Earth and humankind. I recognize it's not particularly your profession to be in the front lines of advocacy. You're scientists, but there does come a moment in life when scientific knowledge must be mobilized into advocate's activities."

"You know better than anyone else what the implications are for ecological integrity and diversity when the forests of Madagascar disappear. You understand better than anyone else the consequences for the world as the Brazilian forests are under assault. You understand better than most the ominous warnings in the succession of natural tragedies visited on the country of Bangladesh."

"You understand the march of the deserts in the Sahel. You grasp all of the implications -- the way most of mortal kind does not grasp them -- of the consequences of the heat waves from the American and Canadian Midwest. You understand the imperative policy options."

"And so my appeal to you is that you combine science and advocacy, that you become both analysts and protagonists. That is the nature of the professional imperative. Move from dispassionate observation to passionate intervention. And do it with the collaboration of as many groups as possible, because one is talking, as did the scientists who opposed nuclear war, about the preservation of the planet. Collectively, you're the strongest voices for mobilizing change. We surely haven't come this far in human civilization to see it atrophy before our very eyes. I salute you, and I throw the gauntlet to you."