

Bio News



Joy
and
Good
Health
for
1995

Vol 3. No. 1, January, 1995 A monthly newspaper for the appreciation and protection of the bio-environment, a shift from an anthropocentric to a biocentric vision

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PLASTIC: The fuel of the future?

plastic containers are separated from any other form of packaging and then mechanically sorted into homogeneous plastic materials, according to their chemical composition. Replastic runs three recycling lines, one each for polyester, PVC and high density polyethylene, the aim being to obtain recycled plastics in as pure a state as possible, to substitute for virgin polymer.

The search for effective technologies to differentiate, and separate plastics from assorted post consumer packaging led Replastic to form a four-party consortium, with I.P.I.C.I, Sorema and Mac Presse (the last two supplying the equipment.) Initially, sorting was manual (as with the development of most industrialised processes), relying on human skill and subject to human error. Replastic's research has now introduced highly sophisticated methods, using x-rays, video cameras and computers at Novate, north of Milan.

The plastic containers, falling down a chute, are x-rayed several times during their descent. A high-speed computer scans the resulting profile and decides on the appropriate outlet by the time the container lands, directing it by air ejection. A similar process is carried out by video cameras which identify by colour and decide on the appropriate choice. So fast are these procedures that 9 containers can be processed, per second. These innovative detector systems as well as full automation, make the plant at Novate probably the most advanced in Europe and the USA, according to Replastic.

Novate is located in a densely populated area of around 5.5 million, who have a rapidly rising awareness of environmental problems. In March 1994 the actual collection figure, extrapolated on a regular basis, was 5700 tons against a potential capacity of twice as much, taking into account a coefficient equal to 2kg a year, of collected containers, per inhabitant. The Italian current average is 5kg per person. Preliminary tests at Novate have already reached a capacity of 7500 tons per year, (which will undoubtedly increase), treating 150 million containers annually.

The Mac Presse machines separate out foreign bodies from the loose packaging, leaving the plastics which are then washed, rinsed and sterilised. After the division into single plastics, the containers are sent by pneumatic conveyors to baling machines. The whole process is controlled by computer. Final costs show at least a 30% reduction when automated, with an incomparable improvement in quality.

When fully operational this one plant will prevent the dumping of 900 cubic meters per day of waste. In 6 years (the expected lifetime of the equipment) the total volume (over 1 million cubic meters) will be equivalent to a landfill installation.

Recycling Homogeneous Polymers

Since recycling heterogeneous, or mixed, polymers is still in its technological infancy, Replastic is currently concentrating on outlets for the single, or homogeneous recycled products. Polyester products are sold for fibre application, and PVC for manufacturing pipes, fittings, conducts, profiles etc. Replastic hopes that research into heterogeneous polymers will, ultimately, result in the conversion of mainly polyester - based composites into feed stock.

Energy Recycling

Since the technology for the direct conversion of plastics into electricity is also new, Replastic has focused first of all on creating solid-fuel substitutes from pure plastic. *Plastic*

Derived Fuel (PDF) can be used in existing plants, especially in the cement industry. The plastic, basically polyester and polyethylene, is milled into granules, which are introduced into existing combustion systems. Several experimental substitutions have been carried out all over Italy, which show no diminution in output and no adverse alteration to the plant concerned. Replastic is now looking for Italian facilities which could be adopted to use 100% plastic as fuel.

Energy Production

With the support of Rome University Chemical Engineering Department, Replastic is carrying out a feasibility study into the creation of an electricity producing plant, based on the combustion of plastics. Such a plant would comply fully with European and Italian legislation, and would benefit from the incentives offered by Italian law for the creation of power through the use of renewable sources including wastes. This ambitious plan is scheduled to start at the end of 1996.

Plastic Waste: Local Solutions to a Global Problem

Plastic is everywhere. 100 million tons of plastic materials

Technology now focuses on creating solid-fuel substitutes from pure plastic. The plastic is milled into granules which are introduced into existing industrial combustion systems ... Industrial facilities could be adopted to use 100% plastic as fuel.

are produced annually world-wide, and plastic waste is continuously accumulating in landfills, causing severe environmental damage. Plastic gets disposed of randomly, and often gets incinerated, with disastrous environmental consequences. Plastic itself is not a hazardous material, but when burned it generates harmful compounds, including acids and other toxic substances.

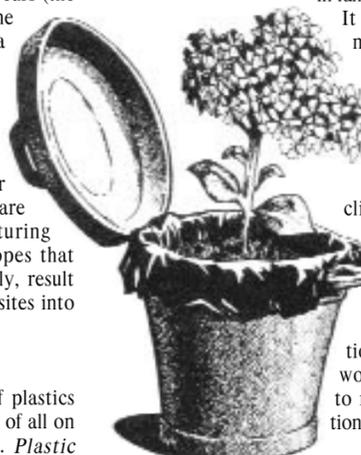
However, plastic can be environmentally-friendly if managed correctly. Used plastic materials, could, under the right circumstances, become sources of raw materials for many industries. Realism, coupled with the prudent application of technology, can guarantee effective recycling schemes, which will not only provide solutions to crucial bio-environmental problems, but will also convert discarded materials into useful products.

Presently, in Western Europe, 70% of plastic waste ends up in landfills and only 8% gets recycled.

It is therefore essential to take more active measures towards establishing effective recycling projects, thus curbing pollution and environmental deterioration, and preserving valuable natural resources for the future. If sorting and recycling became standard practice, more than two thirds of urban waste could be put back into either *natural* or *economic* production cycles.

Some steps in the right direction are being taken all over the world, since people are beginning to realise the gravity of the situation.

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"Market for Recycled Products in Europe" a FEDARENE symposium, Athens, Friday November 25th 1994.

Excessive plastic packaging: as consumers, we have all known the experience of throwing it away in larger and larger quantities. The word recycling is now a household name in the developed world, but how exactly, is it carried out and what are the possible products? Currently, recycling technologies are designed to treat single materials, uncontaminated by plastic. These go into different coloured bins or *igloos* that we all recognise, for glass, metal and paper. In the light of the *EU 40% Recovery Law*, coming into effect in 1997, the Italian government created *Replastic* in 1988, an Italian Mandatory Consortium for recycling plastic containers from post-consumer packaging.

The aim of Replastic was to achieve a good balance of realistic end-products, with realistic outlets. It divided its projected industrialised products as follows:

- 30% Homogeneous recycling
- 10% Heterogeneous recycling
- 50% Energy recovery
- 10% Chemical recycling

The first of a long series of stages is *Primary Sorting*. Here,

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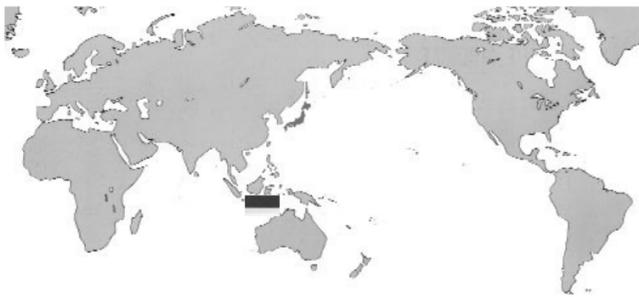
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Human Values, Modern Technology and Bio-Environmental Preservation



PROFESSOR DR. S. BUDHISANTOSO has a doctorate in anthropology, and is a Senior Lecturer in Anthropology at the University of Indonesia. He is on the staff of the Minister of State for Environment in charge of Socio-Cultural affairs. He has written numerous books and articles in Indonesian and English on Communications, Economic Anthropology, Folk Arts and Ethnographies.



It is undeniable that the progress of science and technology has created many conveniences and a greater facility for humans to adapt to their environment. Tools and technology easily substitute and compensate for human physical limitations, in satisfying the rising demands (in terms of quantity and quality) of human biological needs. The facilities created by the application of technology, however, have also shaped human greed. In the past, human beings exploited their environment simply to fulfil their need to survive and reproduce. With the acquisition of advanced science and technology, humans have developed unlimited expectations and demands.

The acquisition of modern sophisticated knowledge and technology should be paralleled by the development of cultural values, as a frame of reference for the respective societies to control them.

The implementation of developmental programmes in developing countries, such as Indonesia, shows that skill and technical expertise do not offer any advantage if not followed up by supporting mental attitudes in the individual society.

Developing countries are urged to adopt and apply sophisticated technology and knowledge, in order to speed up developmental programmes, but at the same time they are also asked to cultivate their cultural identities.

If the transfer of sophisticated science and technology is not carried out with this principle in mind, then it might be followed by the development of new social norms and cultural values, which are not always compatible with the established traditional culture of the recipient society. Although the application of sophisticated knowledge and technology might revitalise neglected traditional values, their re-emergence may be considered a threat to the established culture of the community.

The wish to improve social welfare through science and technology, while preserving national cultural identities at the same time, seems to give rise to 'disadvantaged' mental attitudes among members of a society. Instead of creating and developing cultural values related to the adopted knowledge and technology, communities tend to isolate themselves from the influx of foreign cultures. As a substitute for the adoption or development of new cultural values and social norms suited to these demands, they tend to revert to the sup-

posedly "old" and "original" culture, without taking into account its relevance to the present era of globalisation.

Most members of a community, particularly the older generation, are still dominated by the "post figurative" view; they idealise their past life, without being able to realise the dynamics of their own culture. Any change or innovation in their culture is considered a threat. Although many developing

The labour-intensive work needed for wet rice cultivation seems to lessen the aggression of local males accustomed to inter-village warfare ... men monopolise all the activities in the rice field ... while the women raise pigs, even feeding baby pigs with their milk as though they were their own children

countries are attempting to preserve and develop their national identities for the sake of unity and their unification, they can not avoid the global mainstream of modernisation.

Meanwhile the adoption of sophisticated technology by indigenous inhabitants has quite often created environmental problems which have had almost the same effect as the impact of multinational corporations' activities when exploiting the developing countries' natural resources. Because of their need for cash (to pay for the consumption of factory products) the rural and relatively isolated communities tend to overexploit their natural resources. In addition, since the application of sophisticated technology requires greater capital investment, only a few wealthy members of the community are in general, able to take advantage of this modernisation. Therefore, social and economic discrepancies may arise which could disturb the established social structure.

Most of the developing countries are densely populated and supply the demand for unskilled labour for non agricultural-sector activities. Some developing countries even have abundant natural resources with which to provide raw materials to support flourishing industries, but they have insuffi-

cient technology, so they cannot exploit or process the products, thus they are obliged to sacrifice their natural or human resources to foreign investors, by providing domestic low-paid labour, or are forced to authorise foreign investors to extract the wealth of the nation, without restrictions.

The need to develop a country by relying on sophisticated technology does not seem to be followed up by adequate cultural development, as a control mechanism. The current control mechanism is specifically related to traditional, simple, exploitative technology and is aimed at maintaining the equilibrium between human beings and the environment. The introduction of sophisticated, exploitative technology is particularly intended to maximise productivity, without taking into consideration the possible disruption of the human-environment equilibrium, which results from the social and cultural inability to deal adequately with the consequences.

One of the possible disruptions is the change in consumption patterns in the society which is undergoing development of its welfare, and the new need for a market mechanism to deal with the mass production of consumer goods, as a result of the application of science and technology.

With regard to the improvement of a society's welfare, the Indonesian government is beginning to introduce advanced agricultural technology to the Dani ethnic group, with the goal of raising crop productivity and enabling people to sell the surplus. The Dani, who live near the Baliem Valley, are being taught how to plant wet rice and vegetables, which are unfamiliar to them. The aim of this effort is to enable them to practise continuous land-cropping, and through the use of irrigation and fertilisers, to preserve soil productivity. The introduction of wet rice cultivation is acceptable to all the sweet potato gardeners in the vicinity of Wamena, where running water resources are available. The labour-intensive work needed for wet rice cultivation seems to lessen the aggression of local men, who were accustomed to inter-village warfare. It seems that planting rice is gaining a respectable position in this warrior society. Men monopolise all the activities in the rice field, from preparing, seeding transplanting, and weeding, to harvesting and other post-harvest activities, while the women raise pigs, even feeding baby pigs with their milk, as though they were their own children.

At a glance, the introduction of wet rice cultivation among the Dani of Wamena is a success story in the development programme of Irian Jaya. At the beginning local people sold their rice harvest to newly arrived residents, most of whom are government officials, and traditionally rice consumers. From year to year the volume of sold rice has been diminishing and, conversely, the local people have begun to consume more rice which is now becoming a prestigious national staple food. At present (after 10 years) the local people have replaced the sweet potato with rice as a staple food. Thus the sweet potatoes planted by the women now serve only for the feeding of pigs. Therefore, the variety of the sweet potato is limited to the high yield one, without regard to the quality.

Although the older generations are familiar with more than 60 different varieties of sweet potato, today's children of Wamena do not recognise

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EDITORIAL

A ticking clock

Is time running out?

Recently, an international panel of environmental experts was asked to present an evaluation of the projected future of humankind. Pessimists asserted that, at the present rate of environmental destruction, life on earth will be completely wiped out before the next twenty years are up, while optimists concluded that it could probably still go on for perhaps another half a century. However, more poignant than mere figures are the words of an eight-year-old boy who, puzzled by environmental destruction, asked his father: "Father, what are we doing to the environment? I think I will be able to have children, but will I be able to have grandchildren?"

These simple phrases sum up the whole purpose of B.I.O., which for the past ten years, has been struggling to raise awareness of the fact that if we do not make a serious commitment to protect and preserve the bio-environment, the whole future of humanity is at stake.

The anthropocentric attitude that we have adopted is threatening the very essence of the continuity of bios. Human arrogance and over-consumerism has driven us to the point of believing we can abuse and destroy at will; that the bio-environment is here to serve our greed and avaricious tendencies. But who are we to presume we have the right to cut the chain of life, which has existed for hundreds of millions of years? After all, if we consider the evolution of bios as a twenty-four-hour-day, the appearance of human beings occurred only during the last few seconds.

It is essential to understand that we need to change from an anthropocentric to a biocentric system of values, and place respect and appreciation for the bio-environment at the core of every human endeavour. A new bios-supporting structure for society, based on a framework of global bio-education, bio-ethics, bio-diplomacy and bio-legislation, can help guide humanity towards greater maturity and the commitment to respect bio-diversity and preserve the bio-environment for the future.

We do not have to take a pessimistic position; we still have the potential for optimism, but only if we are deeply aware that time is running out faster than we could have believed, that catastrophe is imminent within our own lifetimes, and is not just a vague concept for the future. We could live to see the destruction of our planet.

It is not enough to work on just sustaining what already exists. We need to reform our thinking and morality and formulate an enlightened vision for the future. Licentious consumption can be replaced by new values, which bring peace, promote inner wealth and reveal the power of the spirit of bios as a unifying factor for the harmonious co-evolution of humanity and the bio-environment. Harmony can be achieved only as long as human society changes its philosophy and channels every aspect of human creativity towards a global appreciation and protection of bios. □



Dr Agni Vlavianos-Arvanitis, President and Founder of Biopolitics International Organisation



Bio News is published monthly by the Biopolitics International Organisation

Editor-in-chief - Dr. Agni Vlavianos-Arvanitis

Deputy editor - Helen Papadimitriou

Production director - Louisa O'Brien

Sub-editor - Alison Graham

Editorial Consultant - Christos Efthymiopoulos

Editorial Assistant - Dimitris Haralambidis

Jacob Brown

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BIOPOLITICS INTERNATIONAL ORGANISATION

TIM. VASSOU 10, ATHENS 115 21, GREECE

TEL: (301) 6432 419 FAX: (301) 6434 093

Printed by Em-Ess Press, 88 Drakontos, Athens Tel. 514 8983

A Magnificent Opportunity in Resource Conservation



J. PATRICK NICHOLSON is chairman and CEO of N-Viro International Corporation in the USA. An outspoken advocate of resource conservation policies and practices, he has been actively involved in lobbying for meaningful resource conservation and recovery legislation since 1976. In 1991, Nicholson was honoured by the President of the United States with President's Environment and Conservation Challenge Award Citation.

How can man be so stupid? Unfortunately and tragically, it is not hard to understand. Mankind can be terribly stupid! How else can one explain today's world leadership's abject failure to recognise the dangers inherent to destruction of the ozone layer; an upcoming global warming crisis; destruction of the rainforests; and the pollution of our air by acid rain. Unnecessary combustion processes such as incinerators; pollution of our lakes and streams by uncontrolled point and non-point source discharge; the groundwater pollution by irresponsible land use disposal programs; and foolish overuse of chemical fertilisers and pesticides; all contribute to the immensity of the problem. Mankind must act now to prevent the destruction of civilisation, or at least civilisation as we know it!

The USA is the leader in this terrible environmental, ecological, and sociological abuse. It is our responsibility to meet this challenge now - not pass the crisis on to our children. The USA is the biggest world-wide user of resources, and as such, we as a government must first meet our own responsibilities before we seek to advise others. However, as individuals, we must speak out today so that all nations may see this critical problem and immense opportunity. Yes, this ecological and environmental problem can, indeed, be converted to a magnificent opportunity. Science and technology exist today to convert and to recycle waste resources into critically necessary products that, in and of themselves, can greatly benefit the world. We can make use of wastes in safe ways ... to help feed the world.

The recently published Worldwatch Institute Report, State of the World - 1994, may, we hope, be a catalyst to challenge our national and world leaders to wake up to the crisis that their inertia is creating and to the magnificent opportunity that they are missing. State of the World Says:

"It may be the ultimate irony that in our efforts to make the earth yield more for ourselves, we are diminishing its ability to sustain life of all kinds, humans included. Signs of environmental constraints are now pervasive. Cropland is scarcely expanding any more, and a good portion of existing agricultural land is losing fertility."

"Much of the land we continue to farm is losing its inherent productivity because of unsound agricultural practices and overuse. The Global Assessment of Soil Degradation ... found that more than 550 million hectares (one-third of all farmland) are losing topsoil or undergoing other forms of degradation as a direct result of poor agricultural

methods." (See right, figures 1 & 2.)

In 1993 USDA published *Agricultural Utilisation of Municipal, Industrial and Animal Wastes*, in an attempt to convince Congress to fund research and programs necessary to safely convert these wastes into sustainable agriculture and fertility products. This excellent report can be the cornerstone of a world-wide strategy to provide sustainable agriculture through safe and effective utilisation of natural bio-organic and mineral by-products.

SOIL AND WATER QUALITY

An Agenda for Agriculture was published in 1993 by the National Research Council. The following quotes are from that very important work:

"Erosion, compaction, acidification and loss of biological activity reduce the nutrient and water storage capacity of soils, increase the mobility of agricultural chemicals, slow the rate of waste or chemical degradation and reduce the efficiency of root systems. All of these factors can increase the likelihood of loss of nutrients, pesticides and salts from farming systems to both surface water and groundwater." (See figure

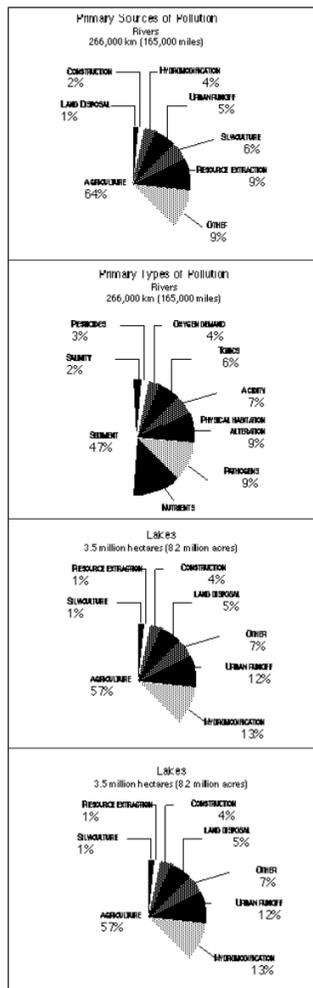


Figure 3

Region	Overgrazing	Deforestation	Agricultural Mismanagement (million hectares)	Other ¹	Total	Estimated Area at Risk of Total Yielded Land (percent)
Asia	197	290	204	47	746	29
Africa	243	67	121	63	494	23
South America	56	100	61	12	249	24
Europe	56	81	61	22	220	23
North & Central America	36	18	31	11	150	8
Oceania	93	12	8	0	109	23
World	679	579	552	156	1,965	22

¹ Includes exploitation of vegetation for domestic use (132 million ha.) and bio-industrial activities, such as pulpation (22 million ha.)
 Source: *Worldwatch Institute*, based on *The Extent of Human-Induced Soil Degradation*, James S. G. Frayn, G. W. G. Collman et al., *World Map of the Status of Human-Induced Soil Degradation* (Wageningen, Netherlands: United Nations Environment Programme and International Soil Reference and Information Centre, 1994)

Figures 1 & 2

	Circa 1990 (billion)	2010	Total Change (billion)	Per Capita Change
Population	5,290	7,030	+39	-
Fish Catch (tons) ¹	95	102	+7	+18
Irrigated Land (hectares)	237	277	+40	+12
Cropland (hectares)	1,444	1,516	+72	+5
Pastureland and Pasture (hectares)	3,402	3,540	+138	+4
Forests (hectares) ²	3,433	3,165	-268	-8

¹ Wild catch from fresh and marine waters, excludes aquaculture. ² Includes plantations, excludes woodlands and shrublands.
 Sources: Population figures from U.S. Bureau of the Census, Department of Commerce, *International Data Base*, unpublished report, November 3, 1988; 1990 irrigated land, cropland, and rangeland from U.N. Food and Agriculture Organization (FAO), *Production Yearbook 1991* (Rome, 1993); fish catch from M. Foresti, cited Statistics Branch, Fisheries Department, FAO, Rome, private communication, November 2, 1993; forest from FAO, *Forest Resources of the World 1980* (Rome, 1993) and other sources determined in methods 3). For explanation of projections, see text.

3.) We would add that organic and nutrient waste of all types, including sewerage wastes (e.g. bio-solids) and septage wastes, are both a major problem and a major opportunity. Sound soil management policies, together with immobilisation technologies, are required.

In the USA alone, we generate, and basically waste, over 3,000,000,000 tons annually (see figure 4) of organic wastes, and over 100,000,000 tons annually of alkaline by-products (see figure 5). The potential for combining these resources as a world-wide source of bio-organic aglime fertiliser and topsoil blend is unlimited!

While these materials are needed on our own cropland and pastureland, Third World countries desperately need these materials to cost-effectively utilise either chemical or sustainable farming technologies. Does it make any sense for large municipalities to require industry to spend hundreds of millions of dollars annually for wastewater pre-treatment programs, and then to spend as much as \$1,000 per dry ton to destroy these residual resources?

Until Third World countries can treat and develop their own organic residuals resources, the by-product resources of industrialised nations are desperately needed in many parts of the world to provide fertile soils. The US government should follow the lead of the World Bank and strongly support actions that safely and economically aid in generating great increases in food supplies, by the development of Third World soils for sustainable agriculture through the utilisation of existing science and technology. These large urban wastes can be converted to soil products and transported for overseas use, at less expense than selecting publicly unacceptable disposal practices such as landfills and incinerators.

Agricultural scientists are unanimous in their concern for the problems of soil erosion, chemical dependency, and organic, mineral, and microbial deficiencies in soils throughout the world.

The 1994 Clean Water Act appears destined to mandate responsible land application practices for all materials used on agricultural soils. Such practices will include seasonal restrictions to protect watersheds from surface and groundwater pollution from leaching. Agriculture represents over 85% (see Figure 6) of the market for by-product organics. Such seasonal restrictions should require that bio-solids must be capable of long-term storage without

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WORLDWATCH INSTITUTE REPORT, STATE OF THE WORLD

re-growth of pathogens or odours. Organic products, capable of long-term storage for seasonal utilisation and immobilised to ensure slow nutrient and organic release, can be the cornerstone of world-wide efforts to concurrently provide for sustainable agriculture, reduce non-point source discharge, and maintain soil productivity.

We believe in a reasonable and scientific blending of traditional and sustainable agricultural practices, particularly in Third World countries where subsidies are not available, where by-product organic materials are readily

available, and where the high cost of chemical fertilisers and pesticides creates huge economic burdens. Sound transitional farm management practices must become a reality.

We fully recognise and respect the important scientific and technological contributions of the chemical industry to food and fibre production in the world. Sensible transitional agriculture practices can reduce chemical dependency by increasing the effectiveness

of chemicals. In 1994 and 1995, Congress will authorise a new act and Farm Bill. Congress must have the wisdom and courage to meet the dual challenge of ecological enhancement and sustainable development.

RESOURCE CONSERVATION AND RECOVERY ACT: A Challenge: Reduce disposal through waste reduction, recycling and beneficial utilisation

B. Opportunity: Provide meaningful technology transfer and incentives for cost-effective reduction, recycling and

Continued on page 4

Below: Figure 4

ORGANIC CHEMICALS	50,000,000 TONS
FERTILIZERS & AGRICULTURAL CHEMICALS	185,000,000 TONS
PULP & PAPER PRODUCTS	2,251,700,000 TONS
FOOD & KINDRED PRODUCTS	575,571,000 TONS
TEXTILE MANUFACTURING	253,200,000 TONS
ANIMAL MANURE	175,000,000 TONS
MANUFACTURING WASTE	145,000,000 TONS

<input checked="" type="checkbox"/> CEMENT KILN DUST (CKD)
<input checked="" type="checkbox"/> LIME KILN DUST (LKD)
<input checked="" type="checkbox"/> FLY ASH
<input checked="" type="checkbox"/> FLUID BED BED ASH
<input checked="" type="checkbox"/> LIME PEST
<input checked="" type="checkbox"/> CALCIUM SULFATE

Above: Figure 5

A Magnificent Opportunity *from page 3*

beneficial utilisation technologies. Aggressively encourage utilisation in lieu of disposal. Eliminate federal funding of any disposal practices.

CLEAN WATER ACT: A. Challenge: Reduce non-point source discharge pollution of surface and groundwater. **B. Opportunity:** - Mandate land management policies and practices, such as seasonal restrictions and immobilisation, that dramatically reduce leaching of organics, nutrients, and metals to surface and groundwaters. Treat all land applied materials in a similar fashion.

- Encourage soil practices that properly increase bio-diversity, organics, minerals, and tilth to soils to minimise leaching and erosion.

- Provide technology transfer on available science to achieve these objectives.

municipal and industrial sludge, and agricultural chemicals, must be controlled by sound science and technology, coupled with fair, responsible, and even-handed regulatory policies and practices. The utilisation of by-products makes great sense, providing that dedicated efforts are made by industry and regulatory authorities to be totally and completely credible. No one will tolerate practices or policies that jeopardise the public trust.

The real challenge is to improve environmental protection, maintain productivity, and concurrently provide for long-term sustainable soil fertility and agricultural development. This is where effective and well-managed utilisation of by-product bio-organic and mineral resources provide

At a recent Biopolitics Conference I heard a presentation by Professor Huisingh of the Erasmus Centre, on environmental protection approaches. The reactive approach looks at wastes at the end of the pipeline ... in the receptive approach the entire process is reviewed by management ... in the constructive approach the product chain is evaluated by all involved sectors to seek a quantum leap. Ultimately, in the proactive pattern, the participants are society and the consequences are visionary

FARM BILL: A. Challenge: - Provide for sustainable agricultural development in the USA while concurrently maintaining cost-effective productivity and protecting watersheds and the environment. - Assist Third World countries to be able to establish sustainable agricultural capability.

B. Opportunity: - Provide technology transfer and incentives to optimise blending of bio-organic and mineral by-product resources with chemical products to provide world-wide sustainable agriculture. - Provide incentives to encourage practices that ensure long-term soil fertility with minimum surface and groundwater pollution.

Senator Robert Kennedy concluded his speeches by quoting the poet George Bernard Shaw:

Does it make any sense for large municipalities to require industry to spend hundreds of millions of dollars annually for waste water pre-treatment programs, and then to spend as much as \$1,000 per dry ton to destroy these residual resources?

"Some people see things as they are and ask, 'Why?' I dream of things that have never been and ask, 'Why not!'"

I dream of a bridge between waste generators of this world and the food and fibre producers of this world, that over the bridge will pass science, technology, understanding, communication, and co-operation. That because of that bridge we will greatly reduce starvation and the dangers that face the world now, and that will face our children's children in the future. When we succeed in building that bridge, each of us will enjoy the ultimate satisfaction of knowing that we did our best!

The establishment of the Exceptional Quality Sludge (EQS) standard finally created a recognised standard of excellence. For example, while EQS products, which require either sterilisation or pasteurisation of disease causing pathogens, are required to be tested prior to use, after storage, no such requirement exists for traditional land-applied sludges, whose pathogen reduction standard is 2000 times less stringent than the EQS standard.

Moreover, to date EPA has issued no guidance on seasonal restrictions on the land application of municipal sludges, while concurrently EPA is strongly supporting Clean Water revisions, which will mandate seasonal controls on manures and other surface-applied organics and nutrients. In order to prevent non-point source discharge pollution, does it make any sense to regulate farm manure, but not city sludge? Does it make any sense to spend billions of dollars annually to manage the discharge of pollutants at point source facilities, such as publicly owned treatment works, and concurrently tolerate year-around land application practices that accelerate non-point source discharge pollution? Land use of all organics and nutrients, including farm organics,

such a magnificent opportunity.

Our contribution to this world-wide opportunity is called N-Viro Soil, a patented process which blends alkaline materials, particularly alkaline by-products, with bio-organic waste materials to create a cost-effective, safe, socially responsible, granular, soil-like bio-organic material used as an aglime, fertiliser, and/or topsoil blend. These products economically provide bio-diversity, organics, aglime, nutrients, minerals and tilth to the soil.

All N-Viro facilities produce a product that meets the EPA Exceptional Quality Sludge (EQS) standard. Our N-Viro Soil product is protected by 5 million dollar product liability insurance.

Recent studies in Northwest Ohio demonstrated a first year value of N-Viro Soil to farmers exceeding \$30.00 per ton. Savings to farmers from decreased input costs and increased yields exceeded \$40.00 per acre. Savings exceeded \$40.00 per acre! In 1992, average farm gross profit in the USA, including subsidies, was just over \$50.00 per acre.

On October 31, 1991, our firm, then called N-Viro Energy Systems Ltd., was honoured to be one of the first recipients of the President's Environment and Conservation Challenge Award

Robert Kennedy concluded his speeches by quoting George Bernard Shaw: "Some people see things as they are and ask, 'Why?' I dream of things that have never been and ask, 'Why not?'"

MARKET	POTENTIAL DEMAND (10 ⁶ TONS)	CURRENT PENETRATION (PERCENT)
LANDSCAPERS	1.4	< 20.0
DELIVERED TOPSOIL	0.6	< 5.0
BAGGED/RETAL	4.4	80.0
SOIL PRODUCTION	10.0	< 1.0
CONTAINER NURSERIES	0.9	< 30.0
SILVICULTURE	55.0	< 1.0
AGRICULTURE	445.0	< 1.0
LANDFILL FINAL COVER	0.3	< 5.0
SURFACE MINE RECLAMATION	0.1	< 5.0
TOTAL POTENTIAL	518.0	< 2.0

Figure 6

Citation for Excellence in Innovative Technology, presented by President Bush. In 1990, The USEPA recognised our organic aglime process and product as the "#1 Sludge Use Technology in the USA." Similar recognition was given to N-Viro Soil by the National Environmental Awards Council, and by the Friends of the United Nations Environment Programme. Winning awards does not make our product perfect, but it does suggest significant demonstrated credibility. The selection committees for the above awards include such groups as the Sierra Club, World Wildlife Fund, Natural Resources Defence Council, the Soil and Water Conservation Society, Renew America, and other dedicated and respected environmental and conservation organisations. In 1992, N-Viro was one of five companies sponsored by the USIA at the Earth Summit in Rio de Janeiro.

In the spring of 1994, N-Viro International Corporation joined with the Composting Council and the Rodale Institute to sponsor legislation to provide incentives to encourage stabilisation and immobilisation of nutrients in land-applied organics. It is critical that all generators of wastes containing large quantities of organics

and nutrients recognise their public responsibility to prevent non-point source discharge pollution. Does it make any sense to spend billions of dollars annually to prevent point source discharge, and concurrently use year around land application practices that increase non-point source discharge pollution? How can we mandate that our farmers must implement seasonal restrictions on the land use of their manures, while we encourage

the year around application of utility bio-solids? No way! Good science is good science! All land-applied materials, including chemicals, should be managed by the same laws.

The Compost Council, Rodale Institute and N-Viro International Corporation also sponsored legislation to amend the 1995 Agriculture Appropriations Bill to provide 3 million dollars to USDA to provide research and technology transfer on the use of stabilised organics and compost to concurrently improve soil fertility, reduce non-point source pollution, and maintain soil productivity.

We believe strongly in the vision of resource conservation and utilisation, and we are actively involved and dedicated to making that vision a reality!

At a recent Bio-Politics for the Environment conference in Athens, Greece, I heard a presentation by Dr. Donald Huisingh, of the Erasmus Centre for Environmental Studies in the Netherlands, on environmental protection approaches. The reactive approach looks at wastes at the end of the pipeline, and consultants are hired to implement reduction. In the receptive approach, the entire process is reviewed by management with the goal of optimisation. In the constructive approach the product chain is evaluated by all involved sectors to seek a quantum leap. Ultimately, in the proactive pattern, the perspective is needs, the participants are society, and the consequences are visionary changes.

In the war on wastes, the war on pollution, and the war on hunger, it is time to be proactive.

In conclusion, let me quote the closing paragraph of President Kennedy's speech in the spring of 1963 at American University: "In the final analysis, our most basic common link is that we all inhabit this small planet. We all breathe the same air. We all cherish our children's future, and we are all mortal."

The above article is extracted from the BIO publication: **Biopolitics- Business Strategy for the Bio-Environment Volume II** (In English, in print).

BIOPOLITICS - THE BIO-ENVIRONMENT - BIO-ECONOMY

Dr. Agni Vlavianos-Arvanitis President and Founder of the Biopolitics International Organisation

BUSINESS STRATEGY FOR THE PROTECTION OF THE BIO-ENVIRONMENT The Honorable George Papandreou, Minister of Education and former Deputy Minister of Foreign Affairs

ENVIRONMENTAL EDUCATION POLICY OF THE UNITED STATES EPA Dr. Bradley Smith, Director of Environmental Education, United States Environmental Protection Agency

STRUCTURAL ECONOMIC CHANGE AND THE BIO-ENVIRONMENT Professor Udo E. Simonis, Environmental Policy Science Center, Berlin

EUROPEAN ENVIRONMENTAL POLICY - LEGISLATIVE AND ECONOMIC FRAMEWORK Scott W. Blackmer, Partner, Wilmer, Cutler & Pickering

CLEANER PRODUCTION - PREVENTING POLLUTION AT SOURCE Professor Donald Huisingh, Consultant.

PREVENTION - GREEN CHAIN OF PRODUCTION Professor Constantinos Yapijakis, Cooper Union School of

Engineering, N.Y.

BUSINESS STRATEGY FOR THE BIO-ENVIRONMENT

Iason Stratos, President of the Union of Greek Industries

BIO-ENVIRONMENT AND BUSINESS ADAPTATION

Dimitris Maniatakis, Managing Director, ICAP Hellas S.A.

ROUND TABLE DISCUSSION

INVESTING IN SURVIVAL Asimakis Fotilas, Director of Investments Promotion, United Nations Industrial Development Organization (UNIDO)

BIO-ENVIRONMENT - GOVERNMENTAL AND AND ENTREPRENEURIAL PLANNING Nikos Skoulas Consultant to the Food Industry, Former Minister of Tourism

REALITY AND PROSPECTS IN GREEK INDUSTRY Dr. Alexis Paraskevopoulos, Environmental Consultant

ENVIRONMENTAL DIMENSIONS OF ECONOMIC EDUCATION Dr. Stephen Buckles, President, Economics America, National Council on Economic Education

ENVIRONMENTAL LEADERSHIP - THE MANAGEMENT OF CHANGE Karl Kummer, Environmental Director, Rank Xerox Ltd

DOW - RESPONSIBLE CARE FOR THE ENVIRONMENT Dr. Constantinos Masmanidis, Managing Director, Dow Hellas S.A.

BUSINESS AND ENVIRONMENTAL PROTECTION Dr. Christos Tsiliyannis, Technical Manager, Waste Management Greece S.A.

MANUFACTURERS AND PREVENTION POLICY Jared O. Blum, President, Polyisocyanurate Insulation Manufacturers' Association

S.C. JOHNSON AND THE BIO-ENVIRONMENT Michael Pagidas, General Manager, S.C. Johnson and Son Hellas Ltd.

PREVENTION OF POLLUTION AT SOURCE - ENVIRONMENT AND THE CONSUMER Polyhronis Polyhroniadis, General Manager, PERAN Environment and Development S.A. and ELAN Hellenic Developments S.A.

RESOURCE CONSERVATION AND RECOVERY - ACTION AGAINST OVER-CONSUMERISM, POLLUTION AND POVERTY J. Patrick Nicholson, Chairman of the Board and Chief Executive Officer, N-Viro Energy Systems Ltd.

PROPOSAL ON A NEW DIMENSION OF PROFIT John Boutaris, President, I. Boutaris and Son S.A.

For details on how to order Volume I and Volume II please, TURN TO PAGE 11.

Towards the Revival of the European Soul



PROFESSOR JIRI MARVAN is the Ambassador of the Czech Republic to Greece. After graduating from Charles University in Prague and completing three years of research at the Czech Academy of Sciences he spent almost 30 years teaching abroad. This experience brought him to over 100 universities in four continents. He is the author of over 100 books and articles including scholarly topics, journalism and poetry.

The battle we are waging today is the battle for the human soul, and its outcome will determine the survival of mankind. Let us as Europeans, remember that with our arrival in the Americas and Australia, a never-ending process of decline started involving the ultimate death of hundreds of indigenous cultures, it is still taking place today. In Australia, every year at least one aboriginal language dies, taking to its grave a part of the legacy that the oldest traceable human culture, going back 30,000 years, offers us. What a loss for us, but also - what shame on us!

Consider the recipe for survival that modern media provides: only if you are an arsonist, a murderer or even better (as in Bosnia) a mass-killer and war criminal, do you stand a chance of being listened to! Who has ever heard of the pre-Indo-European Livonians, who were once, about 2,000 years ago, the main peoples of Latvia, and whose language is dying before our eyes, and who survive in a couple of villages west of Riga?

This grim scenario indicates that we are on the brink of the collapse of our own civilisation. Is there any hope for us?

Hope is concealed - and not yet discovered - concealed in the endless suffering of 300 million Europeans who are liberating themselves from the Communist tyranny. We can only hope that their message is being understood and acted upon by the other part of Europe, the inexperienced Westerners. If they follow it, it will be in their own interests and this endless suffering will acquire a new, very positive future.

The transformation of people by Communist ideology, into mere tools of production deprived them of the right to their individual being, to their private lives, to their inner, spiritual

existence. Western society has not experienced a spiritual disaster of this magnitude, and is neither technically nor psychologically prepared to assist the post-Communist nations in the recovery of their human dignity and national pride.

In ecology, we observe a very curious paradox. The best values we possess are taken for granted and only if they are endangered do we try to do something about it. And at that precarious moment we ask ourselves; would it

Hope is concealed - and not yet discovered - concealed in the endless suffering of 300 million Europeans

not be better if we had prevented this from happening?

The same applies to the spiritual environment, to spiritual ecology. A European who experienced the Communist assault on his soul, on his basic spiritual values, on his linguistic, national and cultural environment, is acutely aware of the dangers his Western fellow-European might be facing within several generations. His experience provides the warning, it provides the definition of a spiritual environment, of spiritual ecology. Let us help him with the recovery of his wounded soul, to find a solution which would help us all.

The human tragedy of Bosnia is a result of negligence involving basic spiritual values, the basic principles of a true, human, spiritual ecology. It is negligence for which the Communist East and Capitalist West must share the blame. We must ask if the money and human effort invested in this conflict had been used to create a scholar's

research centre to educate this continent in the field of human ecology, would not this world be far better than it is today? Would not peace be cheaper than this war, or any other war? And would it not be a good idea to reserve the first year of studies at such an institution for our top journalists, politicians and diplomats?

I have my own statement on human bio-ethics which was published about 15 years ago and I feel still applies:

"It is not one culture and language but the diversity of cultures and language which has the potential for unifying and saving the world. With full confidence, I claim that every culture and language conceals a unique value inherent in the community of the people who use it. Every culture and language is a remarkable artefact of indivisible human history, which deserves at least as much attention and affectionate care as the endangered species of the non-human world attract, without anyone

questioning their pragmatic purpose. For the same reason we should stop talking about language use and start thinking about language ethics and ecology. There is no treasure in the world which can buy back the cultures and languages lost to antiquity, yet much scholarship and money is devoted to this task. Most of all, however, there is, and there will be, no excuse for wasting the time and, perhaps, the bare chance for survival of future generations, as a result of our lack of care and love for Homo Sapiens, the most precious species of our universe."

Let the unprecedented suffering under the yoke of Communism, the suffering of three hundred million Europeans, let it become not just a warning for mankind, but also a program for its spiritual reviva, of spiritual ecology, a road, on which the barbarian and killer of the past and the technologist and civiliser of the present, will be transformed into the human being of the future, God's image on Earth. □

Quotes

"Let us try now, in our time, to find a way of renewing that concept of politics. Let us raise our own as well as others' awareness of the fact that politics needn't necessarily be the art of the possible, most certainly not there, at least, where the term would imply the art of speculation, calculation, intrigue, behind-the-scenes deals and pragmatic manoeuvring, but rather, that they can also be the art of the impossible, namely, the art of improving ourselves and the world."

(EXCERPTS FROM PRESIDENT HAVEL'S
NEW YEAR MESSAGE TO
THE CZECH PEOPLE, 1990)

"In nature, all waste is food for the next cycle of life. Only mankind has succeeded in making products nobody wants."

DR. MICHAEL BRAUNGART,
PRESIDENT, ENVIRONMENT RESEARCH
AGENCY, GERMANY

"We in the academic world are earnestly searching for the best kind of education for the poverty-stricken human poor, who must gnaw away at tomorrow's food in order to survive today..."

"Poverty degrades not only those who suffer it, but also those who tolerate it..."

PROFESSOR LIDUVINA SENORA

"We have less than 2,000 days to go before the the year 2,000 - we have no time to waste"

DR. GUNTER PAULI

"Almost everything men have said best, they have said in Greek" (Hadrian in fictional memoirs)

H.E. MARIO CALDERON-RIVERA

"Humanity stands accountable for its good and its bad deeds"

DR FAYSA TAG EL DIN
ABU SHAMA

"Someone would be considered a cultural ignoramus if he mistook Gothic for Baroque architecture, but no one would blame a novelist for confusing an oak tree with a beech tree..."

DR JAN CEROVSKY

Aristotle and the Bio-Environment



DR. EFSTATHIA VALLIANTZA-AFTIA is a leading consultant on environmental matters in Greece, currently with the Ministry of the Environment and Public Works. She has been head of the Athens Environmental Pollution Control Project, and General Director of the Occupational Health and Safety Sector of the Ministry of Labour. She has given several lectures and seminars on environmental issues.

I would like to start off in a rather unconventional way; by using a classical ancient myth with an environmental theme. It refers to the creation of the universe, and comes from the poem *Theogonia* (Genesis of the World) by **Hesiod**. This is a free translation:

"Once upon a time there was the Earth, the wide-bosomed eternal support of everything; and there was Love, the most beautiful being among the Immortals, the one who affects the souls of Gods and humans, and erases logic from their minds. The Earth first gave birth to her equal, the star-filled Heaven and bound herself to him. From this union of love the *kosmos* (world) was born"

Kosmos, in Greek, comes from the

verb "to adorn". Thus the world, according to the myth, was an *adornment*, the product of love between the Earth and Heaven. The ancient Greek concept of the environment was that of a beautiful adornment.

There is no ancient Greek scholar who would not refer frequently to the subject of the environment. **Heraklitos** expressed the basic ecological principle *En apanta ine*, that is, as we would say today, "In the environment everything is interconnected". **Hippocrates** wrote a book "On Atmosphere, Water and Land", relating human health to environmental factors. **Thucydides** gave us the basic criteria for aesthetics, but the one who first and foremost studied the environment was **Aristotle**.

Aristotle is well known mainly for his philosophic works, such as "Poetry", "Oratory", and the "Athenian Republic," among others. Even if he himself used to say that "Philosophy is an embellishment in happiness and an escape in unhappiness", his philosophic research makes up most of his work.

He wrote over 400 books, of which 143 have survived over the centuries; a quarter of these relate to biological research. He wrote about the heavens, meteorology, plants and minerals, animal motion, respiration and reproduction, adolescence, old age and death.

Aristotle regarded nature with wonder, saying: *Ouden anef fiseos gignete*, "Nothing can be done without nature". He often used anthropomorphic terms to describe many of

nature's processes: "Nature, as a good housekeeper, does not throw anything useful away" (the beginnings of recycling); "Nature does nothing in vain, and nothing uselessly"; "Nature acts as if she foresees the future".

Aristotle's work in biology was



Aristotle conceived of two major categories of animals ... which correspond exactly to the two animal taxa subsequently described by Linnaeus in the 18th century

innovative and extensive. He studied and documented close to 500 species of animals, based on information collected from hunters, fishermen and travellers. He himself performed anatomical studies on at least 50 species. It is said that Alexander the Great financed Aristotle's research with considerable amounts of money, to show his gratitude to his old teacher and friend.

The philosopher, a native of *Stagira*, in the Chalkidiki area in northern Greece, was not only the first to gather information about various animal species, but also the first who attempted to classify animals scientifically.

He conceived of two major categories of animals; those "with blood", and those "without blood". These categories correspond exactly to the two animal taxa, subsequently described by Linnaeus in the 18th century (vertebrates and invertebrates).

It is worth mentioning some of the first ever biological observations made by Aristotle:

- the fertilisation of mollusks, re-discovered only in the 19th century,
- the function of the 4-chambered stomach of goats.
- the classification of dolphins as "cetaceans" (a term still used today) and their distinction from fish
- the classification of fish in two major categories; bony fish and cartilaginous fish.
- the life-cycle of bees.
- the effect of climate and the environment on animal behaviour as well as bird and fish migration.

Continued on page 10

DR KAMLA CHOWDRY, as Chairperson of the National Waste-lands Development Board has been a leading policy maker in the Government of India. In her long managerial and academic career, she has served as Vice-Chairman and Director of the Society for Promotion of the Wastelands Development, Advisor on Public Planning and Management at the Ford Foundation, Visiting Professor at the Harvard Business School, Director of the Research Centre for Group Dynamics, ATIRA, and head of the Human Relations Division of the Textile Industry's Research Association. At present she serves as member of the Technical Advisory Committee of the Consultative Group of International Agriculture Research, member of the Board of the National Foundation of India and the Aga Khan Rural Development Support Services and Chairperson of several institutions including the Forum for Agriculture Research, the Centre for Science and Environment and the All India Council of Management and Studies.

Growth, Food and Equity

...er of the 8th century marvelled: 'Time flies, our lives overcome our insatiable urge for acquiring more and

...taken levels newable of man. eds but not for our greed. Shankaracharya, a Hindu philosopher of the 8th century, marvelled: *Time flies, our lives run out, and yet we are unable to overcome our insatiable urge for acquiring more and more worldly possessions.*

If the industrialised countries continue with their

consumption patterns and lifestyles, then there is no escape from an unequal and divided world, the coexistence of glut and famine, and the inescapable conflicts between North and South. The Third World countries are unfavourably placed in the world economic systems and individually they are powerless to influence these processes and institutions. Julius Nyere, the Chairman of the South Commission, emphasised that, only when the South learned to speak with a united voice vis-a-vis the North, chances of economic growth will exist for them. It is imperative that the international economic order assists rather than hinders their efforts.

After a decade of declining economical and environmental conditions, the countries of the South have been unable to cope with their population growth, problems of poverty, and resource degradation, setting in motion a downward spiral of even greater poverty. The countries of the South are at a dangerous crossroads.

The debt situation in many of the developing countries has become a matter of serious concern and requires urgent action. Since 1984, the developing countries have been transferring money to the developed countries, a net negative transfer of repayments in excess of new lending. The amount of this transfer was over US\$ 50 billion in 1988. By 1990, Third World debt had reached US\$ 1.2 trillion. The cost of servicing this debt in 1990 was US \$140 billion, a burden that has contributed to a reversal of the traditional capital flow from rich countries to poor ones. Developing countries are not only unable to invest in their future but are forced to spend inordinate sums on debts which has led many developing countries to sell their forests and opt for intensive cash crops, causing soil degradation and jeopardising their long-term future.

The developing countries find that access to the markets of the North have become more restrictive. If economic development of poor countries is to progress, the international economic order must become more fair and equitable. The reality of UNC-

TAD and GATT is that it is heavily tilted in favour of the already rich countries.

The economic development of the USA in the nineteenth century was largely financed by European investments. Likewise the rebuilding of post-war Europe was because of the large scale capital infusion due to the Marshall Plan. In general, however, the attitude to investing in the developing countries of the South is different.

The aid provided by several countries is often

Developing countries have achieved in the last 30 years the kind of real progress that it took industrial countries nearly a century to accomplish'

Mehub Ul Haq

linked to the purchase of goods and services, essentially a form of export promotion. With the investment requirements of Eastern European countries and of the ex-USSR countries, there is likely to be a major shift of financial aid from Third World countries to Eastern Europe.

Many of the developing countries gained independence only 30 to 40 years ago, they have had to restructure their economic policies and institutions to domestic needs and national interests, their achievements have not been bad. Mehub Ul Haq, argues that, "Developing countries have achieved in the last 30 years the kind of real progress that it took industrial countries nearly a century to accomplish." Even with limited aid and international co-operation, the countries of the South have made significant improvements in the human development index.

EQUITY

If the world is to survive the great division

between rich and poor countries and also the great division between men and women, must diminish.

The prospects of equity are not too optimistic. And yet, unless man changes radically, 'our common future' will remain merely a slogan.

By 2025, the world population will be around 8 billion and 90% of it will be in the developing countries. Millions are likely to emigrate, largely illegally, raising prickly questions of territorial boundaries and immigration policies. The pressure from poor and populated countries to move into 'empty' spaces of other continents would be painfully high. National sovereignty will be questioned concerning immigration laws, of different quotas for different countries, etc. With the increase of illegal immigrants on the rise, attacks and violence has been increasing. As the report of the Club of Rome asks: "Can we envisage a future world with a ghetto of rich nations, armed with sophisticated weapons to protect themselves against the hordes of hungry, uneducated, unemployed and very angry people outside?" It seems that the concept of national sovereignty will have to be clarified and made more humane and just in this interdependent world.

Race is the leading factor in the location of hazardous waste facilities, 40% of the nation's estimated commercial landfills are located in Black and Hispanic communities. In the USA, in October 1991, the 'coloured' people organised the first National People of Colour Environmental Leadership Summit Meeting in Washington, they showed that industrialisation and development has left a trail of environmental horrors with catastrophic consequences for them.

As Julius Nyere, Chairman of the South Commission has pointed out, "Commitment to democratic values, respect for fundamental rights, particularly the right to dissent, fair treatment for minorities and, concern for the poor and underprivileged, all these increase the South's chances of securing a new world order." □

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P.N. GUINEA R. Parka, Science Officer, Department of Education, PSA HAUS

PERU Dr. H. Nunez Borja, President, United Nations Association • P. Ruelas, United Nations Association

PHILIPPINES P. C. Caleon, Regional Executive Director, Department of Environment and Natural Resources • M. E. Gonzalez, Assistant Secretary for Management, Department of Environment and Natural Resources • Dr. L. R. Quisumbing, Secretary General, UNESCO National Commission, Department of Foreign Affairs

POLAND Dr. J. C. Chojnacki, Department of Marine Ecology, University of Agriculture • Dr. J. Pajestka, Economist, Member, Polish Academy of Sciences

ROMANIA P. Aurel, Economist, Department for European Integration • M. Crivineau, Economist, Department for European Integration • M. Tudor, Economist, Department for European Integration

RUSSIA Y. Korolev, Institute for Legislation and Comparative Law • Professor I. Parkhomenko, Department of Biophysics, Faculty of Biology, Moscow State University • Professor A. Shishkin, Head of Laboratory, St. Petersburg Technological University

SENEGAL Cheikh I. Niang, Institute for Environmental Sciences, University Cheikh Anta Diop • Professor A. Sene, Institute for Environmental Sciences, University Cheikh Anta Diop • Professor O. Wane, Institute for Environmental Sciences, University Cheikh Anta Diop

SEYCHELLES P. Pillay, Principal Secretary, National UNESCO Commission, Ministry of Education

SPAIN M. Lopez-Fuchet, Head, International Relations Department, Corporation of Madrid •

SUDAN Professor F. Tageldin Abushama, Director, National Centre for Research • Dr. M. Bashir Nimir, Sudanese Environment Consultants Society

TANZANIA The Honourable A.S. Mankinda, Government

THAILAND R. Karim, Chief of Environmental Section, IHE Division

NETHERLANDS W. van Dieren, Director, I.M.S.A., Emmastraat

TURKEY G. Tuna, Department of International Relations, Bilkent University

U.K. Professor G.V.R. Born, Director of the William Harvey Research Institute • Dr H.P. Livas

U.S.A. S. Buckles, National Council on Economic Education • Dr. A. Cortese, Executive Director • Dr. B. Frank, U.S. Environmental Protection Agency • J. Harris • J. M. Kelly, Wildlife Habitat Enhancement Council • J. Padalino, Pocono Environmental Education Centre • Dr. M. Simon, President, MathPower • Dr. B. Smith, U.S. Environmental Protection Agency • E. J. Zero, Outdoor Environmental Education Program

YUGOSLAVIA Professor I. Djujic, Institute of Chemistry and Technology, Faculty of Chemistry

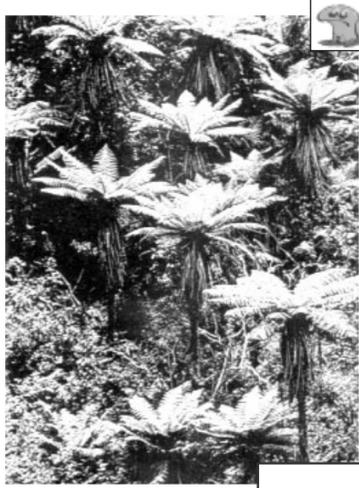
LE JARDIN DE MONSIEUR NOÉ - LA BIODIVERSITE EN PERIL/ Commission nationale suisse pour l'UNESCO

Bio-diversity is Unequally Distributed



The earth is surrounded by a green region at the equator; the **rain forest**. In the course of just one century the total area covered by the rain forest has been halved. The rain forest now covers only 6% of the earth's dry surface, but still has the richest bio-diversity of any other natural habitat. If lumbering and exploitation continue at the present rate, there will be no more rain forest by the year 2060, and six million different species of plants and animals will have forever disappeared.

Just twelve countries in the whole world harbour more than 70% of the global flora and fauna. Scientists have thus identified a number of "hot-spots"; regions where a large number of local plants and animals are endemic - that is they are found in no other place in the world. Hot-spots occupy just 0.5% of the earth's dry surface, but they harbour 20% of the total number of known plants in the world today. □



Why is bio-diversity in danger?

In Industrialised Countries:

Modern lifestyle and over-consumerism have significantly contributed to environmental abuse and pollution, and have placed serious threats to the preservation of bio-diversity on our planet.

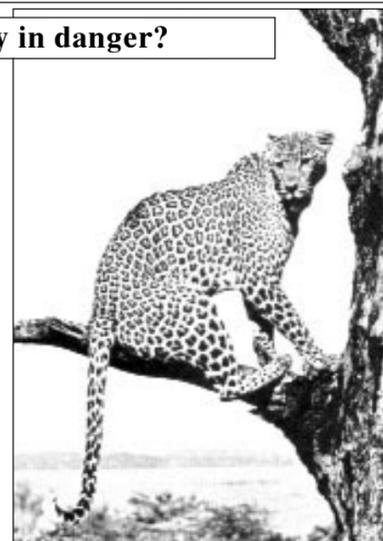
Excessive paving and use of cement, drainage of marshlands and re-routing of riverbeds have led to a serious modification of the bio-environment. Species that cannot tolerate these new conditions become endangered. If they do not find a suitable habitat, or eventually adapt to the new conditions, they become extinct. Presently 40,000 species of plants and animals go extinct every year.

In Developing Countries:

Over-population poses demands for increased agricultural production, which in turn leads to the exploitation and abuse of the natural environment. Increased demand for fire-wood also leads to extensive

deforestation, threatening the last remaining rain forests and the rich flora and fauna they harbour. In order to pay back debts to wealthier countries, developing nations also over-exploit their natural resources to increase export of raw materials. This causes severe environmental destruction, such as burning of forests to make way for plantations, stripping land for mining, and driving animals to the brink of extinction by poaching and over-fishing.

BIOTOPES: Biotopes are natural habitats (wetlands, forests, coral reefs etc.) where plants, animals and micro-organisms live in interdependence. Destroying a biotope results in the elimination of all species living there, whether seasonally or permanently. Migratory birds, for example, rely on two different biotopes for their survival. Destroying one of the two, even in their absence, can severely compromise their survival and quickly lead to extinction.



EXTINCTION IS NOT AN ISOLATED EVENT

Species do not go extinct in isolation. Extinction of one species is, more often than not, accompanied by the extinction of many others. A certain tree, for example, could be the refuge of insects found nowhere else in the world! Destroying that particular tree could cause a plethora of other species to disappear forever.

Fragmentation of the Bio-Environment

Construction of roads, train tracks, or fences, results in the fragmentation of the bio-environment and creates insurmountable barriers for land animals thus restricting their migration patterns. As a result, fragmentation leads to the formation of "islets" where members of the same species form isolated groups and continuously interbreed, therefore reducing genetic diversity, which places survival of the species in jeopardy.

Introduced Species

Introducing non-endemic species (plants, animals or micro-organisms) to a biotope can quite often lead to the displacement or extinction of some of the endemic species that cannot keep up with the competition. Let's not forget the displacement of marsupials in Australia, when Europeans introduced placental mammals to the continent. □

Nature has given us five senses. Just the right number to enjoy its flavours, wonder at the beauty of its creations, listen to the melodies of the birds, feel the bark of the trees, and smell the perfume of the flowers. But in view of the present rate of urbanisation, pollution and environmental abuse, nature, and all the beautiful things it has to offer, are in danger. Of course we can still see flowers and trees, but all too often they happen to be the same flowers and the same trees. Variety in nature is being limited; bio-diversity is in danger. However we might not even notice it, since we seem not to be aware of the treasure we are about to lose. As a result, the best way to help preserve bio-diversity is to learn how to use our senses. How to look at, taste, feel, hear and smell our natural environment. □



DR. CHRISTOS YAPIJAKIS received his M.S. in

Molecular Biology from the University of California, and his Ph.D. in Human Genetics at the University of Athens. He is currently a Research Associate of the Department of Neurology of the University of Athens, where he is responsible for running the new Laboratory of Molecular Neurogenetics.



The term bio-technology is used to describe all those scientific methodologies which utilise the components of living organisms in industrial processes in carefully controlled conditions. In a sense, bio-technology is almost as old as human civilisation itself, since for thousands of years humans have been using microbes in order to produce bread, cheese, wine, beer and other bio-products. Nevertheless, in the past two decades, the extremely rapid advancement of the biological sciences (especially molecular biology and genetics) has led to a remarkable improvement in the efficiency, speed and productivity of the manipulation and genetic programming of micro-organisms.

Bio-technology is considered as the third major technological advancement of humanity after the agricultural and industrial revolutions, and, like them, it is expected to drastically alter the attitudes and values of human civilisation. Bio-technological achievements could solve most of the major prob-

lems of humankind, such as the quantity and quality of food, energy sources, protection of the environment, improvement of public health, etc. Usually based on brilliant scientific ideas, bio-tech solutions may be quite economical as a result of reduced energy consumption and limited human effort. The greatest amount of effort goes to the basic research and manipulation stages of the microbial genetic material.

Biotechnological applications include:

- the production of large amounts of medicinal drugs, such as insulin, by microbial cultures;
- the production of fuel chemicals, such as ethanol;
- the use of specialised mutant bacteria for the biotreatment of toxic organic waste;
- animal fertilisation technologies;
- the production of genetically-engineered plants with selected characteristics; and,
- the prevention of human inherited disorders.

Despite all this, the attitudes towards the technological applications of the basic biological sciences, vary considerably. While there is a tendency toward excitement and euphoria among scientists, businessmen and economists, ignorance or even phobia prevail in the general public, expressed as

Assessing Bio-Technology

The mutant gene which causes the devastating disease sickle-cell anaemia ... has helped entire populations of carriers in the Mediterranean region to survive malaria ... So, who has the right to judge right and wrong? Good genes and bad genes?

"We shouldn't play God". Such fears are no more relevant to reality than arguments such as "Aeroplanes are unnatural because humans were not meant to fly". Behind this superficial hysteria there are indeed substantial concerns, expressed by people who know a great deal about potential hazards: the scientists themselves. It is worth noting that, unlike religion or politics, Science is probably the human discipline the members of which question or even systematically criticise principles, ideas or practices as soon as they are introduced.

The creation of a microbe could be potentially very harmful and in many countries restrictions are already placed on the release of genetically-programmed organisms into the field, but even after a number of safeguarding experiments, the long term effects are often difficult to predict.

We are now beginning to realise that human intervention in biological systems might be even less predictable than we thought a few years earlier, because of the lack of sufficient data. A well-documented example of a conditionally fatal, or favourable, inherited characteristic is provided by the mutant gene which causes the devastating

human disease, sickle-cell anaemia. We know now that this pathological mutation has helped entire populations of carriers in the Mediterranean region to survive malaria. Then who has the right to judge about right and wrong, good genes and bad genes?

Ethical theories based on irrational values, such as doctrine, philosophy, faith or revelation have consistently failed to modify human behaviour, while bio-ethics seems to provide a solution based on the realistic values of the survival of bios and humankind, interdependence among living organisms and respect for the bio-environment.

It would seem best to adopt internationally-accepted guidelines for biotechnology, such as those in the EU and Japan, and, to a lesser extent, in the USA, could provide the basis for the formation of the international guidelines under the auspices of the UN, using only a realistic and scientifically-sound bioethical approach.

Nevertheless, it should be stressed that no expert could really predict the future with reasonable accuracy, even Professor Monod, a famous geneticist and Nobel prize winner, predicted that "man would never be able to recombine DNA molecules from different organisms," only two years before the advent of recombinant DNA technology.

On one hand there are the vast possibilities that bio-technology has to offer us, while on the other, the great potential risks and hazards. Specialised scientists combining knowledge and respect for bios, may help, considering each biotechnological advance with as much prudence and foresight as possible. It would be good to believe that *Homo sapiens* - Thinking Man - will justify his name. □

European Environmental Policy, Legislative and Economic Framework, Part III

The funds in Brussels have not been spent, because member governments and local businesses have not been aware that they could use some of this money... At times of economic recession, when governmental budgets are limited and there is no intention of raising taxes, creative thinking is essential.



W. SCOTT BLACKMER is a resident partner in the Brussels office of Wilmer, Cutler and Pickering. His practice centers on European Union regulatory measures, including environmental, insurance and liability issues, as they affect multinational business transactions, investments and operations in Europe. He has also been involved in the US in environmental and products liability, insurance coverage, counseling and litigation. He participates in the environmental and liability working groups of the American Chamber of Commerce in Belgium and the International Chamber of Commerce in Paris.

combined with outside financing, but not with the structural funds. It is possible to get an EIB loan; to look for financing in the commercial markets, and also to have the large infrastructure portion built with European Union funds.

This is an opportunity that should not be missed. The difference between whether 16% or 20% of this 15 billion ECU is spent in Greece lies in just how creatively and quickly projects can be prepared, presentations made and approved, case-by-case. Each project must also have a cost benefit analysis and a technical environmental assessment as these have been part of the planning from the beginning.

The current meeting of the Council of Ministers in Brussels is discussing Mr. Delor's White Paper dealing with unemployment and competitiveness in the European Union. One of the commitments that has been made, and is apparently going to be agreed by heads of state of all member states, is to increase the level of spending and financing from the European Union for these Trans-European Network projects. They are not focusing on air transport, but are looking at large infrastructure projects in road, rail and maritime transport. They

are also considering the information and telecommunications network infrastructure. A combination of project proposals with the environmental aspects of the proposal will qualify for a new source of funds. All projects must meet the environmental standards of the European Union, and the amount of money to be committed through to 1999 is over 22 billion ECU, which is over 25 bil-

lion dollars.

So the money is available to do something now, in the "window of opportunity" in the second half of this decade. It is available, if companies think creatively, put together their joint projects, get them supported by their national government and presented at Brussels, and thus begin to get things done. This could be a very productive five or six years ahead. Many problems could be dealt with which have long been of concern. If they are not dealt with soon, they will keep business from developing and continue to be a burden on society in the future. □

tal impact of agricultural operations, especially important in Greece, where water is always at a premium. Here, something like three-quarters of water consumption goes in agricultural irrigation. In many cases this simply means inefficient open trenches, where most of the water evaporates. It is possible to look for World Bank, or European Investment Bank financing, as well as European Union agricultural funds. These can be used to convert to hydroponic irrigation, using much less water to accomplish the same productivity. Removing less water from the rivers is also better for the fisheries industry on the coast. Some of the most controversial projects in Greece have been exactly those water-division projects that benefit agriculture, but hurt fisheries. The European Union seeks solutions that do not act to the detriment of one industry or the other.

Now, as a result of the Maastricht Treaty, a new cohesion fund exists. This is not like the structural funds, where the European Union will undertake 20% to 30% of the cost of the project. The cohesion funds, which are focused on Greece, Spain, Portugal and Ireland, are to be spent on two kinds of projects: transport- infrastructure, and environmental protection. However, the cohesion funds cannot be used to pay the administrative costs of the government. The money has to be used for the environmental projects themselves, whether they are pilot programs or the actual infrastructure projects.

It is possible to combine elements in a development project. For example a re-development project for an island, or coastal city, can seek for structural funds to develop the tourist industry and create jobs in the area. It can also look to the cohesion funds to build the new water-treatment plant and the sewage facility. The attraction of the cohesion funds is that they will intervene to up to 80% of the cost of the project.

These cohesion funds are designed to keep the peripheral European Union countries from going further into debt in order to finance non-commercial infrastructure projects. These countries will then be more likely to meet the public debt and

inflation targets which are set for entry into the European Monetary System. The Large Transport Environment projects represent exactly this kind of investment.

Somehow the ECU ends up driving the availability of funds today. Again, this is an area where member state governments have only just begun to use their imagination as to how the funds could be applied. The mandate for the cohesion funds is to maintain a balance between transport and environmental projects. 1993 was the first year in which money was available under the cohesion fund, and obviously all four governments had transportation projects in mind. Very few environmental projects were proposed. However, the director of the cohesion fund said that he would not let the balance become more than 60/40, in favor of transport projects. The only transport projects to be considered, on a case-by-case basis, are those consistent with the Trans-European Network Proposals. The environmental projects have to be for infrastructure, or changes in operations that improve environmental protection. This is in accordance with the guidelines of the fifth Environmental Action Program, EIB, promulgated by the European Commission.

The amount of money committed to the cohesion fund, through to 1999, is 15 billion ECU. Between 16% and 20% of that will be spent in Greece. Therefore it is now time, either as an individual company, trade association, or local chamber of commerce, to develop projects to submit to the Ministry of Economics and to get placed before the Commission in Brussels for 1994 all the way through to 1999. These projects can be com-

Many problems could be dealt with which have long been of concern. If they are not dealt with soon, they will keep business from developing and continue to be a burden on society in the future.

The following article is the third and final section of a paper presented by Scott Blackmer of Wilmer, Cutler & Pickering (who kindly offered the information on the new EU legislation below) at the B.I.O. Business Strategy Conference in 1993. Parts one and two were published in previous issues of Bio News.

We apologise for the abrupt curtailing of the second part when the last paragraph was deleted. It is reproduced here.

These were funds which were directed from Brussels in cooperation with the Greek government, for structural projects.

Regional development funds use money specifically earmarked to promote the development of underdeveloped regions within the Union. Every member state has underdeveloped regions. But in addition, social funds are to train employees in environmentally protective new techniques. Therefore, whether it is tourism, fisheries, or manufacturing, if there are changes required in an industry, not only technical assistance but also employee retraining, can now be funded. These funds in Brussels have not been spent, because member governments and local businesses have not been aware that they could use some of this money for such projects. At times of economic recession, when governmental budgets are limited and there is no intention of raising taxes, creative thinking is essential. Some of these funds could be of great assistance in making the transition.

As part of the Community Agricultural Program, funds are also available for the environmen-

NEW: European Environmental Policy, Legislative and Economic Framework: Council Directives

DEPLETION OF OZONE LAYER

Commission issued amended

proposal for Council

on 4 February 1994 allocating import quotas for some fully halogenated fluorocarbons, halons, carbon tetrachloride and 1,1,1-trichloroethane for the period 1 January to 31 December 1994.

Economic and Social Committee delivered opinion on 21 December 1993. Parliament Plenary delivered opinion on 9 February 1994. Proposal referred to parliamentary Committee on Environment, Public Health and Consumer Protection. Committee adopted report on 26 January 1994. Parliamentary Committee on Economic and Monetary

Affairs and Industrial Policy asked to give opinion. Environment Council held debate on 2-3 December 1993. [Commission: Commission issued on 20 March 1992 a proposal for a Council Regulation amending a 1991 Regulation in order to accelerate the phasing-out of substances that deplete the ozone layer. **Economic and Social Committee:** Committee

ENFORCEMENT OF MARITIME SAFETY AND POLLUTION PREVENTION

Commission issued proposal for Council Directive on 16 March 1994 concerning enforcement, in respect of shipping using Community ports and sailing in the waters under the jurisdiction of Member States, of international standards for ships safety, pollution prevention, and shipboard living and working conditions.

DRINKING WATER

Council adopted Directive related to the quality of water intended for human consumption on 15 July 1980. Directive defines quality of drinking water in terms of 65 parameters, for 44 of which maximum admissible concentrations (MAC) are determined. Member States are to set up standards at least as strict as MAC, Member States are also to monitor drinking water quality.

Regulation on substances that deplete the ozone layer on 24 Commission adopted decision

ENERGY CONSERVATION

Council adopted Directive on 21 January 1994 with regard to energy labelling of electric household appliances.

Commission issued new proposal on 9 June for Regulation accelerating the phase-out of all ozone-depleting substances. (COM (93) 202, O.J. C 232/93).

ENVIRONMENTAL IMPACT ASSESSMENT

Commission issued proposal for Council Directive on 21 April, 1994, amending Directive 85/337 on assessment of effects of certain public and private projects on the environment. Commission also proposes Community-wide criteria for defining which types of projects must be assessed in respect of their environmental impact. Criteria include factors such as size of projects, volume of waste generated, accident risks, and location of project.

Plastic: The Fuel of the Future? *Continued from page 1*

Plastic can be environmentally-friendly if managed correctly. Used plastic materials could, under the right circumstances, become sources of raw materials for many industries.

The following examples from Germany, Greece and the Netherlands show how plastic recycling is put into effect in different countries and give a local perspective to a global problem.

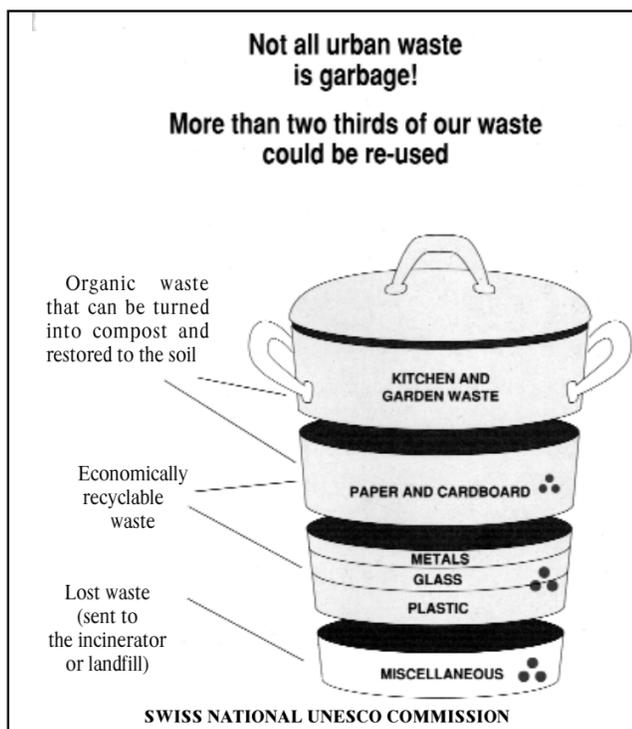
PLASTIC RECYCLING IN GREECE

Opportunities for plastic recycling in Greece are gradually opening up. Several companies involved in collecting, sorting and processing plastic waste have already been established, and besides treating waste they are also involved in raising public awareness about the importance of recycling.

For Greece, environmental protection is not the only incentive for developing efficient recycling programmes for plastic materials. Plas-

tic recycling can be beneficial on many other levels:

- Most of the raw materials for the Greek Plastic Industry are imported. It is estimated that recycling will dramatically decrease the cost of plastic production, leading to increased savings. Furthermore, lower production costs result in more "competitive" products for the world market, that can lead to an increase in exports.
- Recycling plastic reduces the need for landfills and incineration sites, that will result in having more land available for tourist development.
- Finally, recycling facilities will be established, that can eventually be used to recycle other materials, such as paper, glass or metal, and thus significantly contribute to solving the problem of urban waste disposal.



PLASTIC RECYCLING IN THE NETHERLANDS

Plastic silage covers, used in the farming industry, are now efficiently recycled in the Netherlands. The cost of plastic silage covers includes

additional recycling fees, which are applied towards collecting, processing and recycling these copious amounts of plastic.

Several industries and organisations are involved in coordinating

these efforts, and ensuring recycling of silage covers by at least 50%.

PLASTIC RECYCLING IN GERMANY

In Germany, household and industrial plastic waste (bottles, bags, cups etc.) is collected and

Lower production costs result in more competitive products for the world market

sorted by specialised companies, and subsequently taken to recycling plants for processing.

Funding for collection and recycling is provided by Duales System Deutschland (DSD), an organisation responsible for coordinating the entire recycling process. Plastic materials are sold at an additional cost, payable to DSD, in order to cover recycling expenses. □

GRAPHICS
COURTESY OF SWISS NATIONAL
UNESCO COMMISSION

Human values *Continued from page 2*

more than a few varieties. It is clear that the adoption of the sophisticated technology of wet rice cultivation has stressed the economic gain more than the conservation of biodiversity and the local bio-environmental equilibrium. The fate of the sweet potato seems to be identical to those of the replaced yam and breadfruit, a century earlier.

The threat to the existing bio diversity in the Baliem Valley could also be caused by the massive use of chemical fertilisers and insecticides. The Javanese transmigrants, who feel the urge to exhibit their success, tend to use modern agricultural facilities excessively. These facts seem to encourage the locals to follow suit, using chemical fertilisers and insecticides.

Although there is no complaint yet about the decreasing river fish-catch because of insecticide pollution, there is evidence that in the long run bio-environmental disturbance will take place, if it is not anticipated early enough. What we can observe clearly is that the shrimp-breeding centre initiated by the Indonesian National Research Centre has failed to establish a shrimp culture because of the premature death of the germs.

Meanwhile, the need for vegetables and other side dishes for rice is increasing, and is catered for by the sacrifice of the sweet potato fields. In addition, a monetary economic system is spreading among the indigenous people, because they are obliged to sell their rice for cash, to buy the daily articles which they themselves are incapable of producing. These facts indicate that the indigenous people are now obliged to pay the cost for the technology that they utilise. Apart from the loss they suffer because of the dis-

appearance of a number of crop varieties, as a result of the development of rice monoculture planting, they are also losing their ecological wisdom and traditional knowledge of how to preserve their environment. The introduction of rice and imported vegetables from outside will certainly have an impact on the local bio-environmental equilibrium, and therefore anticipative measures should be considered. There is a need for the developing countries to really think about the use of biotechnology in rural areas. The use of high-yield rice varieties is one example from Indonesia, of adopting bio-technology to increase land productivity.

The practice of sophisticated land-cropping is a positive measure with regard to the fact that cultivatable land is limited and the population is continuously increasing because of the better quality of life. The application of science and technology to intensify the use of available cultivatable land is a necessity. The transfer of this technology,

should not however, disregard possible side-effects on the preservation of the biotic environment, which traditionally supports the life of the local people. In Java, the mixed farming practices of wet rice

productivity.

The development of a monetary economy seems to dominate the life of the inhabitants. This in turn stimulates the ease with which people accept the new, imported values

subsistence to a more market-oriented economy for most indigenous societies.

A number of local, original, alternative food resources are being neglected. Most of the outer islands people are now unfamiliar with sago corn, breadfruit, taro and yam, which were their old staple foods. It is an alarming signal. If we do not care about traditional knowledge and wisdom we might lose our germ plasm resources because of our own negligence, and our fixed idea that modernisation is the only way to save humanity and our world.

Research into various indigenous edible crops, and the dispersal of the diffused imported edible crops and their technology should be controlled, to avoid the extinction of locally-adapted edible plants, which would mean a decrease in biodiversity.

Using the knowledge of bio-technology, governments should inform people of the advantages (or disadvantages) and guide them effectively, responding to the application of a technology which might accelerate the depletion of nature and undermine their own cultural values and humanity. □

Apart from the loss they suffer because of the disappearance of a number of crop varieties, as a result of the development of rice monoculture planting, they are also losing their ecological wisdom and traditional knowledge of how to preserve their environment.

fields and fresh water fisheries were ruined because of the use of chemical fertilisers and insecticides. The ability of the peasants of Java to adopt sophisticated technology has also been observed among the Dani in Wamena. They not only require mini rice mills, and tractors to transport their harvest, but also demand chemical fertilisers and insecticides to increase their harvest

which place material advantage beyond anything else. This monetary economic value then affects the patterns of local people's behaviour and their attitudes toward the biotic environment, which are oriented more toward its economic potential, than its social or religious one.

The introduction of sophisticated land-exploitative technology has accelerated the shift from a life of

Aristotle *Continued from page 5*

Protection of water resources

Water was a major preoccupation for the ancient Greeks. One of the ancient Athenian leaders, **Pissistratos**, built many fountains in Athens, but banned the use of pools, in order to reduce the risk of infection and prevent the wasting of water.

Attica always had limited water resources, and this led to impressive water recycling installations, such as those in the ancient metallurgical workshops at Lavrion, near cape Sounion, south of Athens. Aristotle lived in

Athens for many years, and had many impressive proposals for water management. He referred to the need for networks of water supply for secondary use in cities, to avoid wasting drinking water: "The state has to provide, within its walls, water and natural springs in satisfactory quantities to ensure that the city will not be deprived of water in case of siege, since primary importance needs to be given to the absolute protection of the health of the citizens."

"The location and orientation and water quality of the city requires the

"My two professors, Linnaeus and Cuvier, were, in very different ways, my Gods; but they were just simply students of Aristotle."

Charles Darwin



greatest care, since the most important factors for health are air and water, whose use is daily and continuous. If water resources are sparse or the water quality indifferent, just as can happen even in well-organised cities, it is

important to distinguish the drinkable from the other waters which can cover the other needs"

Today, Aristotelian ideas related to secondary water networks are being put into effect for the first time in Tokyo, as well as in Berlin, where certain buildings recycle water for watering parks and for other urban uses.

There are many other examples of Aristotle's vast work on the environment. He dealt with many issues, and at great depth. A total admiration for Aristotle is reflected in the following statement by Charles Darwin: "My two professors, Linnaeus and Cuvier, were, in very different ways, my Gods; but they were just simply students of Aristotle." □

What is the Biopolitics International Organisation?

The Biopolitics International Organisation (B.I.O.) is a non-profit organisation founded in 1985, with the goal of promoting respect and appreciation of the bio-environment as a necessary responsibility for every citizen around the world, in order to shift from an *anthropocentric* to a *biocentric* system of values.

Since then, B.I.O. has gained the support of leading personalities from universities, academies, business organisations, and government and non-government organisations in 85 countries, world-wide, and has organised numerous conferences and symposia. The enthusiasm of the participants in these events has resulted in the international promotion of B.I.O. goals and publications. In an effort to raise awareness of the importance of a global *bios-centred* education B.I.O. launched, in 1990, the International University for the Bio-Environment (I.U.B.E.), to introduce reforms at all levels of educational curricula.

A bio-assessment of technology would allow for the positive dimensions of progress to prevail over destruction. As part of an ongoing diachronic for biocentric values, B.I.O. has promoted an International Environmental Olympics campaign. This campaign, has been adopted with enthusiasm by representatives of governments, universities and U.N. organisations, all over the world, as well as members of the International Olympic Committee. The aim is to communicate the importance of protecting the bio-environment and rewarding accomplishments in this field, by awarding Bios Prizes in every discipline. (Diplomacy, architecture, legislation etc.). Furthermore, since 1992, B.I.O. has been proposing the ancient ideal of cease-fire during the Olympic Games, in hope that the bio-environment will act as a unifying force for peace and international co-operation.

In conclusion, B.I.O. has also been actively involved in establishing environmental protection as a viable and successful business strategy, in order to mobilise the economic driving force to actively contribute towards a global preservation and appreciation of bios.

B.I.O. GOALS

- ♣ promoting international co-operation for the better understanding and appreciation of bios (life) and the bio-environment ;
- ♣ establishing international educational reforms, in order to facilitate the shift from anthropocentric to biocentric values, through the creation of the International University for the Bio-Environment (I.U.B.E.). Within the I.U.B.E. framework, promotion of a global bio-education, through the use of satellites, has been stressed;

- ♣ instating international co-operation for the protection of the bio-environment, leading to a new era of bio-diplomacy;
- ♣ promoting international legislation on bios rights;
- ♣ contributing bios-related dimensions to business and management concepts world-wide;
- ♣ providing incentives for business leaders, political decision-makers and the general public to elaborate a new strategy compatible with the interests, needs and values of the bio-environment;

- ♣ organising an international campaign for Environmental Olympics and awarding of Bios Prizes to "individuals or institutions who have contributed to the preservation and better understanding of the bio-environment";
- ♣ sensitising public opinion to the ramifications of the biological sciences;
- ♣ promoting an international bio-assessment of technology, so as to ensure technological and economic progress that supports the bio-environment.

B.I.O. Publications

BIOPOLITICS - DIMENSIONS OF BIOLOGY

Dr. Agni Vlavianos-Arvanitis, 1985.

BIOPOLITICS - METHODS OF IMPLEMENTATION

Dr. Agni Vlavianos-Arvanitis, 1985.

BIONEWS Periodical Vol. I, No. 1, 1987.

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- BIOPOLITICS - THE BIO-ENVIRONMENT- BIO-CULTURE IN THE NEXT MILLENNIUM - VOLUME V**
Proceedings of the sixth BIO international conference, and International Sakharov Festival held in Athens, July 1994 (in print)

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SCENES FROM THE INTERNATIONAL SAKHAROV FESTIVAL ATHENS, JULY 28 - 31, 1994

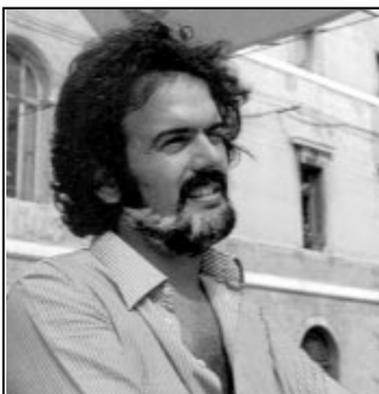
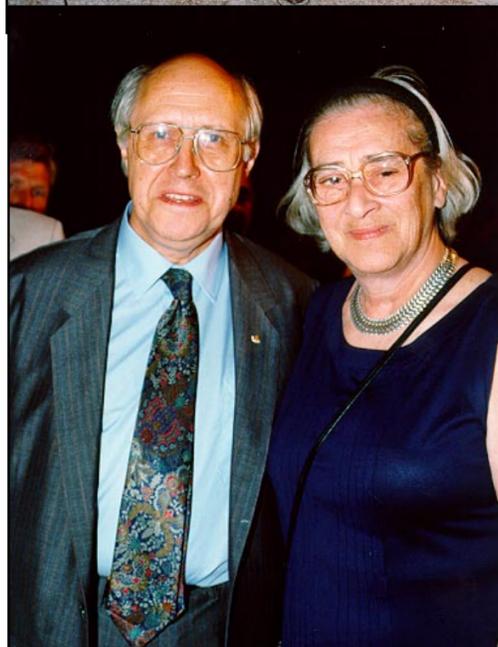
Top Left: The reading of the Message of His All Holiness The Ecumenical Patriarch Vartholomeos, at the Pnyx Hill, founding place of democracy, in Athens.

Bottom Left: Mstislav Rostropovich and Elena Bonner.

Bottom Centre: Some of the Festival participants at the steps of the Evgenidion Hall.

Back Row (left to right): Dr. Sirje Loot, *Estonian Children's Fund*, Dr. Ushakova and Prof. Sergei Ushakov, *Russia*, George Strongylis, *Commission of the European Union Direction, Belgium*, Prof. Vassilios Papadias, *National Technical University of Athens, Greece*, and Prof. Alexander Shishkin, *State Technological University for Plant Polymers, Russia*.

Front Row (left to right): Prof. Rusen Keles, *Director of Environmental Studies, Ankara University, Turkey*, Prof. Jiro Kondo, *President of the Science Council of Japan*, Dr. Gyorgy Kollmann, *Ministry of Welfare, Hungary*, Mrs. Ingrid Pauli, *H.E. Ambassador of Colombia Mario Calderon-Rivera*, Dr. Gunter Pauli, *United Nations University, Japan*, Dr. Agni Vlavianos-Arvanitis, *President and Founder of the Biopolitics International Organisation*, and Dr. Sergei Kolesnikov, *Co-President, International Physicians for the Prevention of Nuclear War, Nobel Laureate for Peace, Russia*.



George Oikonomoy was born in Athens in 1947, and graduated with honours from the School of Architecture at the University of Florence. He is a well known political activist and has been extensively involved in the defence of children's rights. He is also an official UNICEF artist, since 1981, and has designed many commemorative works, including the world-famous San Marino peace sculpture of the dove and the child.

Mr. Oikonomoy, is a strong B.I.O. supporter and has made several recommendations for future B.I.O. activities. His brilliant artistry reflects his sensitivity to the issues of bios, and helps promote the vision of a global bio-culture for the next millennium.

Mr. Oikonomoy was also present at the International Sakharov Festival, held in Athens from July 28 to 31, 1994. The painting shown on the right, adorned the cover of the program of the gala concert that was given at the ancient theatre of Herod Atticus during the Festival, with the participation of world-famous musicians. □

