

Ministry of Education and Science of Ukraine
Sumy State University
Economic Research Centre
Youth NGO "ECO"

7th International Student Conference

"Economics for Ecology"

Sumy, Ukraine,
May 5-9, 2000



VII Міжнародна студентська конференція

"Економіка для екології"

м. Суми, Україна,
5-9 травня 2000 р.

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Sumy State University

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7th International Student Conference

The conference is organized by:
"Economics for Ecology"

Sumy, Ukraine,

May 5-9, 2000

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PROGRAMM OF THE INTERNATIONAL STUDENT CONFERENCE "ECONOMICS FOR ECOLOGY" (ISCS'2000)

May 5-9, 2000

Sumy, Ukraine

Friday, 5	
8.00 – 16.00	Registration of the participants
14.00 – 16.00	Sightseeing (Sumy downtown)
17.00	Departure from Sumy to the conference place (Recreation Center "Metallurg", 10 km from Sumy)
17.30 – 18.30	Accommodation
19.00 – 19.30	Dinner
20.30 – 24.00	Ukrainian party
Saturday, 6	
8.30 – 9.00	Breakfast
9.15	Departure to the Sumy State University
10.00 – 12.00	Opening ceremony
12.00 – 13.00	Lecture of Prof. Leonid Melnik (Sumy State University, Ukraine)
13.00 – 14.00	Lunch
14.00 – 17.30	Student's lectures
18.00	Departure from the Sumy State University
18.30 – 19.00	Dinner
20.00 – 24.00	International party
Sunday, 7	
8.30 – 9.00	Breakfast
9.30 – 11.00	Workshops
11.00 – 11.20	Coffee break
11.30 – 13.00	Workshops
13.00 – 14.00	Lunch
14.00 – 15.30	Press-club
15.30 – 18.00	Sports (table tennis, billiard, volleyball)
18.30 – 19.00	Dinner
20.00 – 23.00	Camp-fire party
Monday, 8	
9.00 – 9.30	Breakfast
10.00 – 13.00	Free time
13.00 – 14.00	Lunch
14.00 – 16.00	Workshops presentations
16.00 – 17.00	Plenary session
17.00 – 17.30	Farewell speech
18.30 – 19.00	Dinner
20.00 – 24.00	Farewell party
Tuesday, 9	
8.30 – 9.00	Breakfast
10.00 –	Departure

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Ukraine on the Way to Sustainability and Information Society

Prof. Leonid Melnik, Head of the Department of Economics, Sumy State University, Ukraine

A social-economic system to which society is now moving can be called the information society. The information society is the social-economic formation where information is both the productive basis and the society forming factor.

Taking into account expected social-economic changes the following interrelated and mutually conditioned priority human dimensions theme and research are undertaken in the Ukraine:

1. Informatization of social-economic system (transforming people and market of goods and services towards the information society).
2. Ecologization economy (greening production, consumption, people).
3. Globalization of national economy (integration of national economy into global economic system, getting knowledge and work using global economic, communication and cultural systems).

The main directions of the scientific research in the Ukraine are defined by the National Committee on Science and Technologies, which organizes competitions among scientific programmes and projects. Proposed issues are directly related to principal programmes of the Ukraine's social-economic development. "The Conception of Ukraine Sustainable Development" and the Programme "Ukraine – 2010" might be named as the most important. The development of the above mentioned directions of human dimensions themes and research would provide the implementation of all high-priority objectives of the scientific-technology and innovation development noted by the Programme "Ukraine – 2010". Particularly:

- creation and introduction of environmentally friendly, energy- and resources saving technology;
- creation and application promising information technologies, telecommunication networks and domestic information means;
- development of competitive types of technologies and goods in scientific-intensive sectors of the national economy, etc.

For each of three above mentioned issues: "informatization", "ecologization", "globalization", and considering that today, economic development of the country is a key precondition for all positive changes within the society, economics is a main focus of the future research activities. Economic theme should include the following points: concepts; long-term and short-term goals shaping; directions of economy reforming and restructuring; profile of policy making strategies (pull-, push-, and interface strategies); economic mechanism of economy reforming; motivation instruments; new type human factors shaping.

Human dimension research theme will focus on relevant human dimensions (economic, educational, cultural, environmental, institutional) in the Ukrainian society related to information society shaping. It is assumed to emphasis upon two

principal directions of studies:

1. Human dimensions scopes (areas, phenomena, sectors of the national economy, spheres of social life) for Ukrainian society which are desirable for development to a coming information society.
2. Human dimensions scopes for the Ukrainian society, which should liquidated, suppress, removed, prevented, hampered) in the Ukraine to a coming information society.

Proceeding from the first point, the following three directions should be studied:

- 1.1. Areas where the Ukraine has traditional very strong positions for the world society or in the space of post-socialism countries, e.g.: space ship technology; freighter aviation; new type information medicine; environmental economic studies; education technology; environmental technology; architecture and so on. These areas should be used as bridges for the country integration into the world society and as the locomotive of information technology development.
- 1.2. Areas where the Ukraine has strong potential (resources, people, institutional) but production-consumption links where suppressed, e.g.: historical and eco-tourism; recreation; plant medicine; flowers decoration and so on.
- 1.3. Areas where the country must liquidate a gap with development countries: global information communication, computer technology, small service business, small processing business for light and food industries, management technologies, and so on.

Considering sustainable development as a political concept, which is supposed to be implemented practically, it is important for further investigate policy changes, changes in attitudes, objectives, legal and institutional transformations, which are taking place in the Ukraine during its transition to a market economy. The main aim here is to work out policy and management proposals, to discuss conditions for sustainability, existing barriers and instruments for development of the national economy towards sustainability. The project concentrates on the elaboration of practical proposals for sustainable development of the Ukrainian economy under changing conditions and institutions.

Besides, on the national and regional levels, the following issues of human dimension should be addressed: social-economic development of underdeveloped regions of the Ukraine (as transport, communication, medical care, recreation activity in the Carpathian mountains); social problems connected with the conversion of the economy (creation of new jobs for former military officers; enhancing social security) and the enforcement of environmental security of the population with respect to possible accidental situations, as for instance, of nuclear plants, those caused by out-of-date technological processes, or considering unsafety or functioning of oil- and gas-pipelines in the Carpathian mountains etc.

Pollution: Economy vs. Ecology?

Oleg Evseenkov, Petrozavodsk State University, Russia

Ecologists all over the world are worried about the pollution. One of the main points of such concern is pollution due to greenhouse gas emission. However, since ecologists are not the ones who produce such gases, there a problem arises. The pollution, which ecologists take into attention, is a biological one. It means that pollution takes place when metabolism changes in animals and other creatures. On the other hand, emitters of greenhouse gas deal with economic pollution. The last takes place when the utility decreases for one or more individuals.

Economists also consider the optimal level of pollution, that is, the level of pollution when the marginal costs of pollution reduction are equal to the gains of pollution reduction. This level is more than zero and will be reached in market economy without any intervention. The main problem is that while pollution reduction costs are clearly identified, the gains of such reduction are not obvious to most people (because they are widely distributed) and have non-monetary nature.

Nevertheless, the problem begins to become widely recognized, first of all on the most common level - on the level of governments. The first global step was made in Kyoto in December 1997 when the protocol on decreasing emission was signed. Now most countries, including the main polluter - USA, ratified it. Recurring to economics, we should mention one more problem: developed countries built their welfare on exhausting natural resources and polluting of the environment, and now they call for reduction of pollution. Developing countries claim that they have right for their own stake of pollution to reach comparable well-being. So the problem was that gains and costs were unequally distributed in pollution market. But the Kyoto protocol has some "mechanisms of plasticity" that afford to trade by quotas and so on. The practical implementation of these mechanisms was filled in on the International Conference on Global Climate Change in Buenos Aires in the November 1999.

Now we have to fulfil the obligations taken in the Kyoto protocol. And these obligations have to be fulfilled on the enterprise level. There is one more mismatch: the obligations were taken by states, but greenhouse gases are produced by enterprises. So additional mechanisms to induce firms to decrease emission should be created. Some companies, like DuPont, start their reduction programs voluntary. But "goodwill is not enough". The best mean to enforce companies to reduce their greenhouse gas emission is competition.

Adaptation of producers and consumers happens very fast and pervasively. Wastage in production and consumption is not allowed under competition, excluding the really limited natural good that have no price and are mistakenly supposed to be free. For a long time air and water were considered as such good. Now we recognized their limitation and have to do next step.

Consumers should take responsibility for the greenhouse gas emission. They should understand that when they buy certain goods, they support GHG emission. As

for Baltic region, Republic Karelia a namely, they should understand that when they buy any aluminum stuff, a perfluorinated carbons are emitted on the Nadvoitsy Aluminum Plant and when they enjoy the heating, the CO₂ is emitted on the Petrozavodsk Power and Heating Plant. When consumers recognize that, the gain from reduction of pollution will be more specific and the equilibrium of pollution marginal costs and gains will take place at lower level of pollution. Science should learn consumers about the consequences of their choices. Now is the time.

State and Prospects of Unorganized Tourism at the South Coast of the Crimea (Prospects and Conclusions)

Alexander Ponomarev, Crimea Academy of Environmental Protection and Resort Development, Ukraine

Crimean tourism activity includes a large share of "unorganized tourists". It stands for about 2/3 of total tourists flow. However, a part of these unorganized tourists prefer big and small health resorts with more or less civilized accommodation; the rest of them follow to neighboring territories. The latter represent the category of tourists, which can scarcely be controlled. This category is also a troublemaker in ecological, economical, administrative and legal terms.

Thus, the present work is dedicated to analysis of current state and prospects for this kind of tourists and their accommodation. The conclusions of the present work are based on a field research in the South Coast of the Crimea, conducted by us. All the material was collected during the research and was analyzed and processed in accordance to existing literary sources on this subject.

The prospective solution of the unorganized tourism problem can be found in developing definite zones for the spoken tourists' rest. The creation of necessary amount of such zones is envisioned, all the administrative questions concerning attractiveness of accommodations must be solved on a site. The regulation of such zones activity should be conducted on a legislative level.

The constant accommodation beyond such zones is strictly prohibited. Propaganda and advertisement of mentioned zones and ecological consultation are expected.

Following these regulations will lead to:

- growth of a season's calendar length,
- new injections to budgets of different levels,
- increase of attractiveness of the Crimea as a tourism region,
- safer sites for tourists' rest.

As a consequence of the above I should mention that the unorganized tourism on the South Coast, in its present condition, is not acceptable and calls for regulation on any level.

State and Prospects of Unorganized Tourism at the South Coast of the Crimea (Practical Research)

Andrey Grechka, Crimea Academy of Environmental Protection and Resort Development, Ukraine

As a result of the work it has gotten clear that the biggest share of unorganized tourists is attracted by towns because of transport, water, food and more comfortable beaches accessibility. In fact, the most attractive territories are becoming a temporal (2-4 weeks) accommodation sites rather than a piece of wild nature.

At the same time such spots are not adjusted to cater for the needs of accommodation. The fire wood is still used for cooking; there are no enough water sources, and those which exist are in poor sanitary condition; there are no toilets and special garbage collectors.

Eventually this leads to pollution of sea water, soil and earth waters and destruction of vegetative cover. As a consequence of this the unorganized tourism threatens attractiveness and ecological and epidemic safety of the South Coast of the Crimea.

There are two main tendencies in organization of such kind of tourism:

- On one hand, popular spots are parts of natural and historical reserve.
- On the other hand, most of such sites are situated on lands, belonging to the forestry funds and in boundary zones.

Thus, the need of creation of legislative and managerial base concerning the unorganized tourism is obvious. Since it is not possible to regulate the flow of unorganized tourists the necessity of optimum conditions for rest in deliberately allocated sites appears.

The Future of World Economy Depends on Ecology

Alexandra Nikolova, University of National and World Economy, Bulgaria

Human beings are part of and depend on nature. That is why the world economy policy must be a policy based on ecological requirements. Human economic activities depend on the greater ecological sphere. The nations of the future will be those that will understand these activities as a part system of the ecological sphere. This will urge them to work for making those activities into a functioning system within the ecological sphere. So far the economic systems have not regarded this relationship, other than counting on the natural resources. It is time to be economic in the relationship with the ecological sphere in a sustainable way. So what is to be done?

Firstly, world economy must develop ecological controlled agriculture:

The production of food is fundamental. Agriculture should be a harmonious way of enjoying the fruits of nature, not a battle for survival, as the one "agribusiness"

fighters with pesticides, fungicides, herbicides and artificial fertilizers. Agriculture should work with nature, not against it. The implementation of agricultural practices should be encouraged, according to the rules of the International Federation of Organic Agriculture Movements, and the development of proper control instruments of ecological/organic products should be supported.

Secondly, use of renewable and sustainable energy sources must be developed:

The use of energy should be in balance with the amount of energy input in the ecological sphere, which means the inflow of sun energy. Today we live on a saved energy "capital" in the form of fossil fuels (coal and mineral oil), which originally was sun energy, too, stored in the ecological sphere billion of years ago.

For this reason the world economy will aim to achieve:

1. The development of renewable and sustainable energy production, which means:

⇒ Biomasses – Energy through plants intake of sun energy in photosynthesis. Out take through firewood, methane gas production and alcohol.

⇒ Water- and Wind power – Energy through climatic effects of sun energy. Out take through power plants.

⇒ Sun energy – Energy directly from the source.

2. The development of energy saving measures, such as less energy demanding technologies and more energy efficient technologies.

Third, ecologically sustainable use of resources and reduction of waste should also be developed:

Most resources are determined, which means that the present level of use can not be sustained. Production must be based on a recycling use of resources, leading to a reduction of the amount of waste, which today exceeds the absorption capacity of the ecological sphere. Therefore regulations should be accepted that encourage the development of recyclable products and the necessary infrastructure for recycling, and the minimal use of packaging

Fourth, environmentally sane transportation systems is the next thing to be developed:

We see the development of communications as a positive step for humanity, especially when it comes to the exchange of thought. However, the biggest stress on the ecological sphere is imposed by transportation. Here again regulations that are to be accepted should encourage:

1. The development of decentralized production units, bringing producers closer to consumers, when appropriate

2. The development of energy saving, less polluting transportation technologies.

At the end, I will repeat that it is very important that future rulers of the world see the interdependence between humanity and the ecological sphere, and this prompts them to take immediately necessary action to secure a common future for all the mankind.

Barriers to the Use of Science for Sustainable Development

Inna Bratushka, Sumy State University, Ukraine

The strengthening of nations' scientific capability has been established as one of the cornerstones for the process of sustainable development. Each country must possess the scientific capability needed to master its own path to sustainable development. Given that the majority of developing countries today fall short of this objective, their national investment in higher education in science should be significantly increased. In this context strong and concerted international support to build up the scientific community, and scientific infrastructures in developing countries, and in particular in least developed countries, is an urgent requirement.

Research needs to become more pro-active and to focus on prevention and early identification of emerging problems – and also opportunities – rather than its present focus on tackling problems only once they become acute. This raises the questions of what sorts of problems are the most critical for sustainable development, and how science might best be mobilized in response.

Proposals for how best to use scientific knowledge to inform development policy actions mention a wide range of elements, such as: broadening the scientific base; integrating the physical, economic and social sciences; coordinating environmental data; building scientific capability.

Agenda 21 established as a priority the challenge of 'strengthening the scientific basis for sustainable management'. Often there is a communications gap between scientists, policy-makers and the public at large. What is urgently required is to develop a process or processes that will ensure the involvement of all appropriate scientific inputs and expertise. Scientific excellence and integrity needs to be combined with a close dialogue and cooperation with policy-makers, including full participation by experts with local knowledge in developing countries. Goals for improved science communication are then seen to include:

- Better lines of communication between scientists, policy-makers and the public concerning the gravity of the environmental and economic problems;
- Deepening of cooperation between local and external experts to ensure full understanding of the socio-economic, cultural and ecological circumstances as a precondition for successful science-technology implementations.

Economic Mechanism of Environmental Quality Improvement

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Continuing economic worldwide growth is leading to increasing pressure on natural resources. This demands new solutions, so that long-term sustainable development can be initiated and guaranteed. Intensive scientific research and well-

developed and organized extension services can make a valuable contribution towards solving the ensuring problems. This is especially true for agriculture, as it is one of the most intensive forms of land use.

And it is also necessary to take note that the modern science is characterized by deep spread the mathematical methods into different fields of natural sciences. The role of mathematics has been essentially increasing in the modern ecology development. Future ecologists need serious mathematical preparation which gives the possibility to research wide spectrum of new problems by mathematical methods with using computers. That's way it is very important to develop and deliver for students such a trend of ecological science as "Ecological Systems Modeling".

One of the first ecological economic tools in Ukraine has become mechanism of payment for environmental pollution. Stimulating function of payments is to prevent the emaciation of natural resources and to stop any rent-free environmental consumption as a recipient of the polluting substances. Now we should bring in the following types of payment: for natural resources consumption under limits; for natural resources reproduction; for environmental pollution; for leasing; for irrational consumption of environment and natural resources, etc.

It would be very reasonable if the practice of free trade by rights to pollute the environmental got certain dissemination in Ukraine (We mean quotes for pollution, which are sold on auctions) This method envisages, indisputably, direct use of market mechanism, but method of administrative and law environmental management is in its base. This is limited by tough standards for content of contaminating substances in industrial and agricultural blips and for quality of environment.

To our mind, it is very important to develop in Ukraine the environmental management and the ecological market infrastructure. The aim of environmental management is search of ways for providing the most compatible decisions in the field of running the environmental protective activities. But, using of environmental management in the models of market transformations in Ukraine is not realized yet. To ecological infrastructure we would refer ecological audit, ecological bank, ecological insurance, leasing of environmental protective equipment, auctions, etc.

To gain the aims of ecological sustainable development external economic relations have their own specific features. For example, the strategy of developing countries external debts reducing based on their duties to carry out environmental protective measures is a significant new tool of ecological contradictions settlement on the world level last time.

Thus, to activate the ecological component in the Ukrainian market reforms we should speed up inculcation of market mechanism of nature consumption regulation, with using administrative and economic control-levers at the same time. So, it is necessary to develop and consolidate the methodic base of payments system for environmental pollution and for using it's resource potential, and also to broaden international ecological relations.

The Global Potential for Drastic Reduction of Greenhouse Gas Emissions

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Technological innovation is often viewed as the key to drastic reduction of greenhouse gas emissions. In fact there are already a number of technologies on the shelf that could fix global warming problems in no time. The trouble is that few people in the developing world can afford them or few people in the developed world find them acceptable. Most people are simply too poor or too critical. So what are the decisive fault lines that should distinguish a climate-friendly next century from a climate-hostile past? First, only a more equal world will make drastic reduction of greenhouse gas emissions affordable. Secondly, mankind will have to accept that in addition to technological innovation, drastic reduction of greenhouse gas emissions depends on lifestyle innovation. The combination of technological and lifestyle innovation provides the key to plausible scenarios of drastic reduction of greenhouse gas emissions.

Discuss, for example, energy use characteristics of Japan and the USA. The difference in income level per capita between Japan and the USA is not dramatic (roughly 15% lower in Japan). The difference in energy use per capita is much larger (roughly 50% lower in Japan). The reasons of this difference are complex, but very illustrative of the intimate link between technological innovation and national lifestyle as the major differences are in the residential and transportation sectors. Energy use per household in the USA is more than four times higher. This is a result of much higher norms of life in the USA. Similar conclusions can be reached for transportation. But not all differences are a matter of lifestyle. Japan also performs more efficiently in a technological sense. On average, industries use 30% less energy per unit of output and the same is true for the average energy use of vehicles and domestic equipment. This results not just from technological efficiency but also a lifestyle factor since average vehicles and domestic equipment are much smaller. It should be stressed that technological performance and lifestyle preferences are not autonomous factors but are strongly influenced but energy policies. In particular, average electricity and fuel prices are much higher in Japan. Both technological innovation and lifestyle are clearly related to the physical constraints and opportunities encountered by a densely populated, resource-poor island as against a thinly populated, resource-rich continent.

The comparison of energy use characteristics between Japan and the USA is not a matter of comparing good with bad. It's simple illustration of how differently the balance between scarce resources and human preferences has been struck in the past century, depending on the circumstances. In this respect the concept of lifestyle leapfrogging is relevant. The term indicates the growth opportunities to developing countries who seek to apply the most advanced technologies at an early stage of development. They can thus skip the long intermediate stages of development and associated mistakes and hardships experienced by the developed nations. but the concept can be broadened to include other aspects of development, in particular consumer choices and human preferences.

Economics for Ecology

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In which direction spins Earth? What is the future of our children? Are we aware of what we are doing?

How to save our planet? The industrial producers must raise outputs far beyond present levels to rise or even keep pace with population growth. Yet the global environment is already overstressed by pollution and resource depletion arising from runaway production and consumption in the richest countries. Optimists claim that technological fixes will enable more goods to be produced with fewer environmental impacts, others say that the only way is for people in the North to adapt their lifestyles to significantly lower levels of consumption but the fact is that care of ecology also impact the economy.

The world economy is currently undergoing a rapid shift in favor of trade liberalization. Economists who approve of this trend argue that the increased wealth around the globe will make countries better able to afford environmental care. They reason that in a free market prices will eventually reflect environmental costs, so driving "clean production" innovations and more frugal use of natural resources. On this basis, industry suddenly finds itself nominated as the sector most responsible for 'squaring the sustainable development circle' through self-regulation and market forces.

Industry survives and prospers through more and more consumer demand. Can it be trusted with the task of adjusting consumer expectations to less and less resource use in the future? And there are still questions about whether market forces and self-regulation are enough. Many industrialists still fiercely resist regulation.

It is time to decide whether to save the earth or live in plenty. Economicity should not be the question!

System Transformation and Environmental Policy (Problems and Options in Central and Eastern Europe)

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At the beginning of the 1990s, all Central and Eastern European states decided in favor of pluralist democracy and a market economy as the base from which to set about dealing with the problems of economic and political crisis.

In their attempts to develop a modern economic system, the reforming countries cannot institute new rules of the game for the allocation of resources while ignoring the problems of the past; on the contrary, they have inherited all manner of economic, yet ecological burdens, which delay the process of structural change of the economy. Not least of these problems is that socialist member states of the Council for Mutual Economic Assistance had been accumulating ecological problems over several decades, the negative consequences of which persist today, including damage to health and hence higher healthcare costs, and constraints on the

development of more sophisticated production processes. Oversized production plants in heavy industry, which were strongly concentrated in specific regions, are not only representatives of the former inefficient use of resources, but also of local pockets of intense opposition to factory closures and the relocation of production. Yet these countries will not manage to draw close to Western European living standards in the long term unless they undergo ecological and economic modernization and efficiency-oriented structural change.

Conflicting Objectives

Reshaping the economy to conform to market principles is intended to produce greater economic efficiency which may also lead indirectly to an improvement in the chances of protecting the environment. Firms under pressure to minimize costs will be forced to reduce the raw material and energy inputs and will also be given incentives to innovate. However, the relative price shocks and the tough competitive effect of devaluing a part of the capital stock, with the result that production, national income and employment will all fall. In this situation environmental protection measures which will force up costs will, if positive long-term effects are disregarded in a short-term outlook, be perceived as additional risks to the safeguarding or creation of jobs. It is in this initial phase of transformation in particular that the profiles of economic growth and job protection could lead to an ecologically dubious course being set for future development. At the same time, products which are ecologically sound and have a positive image in environmental terms could have good sales prospects, in the longer term, on the markets of Western Europe, or even on those of CEE countries. In reality though, adjustment measures which are equally prudent from the ecological and economic viewpoints in the long term are very difficult to implement when faced with a shrinking economy. This is essentially true when both economic and political actors have a very short-term orientation, i.e. their main aim is to survive the current recession, or the next election.

A prime area in which there is a fundamental contradiction between the ecological potential for modernization and what realistically is possible is the energy sector. Just part of this picture is that companies could improve their energy efficiency, with electricity generating companies improving their thermal efficiency and reducing their emission levels. If more natural gas, which is low in emissions, were to be used instead of coal, this would represent an initial ecological modernization move on the input side of power and process heat generation.

Considerable ecological advances can also be expected to be made by private households, particularly by modernization in the housing sector. In contrast to Western Europe, energy prices were kept lower for private households than for industry; on the other hand, private households tend to have few savings or other means of financing home improvements, and state housing corporations, faced with a lack of funds (e.g. due to unpaid rents, major increases in construction costs combined with low rates of rent increase), are unlikely to be in position to pay for modernization projects to improve energy efficiency. Previously, domestic energy prices were considerably below those on the world market, which means that as prices gradually come up to international levels there is a great need for adjustment.

Organization and Human Resource Management for Environmental Management

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This essay emphasizes the need to integrate human resource management (HRM) and organizational aspects into environmental management in corporations. It explains how existing concepts and tools enable management to accomplish this task. The starting point is the need to apply concepts from organizational learning and organizational development and integrate environmental criteria into these processes.

Innovation-Oriented Environmental Management

With regard to corporate requirements, this development basically implies a shift from compliance to an innovation-oriented approach to environmental management. Like globalization or the introduction of new technologies, these changes in environmental policy demand an organizational learning and development process in a corporation. In such a process, new skills and qualifications are introduced and organizational structures and proceedings are changed in order to integrate environmental aspects into all functions and at all levels of the corporation. Moreover, the organizational learning process includes changes

Organization for Environmental Management

Environmental protection as an across-the-board task requires an analysis of the company as a whole in order that the potential for reducing costs and/or the environment-related strengths of the company can be recognized.

Applying Porter's Value Chain

The value chain developed by Michael Porter has proved to be a suitable instrument for this purpose (Porter 1986). For analyzing the corporation as a whole, Porter has redefined the instrument of the value chain. It represents a method of systematically analyzing and structuring all corporate activity and its relationships as a source of possible competitive advantages. The latter can be based either on cost advantages or on the possibility of differentiating the product of the corporation positively compared with its competitors – for example, through high product quality. Thus the relative strengths and weaknesses of a company can be determined.

The value chain can also be applied to environmental problems, and it must be extended to the complete life cycle of a product. The value chain demonstrates the cross-functional organization needed for successful environmental management.

Environmental protection affects all corporate functions and has to be integrated into the individual task areas as a "natural" part in order to be effective. It implies organizational consequences with regard to structure and the routines arising out of them, to the creation of special positions, and to the employees themselves.

As the value chain indicates, the organization of integrated environmental management starts at the *beginning* of the pipe – the purchasing policy of the company. This means first of all that the employees are aware of environmental risks and motivated not to allow entrance of hazardous substances. This can be organized,

for example, with checklists for purchasing criteria that include environmental issues or by sending questionnaires out to suppliers asking for specific information on environmental risks. In a second step, a closer cooperation with the supplier has to be organized in order to develop new input materials that substitute for hazardous materials in the production or recyclable parts for the product.

Environmental Management in Production

Environmental protection has to be integrated into production since the most visible environmental problems arise in this area. Environmental protection can be integrated in three terms:

1. In a production concept including a strong focus on efficiency that avoids the waste of resources and materials and includes a permanent improvement process.
2. In a system assuring high quality of products and manufacturing processes. Both quality and environmental protection are not to be controlled but are integrated functional tasks.
3. In an effective waste treatment and recycling system.

Marketing

Environmental protection plays an increasingly key role in the marketing of products and services. Marketers were the first to acknowledge the importance of environmental aspects for the customer's buying decision. Thus environmental questions influence decisions on the basis of strategy, distribution, and communication of environmental advantages. Moreover, different forms of eco-sponsoring have been developed).

Product Life Cycle

The development of a take-back or disposal system concludes the life cycle and enables the company to forge a convincing policy of environmental protection. The offer of a take-back of products after use by the consumer implies a total change of the character of a product:

It becomes a service for which the corporation takes the total liability and guarantees its environmentally friendly production, use, distribution, and recycling or treatment.

Economic and Political Methods of Capital Attracting into Environmental Regulation

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The development of ecology-oriented business can allow to change an ecological situation substantially in Ukraine. Foreign capital attracting and purposeful ecology program budgeting are enable to solve the problem of rational natural resources usage and environmental regulation. Obviously it is impossible to settle ecological

problems and arrive at stable way of development without total betterment of state economic situation and effective macroeconomic policy.

The range of economic and political factors have had an influence upon worsening of ecological situation in Ukraine:

- macroeconomic policy that leads to extensive usage of natural resources;
- unreasoned legislation leaves many economic factors out of account;
- uncertainty of property right to use the natural resources;
- absence of long-term and ecology-balanced economic strategy;
- existence of incentive to short-term getting of sizeable profit from re-exploitation and/or natural resources selling.
- incomplete evaluation of indirect effect of nature protection (social and economic) at local, regional and state levels, global benefits.

Economic crisis and economy instability make difficulties to realization of long-term ecology programs. In transition to the way of intensive economic development it is necessary to generate society sources to get reasonable ecological policy. At this moment Ukrainian Parliament have passed a range of legislative acts to get ecological aims; therefore the Government gives effect to economic mechanism of rational nature management, that has encompassed payments for natural resources usage, pollution of the environment etc. The program of achieving of high efficiency of environmental protection involves two regulating subsystems: market-competition mechanism and state regulation.

Nowadays the state bears the responsibility for providing an inherent human right – to live in healthy environment.

The one of main elements of economic policy of developed countries that strengthened urgency of effective system of economic methods presence of environmental regulation had been a launch of "ecology stable development" conception.

It is necessary to speed up the development of economic-and-ecological mechanism of certain ecology program financing. The financing system establishment is available due to following structural components (financing sources) such as an enhancement of state budget and local budget deductions; and taking into account the economic forces in lawful ensuring of financing conditions. The successful ecological investment system functioning is also necessary: interaction between Bank of Ecology Development, independent appraisal, environmental risk insurance companies and social structures and funds. But the economic service market by way of the "lively" subsystem serves as a link between ecological and economic-and-lawful parts of nature management regulation system.

The rate of environmental protection expenditures in structure of capital investment in Ukraine is quite low, the financing from region budget and off-budget ecological funds is being put into practice not enough. By that time the expenses to struggle with an environmental pollution requires for multi-billion funds. The state can assume the share of expenditures that's why it is necessary to create all prerequisites to foreign investors for collaboration into the implementation of the ecological projects.

Specific Aspects of the Economic Estimation of Labour Resources of any Region

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The economic potential of a region consists of the labour, investment resources, natural resources and innovational potentials.

The labour resources play the most important role in the formation and use of the economic potential. Through labour all factors of production are aggregated in a single whole, the productive forces are put into operation and the final result of production is determined. In this conditions of the formation of the market relations, the role of men is increased by means of their participation in ensuring efficiency of production, which provide products of high quality through the use of modern technologies and facilities.

The structural factors which are present in every group of the mentioned above factors influence greatly the formation of the labour potential. For example, the age structure of the population within one and the same size of the population of the area affects the correlation between the phases of the labour potential reproduction. The structure or the public production on the given area influences the formation of the structure of the labour resources, etc.

The realisation of any economic arrangement to a certain extent will touch upon the environmental state causing the changes of the ecological systems. In this term the complicated mechanisms of the feedback are reflected on the society, the labour potential. So, evaluation of the influence on the environment must be component of planning of the economic activity and be realised simultaneously with the technical, economic, socio-political reasons. At the same time, judging by the experience of the realisation of such evaluations the used methods approaches, the function and use of the evaluation indicators are not unique. So, in the economic practice the natural, marked and value indicators of the environmental changes are widely used.

Through the use of the different approaches concerning the evaluation is quite justified (they reflect the difference significance of the ecosystem changes in this or that system of the relations established in the society) the problem of the their interconnection is rather complicated.

In this situation the concept of the tree-level evaluation of the environmental changes and the changes in the social sphere is rather appealing.

The first level is realisation of the social-economic evaluation, which is the process of the formation of the system of the natural ecological and social indicators.

The second level is the ecological-economic (social-economic) evaluation which reflects the resource changes, i.e. the changes of the public use value of the resources, the material value, the "quality" of the labour resources. And at last, the third level is the economic evaluation connected with the definition of damages and effects in the national economic branches at the level of certain object.

The territorial formation such as cities, regions, districts are the most interested in the environmental protection from the anthropogenic pollution. Their interest is

directly connected with responsibility of the local administrations for the environmental quality to the people living on the give territory.

Nowadays it is general accepted that 10%-30% of the diseases depend upon the anthropogenic ecological factors.

The economic content of the labour potential changes caused by the ecological factors is contained in the value (cost) form of the state changes (quality and quantity) of the labour resources and the conditions of their use. The change of the labour potential state expressed by the indicators of growth or reduction of their economic evaluation allow to come to the problem of taking into account the ecological factors during the acceptance of the management decisions.

The Directions of Ecologisation of an Industrial Complex of Ukraine

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The further development of an economic complex of Ukraine is necessary for building in view of the basic directions of modern ecology and economic policy. Nowadays it is possible to allocate four basic directions of the further economic development of the country with simultaneous improvement of an ecological situation. These directions are versatile and for their realisation are required a different material input and time interval.

The first direction includes application of clearing structures and filters without change of existing technologies, that is consists in minimisation of harmful emissions. This direction mentions only primary part of economy – enterprises. For its realisation the rather small amount of money resources and time is required, however the first cause of occurrence of polluting substances remain not mentioned.

The second direction is a change of technological processes or their perfection. The essence of this method consists in optimisation of functioning of existing technologies. For its realisation it is necessary to have high enough scientific and technical potential. This direction covers the industrial enterprises wholly, requiring sometimes of radical change of technological process, and consequently also replacements of the equipment.

The third direction consists in replacement of issued production by another with similar characteristics, but bearing smaller ecological loading. That is the change of structure of production, issued in an industry is made, from the point of view of its profitability and ecological safety. This direction covers any more only enterprise – manufacturer of some product, but mentions also other managing subjects.

The fourth stage is a direction of increase of a ecology and economic efficiency is designed for prospect and mentions society. The purpose of the given direction is the change of lifestyle of a society, its consumer psychology.

The application of all these directions can be carried out as gradually, step by step, and simultaneously, on all directions at once.

Project on the Use of Alternative Kinds of Fuel for Automobiles in the City Chernivtsi

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During the last years in Chernivtsi the number of automobiles has greatly increased (at present 70 000 cars are registered in the city). Considerable part of above mentioned vehicles belongs to technically old and ecologically dangerous automobiles, which were delivered from the countries of Central and Western Europe. In most of these countries there is limited use of ethyl forms of petrol and dizel motors without special catalysts, that leads to full burning of fuel. Regions at the frontier became the place and sales market of such automobiles. Chernivtsi is not an exception of this rule. In the result of the excessive released quantity of greenhouse gases into the atmosphere, the percentage of carbon monoxide, metan, chlorofluorocarbons etc. has greatly grown. Soil cover is much contaminated with plumbum, taliy and other hard metals. Mountainous relief of the city and ancient architecture make this problem more difficult.

Maybe because of that, in 1988 governmental commission considered along with other versions of causes of "Chernivtsi disease of children" (alopetsia), another taliy version concerning automobiles gases release.

Taking into consideration that reason, the study of possibilities of introduction in our city the alternative kinds of automobile fuel is rather actual. Among alternative sources of fuel a possibility of introduction of Brassica napus L. oil, biogases, hydrogenium is considered. At present in Chernivtsi natural gas metan is widely used as a fuel. Its effective use is possible under the condition of installation into automobiles modern reductors (technical device). In most cases home-produced reductors are not effective and do not give the opportunity to get the high efficiency from metan burning. As a result of not complete metan burning, atmosphere is much contaminated. Aiming at learning world experience of introduction of alternative forms of fuel, the joint project is prepared by local government and by local ecoNGOs. This project is prepared in the framework of the Program ECOLINKS and the following is expected:

- conduct of international scientific-practical conference on questions of transformation of automobile common fuel into alternative one and changing its technology into environmentally safe technology ;
- purchase of cheap technology and equipment (model installation) on getting Brassica nappus L. oil, hydrogenium, biometan or other alternative kinds of fuel;
- creation of consulting punkt – exhibition (with use of purchased model installations) for propaganda of new technology in automobile transportation;
- conduct in the city by ecoNGOs a wide-scale action "The Day of a Pedestrian" ("Am I able not to drive a car one day a week?");

- conduct of round-tables on TV and with mass-media on questions of negative impact of automobiles on environment, search of solution ways of transport problem with specialists' and community's participation.

Bukovinian Branch of the National EcoCenter "KRONA" seeks the partner from American side in the project realization.

The Improvement of the Economical Instruments of Ecological Management in Ukraine

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We need an active employment of economical instruments to improve the environmental process. The actuality of inculcation of market inducements to its rationalization is intensifying because of budget deficit of Ukraine, reduction of national investments into the environmental activity. If we inculcate reliable economic-juridical mechanisms of environmental sanitation, we'll form such conditions of industrial activity which can help householding subjects to observe environmental claims, to cut the volume of pollution and to prevent its appearance.

A number of payment variety rose in last years. The rate of payments and fines for contravention of ecological legislation was enlarged. The round of environment users who have to fulfill the ecological payments was extended, and the number of people who has some exemptions in environment employment was declined.

The reality of domestic ecological management attests that there is no stimulant action of the system of economical regulators, they aren't able to prompt environment users to inculcate ecological safe ways of conducting the household.

The rod of the ecological politics of Ukraine must be the stimulating of environmental safe activity which is based on existing methodological basis, tested by domestic practice, and consults the visible achievements in the sphere of ecological problem solution, which were accumulated in other countries.

It is worth while to reduce the list of harmful materials, ejection of which must be paid, to provide more reasonable practical conditions of its implementation.

It is worth while to change the order of ecological tax levy.

It is worth while to change the address of ecological tax income, i.e. to direct these resources not to the budget, and to the accounts of out of budget ecological safeguard stocks.

The mandatory prerequisite of financing system in the domain of environmental safeguard improvement due to ecological stocks is reappearance the independent out of budget status to environmental safeguard stocks of all territorial levels.

In light of economic-ecological crisis and ineffectiveness of existing methods of ecological management, it is necessary to inculcate the system of economical regulators of environment using in a brief term.

Realizing the Potential of Science for Sustainable Development

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The principle of sustainable development has been conceived in response to perceived inadequacies of earlier models of economic development. Traditional growth-oriented economic development has not always improved the economic prospects of the poorer sections of the populations, in developing and developed countries alike. As well, the industrialization process depends on natural resource exploitation, including fossil fuel and water resources, at rates and in ways that cannot be sustained indefinitely and that cannot be automatically transferred from the current developed countries to the developing ones. The agro-food industries are themselves contributing, in many cases, to the degradation of soil and water resources. New technologies, such as nuclear energy and genetic engineering, that show potential for relieving some environmental constraints, may also entail deepening environmental, health and technological risks.

Neither the advance of science in itself nor the widening of competitive markets can be expected to promote, as if 'naturally', a path of sustainable development. On the contrary, the short-term orientations of much market-centered economic activity, and the mixtures of commercial, military and other strategic preoccupations that motivate much science-based technology development, can be antagonistic to the goals of ecosystem resilience, resource stewardship and social justice that may be considered foundations for long-term sustainability.

To promote sustainable development there needs to be explicit identification of the kind of future socio-economic order that we wish to strive for, together with policies that encourage research, knowledge exchange and science applications - a permanent social learning - in pursuit of these goals.

The objective of scientific attempt in this new context may well be to enhance the process of the social resolution of the problem, including participation and mutual learning among stakeholders, rather than a definitive 'solution' or technological implementation. This is an important change in the relation between the problem identification and the prospects of science-based solutions.

The agenda of sustainable development thus means the guidance of scientific work and technology applications towards innovations that respect fundamental sustainability values such as local ecosystem resiliency, mitigation of global climate change impacts, energy efficiency, food security, and enhanced problem-solving capacities of local populations. An important part of this guidance and justification is the design and implementation of agreed social processes for quality assurance in science knowledge and technological implementations.

Those who place their faith in science and technology may suggest that knowledge advances can, in themselves, in due time bring solutions to the dangers, disruptions and dilemmas that earlier science and technological interventions have generated. New quality assurance processes are needed for science and policy for sustainability, based on wide societal and ethical reflections.

Combustion in the RainForest: Ecology, Energy and Economy for a Sustainable Environment

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World RainForest areas are shrinking by the combined pressure of the economic power of rich societies and the population needs of underdeveloped societies. The RainForest regions are the ultimate and only protection available on Earth, able to dissipate the combustion emission excess of the motor driven industrial societies, so energy addicted. The loss of RainForest ecosystems is to the biosphere, as the loss of the lungs, the liver and the kidneys to a mammal as us.

"All material economies treat other components of the biosphere as resources, and all the products of economic activity are eventually returned to the biosphere as waste. The Second Law of Thermodynamics states that all material economic 'production' is in fact 'consumption'. Any form of economic activity dependent on material resources therefore contributes to a constant increase in global net entropy (disorder), through the continuous dissipation of available energy and matter. It follows that:

- There is no equilibrium in the energy and material relationships between industrial economics and the biosphere;
- Sustainable development based on prevailing patterns of resource use is not even theoretically conceivable.

The thermodynamic interpretation of the economic process therefore suggests a new definition of sustainable development: sustainable development is development that minimizes resource use and the increase of global entropy.

Any human activity dependent on the compulsive use of ecological resources (forestry, fisheries, agriculture, waste disposal) cannot be sustained indefinitely if it uses not only the annual production of the biosphere (the 'interest') but also cuts into the standing stock (the 'capital')." (William Rees)

The result of technological advances is that in the last 50 years about 70% of all known petroleum resources have been burned: what nature created in 4 billion years, the ruling "economy" has been able to consume in 50 years! What we have chosen to define as progress is actually the reversal of four billion years of evolution. The money attractor and its growth imperative are calling us not forward to the future, but rather backward toward a distant past before the earth became vibrant with life.

Barry Commoner proposed to measure the environmental impact (I) as the result of multiplying three key factors: population (P), affluence (A), and technology (T), so that the environmental impact of any human society may be expressed as:

$I = P \times A \times T$, or, in words, total pollution = population x good per capita x pollution per unit good.

From the above mentioned three multiplying factors, the technology factor is the most influential in the resulting increment in environmental pollution, as neither the growth of the population nor the affluence factor. It is clear, that the environmental impact cannot be attributed chiefly to the increasing world population; therefore, the environmental problems will not be solved by simplistic "zero population growth of

the others."

One measure that would combine the requirements of a sane ecology in a sane economy would be a world GDP taxation system to globally redistribute income between countries and a CO2 emissions tax to penalize non renewable fossil fuel consumption and stimulate the transition to a sustainable Solar Energy economy. A reasonable GDP tax of say 12% average payable by the 20% richest population countries would represent a 100% average income increase for the poorest 70% world population. 4,000 million poor people could access to a more decent nutrition, health services, and education; also the 500 million rich population would reduce the chronic unemployment, with the increase in demand of basic products and services from the poor population of the world.

If there is to be a worthwhile future for human species, it should be based more on the intelligent and efficient use of information and culture, than in the inefficient and egoistic use of matter, money and energy.

Ecological Safety and Products Promotion

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The tendencies of development of a modern society are those, that the concepts effective economy and ecology become indissoluble. One of directions underlining this indissolubility, is eco-labelling.

Eco-labelling is an indirect stimulation of the manufacturer of production to realisation of measures on reduction of influence by an environment, by granting the right of use of special ecological shortcuts at sale of a product rendering the minimal influence on an environment.

For the simple businessman the nature protection measures are unprofitable and consequently intervention and support of the state here is required. This intervention can be made by direct and indirect ways. To a straight line concern directives of a measure (compulsion in the legislative order), provision of economic incentives reduction of the taxes and direct financial support. Eco-labelling concerns to indirect ways of stimulation. It brings effect in a combination to propagation in a society of protection of an environment.

The rating of ecological safety of a product is made on a voluntary basis. Thus is analysed not only product, but also all vital and production cycle, since production of raw material and finishing the order after use. The product, successfully past check receives the right of use on the packing of an ecological shortcut. Thus the consumers have an opportunity to know, that the given product renders on an environment smaller influence, than product the competitors. In this connection for the seller such product has higher parameters of competitiveness.

The right of using of eco-label is limited by time and requires constant confirmation. Such situation stimulates not only manufacturer, but also its partners to constant perfection of production and work cycle, to support of scientific researches directed on decrease consumption of raw material and negative influence on a nature.

Ecological Payments of the Ukrainian Agricultural Enterprises and the Way of Their Calculation and Payment Improvement (on an Example of the Agricultural Enterprises of Dniepropetrovsk Region)

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The distinctive peculiarity of our time is the increased attention of the society to the ecological problems. Today significant part of the population of the globe lives under conditions of ecological disaster or close to them. Especially it concerns the industrially advanced regions, such, as Dniepropetrovsk area.

The technogen load on the territory of the Dniepropetrovsk area exceeds average Ukraine parameters in 3-4,6 times. Agricultural enterprises are taken with account of environment pollution. Decrease of fertility of soils and their chemical pollution makes the ecologically clean production, the demand on which promptly grows in all world, impossible.

The perfection of financing of ecological development, which is carried out on residual methods in Ukraine is one of the essential requirements of the present time. The ecological charges in relation to a total internal product are not planned. The financial resources are used not on purpose. In 1998 an actual pay level of ecological payments by agricultural enterprises of area made 39% from calculated one. It is possible to predict, that for 1999 it was paid in the budgets of all levels even less, as the majority of farms of area are unprofitable, and the introduction of the fixed agricultural tax releases the enterprises of branch from payment of all kinds of ecological payments, except for the tax for pollution of natural environment.

It is used about 40 ecological payments in the countries of Europe. In Ukraine their circle is considerably less and includes:

- Payments for the right to use natural resources;
- Tax for pollution of natural environment;
- Payments for irrational use of natural resources and deterioration of their quality.

The basic lack of the ecology payments system is the uncertainty of its purpose, i.e. only 5-10% of the sum of a payment for ground are used on nature protection measures. The system of ecology payments in Ukraine is constructed by a principle "who pollutes, that pays" (PIGU taxes), which has a number of lacks and its stimulating function is poorly expressed.

The alternative to existing system is the taxes to the factors of pollution, system of bonuses for use the resource saving technologies, ecological investment, sale of the property rights on natural resources, use of tourism and hunt as additional sources of financing of nature protection measures.

With transition to the international standards of bookkeeping the account of ecological payments needs to be change. Ecology payments are offered to include in the cost price of production. Reporting the balance-sheet the sources of reception of natural resources should be displayed in an Assets, and the relation of the property to these sources must to be placed in Liabilities of balance. At the present stage it is

important to find an optimum ratio between the necessary size of ecological payments and tax pressure on the agricultural enterprises.

The Market Mechanism of the Investments in Innovations

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The development of society entirely depends on a level of scientific and technical progress, which goes with the development of science and introduction of innovation in production.

The advanced countries of Northern America, Western Europe, Japan for the last 10 years have increased in absolute and relative expression costs on RESEARCH AND DEVELOPMENT (R&D). The relative parameter of costs on R&D in a gross internal product (GIP) testifies the state interest in application for innovation. In these countries at the end of the 90-th years this parameter reached 3-3,5%, and in Russia only 0,54%. The steep reduction of financing of R&D in Russia is accompanied by the negative changes in structure of the costs on realization of complex experiments, realization of applied research and development in research institutes.

The applied research and its realization in Russia took almost 70% of the general financial costs on R&D. The modern system of financing of R&D is mainly based on financing through the budget outlays and through various funds. The budget outlays are main sources for fulfillment of large-scale scientific and technical problems and target complex programs. The no budgetary funds finance new technical and technological development. The research institutes are financially detached. They are not connected directly to a produce market, in which the serial enterprises issue the innovations. They have to search financial sources for the activity, resorting to the help of the budget, no budgetary of funds, various type of the investment companies, business banks, financial and industrial groups, foreign investments, private accumulation of the natural persons.

For the duration of the centralized control system Russia allocated on R&D the large money. For example, in 1985 costs on R&D were equal to 3,9% of GIP. However majority of innovations have remained not introduced in production. In many industries it makes 50%. In some branches of chemical industry 30% of the development was only introduced.

The optimum decision of financing applied research can be achieved by the following way. We consider the costs on R&D and introduction of innovations should be included by the special entry into the price of the product, produced by the serial enterprise. The certain share of financial deductions after realization of the product purposefully should come back to reproduction of innovation. One part of this money should be in a special bank for use on research, and the other part of them to intend for innovation costs of the serial enterprise. This decision will promote the development of the market mechanism of the investments in innovations.

Economic, Social and Environmental Indicators of Sustainable Development

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Each locality is a human ecosystem with many unique characteristics. Sustainability indicators measure human ecosystem, and they are most useful when applied locally.

Sustainability indicators are derived from the concept of natural ecosystem indicators. The following list describes the characteristics of good sustainability indicator:

- 1) it consistently reflects the status of a significant and fundamental characteristics;
- 2) it is understood and accepted by community;
- 3) it is statistically and practically measured, yielding defensible data backed by clear logic;
- 4) it has clear, understandable links with other indicators;
- 5) it represents or directly relates to important community values.

A variety of well-known *economic indicators* measure the many facets of human society, e.g. Gross National Product (GNP), Gross Domestic Product (GDP), stock market averages, unemployment rate, poverty level and foreign exchange rate. The GNP, GDP and stock market averages are frequently used to determine the health of an economy. Yet the GNP and GDP are really only intended as a measure of a cash flow, and the stock market averages measures the aggregate stock performance; none were originally intended as a measure of economic health. That's because they register costs on environmental disasters, natural disasters and medical expenditures as positive adjustment.

A more comprehensive indicator than GNP or GDP, the Indicator of Sustainable Economic Welfare (ISEW), depends on data on a wide variety of economic parameters, all combined into a single index. In contrast of the GNP and the GDP, the ISEW includes social and environmental costs too.

Social indicators evaluate human development and quality of life. Sub-components include education, health care, cost of living, crime, cultural diversity, racial/nationality disparities, community involvement and youth issues. These elements are most studied in isolation, often ignoring the important links between them.

One combined social indicator used today is the Human Development Index (HDI) developed by United Nations Development Program (UNDP). It combines measures of education, health care and economy by assigning values and gender and income distributional factors.

The plethora of *environmental indicators* have already been developed at international, national and local levels. These generally include indices for

- air pollution, measuring a number of chemical concentrations;
- water quality, measuring pollutant levels and indicator species;
- wetlands, measuring area;

- diversity, measuring number and type of species.

All give useful readings of environmental quality and sometimes of ecological health too.

Missing from the indicators listed above is idea of interconnection between them and their ability together represent a whole system. Environmental, social and economic indicators are linked in a same way as the system they measure are linked.

Necessary tasks towards sustainability evaluation include re-evaluation of existing indicators, exploring links between them and development of a new ones.

Aquatic Ecosystems' Biological Contamination with Alien Species

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Because of human economic activities a lot of polluted substances are being flowed out into the water reservoirs. This may cause serious changes in animals' or plants' communities as well as in whole aquatic ecosystems' functioning. Another side of the antropogenic effect, a kind of so-called "biological contamination", is increasing invasion of water organisms. This kind of contamination and its consequences on environment in some cases can be much more serious then others antropogenic factors. Moreover, different from any other contaminant, which can be removed from the aquatic ecosystems by natural purifying processes and often is human controlled, alien species can successfully breed and spread in the recipient area and may cause a lot of serious unforeseen problems. As a rule, introduced organisms have no predators or specific parasites in the new environment, so they can suppress or completely force out native species competing with them for food and space or eating them out. Such the affection may evoke a simplification of the community's structure and diminish its stability. Invasion of alien species may also further the aggravation of water quality, distribution of some harmful parasites and diseases.

The introduction from other water systems can be accidental with shipping transport, or by anglers. Or it can be initiated by hidrobiologists (for instance, some crustaceans were introduced in 70's into the Lithuanian waters to enrich the fodder base of native fishes). However, sometimes insufficiently considered attempts of directed invasion caused many negative consequences for the most components of the natural ecosystems.

Nowadays the most common method for spreading of alien species is accidental introduction with ships ballast waters. This process has become a global problem and sometimes it is called "ecological roulette". So uncontrolled pouring off the ballast waters led to installation of more than 20 alien organisms into the Baltic Sea. The influence of these organisms on the Baltic aquatic ecosystem isn't completely studied yet, but it is obvious that they can sufficiently affect the environment.

Description of the Charity Information Publishing Center "Green Dossier" Activities

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In 1995 the Green Dossier started the "antiplastic campaign" which aimed at attracting the attention of the public to the problem of household waste disposal. Another purpose was to unite the public and private sectors as well as non-governmental organisations in order to find efficient ways of sorting, recycling and utilising the household waste.

In Ukraine, just like in other NIS, waste products are gathered together. Only glass, metal and polymer-free types of paper are subject to recycling. All other kinds of waste are sent to incineration plants and landfills without being sorted out. As a result, the waste dumps are overfilled with garbage while incineration plants emit various pollutants into the air. Moreover, Ukrainians are not used to sorting out household waste that could serve as valuable resource for industry. On April 22 in 1995, known as the Earth Day, we used plastic bottles and metal kegs to build the "Headless Humankind Memorial" in the Hydropark, the favourite recreational site of Kiev-s residents. The memorial was placed near the Metro station entrance so that every person passing by could see what we are doing to our planet by turning into huge waste dump. The action was sponsored by company "Rosinka", a soft drink producer, that used at that time only environmentally friendly glass for its products.

In 1996 we built a raft of plastic bottles. By doing so we wanted to demonstrate that we should oppose plastic bottles because they are not subject to recycling. And what is more their chemical formula exerts negative influence on the products within them by changing their quality.

In 1997 we organised a street theatre show in order to call the public attention to the problems of household waste sorting. The costumes of all the participants were made of waste: cardboard boxes, plastic bottles, metal kegs. The show was supported by DOEN Foundation (the Netherlands) and Kiev State Administration.

Later we organised a press-club and invited the vice-director of Kiev-s incineration plant as well as representatives of local authorities, mass media, and NGOs to participate in the discussion. Later the Council of City Administration for environmental protection held a special sitting, devoted to problems of waste disposal.

All these activities were preceded by monitoring of the waste problem and informational campaigns in Ukrainian mass media.

The monitoring made it clear that it is easier for our country to incinerate waste or accumulate it in the landfills. In order to recycle waste we need technologies that in fact exist only on paper. When it comes to their implementation it is always a problem for the government to find the money. In such situation we can rely only on the private sector, but our legislature is far from being perfect. For instance, there exist real legal possibilities on tax deductions for environmental friendly production.

There has even been made a precedent: a businessman who gathers broken glass in Kiev was exempted from taxes. However in order to receive a tax-exempt status one has to prove that he or she has a right to it. The faultiness of Ukrainian legislature can also be demonstrated by the fact that the Parliament passed the Waste Law two years ago, but it has nothing to say about the household waste. At the same time the government promised to work out a separate law that would control household waste which has not been passed yet. Moreover despite the antimonopoly law, the Ukrainian state remains the monopolist on waste and its transportation.

For the last few years there have occurred some companies in Ukraine that possess technologies for plastic packaging recycling and also have the means and desire to work in this market. As a rule plastic bottles are recycled into construction materials (like tiles and bricks) or household goods (like buckets and tubs). Three weeks ago a private company in Odessa opened a centre where people can exchange plastic bottles for money. Pensioners and schoolchildren started collecting bottles right away, because the former always need some extra money to survive until the next pay out day, and the latter as a rule lack pocket money. Besides it is not a difficult job because at present most soft drinks in Ukraine are bottled in plastic packaging, which means these people can easily find bottles to collect.

Nevertheless, the problem of utilisation and recycling remains urgent because these few companies that now work at this market function at the local level and cannot span the whole Ukraine. This means that we need a complex program on waste management that will be attractive to all sectors of the society. We know that the neighbouring Poland has a well regulated waste management system. We are sure that Polish experience would be of great value for Ukraine, because our countries have very much in common indeed.

Besides industrial recycling there is another way of using the household waste. Ukrainian craftsmen make rocket projectors, sculptures, pictures, toys and other incredible things of plastic bottles.

Information about our organisation you can find on <http://www.dossier.kiev.ua>

Environmental Innovations: the Strategy of Modern Enterprises

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At the present time we are at a fork in the road. The world around us is changing. Industry has refined its focus away from simple mass production toward quality. Enhancing quality requires empowering every company to find better ways of doing old tasks. It requires discovery and constant innovation. The blending of environmental and economic considerations into decisions about how to design and produce products – is not just theory. It is becoming an essential part of doing business in all over the world.

The necessity to select the best ways to achieve environmental progress will create an explosion of environmental benefits. Opportunities for environmental

improvements should be identified by the regions and localities, not just by government and international programs. Many in the private sector have led the way in innovating pollution prevention, "design for the environment," life-cycle design, and total quality environmental management. These efforts make the environment cleaner, often at less cost. And these efforts sometimes free up resources so that the companies can expand their environmental investment into the inner cities, harbors, parks, and other ecosystems. When we speak about the life-cycle design it is possible to determine the following strategies:

1. Selection of low impact materials
2. Reduction of material usage
3. Optimization of production techniques
4. Optimization of distribution system
5. Reduction of impact during use
6. Optimization of initial life-time
7. Optimization of end-of-life system
8. New concept development

The new environmental goals must focus on harnessing such "green business practice" instead of just pushing for punishment. An important trend within local communities is the development of a wealth of environmental protection. Innovations that combine ecological rationality and sustainability principles with local economic development have begun to blossom around the world. According to such criteria among the all types of environmental innovations it is possible to define main directions which need to be focused on:

- *Agriculture* (rational land-use; environmental planning agriculture)
- *Green construction and design* (alternative building design and materials for resource conservation; "green" building standards; environmentally friend building projects)
- *City-wide environmental agendas* (integrated municipal projects for energy, water and resource conservation; transportation and land-use planning for "liveable", walkable cities; greenbelt and anti-sprawl initiatives)
- *Energy* (efficiency; alternative generation)
- *Green business* ("green" goods and services; scrap-based manufacturing; eco-industrial parks)
- *Community greening* (parks and greenspaces; urban forestry; "brownfield" redevelopment; community land trusts)
- *Military plants conversion* (building deconstruction; reuse and "green" renovation; civilian mixed-use development on former plants)
- *Transportation* (transit-oriented development; mass transit; solar-powered vehicles; fuel cells; car sharing; bicycle and walking encouragement plans)
- *Waste reduction* (composting and recycling partnerships; reuse operations)
- *Water and air* (conservation/efficiency; retrofit programs; biological wastewater treatment).

Conversion and Utilization of Solid Wastes

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The problem of solid wastes utilization is very characteristic in small cities. In Chernivtsi city this problem is constantly discussed. It is necessary to build a modern territory of storing and conversion of communal solid wastes. Present territories of wastes storing and conversion do not meet sanitary-hygienic contemporary requirements and make population living near such places to protest. Accumulation of solid wastes in the city and its irregular removal made environmental state worse. The situation has been improved after introduction of the private firm "Altfater" in the city for transportation of wastes out of it. However, it is still actual to distribute these wastes into the components: paper, food wastes, glass, wooden material, metals and other materials. Especially this problem concerns utilization of plastic wastes (bottles, glasses, disposable utensils, etc). It is urgent to plan small enterprises of wastes utilization and its conversion in the city.

Besides liquidation of communal solid wastes and solution of sanitary-hygienic tasks, it is also necessary to set economic tasks. The use of secondary resources, its utilization can be profitable. To our minds, it is actual for the city to learn global principles: burning of wastes with gas receiving consequences, compost of organic wastes, creation of reservoirs for getting bio gases. Solid communal wastes in our city include a great amount of biogenne components which allow to produce compost out of them. Construction of a big plant of solid wastes conversion is not purposeful for such small cities as Chernivtsi. In our case a considerable ecology-economical effect can be gained in the result of the co-operation between constructions of solid wastes conversion and other local enterprises. For example, the building of small boiler-rooms on burning solid wastes not far from sleeping areas, however this concept is not possible to introduce because of lack of modern air filters which could meet normative needs of environmental state. At present in Chernivtsi solid wastes transportation is done by two ways, but the method of storing at territories is seen as the most accessible and the most simple. At those territories the compression of wastes is conducted in such a way, that it provides increase of load per square unit. Considerable expenses are needed for work on solid wastes isolation and next the place should be cultivated under such territory. Following such methods every 25 years it is needed to choose a new part of territory and that means to take new plots of land out of use. Besides, such places of storing must be located 15-20 km away from the city.

Analysis that was held, points at the necessity to introduce in Chernivtsi city alternative storing methods of solid wastes utilization. In this case, experience of other cities as Chernivtsi is of great interest to us.

Problems of Domestic Firms Innovative Activity Investment

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As on Ukraine the decay to sales of the majority of the conventional domestic goods lasts, for crisis overcoming the firms should orient predominantly to new production. However there is a problem of looking up of the investments, indispensable for it.

In a most cases of the new goods progression in the market demand considerable costs of mining of the goods, its testing, organization of manufacturing and sales, the stimulation of sales etc. Feature of the ascent on the market of the new goods is a high scale of market uncertainty. By one of the main causes of reluctance of the investors to nest means in effecting the new goods there is that the investments not always pay off (46% of costs on creation and the progression of novations is necessary on items, which one do not find demand).

Innovative financing is a new form of firms activity and its development is enough complex. In Ukraine there are a small amount of firms which are capable to innovative self-financing. The commercial banks too reluctantly go on crediting innovative projects. Another mechanisms of innovations financing are only in the early stage.

In Europe for last 10 years considerably have decreased innovative projects financing with the private capital. The EU leaders see an decision in implementation of the cooperation projects, which are financed at the expense of different sources, that lowers a risk level for separate investor. The similar practice can give outcomes in Ukraine: having developed the principles of innovative projects cooperation financing with the cheating in accounts of distribution of the income from implementation of the project for each it is possible to form the participant depending on a risk level, investment pools under profitable innovation projects. It is not necessary to create for this purpose associations of banks or funds: all problems of distribution of the income can be decided within the framework of the contract between the investors. The international contract right allows to realize the similar projects not only within the framework of one country. For engaging means of the private overseas investors in post-socialistic countries the governments of developed countries have created the special investment programs. In Ukraine since 1994 acts "Western NIS Enterprise Fund", however outcomes of it activity retiring. Most perspective should be turn of a network of investment funds and companies.

For 1.01.1998 to the Ukrainian economy was involved 2 billion dollars of straight lines of the foreign investments or 40 dollars per capita. For comparison in diverse countries of transient economics this index by the beginning of 1997 following: in Hungary – 1000 dollars per capita, in Czech Republic – 400, in Estonia – 320, in Poland – 110. In frame to the overseas capital, which one has entered Ukraine, 60% make fees in the real estate and deliveries "not of the maiden freshness" rigging and only 20% – financial contributions. Fees by the way of incorporeal assets, first of all in the form of know-how, off-the-shelf technologies, management and effectings, make no more than 0.5%. And in addition these fees are directed not to forward areas of modern economics, and basically in foreign trade and food-processing industry, accordingly on 1/3 all embeddings.

About the Activity of the Social Organization "Eco – 129" in the Field of the Nature Conservation

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At the beginning of the new millennium the mankind begins to understand the sharpness of the problem of the interaction of society and nature. It is obvious that the future of the present and future generations depends on the solving of this problem. The solving of the problem of interaction of society and nature can not be solved without the development of new way of thinking, environmental ethics of the mankind in general and every person in particular. Thus, the solving of the problem is mostly the task of the youth.

The authors take an active part in the activities of the environmental organization "Eco 129", which was established on the basis of the secondary school 129, Khrakov. The school is a structural element of the concept of continuing environmental education. Students and teaching staff of the Geology and Geography Department of Kharkov National University give all necessary methodical and practical help to the youth organization "Eco 129", take part in the conduct of the environmental experiment. The main objective of the organization is to unite the youth in order to protect nature and to put into practice the ideas of studying and preserving of nature.

The members of the organization "Eco 129" take part in the working out of different environmental projects such as "Eco Summer", "The First Snowdrop", "Eco – New Year", "The Birch Juice" "The Autumn Leaf", etc. The most active and interested of the pupils take part in the scientific research activities in the teams of the Kharkov section of the Small Academy of Science of Ukraine. Some research are carried out by the order of ecological organizations and have practical goals (e.g. "The contamination of the atmosphere of Dzerzhinsky district of Kharkov by the emissions of automobile transport", "Ecological state of the recreational resources of Kharkov", etc.)

The youth ecological organization "Eco 129" is a member of the regional association of school organizations "Leader 21". It cooperates with Kiev department of "Greenpeace", ecological group "Pechenegi", Ukrainian Ecological League, and Ecological Police of Kharkov, museums of nature and water of the city.

One of the main conditions of the transition towards the sustainable development is the development of the continuing strategy of ecologization of all aspects of life and activities of society. The most important role in the process of solving of the problems mentioned above is played by education of youth. The examples of the organization of environmental activities of "Eco 129" are given in the report. The authors analyze the work experience of the organization and discuss the perspectives for the further research for the next 5 years.

Economic Safety Aspects of Reserve Park "Kinburska Spit"

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This summer clubmen of "KMA Economics club" spent an outdoor seminar in Kinburska Spit reserve. One of the most urgent aims was the acquaintance with economic aspects of reserve functioning. A great attention was paid to some problems, in consequence of which a natural state of Kinburska recreation zone can become worse perceptibly. Mainly they are associated with scales of "wild" infrastructure rest. So the proof of scale is almost always full cutters, which transport people across the estuary from T. Ochakov to K. Spit and on the contrary. It is very important to mention each second person returns to the previous resting-place again. A considerable influx of contemporary infrastructure is also observed from continental zone. In fact a considerable amount of houses are built and mainly for so-called "green tourists" on the reserve territory. The building materials must somehow be supplied. That's why the building of the road has been started which will allow to get into the reserve each driver. There aren't any impediments for this. Moreover holiday-makers and local inhabitants are interested in permission of free reserve visit.

Though it's impossible to protect of untouched nature from savage tourism, the way out from regulation can be found in establishment of certain equilibrium between them.

From microeconomics point of view the reserve is itself the social wealth, for which nobody does not pay and is used by every individual. It means that the marginal utility with every additional visitor to the reserve will diminish, because of him polluting the environment. The recreation zone will not be able to bear a permanently increasing amount of holiday-makers.

We have made the analysis of practical arrangements, that traditionally are used in an economic practice for solving such questions. So we can offer the following solution:

- I. To create a tourist complex with a limited amount of holiday-makers on the reserve territory. Attracting money for investing of this project will not compose a problem, as a high demand on tourist services is observed.
 - II. Entrance on the reserve territory must be limited by vouchers presence, which are to offer with a quota.
 - III. An individual permit must be given to the voucher and it'll allow to abide in the territory of reserve some time.
- So, offered arrangements influence on a limitation of reserve using, and formation of money funds.
- Creation of such tourist complex may solve other urgent problems of local inhabitants.

Ecological Insurance

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Ecological situation in Ukraine is very bad. Verhovna Rada acknowledged its territory as the zone of ecological catastrophe. Expenses for environmental protection and volume of using ecologically pure equipments were twice diminished. It needs an immediate energization of environmental movement. But it's impossible without great financial resources. The opportunities of budget are limited; so it needs an alternative source of ecological financing.

Economic responsibility in well-developed countries is provided from insurance (reserve) funds. Insurance of losses after accidental environmental pollution is well used. Ecological insurance is provided in many countries and is carried out by private insurance companies.

The companies also form the own reserve funds for this purpose. From the end of the 70th the special ecological insurance organizations started to appear. Firstly they were formed in Japan for the oil catastrophes. More then 40 countries have such organizations (France, Italy, Holland, England etc.). They insure more ecological risks than other companies.

But the problem in Ukraine is also that payments' dimension exceed financial opportunities of the companies. In this situation it could be better to use collective form of insurance.

Institutional Ideas and Environmental Reality: Economic Theory for Ecology

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Non-successful attempts to achieve economic goals via economic theories applying often bring discredit on importance of economic speculations. Emphasis in many economic theories is placed in very specific spheres of economy, e.g., monetary policy, fiscal measures, demand stimulating etc. Theories are full of different hypotheses, suppositions, tolerations facilitating theoretical development. And these sides of current economics make it distant from the real status quo in economy. Besides, non-economic factors are not taken into account very often. However we should not forget that substantial practical results are impossible without theories.

One of the leading scientific schools in current economic theory trying to solve, to overcome above-mentioned problems of economics is *institutionalism* (institutional approach).

Before all, utility of the institutional approach is in its ability via institutional mechanisms to solve a large scope of problems, not only economical ones in the full sense. One of the founders of institutionalism, *Ronald Coase*, formulated basic principles of *transactional approach to economic organizations research* (connected

with the "transactional costs" concept) and *privacy rights theory*. The main Coase's conclusion is: *if privacy rights are clearly defined and if transactional costs are slight, then resources allocation will stay fixed and optimal, not depending on re-distribution of privacy rights (Coase's theorem)*.

The main idea of this paper is in the possibility of Coase's ideas use in ecology, especially in connection with so called *externalities* (airport noise disturbing local inhabitants, industrial smoke polluting air in the districts of neighbouring houses etc.). On the base of Coase's theorem it is possible to achieve environmentally and economically optimal allocation of resources and external effects via free trade in the sphere of rights to pollute environment in admissible limits. Therefore, levels of emissions are defined by rights bought by every agent. Consequently, producers become interested in use of environmentally more pure technologies to re-sell their rights to pollute to those who are not successful in this sphere. The other useful side of institutionalism in ecology is in its attempts to solve environmental problems creating new forms of institutions minimizing negative effects of other organizational systems in this sphere, that is one of the ways to solve problems is in *institutional design*.

Polymers and Plastics as the Source of Environmental Pollution

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It's a well-known fact that polymers and plastics occupy one of the primary positions among other materials, the sphere of usage is wide. However, now the mankind faces a range of problems, connected with polymers. First of all, a lot of synthetic materials have some toxic effects and therefore, either used for packing food products, medical equipment or because of the migration of harmful substances into environment (not only during usage, but also in the processes of utilization) can cause harmful impact on human health, living beings and environment. Another problem is the great amounts of plastic wastes. They can be either eliminated, which also has some serious consequences for the condition of environment, or recycled. It is now possible to find a wide range of opportunities of recycling the polymers wastes, some of such technologies are really useful and convenient, and are worth being provided into life in the state level. It is still a problem how to separate plastic wastes from the garbage so as to make the whole process of utilization as cheap as possible. The significant success in the solution of these problems has been achieved by many countries of the world, so global cooperation can bring the most effective and positive results. Besides, the whole problem has much in common with the creation of systems of waste-free production, the most possible approximation of the producer and the customer, forming new types of economic systems and so on. The solution of the problem depends strongly on the government of the state, so there's the necessity in investigating such questions on the state level.

Environmental Management in Ukraine

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After a 20-year incubation period, Environmental Management is now accepted as the leading operational concept for organizations aiming to improve their environmental performance and work towards goals such as eco-efficiency, sustainable production patterns and development. The mid-1990ies are the turning point in the trend away from command and control towards more voluntary or market based instruments.

Organization and managing projects of environmental use, operating now in Ukraine don't provide coordination of economic and environmental protection aims.

The reforming of Ukrainian economy and mechanism of realization environmental management system must not be separated. This principle is the base for "The main direction of Ukrainian state policy in the field of environmental protection, using natural resources and providing ecological safety".

Concerning the ways of reforming mechanism of environmental management in Ukraine it is useful to transform methodological base we have today and to emphasize the new, more efficiency market instruments of environmental using.

Many countries have stored up a great experience of using different economic tools of environmental management. The main of them which can be used in Ukraine are grouped in several ways:

- tax-tools;
- tools of credit sistem;
- eco-payments for pollution;
- price tools;
- payments for achivement of ecoresults;
- selling of ecorights for pollute;
- eco insurance;
- market certificates.

Non-Timber Forest Products

Helena Fornazarič, University of Koper, Slovenia

"You can't see the forest for the non-timber products" doesn't sound quite as good as the original, but it is becoming an accepted fact: there are alternative economic resources in the forests besides timber. Plants, lichens and fungi have been valued and used throughout history. We have recently given them a new name: non-timber forest products (NTFP), reflecting our constant interest in the economy of things. The most common NTFPs in the Pacific Northwest are used as floral products, medicinal herbs, edibles (mushrooms, berries), and transplants for landscaping. Wildcrafters, or NTFP harvesters, are not easily characterized. Some folks are experts on the flora of their local area. Others may travel throughout the region following seasonal timing for best quality. Different products attract different

harvesters. Some products are typically harvested by groups of migrant pickers, often Asian or Hispanic workers. Other products are mainly collected by local harvesters for personal uses or small local businesses. Some large industries contract with pickers for commercial quantities. In contrast to trees, many NTFPs can be sustainably harvested more frequently. NTFPs are an exciting economic opportunity in place of or in combination with timber harvest. For example, after a fire, although timber trees may have been lost, some of the early seral species, those which rapidly take hold in the open spaces after a fire, are NTFPs. By utilizing these species for the few years they are abundant, the land manager may be able to maintain a more constant profit, and actually reduce the amount of trees necessary to harvest later. Non-Timber Forest Products, typically smaller plants, tend to have narrower habitat ranges than trees. They are more sensitive to ecosystem changes. In the process of re-learning the value of these species, we not only find more income opportunities from our forests, but greater incentive to assure that management is sustainable for the entire ecosystem. Since many of our forests are dense due to fire suppression, ecosystem management can involve thinning great numbers of NTFPs. These include small diameter materials and brush (manzanita, ceanothus), but for species are likely impacted as well. Can we get in before the large activities and salvage any for populations that will get destroyed by the thinning? Can we find markets for the brush species and smallpoles that come out as part of the management plan? Where starting to research the possible markets for the shrub and for species that are common by-products offer work in the forests.

Environmental Management Development in Ukraine (EMDU) – a Ukrainian-Canadian Program for Rehabilitation the Dnipro River

Igor Iskra, International Development Research Center, Ukraine

The International Development Research Center (IDRC) is started to implement EMDU program in Ukraine based on memorandum of grant conditions with Ministry of Ecology and Natural Resources. The goal of EMDU is to support and strengthen on-going reform process in Ukrainian institutions for better environmental protection activities, to improve economic and investment policy and to increase environmental awareness among the Ukrainian population. The overall Canadian contribution to the program exceeds 10 million CAD. The program is going to be terminated at the end of 2000.

There are seven main components in the program: drinking water quality management, public outreach through television programming, development of environmental management informational systems, development of biotest system, environmental audits and clean technologies, investment and environmental entrepreneurship, ecology and economy of solid wastes.

IDRC is giving research grants to local organisations to support projects recommended, monitored and approved by a local committee of experts with vetting by IDRC. As necessary IDRC provides management support and technical guidance to grant recipients.

Complex Ecological System Modeling

Rais Imayev, Kharkov State Aerospace University ("KhAI"), Ukraine

A mathematical model in ecology, as in the other sciences, is not a goal, but a means of studying the actual system. Therefore, it is essential know and understand the possibilities and limitations of such mathematical models, and of using them in various tasks of both theoretical and practical ecology. Among these various task are eco-system behavioral forecasting, choice of optimal strategy of eco-system exploitation, population control, ecological estimate of agricultural technologies, etc.

The imitating process model itself must stand as a foundation of any imitation dialogue system which we might develop. The imitating process model is a model that allows us to perform a process within given parameters. Analysts receive information about a process as that process plays itself out. They then analyze that information and introduce influences to control the process.

It would be very helpful to use computer applications (expert systems) instead of analysts to guide and control such imitating processes. Fuzzy logic controllers help to build such expert systems. A computer application can be built to control the ecological system. In such an application various modules can be represented as unique and independent expert systems that can give certain influence on any other modules of that system.

A.Y. Sokolov, associate professor, department of computer science, State Aerospace University in Kharkov, guides a group of students in such work. They are involved in research and application design in that field of study. The end goal of such research, and of the working applications that may come from it, is to make life easier for people everywhere.

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Energy Conservation as a Factor of the Country's Economical and Ecological Welfare Increase

Irene Sotnik, Sumy State University, Ukraine

The changes we are currently observing in the earth's climate show a general tendency towards warming, namely, an increase of the global average near surface air temperature of about 0,4-0,7 K over the past century. Among the uniformly mixed greenhouse gases, CO₂ shows the largest effect. Today the main source of the CO₂ emissions into the atmosphere is the processes of energy producing and

consumption. In order to avoid the global ecological catastrophe we must reduce the volumes of our energy consumption.

Since 70s the energy conservation policy has been carried out in the western countries. It has given them a real opportunity to increase their economical and ecological welfare by saving power resources and reducing the volume of CO₂ emissions. The realization of the demonstrative projects in western countries (project "Sustainable Cities Europe", JUPITER, ENTRANCE, ANTARES etc.) by the Commission's Energy Directorate (DG XVII) support has shown their high efficiency.

The deficit of the own fuel resources, unsatisfactory ecological conditions, increase of the GDP power capacity during the years of the economical crisis have caused Ukraine to address to the energy conservation policy. The Ukrainian law about the energy conservation was adopted in 1994, then the Integrated State Energy Conservation Program of Ukraine (ISECPU) and regional energy conservation programs were elaborated. ISECPU determined the general energy conservation potential for Ukraine at the level of 145-170 mln t of standard fuel or 42-48% of the energy consumption level in 1990. The Program contains 3 phases of its implementation: the first – 1996-2000, the second – 2001-2005 and the third – 2006-2010 according to the Ukrainian economics gradual going out of crisis. ISECPU pays a lot of attention to the creation of the economical mechanisms of energy conservation policy's realization such as the formation of the legal base, management system, financial mechanisms of energy conservation.

In 1995-1998 the Energy Conservation Program for Sumy region was elaborated and the practical recommendations about the power resources productivity increase were designed. The general energy conservation potential of Sumy region was estimated as 2690-2859 thousand t of the standard fuel or 32,5-34,5% of the total energy consumption level in 1990; the technically probable and economically effective potential was 2080-2154 thousand t of the standard fuel or 75,5-77,3% of the general potential. The practical low-cost potential makes 1404,8-1450 thousand t of the standard fuel or about 68% of the technically probable and about 52% of the general potential. The total costs of practical energy conservation potential's realization makes about 240 mln dollars. One of the important moments of Sumy Region Energy Conservation Program is the creation of the energy conservation management system. The formation of the financial sources of energy conservation and creation of the energy conservation infrastructure are the main parts of this system.

The practical implementation of the Energy Conservation Program in Sumy region has already began: today we have the positive shifts in the building sector and now step-by-step the market of the energy conservation technologies is developing.

The similar tendencies, in case of their strengthening, makes us hope for the speed overcoming of crisis phenomena in the economics of Sumy region and Ukraine as a whole.

Forests in America

Damjan Mešiček, University of Ljubljana, Slovenia

From Native American communities to our present day societies, forests have been an integral part of the daily lives of people in the Northwest. We have been using the forest for food, building materials, recreation, and to generate cash income. Over the past 40 years we have seen a dramatic change from small, locally-oriented to industrial uses of the forest. Small scale harvesting became a booming industry and then began to decline. Today, most of the easily accessible big trees are gone, the demand for wood has continued, and increased technology allows more harvest with fewer workers. We've been having a harder time - grappling with the economy of this place. This newsletter focuses on economic incentives for sound forestry. Our forester will take us on a tour of the rapidly evolving forest-certification movement, and the Institute's efforts to bring concrete definition to the idea sustainability. Adding to this is a review of our several years' efforts in developing non-timber forest products as an opportunity for new uses of forest lands and creating renewable products that cover a broad range of market opportunities. Our goal is to find a balance point, where healthy economies and ecologies co-exist with human culture as we enter a new age and a new century. For the past seven years our work has been moving forward these ideas - a forest system that can be sustained into the future, nourishing and providing for us, our communities, our children's children. The high paced economy of industrial forestry could not be maintained. By the late seventies, established industry had successfully driven unions out of the woods by shifting to small independent logging units. In the early 1980s, the number of jobs and pay of those jobs began to decline. By the end of the 1980's a dramatic transformation was clearly under way. Mechanization, changing world timber markets, declining availability of large diameter trees, and changing ideas about how forests should be managed were all transforming the industry.

So, as we entered the last decade of the 20th century, we had a largely mechanized timber industry dependent on high volumes of lumber. To pay for expensive mills, logs had to keep coming. But the number of jobs that each log supported was declining. Many communities were directly and indirectly dependent on this economy for their well being.

Economic Tools of Stimulation of Nature Protection Measures. Future Prospect (Example of Ukraine)

Alexei Nikitin, Kharkov National University, Ukraine

Situation The most efficient method of the ecopolicy today is applying a system of economic and legal tools. In most cases traditional systems of tools of environmental management are not efficient.

The state of the art of countries with transitory economy needs fundamental change of the policy in the field of environmental management

Most actual in the sphere of environmental management today is reforming a traditional system of economic tools, to boost their stimulative activity, introduction of new economic tools. The large attention in the work will be given to a tax system, introduction of the fringe benefits and approbations.

The purpose of the report is to define reference directions of reforming of existing economic tools (tax system, system of payments). And also to reveal reference directions in development of stimulative tools of environmental management for countries with transitory economy.

Sources and methods of research:

- Analysis and review of relevant publications digest of the laws and normative acts of Ukraine on environment, official state sites in Internet.
- Work with official and unofficial organizations in the environmental sphere.

Importance of issue:

The relevance of the given problem is defined by the fact that at the present stage progressing of countries with transitory economy applying of traditional economic tools does not give considerable economic benefit

The applying of new stimulative mechanisms will augment quantity of the received means by nature protection measures, will increase productivity of the received means. An environmental quality therefore is improved. The introduction of the padding stimulative tool, will give the greater economic benefit, than introduction of several economic or legal sanctions (fines).

It is necessary to take into account that the meliorating of a state of the environment depends mainly on more rational approach to the problems of management of nature and resources-economy. Even in the conditions of economic instability the problems of the ecopolity of the state should leave on the maiden place.

Analysis of Role of the Internet in Promotion of Public Participation in the Environmental Decisions

Alexei Varivoda, Kharkov National University, Ukraine

Situation: Under the conditions of aggravation of ecological crisis, the role of a public in acceptance of the environmental decisions becomes more and more powerful, and the Internet has got function of the unique intermediary between the man and environment. In turn the participation of public is characterized, firstly, by its interest, i.e. is directed by the willinness to participate in acceptance of the decisions and, secondly, by opportunity of realization of these decisions. The first motive is served directly by a) a condition of environment and indirectly b) by the

information contained at the environmental sites of the Internet, as informational-educational tool. The author has put a task:

I. To analyse environmental information on the Network, where the preliminary analysis has allowed to make the following conclusions:

- a) All sites can be divided by the levels of organizations developed the given sites, namely the sites of the international, intergovernmental and governmental organizations, and on directions, on which the information is designed: such are educational structure, public level and other informational sites.
- b) Resources of the English-language environmental information at the Net are practically boundless in comparison with Russian. In quality and convenience of usage the same is true.
- c) Independent of the level of the consumer, information ascertaining the facts or results of research is colourfully submitted but the information capable to interest the highly professional consumer is not allocated.
- d) It is a lot of the "cheap", general theoretical information and lack of urgent practical references.
- e) At many sites of large and influential organizations there are references to the every possible grants and workplaces, which are really accessible to the educated man.
- f) The significant share of the sites has the information on possible meetings, contacts, opportunity of the publications of the materials, reports or reports.

II. To define a degree of availability and interest of use of the environmental information by broad public and population of the post-Sovietcountries on an example of Ukraine.

III. To allocate the factor of quality and to compare Eastern European sources of the information with the Western ones.

IV. To make an indirect conclusion about environmental education of the population of Eastern European public.

V. To emphasize importance of participation of public in acceptance of environmental decisions in the concept of sustainable development. To discuss this fact, as the precondition to transition of mankind to a new stage of development, where the decision on global environmental questions will be environmentally friendly realized especially via well-informed approach of generalpublic.

Research: direct work in the Network and analysis of the information from GIS journals; reviews and reports on economy of Ukraine served as the basic material for the report.

Importance of Issue: During an aggravation of a global ecological situation, education, knowledge and the participation of general public in the environmental decisions plays a priority role, and the most powerful tool of realization of the given factors is the Internet. And urgency of use of the Internet by a society in the decision of global environmental of problems also consists in its importance.

Value Estimation of Losses from Pollution During Industrial Process

Irina Rozora, Kiev National University, Ukraine

Ecological problems become global ones during the 20th century. These problems should be considered by ecologists together with economists, mathematicians, and others, using integrative approach to solve them.

Around the world, humankind's economic activities and the competition for wealth among nations contribute daily to the destruction of the environment and the depletion of natural resources. As environmental problems escalate, environmentalists and economists are beginning to understand that they are looking at the same problem from different points of view.

The erosion of soil, urban blight, disease, acid rain, global warming, the extinction of species—all these environmental issues are viewed by economists as facets of a greater crisis that results from global problems in agricultural and industrial production. Economists search for the causes of environmental destruction by studying imbalances in world trade, international debt, and the inequities in the worldwide division of wealth, power, and land between and within nations.

The Earth is a living dynamic system; as such it can survive only by achieving a sustainable balance within its various subsystems, within interactions of human beings with their natural resources. Achieving a sustainable balance means maintaining levels of resource use, industrial activity, agriculture, population growth, and so on, that can be sustained for generations to come.

Current circumstances, such as rapid population growth and environmental problems resulting from global economic activity, dictate that humankind can no longer ignore these factors. Humans simply cannot afford to dismiss the limits of the planet or the greater community and society in which economic activity takes place.

It seems only logical to acknowledge that global economic activity must function within the natural and social boundaries of the planet. It certainly has no place else to function. The Earth is the ultimate source of economic capital because it is the only sources that are converted to goods and services in the economic subsystem.

Because most of human activities in different field of industries results to depletion of natural resources and our flora and fauna, I'd like to present some integral appraisal of value of loss depending on the pollution by industrial productions in all region Σ . For this let's consider differential characteristics which describe the quantity of biomass of given component l , which is lost in consequence the pollution by aerosol j , into consideration on a unit of an area in a unit of the time of single aerosol's concentration. Let's mark it in $nlbjl$ ($j=1,2,\dots, m$; $l=1,\dots,s$), where $nl(x,y)$ – density of l -th population in the Σ region, bjl —the loss in biomass of this population into consideration on single density. Then full loss of the component of biomass l from aerosol pollution with concentration η_j in the Σ region for one year can be describe by formula

$$Bl_j = \int_0^T \int_{\Sigma} nl * bjl * \eta_j d\Sigma.$$

Today business organizations are faced with increasing environmental concerns. Consumers are demanding environmentally safe products, investors are demanding environmentally responsible business practices, and government regulation is increasingly targeting environmental protection. Is it possible to make strategic decision that are both economically successful and sensitive to the Earth's natural environment?

It is important to examine environment pollution not only by means of chemical and biological analysis but also from the with the help of economic analysis, value estimation, dynamic modeling.

The Recreation Zone of Lithuanian Seacoast and its Problems

Raimonda Kaupyte, Saulius Faidušas, Klaipeda University, Lithuania

The Baltic Sea is the brackish-water sea and one of the most isolated seas, because of the limited water exchange with outside world. However it is very sensitive sea for the harmful effects of activities of millions people on land and at sea. There is over 80 million people living in 9 countries on the Baltic seashore, which are all heavily industrialized. The sea is constantly furrowed by different kind of ships. The more economic significance of the Baltic Sea is increasing the more urgent is becoming its pollution.

Only 94 km of the Baltic Sea coast belong to Lithuania. The seashore is not the same, simultaneous. There are some natural objects under protection, such as wonderful beauty of Curish Lagoon with its "gold" sandy dunes, urbanized territory (cities, recreation zone), and industrial establishment such as Butinge oil terminal near the border with Latvia, which is constantly observed by different scientists. However the little seacoast region make us purposefully use every piece of its land area.

The anthropogenic influence changes natural processes; it accelerates pollution and eutrophication. The main sources of pollution in the Baltic Sea are sewage water and polluted river water. Actually increasing transport of oil products (about 100 000 tones per year) makes a great effect on the Baltic Sea pollution. For that reason the Sea contamination with oil products have increased about 30% of late years. However the significance of our seacoast recreation is decreasing nowadays because of the decreased area for the tourism business and other activities. This area is occupied by urbanization and industrialization.

Some Methods of Preventing Greenhouse Effect

Anna Gubar, Ivan Otenko, Sumy State University, Ukraine

Every year humanity discharges approximately 5.5 billions tons of carbonic gas into atmosphere of the Earth after burning different kinds of fuel.

Plants partially absorb carbonic gas in the process of photosynthesis, but most of it remains in atmosphere and results in greenhouse effect.

However, experimental data doesn't give grounds to think about loosing biosphere sustainability, as well as about its degradation.

Though, anthropological impact on biosphere is really significant. In order to reduce this impact it's necessary to decrease fossil fuel consumption and to use alternative power sources and to restore tropical forests.

With the present stable fossil fuel consumption, there should be forecasted the following carbonic gas concentration growth in atmosphere: 360-385 millions in 2000, 400-580 millions in 2050, 420-900 millions in 2100.

We can be sure enough in predicting future climate changes due to current increasing of carbonic gas concentration in atmosphere. It is believed that aggravation greenhouse effect caused by burning of fossil fuel will remain to be the most significant climate changing factor.

If carbonic gas concentration doubles, average temperature will increase by 2.5 degrees, so in 2050 it will grow up by 1.5-2.5 degrees and the ocean level will rise by 35-55 cm. As a result coastal regions of some countries, especially Japan, Bangladesh, Senegal, Nigeria, Uruguay, will suffer from floods. Total annual precipitation will increase by 3-15%, but will vary from one part of Earth's surface to another. That's why desert areas expansion and shift of all climatic zones from equator to poles approximately by 500 km is expected.

As far back as the 1977-year Italian power engineering specialist E. Marketti offered to separate carbonic gas from the smoke of power stations and pump it into ocean cavities where it should stay forever. However, approximate estimations in 1984 revealed that electrical energy cost would be doubled.

Nowadays, when signs of global warming appeared, specialists work on the problem of efficiency increasing and cost reduction of this process. Although, they say, it's almost the same as to sweep rubbish under the carpet.

There are some mines with the large amounts of methane, so coal mining will be not only complicated but dangerous. Canadian engineers try to pump power stations smoke (electrical energy cost rises low) into these beds, because smoke displaces methane which could be used.

In the USA coal deposits of this kind are able to store all carbonic gas discharges for 6 years, that accounts 37 billions tons. In American underground reservoirs of salty water, which is useless for drinking purposes and others, it is possible to store nearly 500 billions tons of carbonic gas. There are so many useless water reserves in the world, that there could be hidden carbonic gas discharges for 350 years.

Norwegian engineers pump carbon gas into underground beds at a depth of 1000 meters under the ocean floor on the artificial island in the middle of the North

Sea. Annually Norwegian public enterprise "StatOil" gets rid of 1 million tons of carbonic gas.

As a rule, carbonic gas is separated from fuel and discharged into atmosphere in this case. But amount of company's discharge is so big, that it should account 3% of total Norwegian discharges and company should pay \$50 millions fine per year. That's why company paid 80 millions for special equipment to pump carbonic gas in water-bearing level under the ocean – 1 million tons of gas annually. It will last for the nearest 20 years.

However, critics of this proposal notice: nobody knows how this present will influence the deep-water animals and microorganisms. Thus, we need many years and funds to see the consequences of the results of this project.

The Problems Utilisation of Solid Domestic Wastes

Vlad Markov, Sumy State Pedagogical University,

Yulia Sibirko, Irina Sibirko, Sumy State University, Ukraine

To the end of the 20 c. a great amount of wastes is amassed on the Earth. According to the data of UN every year 5.2 millions of people, among them 4.0 millions of children, die from the diseases which take place as a result of the wrong putting out of the wastes and of the wrong disposing of the sewage.

A total world volume of the wastes is more than 300 millions tones. The amount of them increases by 4-6% a year.

It is considered that in average one city inhabitant produces about one tone of solid wastes a year.

The problem of s.d.w. is in terms of their decomposition book:

paper decomposition – 2-10 years;

polyetilen – 200;

plastic – 500;

glass 1000.

The removal of wastes to the dump predominates in most of cities. The dumps occupy a great territories. Also concentration of wastes promotes to the reproduction of flies rodents, pathogen microbes.

Another method is burning. Most of all by opened method, on the dumps. Great amount of ashes with toxic substances and gaseous emissions are amassed while burning. But it is one of the most spread methods.

The industrial methods of recycling wastes are the more profitable. The great role in the recycling wastes plays the sorting. Ferrous, non-ferrous metals, energy are received.

In the European countries 30-50% of the s.d.w. is recycled, in the USA – 60-70%, in the developing countries – 7-10%, in Russia, Ukraine – 3-5%.

The problem of wastes utilisation try to be resolved in many countries. Immediate salvation of this problem is required. We need the rising of amount of investments, quantity of recycling and involving new technologies to this process.

Participation of EcoNGOs Activists in Conservation of Medicine Plants of the Carpathians (*Gentiana lutea* L. *Rhodiola rosea* L.)

*Andriy Skakun, Chernivtsi Faculty of
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World communities' understanding of danger of further loss of bio-diversity and the necessity of conduct of practical actions aiming at its conservation, resulted in the Convention on bio-diversity adopted by UNO Conference on environment and development (Rio-de-Janeiro, June 1992)

Conservation of plants and animals bio-diversity became actual problem in Ukraine. In Ukraine the Conception on bio-diversity is prepared (decree of the Cabinet of Ministries of Ukraine dating from 12.05.97 № 439, it was agreed by Verkhovna Rada of Ukraine (Parliament) in 05.03.98), the project of the National Programme on bio-diversity of Ukraine is prepared till 2015. Among the means of the National Programme realization, beside legal, financial and organizing, there are scientific-methodological and educative-informational ones. The latter means expect involvement of wide levels of the public in the programme realization. In this case joint expeditions and projects of the scientists and activists of ecoNGOs are of great value (lately because of worse funding of fundamental and applied science, many scientists become volunteers, do their work free of charge, and also use their free time for writing public projects and assist in realizing them). Monitoring system improvement, including taking stock of natural resources, control of cadastres on the basis of database establishment and geoinformational systems of bio-diversity in most cases can be solved by way such joint expeditions.

Using the above-mentioned approach, during the public expeditions of ecoNGOs of the region in 1995-1999, the author conducted the following researches. During the mentioned period it was described dozens of populations of rare plants and those under extinction of Chornogora, Svydovets, Horhany masses in the Eastern Carpathians. Besides, it was pointed on evident decrease of natural habitats areas of *Gentiana lutea* L. and *Rhodiola rosea* L. in Chornogora mass, described by a row of researchers in eighties. In most cases, in Horhany mass only populations of *Gentiana punctata* L. was described and *Gentiana lutea* L. was not almost met. Organized expeditions gave the opportunity to initiate a proper system of observation and monitoring of change of *Gentiana lutea* L. species bio-diversity. The extinction from population is stated of more valuable species (from phytotherapy point of view) - *Gentiana lutea* L. Besides there is the change of age structure of valuable medicine plants populations in the Carpathian region. For example, in our observation of plant populations in most cases prevail juvenile plants, that could be the result of intensive destruction by people of reproductive specimens as valuable medicine material.

Besides scientific meaning, public ecological expeditions can serve also as a considerable instrument in the awareness formation of careful treatment to the environment.

Stimulating Environmental Action in Small to Medium-Sized Enterprises

Ivashova Nadeghda, Sumy State University, Ukraine

The importance of the SME sector

Communities are forced to cope with a variety of social, economic and environmental impacts. Those communities with declining traditional manufacturing industries often have an unwelcome legacy from these activities in the form of environmental degradation. In addition to the direct negative effect of the loss of jobs, the poor environment can be a threat to that community's ability to retain its workforce and to attract new business.

Those SMEs in the service or new technology business may not believe that they operate in areas that have any environmental impacts. Opportunities may again be missed.

Barriers to improving SME environmental performans

SME owners and managers cite a whole raft of reasons why it is important for them not to address environmental issues related to their business. A list of typical reasons why they should not address environmental issues follows:

- I'm a small or medium-size enterprise: "What a environmental effects?"
- You should see what ... (multinational) gets away with!
- If I'm caught I'll plead ignorance and then do something, perhaps.
- I'm won't make difference, when everybody else does something then I will.
- I'm too busy to deal with quality, heals and err, umm, environmental issues.
- Consultants are for large companies with lost of money.

Groundwork's experience in assisting SME's in improving environmental issues

Groundwork has taken a very proactive approach to contacting local business with support from its partners. This literally means personal calls to every business: very hard and expensive, but ultimately rewarding.

Groundwork provides three key levels of assistance:

- Motivation
- Support
- Solution

To motivate an SME, the main features stand out:

- Cost savings
- Legislative compliance
- Market profile

To support an SME:

- Grants
- Personality in whom ti place trust
- Information practice transfer
- Workgroups

- Signposting

The solutions are:

- Checks
- Best practice reviews
- Audits
- Training
- BS 7750
- EMAS regulation
- ISO 14001
- Health and safety
- Quality
- Total quality management
- Integrated management systems
- Others.

Helping business leaders achieve quantifiable and sustainable results based on their own interests is fundamental to demonstrating the positive link between environmental concerns and business.

Implementing Environmental Management Systems and Decision Making Process?

Natalia Vakulishina, Sumy State University, Ukraine

At the turn of the century and hand in hand with the local Agenda 21 processes an increasing number of municipalities are gaining experience with implementing environmental management systems. The driving force is to turn a stop-gap environmental policy into a long-term perspective of targets and actions, to be undertaken in order to meet the needs of sustainable development.

There is, however, some confusion in using terms like environmental management or environmental audit. Sometimes they are used to mean industrial pollution control, sometimes to describe a more pragmatic way of handling environmental issues.

Managing environmental questions has always been complex, involving different media, different polluters, different responsibilities and players, different effects, different groups experiencing various impacts and so on. Many management tools have been developed. However, different people tackling similar problems have often come up with similar solutions.

A lot of apparent complication is because different groups have chosen different words for the same thing, or the same words for different things. This is a particular problem of decision making process with some phrases such as environmental audit which sounds technically precise but currently used to mean several things.

Integration by Participation: Ukraine Participation in International Environmental Conventions as the Way of European Integration

Sergei Velichko, Kharkov National University, Ukraine

Introduction. Problem of Ukraine participation in International Environmental Conventions consists in the fact that most of the signed by Ukraine International Environmental Conventions do not comply with the basic objectives and principles of Ukrainian environmental policy. That fact arises two questions: is the signing of Conventions really important for the state and are the objectives and principles of Ukrainian ecological legislation established correctly. Reasons of such non-correlation author sees in the difference between environmental policy principles of Ukraine and of those of European Union as the main initiator of International Environmental Conventions.

Research. Comparison is aimed to determine a correlation and the differences between Ukrainian and internationally accepted environmental policy principles, especially in the fields of public involvement. Reasons influencing the correlation are investigated and the suggestions of the results are proposed. Unification of these reasons, correlation and results with taking into account 25 years experience of European Union in environmental policy defects. They define difference between desired and possible perspectives of Ukrainian environmental policy, which indicate changes needed to be undertaken to make from desired perspectives possible ones. Decisive is that one of the way of changing national environmental policy is ratification by the state of International Environmental Conventions. Thus uncover great principles and benefits for Ukraine in participation in International Environmental Conventions.

As the sources author uses Ecological Legislation of Ukraine, conception of European Union environmental policy, Convention on EIA in transboundary context Espoo 1991, Convention on access to information... (Arhus 1998).

Importance of the issue. These documents analysis testifies considerable difference between European and Ukraine approaches in environmental policy-making. Since European Union environmental policy is greatly developed, Ukraine needs for constructive changes in the field of managing environment. In that case participation in International Environmental Conventions is of great importance for the state. That participation gives Ukraine real perspectives in European integration by introducing lacking provisions and measures in ecological legislation that indirectly contributes to environmental policy success. They are environmental policy integration in other policy areas, preventive strategy entrance, damaging activity avoiding, environmental rights development and forming of environmental ideology. That exactly testifies significant meaning and real development of participation in international treaties and of transparency of interrelations between the states.

Experience of Development of The Simulation Model-Game "World 2000"

*Olga Sumina, Sumy State University,
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The necessity of the problems solution of quality management of an environment today is understood to the full. The major approach to their solution is the comprehension:

- Integrated approach ecologo-economic, socio-economic, demographic, is structural-organizational of interdependence and their closure;
- Openness of ecological systems;
- Sequences and eligibility of different kinds of effect of the antropogeneous factor on an environment;
- Necessities of development of the strategy and tactics of management of a ecology economic complex with allowance for of constant increase of quality of life and maintaining of excellence of an environment.

The complexity of these correlations forces to consider modern production and natural ecosystems as a uniform ecology socio-economic complex.

The understanding of links between elements of this system most of all restrains by impossibility of experimental confirmation of regularities managing in development of those industrial integrated relations of company, within the framework of which there passes all human activity. Even the use of a plenty of the visual allowances does not save an appropriate material abstract exposition.

For a research of processes in this complicated system, and also for the purposes of management the simulation model-game "World 2000" was developed. The model-game allows to simulate not only system, but also control procedure by it.

The simulation model "World 2000" – complicated system consisting of the following interconnected blocks, describing it:

- National economy (industry, agriculture, mineral raw material, transport, service etc.);
- The environment;
- The population;
- Quality of life of the people (health, feed, culture, formation etc.);
- The profit.

The game consists of 25 years, where each round-control action on a system and deriving of outcomes of this effect for one year.

Control action is understood as the profit distribution with the purpose of a modification of significances of the model parameters. The purpose of game consists of choice of such sequence of control actions, which has supplied stablis and most heavily growth of well-being of the people (quality of life).

In summary game the evaluation of activity, performance of activity, condition of a models obtained in an outcome of game is removed.

The realization of a model as the simulation model-game "World 2000" has allowed to simulate process of development of global economy with allowance for of initial condition of a system and solutions, accepted by the manager.

The realization of a model on the computer has allowed to achieve speed, exactitude and obviousness of process of simulation. Has become to possible preservation of the best outcomes and their consequent analysis.

The simulation model-game "World 2000" with success can be used in those to an orb of preparation of the economists, managers, and practical ecologers, where are necessary experience in development and acceptance of optimum solutions and practical skills of management of complicated systems.

The Strategic Directions Ecological of Ukraine's Stable Development Safeguarding

Yuri Ulyanchenko, Kharkov State Agrarian University, Ukraine

Ukraine's transition to the stable development demands social, economic, ecological and political state institutions which must form reliable mechanisms for transition to the stable development both on the state and regional levels on the basis of law and economic methods.

The state plays a dominating role in securing of the safety guarantees in political, social, ecological, defense and other spheres of the society's activity.

The principal changes in different directions of the state's ecological and economic policy must become the main key factors of the formation of the system of Ukraine's stable development.

The strategic direction of the economic reforms lies in their social and ecological orientation, which is realized through the solving of following main tasks:

- the improvement of the social, economic and production labor conditions;
- the increase of the people's real income on the base of the state regulation of wages and pensionary provision;
- the growth of the people's educational and cultural level;
- the improvement of medical service;
- the strengthening of the environmental protection;
- the creation of the favourable conditions for the health, maternity and child protection.

The complex of measures which should be taken for the creation of the country's stable development base must be realized for 3-4 years.

The gradual formation of the stable development potential, first of all, connected with the active structural policy in the material production sphere.

Such a policy lies in the creation of the highly developed national economy complex that can meet the requirements of the market farm and ecological security.

The complex programmes with special purposes that must be the base for the achievement of the production and consumption balancing and specific, technological, branch, reproductive and territorial structure of the productive force as well, must become the base for the formation of the ecologically directed state's structural policy.

The achievement of the purposes of the stable development requires the creation of the effective production in combination with the change of the consumption structures. In connection with this, we must carry out the policy which can allow to secure the economic growth and prosperity simultaneously with the decrease of energy, raw material and production income expenses.

The expediency of the cardinal changes in the material production and industry spheres demands:

- a stage by stage ecologization of the production process;
- the changing of the production profiles and abolishment of those branches that don't meet the state's requirements;
- the reconstruction of the technogeneous environment, technical requirement of the production on the basis of the introduction of the newest scientific achievements, energy and resource preserving technological processes, the using of the renovated energy sources;
- the solving of the problems touching upon the using of all the waste types and rendering them harmless.

A new paradigm of the state's social policy comes from the Declaration of human rights and absolute priority of the guarantee of a high quality life for modern and future generations. This paradigm is based on the people's development principle for people's welfare and by people's force. Thus, we foresee the securing of:

- the social and economic equality of all the state's citizens, independently of their origin, sex, nationality and the residence place;
- every society's citizen's possibility of deciding his own fate himself and being responsible for the adopted decision

The aspiration of the made purpose indicates the successful solving of the whole complex of the interconformed tasks. The degree of the success is measured with the help of the indicators which characterize:

- the educational level;
- the employment level;
- the economic welfare;
- the health level

Issuing from the expedient priority of a person's development and the necessity of the facilitation of the economic reform difficulty, and, at the same time, security of the great population mass support, the state must concentrate its efforts in such directions:

- the whole employment of the capacitated population, i.e. the existence of the unemployment (including the hidden form) on the level that does not exceed the natural norm (approximately 3% of labour force);
- economic support of the incapacitated strata of the society;
- provision with free of charge basic medical service;
- guarantee of free of charge secondary education and allocation of the privileged credits for paying for a higher education. Considerable changes must take place in the energy policy: the decrease of the power-consuming industries.

The basis of the stable development can be promoted by the steady energy preservation, which, at the same time, is a precondition of the industry enlivening and elation and the mechanism for the fuel and energy effective usage.

The energy preservation problems must be solved in the following directions:

- modernization, reconstruction and changing of technologies for energy expenditure decrease;
- carrying out and introduction of the energy economizing mechanisms, including improvement of the price policy;
- effective using of the own energy resource base, the reconstruction of the coal industry enterprises, taking measures for creation of the own fuel and energy cycle.

The creation of the rational electric energy production structure, improvement of the technical level and ecological safety of the electric power stations have a principal significance in the electric power engineering.

Our attention should also be paid to the development of the non-traditional power engineering: building, wind electric power station usage of sun energy, geological prospecting and the technological development of production capacity of the geothermal resources, using of mine methane.

The main directions in the financial sphere are the following:

- the increase of financing sizes for nature protection programmes not only at the state's expense but also at the expense of the nature users' payments and taxes;
- creation of the correspondent financing mechanism and the institutions that can promote the solution of the urgent ecological problems.

The state controlled price policy, especially the determination of the price and tariffs of the main nature using types will promote the creation of the balanced national economy complex.

The stable development of the national economy will be impossible without a considered scientific and technical policy which should secure a technological renovation of the production potential and producing of the ecologically pure output.

The specific priority should be given to the carrying out of the financing sources of the research works dealing with the problems of nature using and environmental protection.

Procedure for Establishing Environmental Indicators

Olga Lukash, Sumy State University, Ukraine

The most important management tool of environmental controlling are indicators, as those that have long been used in business accounting.

Environmental indicators can be divided into three main groups, such as:

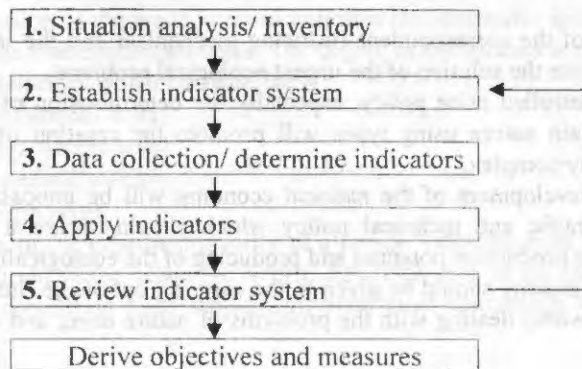
- Environmental Performance Indicators (describe a company's environmental impact);
- Environmental Management Indicators (describe the management's environmental activities);
- Environmental Conditional Indicators (describe the company-external condition of the environment).

One of the main strength of the environmental indicators is the fact that they quantify important developments in corporate environmental protection and make them comparable from year to year. Comparing environmental indicators from different companies or company departments can demonstrate weak points and optimization capacities, which can be used to derive specific improvement goals.

Any company must establish indicator system to see its total environmental impact and to find its own ways of environmental controlling.

There is procedure in the company of establishing environmental indicators. It consists of five main points. The first one is situations analyze, then we establish indicator system. The third step is to collect data and determine indicators. And the last, we review indicator system. If it is useful and satisfy environmental condition and external requirements we derive objectives and measures. If it isn't useful we come back to the establishing indicator system and make remarks until it will satisfy. To use indicators as an effective management tool they must be periodically modernized and developed.

Method For Establishing Environmental Indicators



Economic Effectiveness of the Protective Afforestation in the Donetsk Basin

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Ukrainians fertile black soils and high bioclimatic potential of it's territory determine the priority of the agrarian sector of economy in the development of the state. It is well known, that high results in agricultural production can be achieved only with the help of forest- agrarian landscapes, which are created with the help of protective forest shelter belts. Under the influence of forest shelter belts natural conditions and natural resources are improved, as well as the economic indicators of the agricultural activity. Reclamation influence of the protective forest shelter belts is taking into account, while the land cadastre of Ukraine is created. It's the necessary condition of realization of agrarian reforms.

The influence of the forest shelter belts on the fertility of soils has the regional nature. The most vivid example of the protective role of the forest shelter belts in the fight against the wind erosion we can see in Donetsk Basin.

Wastes from the death of sowings during the dust storm in 1984 in Lugunsk region, with the protectiveness of sowings about 19% were 108 thousands, grivens and when it was 60% – they diminished to 0.

Thanks to the increasing of the field-protective forest shelter belts from 15% to 68% the addition of winter wheat enlarged averagely from 0,8 to 3,2; spring barley – from 0,4 to 1,7%; corn – from 0,6 to 2,5; sunflower – from 0,3 to 1,1 metric centners from hectare. During the years of dust storms the effectiveness of the forest shelter belts increases, that is effected on crop's capacity, and their preservation.

General value of the additional production under the influence of the forest plantations fluctuates in the bounds of 0,8-3,2 thousands grivens per 100 hectares of sowings.

The average total profit per year from reclamation influence of forest shelter belts (taking into account the structure of the sowing areas) also is increasing with the growth of the protection of tillage table 1.

Table 1. The average total profit per year from reclamation influence of forest shelter belts per 100 hectares of tillage (thousands grivens)

Protection of tillage, %	Deflation regions				
	Zadonetsky, Priazovsky	Pridonetsky	Center Donetsk	South Donetsk	North Donetsk
5	1.43	1.75	2.06	2.67	3.91
40	6.16	7.37	8.59	11.03	15.88
60	7.20	8.53	9.87	12.53	17.87
10	8.48	9.86	11.20	14.01	19.35

As we can see, the profit becomes 5 or 6 times larger and the largest marks are in the deflation regions.

Calculations show, that total profit from the protective influence of forest shelter belts becomes equal with wastes on it's foundation and growing during six year after planting.

The ratio of the profit to the value of basic industrial funds is called the coefficient of economic effectiveness. The coefficient of economic effectiveness of to-day's existing forest shelter belts of Donbass in the age of 15 makes up from 2.71 to 7.25, which is much more larger than fundamental coefficient of using of capital investments in economy as a whole (0.14). So the usefulness of the forest is obvious.

The data of economic effectiveness field-protective shelter belts shows, that during nowadays transitional period from the planing economics to the market one it is necessary to find the effective mechanism of solving numerous problems of protective afforestation for the development of the agrarian sector of economy in Ukraine.

Internet Technologies in a Contemporary Economy and Its Influence on Ecology

Nickolay Sergeenkov, Sumy State University, Ukraine

Nowadays we can see more and more tendency of transference of the relations between the people from a material orb in virtual appears. Internet becomes one of such virtual environments.

The modern technologies have converted Internet into a developed infrastructure covered all main information centers, global libraries, scientific and law information databases, many state and commercial organizations, exchanges and banks. Today Internet can be considered as the huge market which is capable to envelop in a potential practically all population of the Earth. For this reason the producers of program and hardware solutions, trade and financial organizations develop actively different sorts and methods of support of commercial activity in Internet.

Internet is an absolutely new environment for business dealing. And the business in Internet, unconditionally, will interest not only programmers, but also other different professional stratum.

That's why it is possible to observe effect of the new virtual economic relations on other branches of a national economy. The problem of a ecology is a very important for today. It's interesting that new forms of the economic relations also definitely influence environmental ecology. And in many cases, that is very important, this effect is smaller than effect of traditional methods of economy support.

In the given article are resulted some information and data touching structures, which one have arisen for realization of support of the economic relations in the Internet. After considering all features of Internet technologies we will be able to do conclusion about its effect on an environment.

Technologies of electronic commerce lie at the heart of service to purchase and to sell the goods through computer networks. This capacious concept includes a

large set of variants of operations both for sellers and for buyers. The definition "electronic commerce" means not only systems oriented on Internet but also electronic shops operated with other communication tools.

The electronic commerce starts to play major role the Internet. In compliance with it different producers of the software offer new technological solutions for optimal usage of global network possibilities for selling and purchasing. For a example of such solutions it's so-called e-cashes. In conformity with it there is a possibility to make small comparison of habitual substantial and new virtual money.

As well as money receives virtual appearance, financial structures receive opportunity to conduct the operations in the electronic network. Electronic banks and exchanges can be for an example. And they don't always represent independent structures existing only in the Internet. In many cases the large financial establishments extend a field of the activity and create own Web-sites handling inquiries and transactions.

As was already said, the Internet represents absolutely new environment for information activity. in concordance with it there are new sphere of business in the Internet concerned with advertising, marketing, getting different information, for a example the information about current position in the financial markets, data about the holders and shareholders, market prices, sizes, yield of the shares and bonds.

Thus, we see that spectrum of new technologies in the Internet very broad and grants great possibilities for development and support of the economic relations. On the one hand it is certainly good, but with it there is a problem with definition of any uniform system and concept for business in the Internet. But doubtlessly is that the appearance newest information resources renders alternative of replacement of ecological unsafe sectors of economy for practically harmless.

Payments for Air Contamination by Agricultural Enterprises (as an Example of Open Agricultural Joint Stock Company "Agrocomplex Slobozhansky", Chuguyiv District, Kharkiv Region)

Sergiy Kolisnyk, Kharkiv State Agrarian University, Ukraine

Agriculture rather seriously influences atmosphere contamination. This influence is caused by wide using of large quantities of different machines, complex agricultural animal breeding technologies in agricultural production.

At present in Ukraine exists a system of payments for air contamination, which is based on determining the level of limited acceptable throwings of contaminative substances into atmosphere for each enterprise and the level of limited acceptable concentration of contaminative substances for each region. An enterprise should pay for overlimit throwings due to special coefficient depending on social, economical, ecological and territorial features of a certain region.

Let's examine the mechanism of payments for throwings of contaminative substances into atmosphere by movable and stationary contaminative sources, as the example OAJSC "Agrocomplex Slobozhansky" in 1998.

Settling accounts for throwings of contaminative substances into atmosphere by movable sources is adduced in Table 1.

Table 1. OAJSC "Agrocomplex "Slobozhansky's" payments for throwings of contaminative substances by movable contaminative sources into atmosphere in 1998

Sort of fuel	Standard of throwing creating after burning of 1 ton of fuel, UHR	Annual volume of used fuel, tons	Regional ecological feature coefficient	Payment, UHR
Diesel fuel	0,3	1150	1,65	569
Patrol	0,4	480	1,65	317
Sum	-	-	-	886

Thus, OAJSC "Agrocomplex "Slobozhansky" paid 886 UHR for throwings of contaminative substances into atmosphere by movable sources in 1998. It was 0.13% of market value of used fuel, in hard currency calculation it was 248 USD.

Payments for throwings of contaminative substances into atmosphere are accounting by multiplying mass of annual throwings of contaminative substance, payment standard for throwings of contaminative substance in bounds of certain limit and regional social ecological feature coefficient. Fines must be paid for overlimit throwings of contaminative substance and exceed payments in bounds of limit from 1 to 5 times.

In 1999 OAJSC "Agrocomplex Slobozhansky" didn't exceed any throwing limit of any sort of contaminative substances into atmosphere. This is the result of strict and consensive work of the enterprise's collective. The biggest sums were paid for throwings of such cotaminative substances into atmosphere as nitrogen oxide – 152 UHR for 2,876 tons, hydrogen sulphite -104 UHR for 0.608 tons, carbonic gas – 37 UHR for 18,739 tons, sulphuric anhidrate – 25UHR for 0.469 tons, ammonium hydrate – 22 UHR for 21,502 tons. The total sum of the payments for throwings of contaminative substances into atmosphere by stationary contaminative sources was 1368UHR or 385USD in hard currency.

The total sum of the OAJSC "Agrocombinat Slobozhansky's" payments for the throwings into atmosphere was 2254 UHR or 633 USD in 1998.

Specific Problems of Water Consumption in Ukraine

Tatiana Yarotskaya, South Ukrainian Pedagogical University, Ukraine

The wasteful spending of water, which is used for drinking and sanitary needs, is often occurs in Ukraine. It is primarily happened when water is supplied by centralized system. The results of such consumers' behavior can be estimated negatively from the point of view of ecologists and economists either.

The diminish of water consuming can be the factor, which will contribute to the improvement of micro and macro situation. It will (under the condition of precise

accounting of consuming water):

- improve the households' budgets (because if somebody wish, he can consume less water, and therefore to pay less for that communal service.) It is very important for households, who do not get housing subsidy;
- reduce the pressure of payments for industrial companies, because there will be no explanation for the supporting of high prices for enterprises and low prices for households;
- allow to turn the economized money to other goods and services. In the situation of low rate of aggregate demand it will facilitate the development of other segments of national economy;
- slow down the rate of debts for service of water supplying enterprises;
- diminish demand for factors used in water supplying process, this, in it's turn, will reduce the scarce of some of them (for example, of electricity) and so on.

Western economists contend, that it is easy to reduce the level of water consumption. The solution to the problem of uneconomical use of water lies in forcing the households to pay more for this good. But in our situation, when the watermeters are not almost used by households, the higher prices for water service is not that economic factor, which, according to the law of demand, will cause the diminish of water consumption. The result of price growth will be just opposite. The higher prices for water supplying will lead to more consumption of water by households, because people in a such situation wish to get this good "in full". They have no an economic incentive to reduce the consumption of water, because the tariff is determined not for cubic of water, but for time period (for month in our case).

Starting point in decision of this problem is providing the technical accounting of water by households, who use the services of centralized water supply system. If ultimate consumers could control the quantity of water they use, many of them will desire to limit themselves and by doing so they save their money.

Although the discussion, concerning the installation of water meters by ultimate consumers is the old one, there's no mass application of this device today.

Conflict of households' and water supplying enterprises' interests, the high price for water meters and other problems place demand upon government interference in the process of transformation in this area of Ukrainian economy.

In this connection, we are proposing to work out the set of regulation tools, namely, during a certain period of time it is necessary to proclaim: the government support of action aimed on installing of water meters in every apartment or house and price control for water meters (this means to make the price free from taxes, to determine the ceiling for retail extra charge, to permit the installation of water meters by big quantity of firms and organizations.) For successful perform of this action it will be necessary to permit the consumers' pools (where possible) and to find out a source of money for address help for those who can't afford the device.

The task for the economists today is to choose a balance of regulation instruments so, that households', water supply enterprises' and government' expenses will be minimized.

The Christianity Idea as the Instrument of Realisation of Sustainable Development

Vladimir Melnyk, Sumy State University, Ukraine

The concept of Sustainable development, which came into the world at the beginning of 70-s, with its main idea "to develop today in the way, which will not harm our progeny tomorrow" became popular among economists and ecologists very soon.

But has anybody ever thought why should this idea works, is it possible to make society and concrete person renounce from something in favour of future generations?

The "mechanism", which can realise this concept is really existing. It is the Christians attitude of a person to the environment. In particular the 2 aspects of it:

- *love to a human and moral responsibility for one's actions;*
- *the attitude to the nature as to "under wardship".*

1. The life of future generations in many respects depends on our today's activity. And the track, which we left in the nature (that can be creative or destructive), certainly will influence our progeny. In this aspect we can see one of the most important commandment given by God - love to a human. A fact, that love, in this case has extrapolated to the future does not change the essence of it, because Christians should equally show their love to there contemporaries, the people of future, nearest and distant.

2. From the Bible we can learn, that at the time of creation of nature, human assimilate all totality of created space and in this way human allys himself with it. He is like "microcosm". From this moment human's and nature's fates are indissoluble. Nature, as it is, entrust destiny to human.

The principle of "consumer" in the attitude to nature is delusive. Having brought short term use, it at the same time irretreivable spoils the environment and destroys harmony unity between human and nature.

That is the Christian's view as to relationship of human and nature. But there is a problem: how we can impose this kind of relations. Sure, in the Christians countries the part of this problem can be solved by ideological way - with the help of pastors. The other part of the problem - is how impose it on the industrial level, where the financial benefits have the major importance, but not the trust. But this problem also has its solution. Firstly, it is possible to "peen" non-ecological producers with the help of penalties, prohibits, restricts, charges, fees - this is the mechanism of negative influence. But the effectiveness of it is limited. It is can be used for restriction of "dirty" producers, but it does not solve the main task of stimulation of "clean" technologies and production of products and services of the new generations. Other mechanism - "positive motivation" is much effective for this goal. The main idea of it is to create, with the help of special key factors, the conditions, under

which forming of sustainable development would be not only necessary, but profitable from economic point of view. That key factors can be:

- 1) *flexible taxies and tariff system*, which suppose the use of different facilities for producers, for those who try to "clean up" there productive cycle and do that.
- 2) *accordance subsidies and credits* to producers for technological improvements and their "greening".
- 3) *establishing of special premiums and special labels* for the most ecological or "organic" producers and products.

The instruments of the positive motivation stimulate the development of the producer in the direction of "sustainability".

In the result of this instrument using the "clean" producers soon or later not only will take the lead among their "non-green" opponents, but forth out them from the market. This is the reaching of the main goal - transition to sustainable development.

The energy of positive motivation is much more powerful and constructive, than the power of negative influence. And that is just the core of the positive influence, which the Christian ethic contains.

Sustainability and Renewables in Production of Electricity in the European Union

Yulia Opanasyuk, Sumy State University, Ukraine

There are a different interpretations of sustainability. The popular Brundtland definition of sustainability is: "A sustainable development is a development which meets the needs of the present without compromising the ability of future generations to meet their own needs". After describing and discussing Hartwick's sustainability rule we define four types of sustainability: From very weak over weak to strong and very strong sustainability. In the very weak sustainability the use of all types of capital is allowed for the present generation, if the present generation generates a "comparable" net-saving. In the very strong version of sustainability, it is required that no reduction of exhaustible capital takes place

Lets consider the electricity sector in The European Union. Use of fuel for electricity production in the EU countries has risen with an average yearly growth rate of nearly 4 per cent. Nearly 25 per cent of the electricity the in EU are based on renewables - mainly hydro - unfortunately a slowly declining percentage.

If calculate technical rates of substitution between exhaustible resources e.g. natural gas and coal, and reproducible capital for windmills, photovoltaic and biomass a use of 1,000 tons of coal per year can be substituted by 3 windmills or 22,000 m² photovoltaic solar panels or 1,700 tons of biomass.

That's why the concept of sustainable development does have meaning and practical implications for policy.

Specification of the Role of Ecological Factor in the Division into Districts Process

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One from basis conditions of effective regional policy is the socio-economic division into districts and often territorial units restrict by administrative frontiers. This way not ever takes into account natural conditions of territories and level of technogenical load at components of environmental. None the less, we can pick out districts are distinguished one from other by ecological indices at territories with similar natural conditions.

In socio-economic crisis formed in Ukraine, effectual factor for stabilization is forming effective regional policy, which is based on ecologo-economic division into districts.

So long as number of factors that have an influence on ecological situation in region is large and their impact on components of environment is unequal then index of condition of the population health can serve as a criterion for ecological region formation. Such criterion can be death-rate and one from components of module technogenical load (particular case is quantity of generating and accumulated waste). This choice was founded on results of analysis, which permit to determine the presence of correlation between quantity of the solid industrial waste generated in region and death-rate (coefficient of correlation is 0.590). Besides the solid industrial waste has a low utilization level (not more then 10%) that favours to intensive accumulation of them in all districts of Ukraine but consequently that favours to increasing influence at the population health.

So long as waste from all classes of hazard are included into composition of generating and accumulated solid industrial waste, then next method was used to estimate their quantity in each region: real mass of the waste appertains to i-th class of hazard was transformed into reduced mass by multiplication at index of relative harmfulness of a waste appertains to i-th class of hazard.

This index was determined as a ration of admissible concentration limit in soil (ACL_s) of a waste appertains to 4-th class of hazard to ACL_s of waste appertains to i-th class of hazard. This way permits to get comparable values of generating (accumulated) waste from different classes of hazard in each part of Ukraine.

By data was derived with taking into account pointed method it was conducted clustering analysis of regions of Ukraine. As the sum up it was outlined eight ecologo-economic mesoregions: 1) Dnepropetrovskaya, Donetskaya, Sumskaya; 2) Zaporozhskaya, Respublic Crimea, Kirovogradakaya, Lvovskaya; 3) Luganskaya, Nicolaevskaya, Kharkovskaya; 4) Ivano-Frankovakaya, Rovenskaya; 5) Vinnitskaya, Poltavskaya, Chemigovskaya; 6) Kievskaya, Odesskaya; 7) Khersonskaya, Cherkasskaya; 8) Volhynskaya, Zhitomirskaya, Zakarpathskaya, Temopolskaya, Khmelnitskaya, Chemovitskaya regions. The number of these mesoregions exceeds quantity existing economic macroregions by classification of Popovkin V. N. Obviously this division permits to distribute more rationally State's means for improving economical and ecological situation in the country.

The Influence of Industrial Throwings into Atmosphere on the Production of Agricultural Output

Inna Shemetova, Kharkiv State Agrarian University, Ukraine

Agriculture is closely connected with natural environment and pollution of the nature has negative influence on the agricultural production's indexes. One of the factors, which makes harm for agriculture is atmospheric industrial contamination. Its influence on plant's production needs serious attention and accounting.

The question of quality of products received in industrially polluted areas is becoming especially acute, because the factor of environmental pollution hinders the rising of nourishing value of agricultural production. We can obviously see increasing maintenance of aches, phenols, sulfates, chlorides, mineral nitrogen, fluorine, heavy metals; less of proteins, oils, in the grain of cereals leads to decreasing of the maintenance and quality of gluten. The deterioration of plant's production quality causes considerable damage to agricultural producer.

The facts got from the definition of the shortage of production of agricultural crops can be seen on an example on one of the farms. The analysis was cared out in the maximum polluted zone for basic agricultural crops: winter-wheat, spring-barley, corn and sunflower. Such results were received:

1. Difference in pollution and control zone of crop capacity was such 4.4 for wheat, 3.3 for barley, 5.8 for corn, and 3.8 for sunflower metric centner from the hectare.

Table 1. Damages from land withdrawal for building industrial enterprises and from atmosphere pollution by harmful throwing.

The Crops	The Figures				
	The Withdra-waled land, ha	The shortage from withdrawal of lands, metric centner	The damage from withdrawal of the lands, gr.	The shortage after starting function of enterprise, metric centner	The damage after starting function of the enterprise, thousand gr.
The spring-wheat	100	1650	33000	19470	389.4
The spring-barley	50	680	10700	11630	183.7
The corn	200	4760	105600	21860	485.3
The sunflower	-	-	-	7530	184.5
Together	350	7090	149300	60490	1242.9

2. In accordance the index of product's quality was: 0.75 for wheat, 0.47 for barley, 0.87 for corn and 0.99 for sunflower. So barley suffers from the pollution

more than other basic crops and sunflower suffers from the pollution less than others.

3. The shortage of crop capacity with calculation of product's quality decrease: wheat – 7.4, barley – 8.8, corn – 8.1, sunflower – 4.4 metric centner from one hectare.

4. The damages from shortage of crop capacity from one hectare were: wheat-148, barley – 139.04, corn – 179.82, sunflower – 107.8 grn.

There are damage from land withdrawal for building industrial enterprises and from atmosphere pollution by harmful throwing. This data for basic agricultural crops is given in a table number one.

Dynamic and Responsive Ecological Energy Taxation

Yuriy Derevyanko, Sumy State University, Ukraine.

Ecological tax reform will be introduced for example this year at an initially low level of 5%-10%, increasing annually thereafter at an effective rate of 5%-8%. This increase is dependent on the economic situation. Increases in boom years will be rather higher and in times of recession rather lower for example 4% a year during recession and 8% with a GNP growth of 2%. This dynamic process continuously raises the prices of non-renewable energy forms subject to ecotax: at first slowly, but later on at an increasing rate. For industrial investment purposes it is important to know that this continuous rise in energy prices is a *more reliable long-term signal* than the present basis of global market prices.

Taxation will apply primarily to all conventional energy forms associated with significant environmental pollution and serious risk:

All fossil fuels (oil, gas, coal), Nuclear power, Hydroelectric power, Waste heat/power from refuse incineration.

Fossil fuel energy will be taxed and priced at different levels according to atmospheric pollution (CO₂-emissions), although the general percentage will be based on end consumer prices. This will ensure an incentive for greater efficiency, energy savings and the development of innovative renewable solar energy forms instead of substituting between fossil fuels and electric power (nuclear and hydroelectric power). At the same time this will achieve comparable effects on the traffic.

Solar energy (heating, power generation and ambient heat), wind power, bioenergy and geothermal power generation will not be taxed for the time being since for ecological reasons they should be promoted to the point where they are fully competitive with conventional energy forms. In all likelihood this point will be reached when energy prices are twice or four times as high as today, thus accelerating the substitution of conventional environmentally incompatible power generation with new forms of clean energy. The consumption of conventional energy will decrease rapidly. Afterwards ecotaxes will be successively introduced on new energy forms as well.

Information Economy – is it the First Stage of Sustainable Development?..

Valentyna Melnyk, Sumy State University, Ukraine

The economy we live in now is more and more changing in the direction of increasing role of the information. Now the opinion that we are moving to a new type of economy- information economy is widely broadening. The main features of this economy are:

1. Information becomes the main resource and factor of production and in the frames of the world economy it provides the economic growth.
2. Constant growth of the services market.
3. Rapid growth of the multinational corporations.
4. Growth of small business sector, as more flexible.
5. Much more effective use of each resource's unit, compared to the same indexes of 20 years ago.
6. Growth of the Internet influence in all the economy spheres.
7. Principally new technologies development, (in particular, nano-technologies, gene-engineering).
8. Paying more attention to environment on all the levels of the economic activity, and as a result, "greening" of all the sectors of production.

Talking about sustainable development and the information economy, in particular, the first feature of this type of economy should be noted, for it underlines the non-destructive and non-material nature of it. Information as the main factor of the economic development, compared to manual labor – in the slave type of economy and energy - during capitalism, epoch of machines, is much "softer" and the economic growth caused by information economy can be sustainable.

Globalization of world economy and features of multinationalism shows the way of solution of "third world countries" problems. Information economy has a potential in providing sustainable growth in all the counties and the world economy in whole.

So, maybe the new information economy will be the first stage in making our dream of sustainable development come true?..

Economic Effect of the Waste Utilization Complex Producing Electric Energy

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In Sumy region there is an urgent problem of waste utilization. In 1999 317,1 ths m³ of waste were stored.

Under that circumstances the project of construction the waste utilization

complex producing electrical energy was worked out.

The treatment of 120 thousands of waste make it possible to built an electric station with set power of 12 MW. There will be produced 69,6 mln kW/h of electric energy per year.

The full cost of construction is 10,515 mln cu. According to the prior estimate the profit will be 1,26 mln cu., profitability of investment – 12% and the term of recoupment – 8 yrs, that is acceptable for the energy – technologic branch.

According to the results of economic substantiation the damage of environment corresponds to the sanitary standards. The smoke emission from the complex taking into accounts the usage of purifier, doesn't seriously influence air pollution.

The construction of the waste utilization complex in Sumy and other cities of Ukraine will solve the problem of waste utilization and make possible to produce additional electric energy using cheap gas.

Ecological Aspects of Waste Utilisation Problem

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It is common fact that Ukrainian nuclear power stations work on fuel rods. Cesium-139 and Strontium-90 are present in spent fuel. Both isotopes are important hazards to human health (they were major problems downwind from Chernobyl, representing the main factor behind added leukaemia risks). So, Ukraine has a big problem: how to utilise nuclear waste?

The idea of burying radioactive wastes in some deep geological repository to isolate them for thousands of years was first endorsed by the National Academy of sciences in Washington, D.C. The main features of such process: nuclear wastes will have been vitrified, that is turned into glass, and the molten glass poured into the canisters to cool and harden before they are shipped to the repository. Much of this work will be performed by robots. The pilot plant's designers know that the flowing salt will crush the drums and boxes of wastes within a few months, and this is their desire. The salt will fillevery tunnel and the shafts will finally shut down themselves.

As for Ukraine, our country doesn't have such experience. There is an opportunity to utilise nuclear waste in old cool-mines in Donbass, Ukraine. But this program has faced opposition from scientists who have claimed it might be compromised by earthquakes or that the high-level waste stored in it might even go critical or explode chemically. Consequently, it is very important to co-operate with other countries in solving such problems.

Energy Savings as a Prior Direction of the Economical Development Worldwide and in Ukraine

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Energy factor influences formation of the economic situation in Ukraine greatly now. Storage of the fuel power-base resources, which averages 60% of the Ukrainian economy, covered by import from Russia, Turkmenistan and other countries; moral and physical depreciation of the fixed production assets and energy consuming technologies which increase air pollution put tasks national security depends on. That's why economy of energy in all spheres of public activity is one of the most important direction of the economical development in Ukraine.

Problems of the energy economy are in the centre of attention of the world community. Leading government and public international organizations emphasize on the importance of the increase of the energy efficiency of the economy, decrease of the unproductive losses of fuel and power, environment protection, when using or producing fuel and power. Among these organizations are European Economic Commission of the United Nations, United Nations Industrial Development Organization (UNIDO), World Energy Council (WEC), International Energy Agency (IEA), Center for Renewable Energy and Sustainable Technology (CREST). Ukraine takes part in the international cooperation in the sphere of the energy economy on the state and public levels.

In this respect we should mention European Union TACIS program, which gives finance and technical support to the development of the energy sector. Thus in Sumy Region TACIS energy saving program was first realized on the JSC "SumyKhimprom" 4 years ago. Recently on the basis of this company in cooperation with the regional state administration the scientific production center of the energy efficiency was formed.

Energy sector requires great investment, which can be obtained via privatization of the power-generating and distributing companies, economic stimulation of the energy savings and strict government regulation.

Problems of the energy economy can't be decided without energy sector restructuring. It concerns first of all settlement of the payment discipline, bringing energy tariffs into line with real production, transmission and distribution expenses and removing of the energy subsidies. The last can reduce energy consumption, increase GDP growth through higher economic efficiency and lower CO₂ emissions, producing domestic environmental benefits, including reducing local air pollution.

Improvement of the environment situation and economy of the traditional energy sources can be achieved by usage of such nontraditional renewable energy sources as biomass, wind, sun, geothermal environment, ocean, small hydro power plants.

Successful realization of the energy saving program and getting over the crisis in the fuel power-based sector requires new economic and power-base strategy in Ukraine to be developed in the near future and implemented in accordance with economical situation in the country.