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Papers presented at 20th  
**International Scientific  
Conference in Sumy**

**Economics for Ecology**

Ministry of Education and Science of Ukraine  
Sumy State University. Faculty of Economics and Management  
Sumy Local Youth NGO "Council of Young Scientists"

20<sup>th</sup> International Scientific Conference  
*"Economics for Ecology"*  
*ISCS'2014*



***Економіка для екології***

Матеріали  
XX Міжнародної наукової конференції  
**(Україна, Суми, 6–9 травня 2014 року)**

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Сумський державний університет  
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20<sup>th</sup> INTERNATIONAL SCIENTIFIC  
CONFERENCE

**"ECONOMICS FOR ECOLOGY"  
(ISCS'2014)**

**May 6-9, 2014, Sumy, Ukraine**

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- Sumy Local Youth NGO "Council of Young Scientists"
- EU and UNDP Project "The Community Based Approach to Local Development - II Project (CBA)"
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**Conference place:**

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# Program of the 20<sup>th</sup> International scientific conference “Economics for ecology” (ISCS 2014)

## Tuesday, May 6

- 8:00-09:45 – **Registration + morning coffee**, Training building N (ground floor)
- 10:00-10:20 – **Official conference opening**, Training building N (room 121)
- 10:20-11:00 – **Plenary Session, presentation by Dr. Samuel Chayen (Israel)**, Training building N (room 121)
- 11:00-11:05 – **Photo session**, Training building N (entrance)
- 11:05-11:30 – **Coffee-break**, Training building N (ground floor)
- 11:30-12:15 – **Plenary Session, presentations by Dr. Oleksandr Romanko (Canada), professor Leonid Melnyk (Ukraine)**, Training building N (room 121)
- 12:30-14:00 – **Excursion to Medical Institute of SSU**
- 14:00-14:45 – **Lunch**, the canteen of SSU
- 15:00-16:00 – **Open lecture “Business analytics as a profession: opportunities and Trends”, Dr. Oleksandr Romanko (Canada)** Training building N (room 121)
- 16:00-16:30 – **Coffee-break**, Training building N (ground floor)
- 16:30-18:00 – **Workshops**, Training building N (rooms 121)
- 18:00-22:00 – **Banquet**, the canteen of SSU

## Wednesday, May 7

- 10:00-11:00 – **Open lecture “Environment, Society and Economics in the Philosophy of Rabbi Samson Raphael Hirsch and Dr. Isaac Breuer”, Dr. Samuel Chayen, Spokesperson of the Green Knesset Project, The Israeli Parliament (Israel)**, Training building N (room 119)
- 11:00-11:30 – **Coffee-break**, Training building N (ground floor)
- 11:30-13:00 – **Workshops**, Training building N (rooms 121)

13:00-13:45 – **Conclusions of workshops, rewarding**, Training building N (room 121)  
14:00-14:45 – **Lunch**, the canteen of SSU  
15:00-16:30 – **Concert program dedicated to Faculty of Economics and Management anniversary**, hall, main building of SSU  
17:00 – **Departure to the recreation center**, the square in front of the Main Building of SSU  
18:00-22:00 – **Barbeque party**, recreation center of SSU

## **Thursday, May 8**

10:00-11:00 – **Open lecture “Biogas generation, property, production, purification and use”, professor Yan Cebula, Technical and humanistic academy (Bielsko-Biala, Poland)**, Training building N (room 121)  
11:00-12:00 – **Balatzkiy O.F. commemoration**  
12:00-13:30 – **Excursion to Kerameya Ltd.**  
14:00-14:45 – **Lunch**, the canteen of SSU  
15:00-16:00 – **Excursion to SSU library**  
16:00-19:00 – **Excursion around Sumy**

## **Friday, May 9**

08:00-12:00 – **Departure**

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## **ALTERNATIVE TAX MECHANISMS OF STIMULATION TO ECOLOGICALLY SAFE STATE DEVELOPMENT**

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Foreign countries' experience demonstrates, that taxes for soiling natural environment have short-term character as in fact volumes of soiling from subjects of economic activity decrease. That's why strategy of taxation should be based on long-termed program of tax system 'greening' and cultivation of alternative tax stimulation mechanisms to ecological-safety state development is one of the most important tasks. Putting into production ecologically clean resource and energy saving low waste technologies can promote following alternative tax mechanisms of stimulation: preferential taxation liberation from taxation, implementation of principle of extended responsibility of producer for wastes in legislation; tax regulation of electronic wastes. Let's take a view on each of them separately.

Preferential taxation can be applied for those factories which have positive dynamics in pollution minimalization. As for example, if factory has in dynamics decrease of pollution and in volumes which are less than it is settled by limits for the following stimulation it is proposed to enter minimalization coefficients into formulas of ecological taxes calculations.

Exemption from taxation. During the reconstruction period "green" modernization of the factory, considering that for rising of ecological level generally required additional financial resources, in case that approval/coordination with executive bodies in branch of nature environment protection and racional use of natural resources, relevant programs, factories-pollutants can be freed from ecological taxes payment for the term, which is necessary for achievement of actual amount of contamination within established limits – maximum permissible emissions/discharges (MPE/MPD). In such cases there are settled meanings of temporally agreed emissions/discharges (TAE/TAD), but no longer than for 3 years.

Implementation of the principle of extended responsibility of producer for wastes into tax legislation. According to the principle of extended responsibility of producer (ERP) producers and importers should

carry the main part of the financial responsibility for operation of Handling with wastes system which are formed in a result of losing by production its consumer characteristics.[1] In our opinion using the principle of ERP in domestic practise of stimulation of protection natural environment is possible as follows: for producers and importers who independently collect and malify wastes, should be conducted preferential taxation proportionally to the percentage, which were formed as a result of losing by production its consumer characteristics. Such, for example, in European Union countries percent of collection of such wastes is determined by legislation; in case of secondary resources application for producing the production there can be settled by tax legislation benefits for taxation, proportionally to the percent of secondary resources in production.

Tax regulation of electronic wastes problem. According to experts, accumulation of “electronic wastes” (EW) volume occurs three times faster than rising amount of other wastes. According to information of GOST of Ukraine, on the territory of our state are in the usage about 55 million mobile means of communication, each year there are imported more than 300 thousand computers, about 280 million batteries [2], which after working out are potentially dangerous wastes or in conditions for recycling – source of precious resources, ferrous metals and chemical substances. According to active legislation EW are not taxed, but only exist tax rate for accomodation individual species too dangerous wastes: equipment and devices which contain mercury, elements with ionizing radiation – 506,44 hryvnas for the unit; fluorescent lamps – 8,81 hryvnas for one. All another types of EW are staying neglected. So that’s why one from alternative ways of reformation of tax system is establishment of tax for EW. As their number increases and it will not increase with years to change for taxes for pollution will be compulsory ecological tax for wastes of electrical and electronic equipment (WEEE).

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2. Вирішення проблеми електронних відходів: європейські підходи до української проблеми / Шуміло О. М., Виговська Г. П., Цигульова О. М. та ін. – К. : ФОП «Клименко», 2013. – 88 с.

## **ECOLOGICAL TRAINING BY ECONOMIC MEANS ON THE HISTORY LESSONS**

***Roman Balandyuk***

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The modern condition of the environment is very dangerous, so it is a real threat for humanity. Discussing the ecological issues by statesmen, writers, historians pay attention on them. In these circumstances the main purpose is to form the ecological culture as between the older people, so the young one. The important component of the ecological culture is to form the ecological training, that's to learn the ecological morals, the ethnics of people's relationship to the nature.

The content of majority school subjects has got the ecological knowledge. If students learn physics or chemistry, they pay attention to some problems of the social ecology. But when students learn history or social science they pay attention to the global problems of humanity. The main knowledge of the ecological education students get when they learn the natural subjects like biology, chemistry, geography and so on. But the social subjects such as history, social science and economics have the educational means to form the attitude of students to the environment, because the history of humanity is very connected with the history of nature. For example, if students study history in the 8<sup>th</sup> or 9<sup>th</sup> forms, they get to know such process and notions as the industrial revolution, the development of the technical progress, the changes in the nature of work and the organization of production in Europe. It favors to form notions that in the Western Europe the active work of human takes the main place. The science cognition increases the strength, the inventive ability of human, his or her opportunity to change the environment. Up to now these changes, on the one side, have driven to the general correction of the living quality in developed countries, but, on the other side, to the ecological crisis.

Thus, on our opinion, when students study history in the 8<sup>th</sup> or 9<sup>th</sup> forms, they learn the notions about the national technical progress (NTP) as the changes that have driven to the correction of human life, create the conditions for the economic profit from these changes. But very often the

information about the results of NTP for nature and the intelligent attitude to the nature during the process of work don't pay attention.

In such conditions, the content of school history education should be revising. History as a school subject can form the system of knowledge, opinions and persuasions of students in order to ensure the public responsibility for the condition of the environment as the basics of existence of state, the comprehension of the NTP influence to the nature or reasons of the global issues' arise, the realization of the interdependence between the economics and ecology, the mastering of knowledge about interconnection in the system "human-nature-society". Generally, it helps to understand that human is not only a part of society, but a part of nature. Such things people often forget ourselves.

Therefore, on our opinion, when students study economic information on the history lessons, they learn the notions that human is not only a part of society, but a part of nature. If we save our environment today, we will be happy in future.

## **CLIMATE CHANGE: CAUSES, EFFECTS AND THE WAYS OUT**

***Laura Bashir***

*Scientific supervisor: Nadiya Kostyuchenko  
Sumy State University, Sumy, Ukraine*

Climate is a significant and lasting change in the statistical distribution of weather pattern over periods ranging from decades to millions of years. It can be a change in average condition.

Based on the broadest scale, the rate at which energy is received from the sun and the rate at which it is lost will determine the equilibrium temperature and climate of earth distributed around the globe by winds ocean currents and other mechanisms to affect the climate of different regions.

It includes factors such as natural or forcing, meaning the natural forces that take place or occurring forces in the earth which include processes such as solar radiation, mountain building, the continental drift and the change in green house concentration. The variety of climate change feedback can either amplify or diminish the initial force.



The forces can be either internal or external. The internal are the natural processes within the climate system (e.g. the thermohaline circulation). External forcing mechanisms can be either natural (e.g. changes in solar output) or anthropogenic (e.g. increase in green house gases).

We can see the evidence of climate change in our everyday life.

It has been observed that the temperature has increased for about 0.89 from 1901 to 2012. An increase in the amount of rainfall in the mid latitude of the northern hemisphere has been observed since the beginning of the 20<sup>th</sup> century. The sea level has risen by 10 cm since 1900 and even more in the current decades. A large amount of glacier deposits are melting down all over the world (e.g. in the Alps mountains, Rockies in Africa, etc.) as well as the ice sheets in the sea (e.g. in the Southern sea or the Antarctic sea, etc.).

Climate change has the following effects:

- *Increase in temperature.*
- *Changing in landscape.* As a result of climate change the landscape of different places has changed. For example, now there is a semi desert in northern part of Kenya meaning that the Saharan desert is expanding down to the South.
- *Rising of the sea level.* During the 20th century the sea level rose for about 15 cm (6 inches) due to melting of glacier ice and expansion of warmer seawater. Scientists predict that the sea level may rise as much as 59 cm (23 inches) during the 21st century, threatening coastal communities, wetlands, and coral reefs.
- *Increase of drought, fire and floods.* Higher temperatures cause a higher rate of evaporation and more droughts in some areas of the world.
- *Change of ecosystems.* As temperatures increase, species may either move to a cooler habitat or die. Species that are particularly vulnerable include endangered species, coral reefs and polar animals. Warming has also caused changes in the timing of spring events and the length of the growing season.
- *Seawater is becoming more acidic.* Carbon dioxide dissolving into the oceans is making seawater more acidic. There could be impacts on coral reefs and other marine life.
- *Effects on human health.* There have been more deaths due to heat waves and more allergy attacks as the pollen season grows longer. There have also been some changes in the ranges of animals that carry disease like mosquitoes.

- *Crops are withering.* Increased temperatures and extreme drought are causing a decline in crop productivity around the world. Decreased crop productivity results in food shortages.

There are three basic ways to prevent the further climate change:

- 1) *To reduce emissions through efficiency.* That means to use less of the things that contribute the emission of greenhouse gases (e.g. using fuels that emit less CO<sub>2</sub> than fuels currently being used, using biofuels, hydrogen; using electricity from renewable sources, such as wind and solar).
- 2) *To reduce emissions through substitution.* That means to use something else which is less harmful to the environment (e.g. using bicycles instead of cars; using solar energy).
- 3) *To reduce emission through sequestration.* That means to use something to capture and store emissions (e.g. using new combustion system to prevent emissions of greenhouse gases from the industries; using more advanced methods of waste disposal).

Thus, climate change is an unpleasant situation. Every individual in his everyday life should take part in the prevention of further climate change for his own benefit and future of the whole world.

## **ECO-INNOVATIONS AS THE BASE OF GREEN REGIONAL DEVELOPMENT<sup>1</sup>**

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It is known that sustainable development is the basis of effective environmental and economic activity due to the development of innovative techniques and technology. The necessity of creating a sustainable environment requires deep understanding and formation of mechanisms of effective management, taking into account environmental factors. One of the best ways to achieve these goals, to the implement the mechanisms for effective environmental management at the regional level is the creation new forms of development based on eco-innovations. These days, eco-innovation

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<sup>1</sup> This material was prepared while performing scientific research (# 0113U002790), 2013-2014.

presents interesting growth perspectives for an ever greater number of businesses thanks to a wide variety of niche market opportunities.

Eco-innovation covers a wide range of activities including areas such as:

- alternative energy, including energy storage and supply infrastructure, energy savings,
- consultancy and innovative project/business engineering and finance services,
- environmental damage remediation, including brown field rehabilitation,
- transport,
- recycling,
- eco-innovative product engineering, i.e. factoring recycling from development,
- new ways of leveraging natural resources,
- construction, eco-construction and urban regeneration,
- new products, processes and business models and even possibly new uses and
- adaptations of existing products and materials (eco-design and eco-products), as well as new materials,
- environment-friendly agriculture, including production and breeding of natural
- organisms,
- spatial planning,
- zero-energy housing, intelligent water management housing and housing built with sustainable construction products,
- the wellness industry, which in some regions can also include the development and processing of organic products, eco-tourism and therapeutic tourism as well as preventive medicine and medical care for the elderly.

Such a wide range of activities should theoretically enable all types of regions to generate competitive advantages in this sector. From the perspective of regional development, eco-innovation can be the subject of one or more clusters and regional development strategies geared toward either the mainstreaming of green technology into strong regional industries or a niche based approach. There are the different components of the eco-

innovation industry value chain, which actually encompasses five industry clusters, i.e.:

- energy;
- clean technology;
- eco-construction;
- spatial eco-planning and eco-utilisation;
- environmental damage remediation.

The activities associated with these four stages include:

- investigating and developing new energy sources (hydrogen, biofuels, etc.) and products with a small environmental footprint;
- manufacturing eco-innovative products and services;
- infrastructure and logistical systems providing products and services to customers, including alternative energy storage solutions;
- the different market segments of the eco-innovation industry.

Among the significant benefits offered by the region innovative approach to ecological specialization of its economic potential , can be described as a gradual conquest of markets for environmental goods and services , increasing the export potential ; conversion of productive capacity in the direction of strengthening the scientific and information capacity and reducing material and energy production; efficient use of capacity research and production complex , reduction of destructive pressure on ecosystems and improvement of the human environment , the creation of conditions for the export of educational and training programs for service of products for environmental purposes , will be produced for export.

In Sumy Region some positive steps are observed in the direction of forming an environmentally attractive image of the region for the development of mass ecotourism promotion of Sumy region as a region, based on environmentally friendly products and environmentally friendly technologies, increasing the number of jobs through the development of environmentally oriented enterprises. The least developed direction turned stimulate recycling industrial and household waste due to lack of economic incentives for such activities in the region.

For successful organizational and economic forming of green industry and long-term development of eco-innovations in particular, need to perform the provisions on granting state support, that include full or partial interest-free crediting, preferential terms of VAT payment of tax bills while importing new equipment, devices and components, stability of a special

regime innovative activity, compensation arrangements for industrial parks and their participants, priority in attracting foreign credits.

## **RISK MANAGEMENT STRATEGIES FOR FARMERS**

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Agricultural producers face many sources of variability which can affect the cash flow, net returns, and economic progress of the farm firm. The risks which producers face and the risk management responses available to producers have been significantly affected by the 2008 Farm Bill. The Average Crop Revenue Election (ACRE) program appears to significantly risk management strategies and impact direct payments, marketing loans and loan deficiency payments. Less than fully equity in the farm business creates financial risk which may compound the effects of the business risks which all farmers face. Farmers typically combine production, marketing, and financial responses to risk and practice risk balancing. Past research has often failed to consider the sequential nature of the decision-making and knowledge which becomes available during the production process. For example, grain storage investments are often analyzed assuming storage will be used each year without considering the effect of alternative market situations.

A key element in this process is establishing what constitutes a strategic shortfall relative to expectations. Obviously, the management information systems needed to monitor critical success factors which are a prerequisite for achieving strategic risk management through control processes, as farmers begin to see their farms as a biological manufacturing plant, they should be able to take advantage of operations analysis and process control techniques for enhancing strategic risk management. At first glance production process monitoring and control might appear to be a topic better suited to the earlier discussion of operational risks. But clearly, persistent production problems can have strategically important consequences for farm firms.

*Using Options Thinking to make Decisions and Manage Risk, The* pragmatic application of these option concepts to risk assessment and decision making in farming is consider in the strategy of a producer who has two alternatives:

1. Buy a parcel of farmland that has been rented for the last five years;
2. Continue to rent that farmland for another year and purchase it after a year has transpired.

Because of the uncertainty associated with recovery of market prices, the size of future government payments is a potential to other buyers and declines in land values, etc. The flexibility associated with waiting to purchase the property has a value. That value is sometimes reflected by the producer making a payment for the seller to give him a right to buy in the future - a purchase option. Or the value of waiting to purchase might justify a higher rental payment this year to not only buy time to obtain more certainty about market prices and government payments (irrespective of whether they are higher or lower), but also to maintain a relationship with the current landlord which may increase the chances of being the successful purchaser when the property is sold. And the more uncertainty about future market prices and government payments, the higher the option premium that the renter would be willing to pay to maintain a rental arrangement rather than purchase the property or lose the lease. Consequently, cash rents may be perceived to be irrationally high in periods of great uncertainty because of this sizeable option premium that is being paid to buy flexibility.

If the required investment must be made up-front with limited capacity to make adjustments, the expected benefit stream or the expected payoff may not justify the outlay critical investments such as storage facilities for identity preservation can be made in the first year – and specialized planting, pest control and harvesting equipment investments delayed for a year or two until new information is available on the magnitude of the price premium or yield drag for example, the option value of delaying part of the investment outlay plus buying time to obtain more certainty about future payoffs may convert an unacceptable business venture into one that is acceptable. An example of sequential expansion in livestock facilities would be constructing finishing barns initially, and then a breeding/gestation/nursery unit two or three years later if initial uncertainty concerning pork prices and feed costs subsequently suggests that margins will be on the higher end of the original probability distribution function rather than the lower end of that function. These examples suggest not only the benefits of using the options approach to

making investment or strategic decisions, but also indicate the value of making such decisions sequentially when possible. Thus a fundamental management strategy that should be considered in any capital investment or strategic decision is how to structure that decision to buy time and take advantage of the benefits of sequential decision making.

## **SUSTAINABLE DEVELOPMENT IN ZAMBIA: EXPERIENCES AND WAYS FORWARD**

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Zambia is largely a mining country with abundant deposits of copper, cobalt, emeralds, coal, amethyst, gold, lead and zinc. Historically, the industry has been a pillar of Zambia's economy and continues to do so today. It is also the country's largest foreign exchange earner.

In fact, despite the rich endowment of natural resources, Zambia ranks lowly on the Human Development Index. While many empirical studies have been conducted on the impact of mining on sustainable development, hardly any extensive research has been carried out on the impact of mining on the local livelihood of the people and the environment and biodiversity. Existing information does not incorporate macroeconomic trends like economic growth, and the impact of mining on the environment and biodiversity in Zambia.

After the year 2000, the commodity market recorded an upturn in prices mainly due to increased demand for commodity metals in fast growing economies like China and India. This also coincided with a rise in the mineral production in the country and by its nature, mining is a highly disruptive activity. It requires large tracts of land, consumes significant quantities of water and leaves a lot of waste materials.

Addressing the problem environmental and social impacts of mining, the government should formulate clear policies and regulations for the management of natural resources. The formulation process should ensure that policies reflect the interest of a wide range of actors including communities, civil service, workers' representatives, investors and donors.

Sustainable development research in Zambia Despite the economic success of the mining industry in the recent past, a majority of Zambians

continue to live under poverty.

The economic reforms experienced in the mining sector led to a loss of 8,000 jobs. It is estimated that the 8,000 individuals supported at least five other family members. Most of these unemployed miners resorted to economic activities like charcoal burning, shift cultivation farming methods and small-scale mining to sustain their livelihoods, leading to further environmental degradation.

The mining community and the surrounding neighborhoods also depended heavily on the mining companies for the provision of social amenities such as health, education, and sanitation. As these services were no longer offered by the new mine owners, it became difficult for most of the locals to meet their basic needs. This undermines the country's efforts to attain the Millennium Development Goals by the targeted 2015

UNU-IAS research activities on mining in Zambia is undertaking research to determine whether the mining industry in Zambia has a positive impact on sustainable development and environmental management. This entails assessing the impact of mining in meeting the needs of the present without compromising the ability of future generations to meet their own needs. The outcomes of this research are expected to result in:

- 1) Contributing to the ongoing debate on the importance of mining to sustainable development in Zambia,
- 2) Enhancement of economic policies on natural resource extraction to promote equity and transparency,
- 3) Highlighting the impact of mining on the environment, biodiversity and ecosystems as a whole, and;
- 4) Advocating for the adoption of more robust and internationally-accepted and recognized procedures and regulations for environmental management.

## **STRATEGIC PRIORITIES OF ENVIRONMENTAL POLICY IN THE REPUBLIC OF MOLDOVA**

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The main priorities of environmental protection and sustainable management of natural resources in the republic of Moldova are the following:



1. Improvement and insurance of the conditions of good governance in the area of environmental protection and sustainable use of natural resources

This objective will be achieved by:

Consolidation of the institutional and managerial potential in the area of environmental protection and sustainable use of natural resources;

Defining the Action Plan for approximation of the National environmental legislation and initiation of transposition of the European Union Directives.

2. Maintaining the quality of environment as a factor which insures health and life quality

This objective will be achieved by:

Consolidating the measures on preventing the pollution of the environment through increased awareness and integration of the requirements for environmental protection in the National, territorial and sectoral economic policies;

Prevention and reduction of the degradation of the natural resources and their efficient usage;

Extension and protection of the nature territories protected by the State;

Improvement of the policy of the waste management;

Modernising and making more efficient the National monitoring system of the status and evolution of the hydrometeorological conditions and the environmental quality;

Improvement of the State control on insuring the execution of the legislation in environmental protection and sustainable use of natural resources.

3. Transboundary cooperation on the environmental protection and sustainable use of natural resources

This objective will be achieved by:

Strengthening the efforts in the framework of bilateral agreements

Strengthening the administrative capacities for the implementation of the stipulations of the International treaties that Moldova is party to

Attracting investments for environmental protection

Capacity development on project drawing

4. Increase the public's awareness, including information and education

This objective will be achieved by:

Development of a National Strategy on „Education for sustainable development”

Organising radio and TV ecological programmes.

## **UNSUSTAINABLE RESOURCE USE OF PRA RIVER BASIN IN GHANA: CONSEQUENCES ANALYSIS**

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The Pra River is a river in Ghana. It is in the easternmost and the largest of the three principal rivers that drain the area south of the Volta divide. Rising in the Kwahu Plateau near Mpraeso and flowing southward for 240 km through rich cocoa and farming areas and valuable forests in the Akan lowlands, the Pra enters the Gulf of Guinea east of Takoradi.

The Pra River and its tributaries constitute a major source of water supply to communities within the basin. The major tributaries are perennial and constitute all-year-round reliable water source. However, human activities such as mining (mostly illegal) and logging are having adverse impacts and degrading the surface water resources of the basin.

The Pra Basin is one of the most extensively and intensively used river basin areas in Ghana in terms of settlement, agriculture, logging and mining. The basin contains most of the large cocoa growing areas in the Eastern, Ashanti, and Central regions. Tree cash crop cultivation other than cocoa includes mainly oil palm. The basin contains the highest density of settlements (both rural and urban) in Ghana. It has a high concentration of mining activities mainly concerned with gold and other ground minerals.

High concentration of mining activities in the upper regions of the basin may dry up the source of the river. Large scale and small scale mining with disruptive impact on surface cover including soils occur around Obuasi and Konongo.

Pollution of the rivers caused mainly by the dumping of refuse especially in large settlements and related industrial waste discharges, unapproved fishing practices and use of agrochemicals in vegetable farming are amongst the activities destroying the potential or ability of the water body to support plant, animal, human as well as aquatic life. Thus the water becomes unsafe for domestic use and also unhealthy to support fish and other aquatic life, of degraded land unable to produce food and also pools of water which serve as mosquito breeding sites.

One of the biggest problems caused by this activity is the use of mercury, which is poisonous to human health, getting into the food chain when accumulated in the fish. The river is likely to be chemically

contaminated if the illegal mining activities do not come to a stop. And let's not forget about the furious deforestation, among others. This is gradually resulting in the reduction of the water level. Moderate to severe sheet and gully erosion poses a threat for flooding within the basin as logging activities increase. The extensive forest clearance for mining, settlement, and infrastructural development causes considerable loss of soil minerals and subsequent high sediment transport in the Pra and its tributaries.

One of the major red flags pointed out by scientists is that the Pra River basin, which will soon be chemically contaminated if the illegal mining activities in the area aren't stopped or properly regulated is that if the exploitation at the basin of the river continues going at this rate with its present conditions the river would not be able to support human life in the next five years to come. The use of mercury and other chemicals is even more serious because fishes in the rivers get contaminated and people who eat such fishes could be at risk of losing their lives..

Ghana however requires a substantial amount of money to dredge and clean the rivers and water bodies which have been heavily polluted by illegal small-scale miners. The de-contamination of the polluted rivers could also be done by the use of chemicals, but this option of trying to return the quality of the water source or at least improve upon its present state is very expensive.

Alternative livelihood projects could be created to deter people within these mining communities from continuing these illegal mining activities. Also, in order to protect human life, mining communities near this river are advised to consider rain water harvesting and the use of boreholes and underground water as alternative sources of obtaining water.

The government as well as the inhabitants of these mining areas would also have to engage in extensive planting along the water body. This would help in controlling erosion as well as preventing the porous part of the soil from been washed into the river. By so doing, the rate at which the banks of the river floods would also be controlled.

Also in an attempt to solve this problem the police force should be given the mandate to seize machinery of these illegal miners. The monies obtained from the sale of such machinery could be invested in the dredging of the water body. In addition, huge fines or penalties should be passed on any persons caught in the act of engaging in this illegal mining business.

In trying to solve this problem however, we would have to deal with the first things first. Thus, serious attention should be focused on how best to

stop the illegal mining activities as well as the logging activities which seem to be the main activities destroying the quality of the river water and also making it lose its ability to support plant, animal, aquatic and human life.

The government is however been challenged as it is not financially capable to take up a project such as the dredging of a large water body such as the river Pra. Aside the dredging of the water body which serves as a challenge to the government, the government is also challenged with coming up with funds to provide alternative water sources for the people living in these mining communities. The issue of money arises once again when it comes to providing the inhabitants of these mining communities with alternative means of livelihood.

Finally, inhabitants in these mining communities would have to be educated in order to make them aware of the consequences their actions. This enlightenment would cause them to find alternative as well as environmentally friendly ways of disposing off their waste materials. Educating them on the effects of the illegal mining might also deter them from involving themselves in it. It might even cause them to assist the police with information to help them bring these foreign illegal miners to book.

## **SOCIO-ECO-ECONOMIC SYSTEM INTELLECTUALIZATION: FROM GROWTH TO DEVELOPMENT**

***Pavlo Denysenko***

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Considering sustainability as a target we usually consider our current needs satisfaction as one of tradeoff parameters. Also our current (“unsustainable” in some way) consumption according to our income is our main base of comparison to some other variant of (“more sustainable”) preferences and lifestyle in general. It means that sustainability becomes possible if our income generation and its further spending do not harm the environment in unrecoverable manner.

In Fig.1 we can see that according to green economics paradigm the economic system is considered as a part of socio-economic system which is also a part of bigger environmental system. And humans represent all three sub-systems. Our everyday choices are harmful in the long run because of

two main factors of limited natural resources and pollution. In general we can either take too much from the environment or return too much waste back. Taking into account that it is more and more “us” at this planet sustainable growth is possible only if our needs will be satisfied in more and more efficient way. So technology and science (and education as its development factor) becomes the main factor of sustainability achievement.

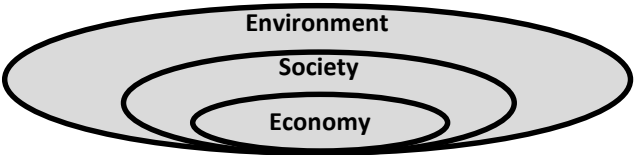


Figure 1. Green economics concept of socio-economic system components interconnection with environment.

At the same time in Fig.2 we see that sustainable development strategic target (in the intersection point of all three sets of goals) does not reflect the inclusion of economic system into social and bigger socio-economic system into environment. Main message here can be to show the point where “the goals meet”.



Figure 2. Conventional view on sustainable development strategy goals interconnection.

Human creativity armed with fundamental knowledge and professional skills can definitely implement technological changes needed to push the limits of surrounding environment. In theories of economic growth (very desirable factor of quality of life) one of the trends for current decade was to consider endogenous technological change in the growth models. It reveals the idea that limited resource inputs into socio-eco-economic system (such as economy of some region) can result in progress. In addition due to the possible substitution of production factors if technological change makes the cleaner nature management cheaper – this leads to getting rid of the

“dirtier” productions. In other words socio-eco-economic system becomes cleaner in general and therefore more sustainable.

Current ecological economics as a part of neoclassical theory considers natural resources as a subject for Pareto efficient allocation. It means that the harm for different ecosystem services due to the extraction and pollution becomes sufficient parameters for production decision making. And growth as a quantitative increase in throughput with its natural limits has an opportunity to transform into development – qualitative improvement in goods and services and in human well-being in general.

Personal human inclusion first into environment (even before being born) and later in socio-economic system can be shown as in Fig. 3.

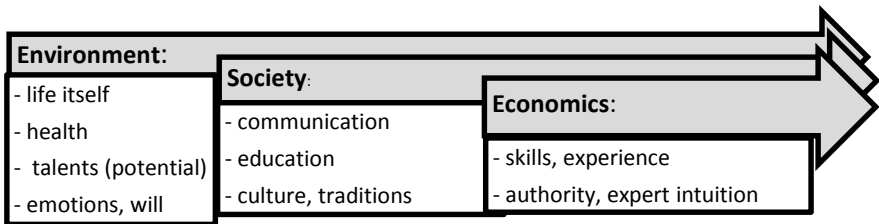


Figure 3 – Human development path

It is possible to conclude that comprehensive human life, strong health and satisfied basic needs, intellectual curiosity implemented by society can be both tool and the goal on the way to sustainability achievement.

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## **TIME DUALITY IN ECONOMIC SYSTEMS**

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The influence of the time factor on the socio-economic processes for a long time period is the one of the key problems of economic research. Such researches are largely very indirectly concerned with the conceptual study of the time factor impact as a separate category of economic science. As an important issue of current research we see the necessity of research systematisation for the study of the role of the time factor in the economics in the contemporary studies of researchers. The purpose of this manuscript is to systematize methodological approaches to examine the duality of time in economic research. The main objectives of this paper can be considered as the study of researchers views on the nature of time duality at all, its manifestation in the economic theory, comparison of different visions about the impact of the time duality problem on contemporary development of economic system.

The purpose of this research is to systematize methodological approaches to examine the duality of time in economic research. The main objectives of this paper can be considered as the study of researchers views on the nature of time duality at all, its manifestation in the economic theory, comparison of different visions about the impact of the time duality problem on contemporary development of economic system. This feature of the time effect on the economic processes has several associated symptoms, in particular: time-duration and time-order; basics of economic laws and limiting factor in the space-time development; qualitative and quantitative property; time as a relative definitions and categories and time as a specific measurement values; short-term and long-term phenomena; profit maximization problem and cost-minimization problem; time as an astronomical (calendar) and functional time; time as an interval duration and the irreversibility of its passage.

The theory of duality is a very important concept within the field of scientific research. This theory was first developed in relation to linear programming, but it has many applications, sometimes even more natural and intuitive interpretation, in several related areas such as nonlinear programming, networks and game theory.

In human everyday life time serves two functions: to measure the duration of the processes and determine the order of events. The possibility of such

use is predetermined by the dual nature of the time phenomenon. Time-duration is in relation of complementarity to the time-order. With the increase of time units (unit of indistinguishable) decreases the error in determining the duration of the process and increases the error in determining the order. The multiplication of errors is a constant, which is specific to each of the physical, biological or social process.

Time acquires its true meaning associated with the irreversibility or even with the “history” of the process, and it is not simply a geometric parameter characterizing the motion.

According to D. Meadows, by and large, from a systemic point of view there is no distinction between short-and long-term prospects. The phenomena of different time scales simply attached one into another. Some actions that are taking place today will have consequences that occur almost immediately, and others – many years later. The art of management in economics is the ability to see both short-term and long-term prospects. In her point of view, economics time horizons are limited by political elections or by the return period of investment, while the family time horizon is much larger, and historically humanity trying to plan their lives for much longer periods of time. The wider time horizon, the more chance there is for further progressive development.

Objectively, there is only a functional time, which is formed by all, without exception, actual processes, including economic. Only functional time is objectively exist, because it formed by the real processes. In other words, each process takes place (exist) at the time, which is formed by the sequential change of it qualitatively new conditions and does not depend on a person's consciousness.

Astronomical time and calendar time, as they are postulated and invented by a human is not correct to call objective, regardless of whether they are attached to economic or other process (postulated are the moments of time that have nothing corresponding to them in objective reality).

Developed a systematization of economically important time properties as a resource, showed the nature of the difficulties of the traditional use of the resource approach to economic time. Consistent inclusion of time bivalence as an economic resource and the concept of time-consuming need to draw distinctions between the so-called static and dynamic resources. It is noted that the doubling of economic time characteristics must comply with the doubling of concepts that describe the actual processes of post-industrial time-consuming economics that meets the time transformation from



exogenous to endogenous parameter of economics. The concepts of static and dynamic resource, static and dynamic value, reversible and irreversible components of the time evaluation and other economic resources.

An important result of this research we consider valid evidence of the dual nature of the time factor in the socio-economic life. This feature of the time effect on the economic processes has several associated symptoms, in particular: time-duration and time-order; basics of economic laws and limiting factor in the space-time development; qualitative and quantitative property; time as a relative definitions and categories and time as a specific measurement values; short-term and long-term phenomena; profit maximization problem and cost-minimization problem; time as an astronomical (calendar) and functional time; time as an interval duration and the irreversibility of its passage.

As an important area for further research we consider study of the impact of time duality on specific developments processes in the economics of the enterprise or the region (country), distinguishing features influence of the time factor on the results of economic agents' development.

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## **ENERGY EFFICIENCY IN BUILDINGS AS ONE OF THE SOLUTIONS FOR ACHIEVING ENERGY SECURITY**

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Energy is essential for economic development, food production and global security. According to the UN, the world will need at least 45% more energy by 2030.

It is well known that resources we are using today for the energy production have very negative impact on the planet, especially for the climate change. Alternative resources that are renewable and don't have CO2 emission also have own disadvantages. For example, solar panels are quite

expensive, depend on climate, need a lot of place and also there is a big issue with utilization of panels in the end of their life cycle. Wind farms and hydroelectric power stations are located too far from consumers and transmission losses are very high in these cases. Indeed, in future scientists will solve these problems, but so far we have to deal with them. It means that the best solution would be to combine alternative energy resources and energy saving.

According to the Ukrainian Energy index (UEI-2011) housing sector is the second after industry in terms of energy consumption. It means it has also second large energy saving potential. It is 35% of nationwide energy consumption, which is €4 billion or 11.4 billion cubic meters of natural gas. In 2013 Energy saving ranking was led by Transcarpathian, Chernigov and Vinnitsa region, the lowest place occupied Rivne, Cherkasy and Lugansk region. (UEI-2013).

According to the EU Commission 60 % of office heat is lost through the building fabric, 22 % from the roof, 9 % from the walls, 26 % from windows, 35% from ventilation and air infiltration, 8 % from the floor. This figure shows us that the potential of energy saving is more than 60 %.

Initiatives for sustainable buildings can help bring better living conditions, financial benefits for consumers and create green jobs for construction workers that won't be dislocated. It will give us lower energy bills, comfortable, modern homes and cleaner air. As a result, we have positive ecological - economic effect (win-win strategy).

Buildings in Ukraine can be built or insulated by further developing proven technologies that already exist today. The real challenge is to apply all the necessary technologies and bring them to scale. Another challenge is to work out ways to finance as many of these projects as possible and in recent years there has been a surge of interest in third-party finance for efficiency investments, a surge of interest that is not yet matched by actual transaction volume. The real problem is not a lack of finance per se, but rather a lack of structures that address investor concerns and would enable funds to flow into energy efficiency projects.

Despite the global financial crisis there is no shortage of investors in the world looking for stable low risk returns, and the risk-return profile of energy efficiency projects should be attractive to many investors. (Dr. Steven Fawkes, 2014)

Despite increasing policy attention on energy efficiency everywhere and more money being committed to energy efficiency, deals are being done

slowly. From programmes attempting to transform the market in Europe, and experience in North America and Asia it is clear that the fundamental problems are the same everywhere; small project size, insufficient volume to access the bond market, high project development costs, lack of capacity in both the customer base and financial institutions, and insufficient confidence in energy savings.

Markets cannot operate without standardisation and the Investor Confidence Project (ICP), which is supported in the US by the Environmental Defence Fund, is developing and deploying protocols for different building types that set out standards for developing and documenting efficiency projects. It is not designing new technical standards, that lie with the technical standards organisations, but rather to provide a common approach that investors can recognise and have confidence in. It reduces transaction costs, facilitates a portfolio approach, and allows different actors, project developers, insurance companies, investors to do what they do best rather than trying to address the whole problem. The Environmental Defence Fund is now working with European partners to develop an ICP equivalent in Europe – a common approach would facilitate a global market and enable global investors to address efficiency at scale. It is a good chance for Ukraine to take part in this process.

We need to move the focus to be much more about creating real markets that reward exploiting the efficiency resource by actually delivering megawatt-hours saved, rather than having governments specifying expensive processes.

Only by making investment into energy efficiency projects understandable, standardized and reliable we can unlock the required amounts of capital needed to achieve the large potentials for efficiency improvement we know to be there.

We can use an experience of USA in creating real energy efficiency investment market and to adjust it to Ukrainian realities and problems.

# FORESTRY AND FARMING A WAY THROUGH: ALOE VERA THE GREEN GOLD AMONGST US

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Eritrea is a country located in the arid, semi arid and mountainous parts of east Africa. During the past times, the merciless cutting and destruction of forest resources in Eritrea have resulted in environmental degradation and expansion of desertification. Land is exposed to erosion and the fertile part of the soil has been depleted. To combat this alarming situation and having realized the precarious conditions of the environment different sectors of government have been involving in various activities.

As a strategy, planting multipurpose species would be advisable considering the assurance of growth in production and environmental sustainability. Among them is a species known as Aloe, that has been demonstrated its multipurpose and cultivated for centuries. Most Aloes have some medicinal or commercial value, but it is the *Aloe Barbadosis Miller* (*Aloe vera* or "true Aloe") plant which has been of most use to mankind because of its multiple benefits.

*Aloe vera* (*Aloe barbadensis Miller*) is a perennial, species of Aloe, native to Northern Africa. Cultivation of *Aloe vera* has a multiple objectives that include Health benefits, productive and social welfare benefits, soil and water conservation, environmental Provision and Tourism. It is one of the most versatile plants in the surface of the Earth. This species is now popular both with modern gardeners and commercial farmers. Although *Aloe vera* is simple to grow, it is best if we follow specific scientific recommendations.

In Eritrea *Aloe vera* is a native crop that grows naturally in most parts of the country. Eritrea has the right climatic conditions, diverse ecology, an arable land and concerned government sectors to carry out successful *Aloe vera* plantation. The *Aloe vera* can be cultivated in hillsides and mountains, around coastal areas, in community closures and in modern farms. If we effectively utilize this plant we will be one of the greatest producers in the regional and international markets where the demand is sky rocketing.

The primary objective of this paper is to introduce and increase awareness of the population on the wonders of *Aloe vera*, and future proposals on what should be done to get the maximum payback of the plant.

One other objective might be Eritrea, a country that has been damaged by long term colonialism, war for independence and natural problems. This paper is a contribution: in addition to the promise held by the people and the government of Eritrea to heal this damage.

*The other objectives is*

- Reducing poverty by supporting value chain development of Aloe vera products which have a potential “economies of scale” for increased income and employment opportunities
- Ensuring practice of sustainable forest management by promoting resource conservation that uses incentives (cash in kind) to influence environmental services through a concept of Pro Poor Payment for Environment Services
- To expose farmers to Aloe vera farming and its value addition for income generating and poverty alleviation within the semi arid lands and to determine the Aloe vera species that are most adaptable for growing in the semi arid lands and their fertilizer and manure requirements for commercial production.

## **ANTICRISIS MANAGEMENT OF THE COMPANY DEVELOPMENT**

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The term «crisis management» has recently emerged with the beginning of economic reforms in Russia and with the gradual entry of the country into a state of crisis. Obviously, the economic crisis requires a new type of control, radically different from the management, to be implemented in stable conditions. The aggravation of the crisis in Russia has caused the need for policy crisis management. This special type of management received the name of crisis management.

This raises the question of the need for crisis management as a practical activity, science and educational discipline after the country out of the crisis, because, of course, the economic crisis, how deep it was, and ever will be.

Crisis management is a form control, which developed the mechanisms of foresight and monitoring of crisis, his analysis of the nature,

likelihood, signs, application of methods to reduce negative effects of the crisis and the use of its results for the future a more sustainable development.

The causes of the crisis the company can be many and diverse, since the company as an open system is under the influence of factors of external and internal environments, objective and subjective. Obligatory element of the strategy and tactics of the company must be measures, programs, algorithms, behavior of this or that crisis phenomena that lead an active strategy on the market.

Since any, including those undertaken in conditions of crisis, the activities implemented employees of the company, management of the personnel management must not only be informed of actions taken, but also to actively participate in their development and implementation, with the aim to minimize the damage both for the company and for workers. Western experience shows the priority problems of staff, especially of key specialists in the success of reconstructions and reorganizations. Any redistribution of resources related to the needs of companies in qualified managers and specialists at minimum costs of living labor. Solutions in the field of personnel should, of course, take into account the situation on the labour market, labour costs, motivate workers to work at this company, the value of each individual worker from the standpoint of current and future objectives of the organization. In such cases are objective certification of employees, redistributing responsibilities, optimization of loading and subsequent revision of job descriptions; it is sometimes useful for partial upgrades of the staff, and engaging of the specialists of high qualification (this measure requires special care not to disturb the positive attitude of employees to the organization). In this period, it is useful to make changes planned character or a number of unpopular but long-overdue measures.

Preventive actions of the personnel management:

1. Flexible organizational structure «under tasks of the organization, extra units should be eliminated, and redistributing partially dismissing employees.

2. The definition of priorities in personnel development and implementation of management functions to them.

3. Annual certification.

4. Systematic review (update) «Regulations on departments and Job descriptions for their improvement in accordance with changes in the division and organization of work, as well as changes in the level of professionalism of the workers themselves.

5. Development of compensation packages (size, structure, ratio of different forms of employee benefits) with focus on the end results are significant for the organization (the system of through rates, for example), and subject indexing.

6. Development of a system of constantly operating antidementia measures, including on the occurrence of objective reasons to reduce the level of firm commitment (for example, with the threat of dismissal). The question is about the protection of confidential information, including relevant provisions in contracts of employment, and measures against fraud, including internal audit.

7. Permanent informing employees about the market of goods and services on which the organization operates, formation of market thinking, ensuring involvement in the problems of organization.

8. Preventive measures (starting from the moment of receipt of the employee) in case of reduction of business activity of the company and the need to cut workers, although these measures do not contribute to the formation of the worker's firm commitment and coordination his life goals with the goals of the firm. This action type: concluding a fixed term employment contract, contract on the keeping of commercial secret and confidential information, official secrecy, liability, introduction of a receipt with the job description (for heads of departments or even with the Regulations on the unit), the internal Regulations, the Regulations for remuneration and incentives, the Collective agreement (if available) special measures in case of need dismissal.

9. Unconditional compliance with the Law.

Legitimate to add: the introduction of normative documents on industrial relations sections that define the behavior of the parties in the conditions of crisis the organization, principles, criteria, indicators, based on which the decision on the assignment or dismissal.

On the basis of the strategy, available resources, accumulated experience and projected consultants draw up a plan of anti-crisis measures, which determines the period of (duration), cost and outcomes (generalized parameters of the enterprise) crisis management. This is the most important moment of the anti-crisis consulting, allowing:  
- customer to receive representation about those problems and the chance is associated with crisis management of its business; it is at this stage clients often refuse from the further implementation of anti-crisis consulting and decide to sell their business; consultants to start a specific plan of anti-crisis

measures (if the customer has not suspended the project). Preliminary definition of the term (duration) and output parameters of the enterprise demonstrates the basic principle of anti-crisis planning - from the end to the beginning. Anti-crisis measures are planned not to the here and now to solve some problems of organization and overcome some difficulty, and that the target date to achieve the goal (to ensure the achievement of target parameters of the enterprise).

As a rule, the anti-crisis program in detail planned in the first quarter of the period of implementation of anti-crisis project. Planning for the longer term is useless because the realization of the antirecessionary program is fraught with many uncertainties that may make too long a plan fictitious.

Anti-crisis plan should be a detailed list of interconnected events. Each of them should contain the following information:

- dates of beginning and end (usually in weeks from the start of the program);
- the costs of implementing the activities;
- intermediate and final results of the event;
- organizational structure (organizational unit, top-Manager) responsible for the implementation of activities;
- conditions of implementation activities (for example, the successful completion of another event).

Anti-crisis strategy always identifies three main areas of action for the managers of the enterprise:

- search for the optimal ways to increase revenue, either through mobilization internal reserves (by entering new markets, increase of sales plans, expansion of the nomenclature of products), or through the potential sale of assets not involved in the current business to repay part of the debt from the proceeds of sale;
- seek opportunities to reduce costs (and often large-scale decline «cost cutting») through the reduction of the wage Fund, the failure of the implementation of investment projects, reduce operating expenses and other;
- reduction of the financial cycle, either by revising the policy of work with buyers and reduction of delays, either through trying I agree about the delays with suppliers, either through a change of supplier or dealer or through a review of the production cycle.

Within the anti-crisis strategy is necessary to develop detailed a schedule that shows the whole complex of measures planned for



implementation, with exact indication of performers, sources of financial or material resources, responsibilities, etc.

Anti-crisis planning is a complex of the actions directed on overcoming of crisis situation in case of its occurrence. The content of the anti-crisis planning varies depending on the specifics of the organization, the risks to which it is most vulnerable, the situation in the industry and in the region where the organization operates, the size of the enterprise and the extent of its activity.

It is necessary to pay attention to the features and specificity of the anti-crisis planning in the system of planning of activity of the enterprise. Crisis planning is a new direction for Russian planning, which is carried out as one of the functions of crisis management.

In the situation when the organization is stable and successfully operates and develops leadership hard to force myself to think about the possibility of a crisis in the future and, moreover, to allocate time and resources for the implementation of anti-crisis planning. Many managers deny the necessity of such events for their organizations, arguing that the threat of a crisis is unlikely to be relevant for their enterprise, as it operates in a stable environment has reliable suppliers and existing client base. However, crises can happen in any, even the most successful companies, even in the period when its main indicators grow and the situation seems favorable.

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## REGIONAL ECOLOGY KURSK REGION

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Ecology implies the relationship of organisms, communities among themselves and with the environment. Russia has enough difficult situation with ecology, because Russia is one of the most polluted countries in the world. Economic situation exacerbates ecological one, and the severity of the prevailing negative trends is growing every day. Major rivers shallows, large amount of small rivers vanish; superficial water pollution, depletion and pollution of the groundwater, drinking water quality degradation, seas pollution, deforestation are big problems in the Russian Federation. Plowing up of turf-covered slopes, low quality agricultural methods cause accelerated soil erosion. Also there was a large degradation of the land resources in the recent years.

The environmental pollution includes:

- 1) contamination of the lithosphere - occurs as a result of the construction and mining, and also due to industrial, agricultural and household waste;
- 2) the hydrosphere contamination, which occurs as a result of the waste dumping into the seas and rivers;
- 3) atmospheric pollution, which occurs as a result of the combustion of the mineral fuels.

Kursk region is one of the most beautiful on the nature and rich in the minerals in Russia. The huge supplies of iron-stones bed in the bowels of the earth of area. The most important irreplaceable gift of nature are black earth soils. One of major ecological problems of area and all Russia is a problem of maintainance of our main natural resource — black earth, because there



is worsening and destruction soil cover as a result of development of erosion, violation of technology of treatment of soils, mining, and also a large problem with the quality of drinking-water.

Black earths are famous the fertility. They contain plenty of humus (approximately to (8-9%) under the natural steppe vegetation and (4,5-6,5%) on ploughed field), connections of nitrogen, potassium, calcium, phosphorus. They have slightly acidic or near-neutral pH for the good sprouting of plants.

The soil cover of Kursk region is subject of erosion. Wide distribution of slopes of different steepness, loose rocks composing territory, thundershower character of rainfalls, rapid melting of snow are the course of erosive processes.

The region has about 600,000 hectares of land, which need protection from erosion.

All-russian research institute of agriculture and defence of soils from erosion, located in Kursk, developed the “General chart of ravine measures”. The whole complex of measures of fight is foreseen against erosion: agrotechnical (ravine treatment of soil, high agrotechnics), fitomeliorativnye (zaluzhenie of steep slopes, forest bells) and hydraulic engineerings (water-detention billows, pletnevye dams and other). As we know water - is source of life. But in the Kursk area there is serious problem with water. For the results of laboratory researches during the row of years to 14% investigational tests fall short of Gost 2874-82. And a drinking-water on physical and chemical indexes and to 8% tests is dangerous in an epidemic relation.

So on results 2013 in the districts of the Kursk area water falls short of norms.

Medvensk district	17,3%
Sudzhansk district	17,7%
Solncevsk district	18,2%
Khomutovsk district	20,1%
Fatezhsk district	22,9%,

Samples of drinking water does not meet the state standards in the areas of Kursk region on bacterial indicators at the average regional index of 6.8%.

Glushkovsk district	68,5%
Zolotukhinsk district	37,3%
Kastorensk district	22,1%
Oboyan district	20,9%

In relation to the atmospheric air, here is also serious enough problem, because contamination of the atmosphere increases the amount of small

particles, harmful gases and impurities. And if oxygen diminishes reasonably slow, the contamination of the atmosphere grows swiftly. The atmosphere pollution affects, flora and fauna, reduces the atmosphere transparency, increases the number foggy days, destroys the ozone layer of the atmosphere. The negative influence of the atmosphere contamination on a human health is characterized by the change in the general structure of diseases. More specific: by the number of chronic nonspecific diseases for both children and adults; by death rate growth.

Nowdays Kursk region is yet too far from the ecological prosperity: the soil degradation process has not been stoped, a natural environment is contaminated by production and consumption waste, by discharges and outlets of harmful matters during transport and production facilities operation; problems of the Mikhaylovskiy mining industrial complex, Kursk nuclear power plant and complex of town-planning problems are still important; the wounds from the Chernobyl disaster are not healed; the violation of the geological environment, hydrological and hydrogeological condition causes particular alarm.

Contamination of environment, exhaustion of natural resources and violation of ecological connections in ecosystems became global problems. And if humanity will continue to go on the present way of development, his death, as leading environmentalists of the world consider, through two-three generations inevitable.

Among the most effective ways of decision of ecological problems it is necessary to select introduction ecologically of effective and resource saving technologies, raw material, products and equipment, rational use of natural resources. So, very real already presently steps on introduction in a communal sphere and on the production of technologies on utilization of wastes – general and one of main sources of contamination of all natural spheres.

Swift market of consumption development entails continuous growth of volumes of education and accumulation of communal wastes, that makes the problem of one their utilization out of major tasks of humanity. In this connection, processing of wastes, acquires the special role for every separate state and planet on the whole. So, on the estimations of specialists, about 60% wastes are the potential second raw material which can be processed and advantageously realized.

There are three ways of decision of nature-conservative measures problems:

- 1) creation of cleansing buildings;
- 2) development of nature-conservative measures;
- 3) rational placing of dirty productions.

It is similarly necessary to mark that, in spite of all steps undertaken presently on the decline of level of anthropogenic pressure on an environment, a considerable result will not be attained without the increase of level of ecological culture of man, his ecological education and education.

## **ECOLOGICAL AND ECONOMIC POTENTIAL OF SECOND-HAND MARKETS FOR DEMATERIALIZATION OF THE ECONOMY**

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Since the 1970s, a growing body of research by environmental scientists has suggested that greater material efficiency, use of better materials, reuse and recycling, and the growth often service economy are contributing to the "dematerialization" of the economy.

In this context, it is often suggested that the recycling and reuse of products, materials, and wastes have significant potential for increasing material efficiency and reducing environmental impacts. Taking this idea to its limit, Graedel and Allenby (1996) have suggested that the ultimate goal of environmental management could be the evolution of the economy into a system in which all materials are reused and recycled. But despite the interest in dematerialization and reuse of materials, there is as yet no theoretical framework for understanding the future evolution of material use in industrialized societies.

The potential for second-hand markets to reduce demand for new goods is investigated. Using a variant of an economic model originally developed by Anderson and Ginsburgh, the physical implications for material use are explored. The second-hand market grows if transaction costs decrease or if product lifetime increases. In this model, growth often second-hand market reduces demand for new goods if there are waste used goods that can be brought into the market. But if there is not a ready supply of waste used goods, growth of the second-hand market can increase demand for new goods, thereby increasing material consumption. Moreover, even when second-hand sales reduce demand for new goods, it is typically not on a one-

for-one basis. The extent to which the purchase of used goods replaces the purchase of new goods is shown to be an explicit function of the relative value provided by used versus new goods.

Consider a product that is used by the purchaser for only one period (for example, 1 yr), but which has an additional lifetime  $L$ , so that the total lifetime of the product is  $1 + L$  periods. After the purchaser has used the product for one period, he can sell it, store it, throw it away, or give it away. The price for a new product is  $p_N$ . If the product is sold after the first period, the used price is  $p_S$ , which the seller receives, plus a transaction cost  $s$ , which must be paid by the buyer and includes search costs, delivery costs, and so on. Even if  $p_S = 0$  (if there is insufficient demand for the used product and the seller is willing to give it away free), the buyer is still required to pay the transaction cost. Disposal is assumed to entail neither financial costs nor benefits. The value of the service provided by a used product is  $v$ , and the value provided by a new product is  $v + k$ , where  $k$  is the extra benefit of newness. Consumers have different valuations of these services according to a parameter  $\theta$  that is between zero and one, with higher  $\theta$  denoting individuals with higher willingness to pay.

The options available to the individual are  $N$ , buy new and sell/give away/store/throw away;  $U$ , buy or find used; and  $Z$ , do not consume the product (the zero option). The utility  $V$  - Effect of Dematerialization **Second-Hand Markets (EDSHM)** under each of these options is as follows.

$$1. \quad V_N = \theta(v + \kappa) - p_n + p_s \quad (1)$$

$$2. \quad V_U = \theta L v - (p_s + \tau) \quad (2)$$

$$3. \quad V_Z = 0 \quad (3)$$

**EDSHM as a Function of Transaction Costs.** The size of the markets for second-hand and new goods depends on the parameters  $s$ ,  $v$ ,  $k$ ,  $L$ , and  $p_N$ . This section focuses on transaction costs  $s$ , and the next section focuses on product lifetime parameter  $L$ .

Total material consumption of course includes manufacturing and production wastes as well as the material in the product, which is taken to be proportional to  $N$ . Above a certain maximum transaction cost  $s_m$ , the second-hand market ( $U$ ) does not exist. As the transaction cost decreases below  $s_m$ , the second-hand market grows and the number of people buying new decreases. But as  $s$  continues to decrease, the waste is used up.

**EDSHM as a Function of Product Lifetime.** The model also assumes that second-hand owners may own more than one of the product and that the price for new goods is exogenous. These assumptions are unlikely to characterize all second-hand markets of interest. By changing equations (1 -

3) to develop new models, the implications of different market behaviors could be explored. Data on how consumers and markets react to changes in the lifetime of products, transaction costs, or product obsolescence would allow the development of models that reflect observed market behaviors.

A key factor in this model is whether the second-hand price is or is not effectively zero. Examples of second-hand markets with nonzero second-hand price might include markets for cars, housing, and some books. The model indicates that in markets with positive second-hand price, increased second-hand sales would not correspondingly decrease sales of new goods. If all other variables remain constant, increased second-hand sales in these markets can increase sales of new goods and increase material consumption. On the other hand, in markets with zero second-hand price, such as markets for electronics, furniture, clothing, and garage-sale items, increased second-hand sales can be expected to decrease the demand for new goods.

The model presented here has implications for extended producer responsibility and the substitution of services for products. It has been argued that firms would have an incentive to be more efficient with materials and energy if products were leased rather than sold to consumers however, it has also been argued that one motivation of the lease-only strategy of firms.

## **THEORY COMMUNITIES AND CARRYING CAPACITY OF ATMOSPHERE**

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Uncertainty about resolving contradictions in greenhouse gas emissions management slows economic growth. Significant progress in improving environmental and economic efficiency does not provide the desired level of production and consumption in the existing resource and technology constraints. Free access to atmosphere carrying capacity is one of the key factors of such contradictions existence. Its influence is considered in this work through the prism of the theory of "tragedy of the commons."

Free access to the resource allows over-exploit it. In such a case profits are taken by concrete polluters, while the costs are distributed among all subjects, regardless of rent distribution. This situation, in terms of game theory, defined as the concept of "tragedy of the commons". It was examined by Garrett Hardin in 1968 in "Science" magazine [1].

Tragedy of the commons phenomenon interconnects with the concept of economic growth. On the one hand it is obvious that the presence of tragedy of the commons is a sufficient condition for growth, because it deals with recourse utilization extension. On the other hand, there is no reason to suppose that the tragedy is a prerequisite for growth. Growth may be constrained due to the depletion of the resource consumption, the unwillingness or inability of subjects to improve the efficiency of resource use, to find substitutes for this resource.

Tragedy of the commons arises due to certain forms of market failure, which is caused by inefficient Pareto distribution of resources between subjects. Market failure can be caused by the presence of weak or non-existent market. Therefore, in terms of game theory, it is necessary to appoint "Elder" to define rules of the game. Regulation of emissions trading is carried out in accordance with the flexible mechanisms of the Framework Convention on Climate Change (UNFCCC) and the rules of the Kyoto Protocol, adopted in addition to the UNFCCC. So, in fact, the market and Elder are defined. However, in our opinion, the market still has the attributes of a weak market. Declared in international agreements emission dynamics in the long term is relatively mild, because, in fact, not possible to stabilize the concentration of greenhouse gases at an acceptable level. Acceptable scenarios (eg, Scenario 450 or 550) are inaccessible from the perspective of development at the current technological structure of the world economy. Thus, the resource, the carrying capacity, continues to exhaust. Consideration within the anthropocentric approach of economic damage as an alternative resource carrying capacity, also does not allow to come to a different conclusion. In this case, economic damage in short-term grows linearly, while in long-run it grows exponentially, if the climate change consequences are taken into account.

We can conclude that the concepts of tragedy of the commons and economic growth are interrelated. In a weak market of carrying capacity the situation falls under the definition of tragedy of the commons. This tragedy can be considered as a sufficient condition for the economic growth, but is not necessary. Under certain conditions, its impact on economic growth can be minimized, but in a weak market of resource management at mitigating the consequences of this tragedy can be extremely difficult, even in the case of direct intervention.

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## **HEAT PUMP ENERGY IN THE ENERGY AND ENVIRONMENTAL SECURITY IN THE ECONOMIC DEVELOPMENT OF UKRAINE**

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Volatility of Ukraine on imported energy resources and modern requirements to reduce anthropogenic pressure on the environment threaten the country's economic situation. A similar picture emerges in other countries. In this regard, special attention is paid to the energy policy of the development of heat pump energy.

World market of heat pumps tends to positive growth (2 times every 2-3 years) as a result of state support of the consumers of this equipment. Total sales of heat pumps in 20 European countries in 2012 amounted to 780 thousand units, which is 2.5 % more than in 2011, and the share of the heat manufactured on their base in heat power balance of some countries is 70%.

It is stated that almost all the countries with a high proportion of the heat pump energy in the energy balance manufacture heat pumps themselves, and they widely use methods of state regulation and support, which are not the same for different groups of consumers of heat pumps. The scientific and technological progress in the field of heat pump energy is rapidly developing; this process is based on consolidation of the efforts of developed countries in the International Energy Agency. The Ukraine is not yet the member of the International Energy Agency. National market for heat pumps presents a huge variety of styles and types of heat pumps, which causes difficulty for the consumer in selecting them. Often consumers choose expensive model of heat pump or the pump which is not suitable for climatic and other conditions. The cost of the heat pump of the same model may be twice more expensive, depending on the brand image of the selling company. Companies which offer ecologically safe models enjoy tax benefits, and the landlords who buy this equipment, receive grants, subsidies and tax credits.

In our opinion, the formation of energy-efficient economy is necessary. This can be done through a phased release of promising projects for the use of heat pumps in heating supplies of the Ukraine. They should be ranked by the degree of «profitability». The efficiency of the use of different scale

projects of the heat pumps is based. The use of the average economic performance, as it is presented in the Energy Strategic Plan of the Ukraine till 2030, can discredit the very idea of the development of the heat pump energy in Ukraine.

We have conducted classification of the heat pumps usage according to the unit capacity, the direction of their use in various sectors of human life and activity (energy, utilities, industry and agriculture), and have assessed their effectiveness, which varies by 5-7 times.

The current expenditures on using heat pumps is comparatively lower for 20-50% than traditional heaters when using large scale (about 3300 kW) and medium scale (50-150 kW) of power because of the reduction, the expenditures of organic fuel. The heat pumps are paid off in 2-3 years which proves its beneficial realization. Thus the cost of the heat pump system can be comparable or scientifically higher than the value of the traditionally used boilers, depending on the type and model of the heat pump.

The realization of the individual heating projects based on heat pumps with small capacity (10-50 kW) requires more investments if compared with the traditional pumps. Low and standard capacity heat pumps are good for commercial institutions, organizations, enterprises, since heat tariffs for these consumers is 2-3 times higher than for others. So, if the pay off period for these projects for the population is 8-10 years, for commercial customers it is twice shorter. At the moment, the efficiency of the heat pump usage may increase due to the use of all its technical and technological capabilities (heating, hot water supply, air, water) , as well as special control mechanisms.

The most promising direction from the economic point of view, is the implementation of projects of heat pumps for upgrading TPP boilers manmade park which physically and morally outdated by 60-80% . These projects will be compensated in 2-3 years. In addition, taking into account environmental factors the period of the payback of these projects may be reduced.

The most expensive projects are the projects in which groundwater heat pumps are used. To improve economic efficiency of such projects we recommend to use them in heat and water supply, which is really important for water-scarce regions of the Ukraine.

At the same time, the lack of effective management development of the pump energy, as in European countries, endangers both the implementation

of the national energy policy and the implementation of the international obligations under the Kyoto Protocol to reduce greenhouse gases.

## **ANALYSIS OF ENVIRONMENTAL COVERAGE IN ADDIS ZEMEN AMHARIC DAILY NEWSPAPER**

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In Ethiopia, environmental-induced problems are huge and threatening. There is a common understanding that environmental degradation is partly due to lack of awareness about the environment. However, studies conducted in Ethiopia on this issue are very limited. This study has attempted to assess the coverage of environmental issues in print media. For the study, quantitative and qualitative data were used in combination.

Addis Zemen Amharic daily newspaper was selected for case study, and a sample of 120 editions, evenly distributed across a period of five years (2001-2005), has been analyzed. Results show that no permanent section was assigned for environment issues and no reportages, interviews and commentaries were presented on the issue. The limited available coverage was inconsistent, showing a rising trend in one year and then falling in another.

The research also revealed that no proper emphasis was given to environment issues either within the newspaper or in the editorial policy; if at all covered, most of the environment issues were too brief and covered only indirectly giving high priority for other issues such as development, investment, agriculture, health and education. Scarcity of environmental information, poor information delivery system and journalists' lack of the necessary knowledge and training on the concepts of environment is some of the challenges faced in the environmental reporting.

Whether or not the absence of environment issues in the editorial policy has led those in the newsroom of Addis Zemen to ignore environment issues of great concern is difficult to tell. The poor emphasis of environment issues in the editorial policy may have ultimately resulted in poor and inconsistent coverage on the newspaper. As the editor of Addis Zemen explained, the personnel in the newsroom are trying to fulfill the objectives of the press stated in the editorial policy. The editorial policy is their guide

and they are abiding by it; it guides the editorial room in every detail – selection, exclusion, prioritizing and killing of stories. Yet, the editorial policy has also given to the newsroom a mandate of setting any public issue as agenda of the newspaper, giving it the possibility of covering environment issues as one of the major issues. However, as the findings showed environment issues were considered as major issues neither by the editorial policy nor by the newsroom, and this show there is a gap in the knowledge of environment issues both in the editorial policy and among journalists themselves.

Despite the existence of many environmental problems in both rural areas (such as deforestation, loss of biodiversity, soil degradation and erosion, desertification) and in the urban major cities (such as sanitary problems, water and air pollutions), these were seldom mentioned in the paper. The main sources of information used were very limited (government authorities, Ethiopian News Agency); whereas the major stakeholders of environment issues – environmentalists, research institutions, industries, NGOs, and the society at large were ignored.

The research also found that Addis Zemen did not have a proper communication system with concerned government bodies (such as EPA) or with other bodies working on environment (such as NGOs). As understood from the interviews, the line of information between Environment Protection Authority and Addis Zemen is very weak. There is no proper linkage, which could enhance exchange of environmental information.

Overall, from the study's findings it is possible to generalize in saying that environment issues were not considered an important public issue, and were included in the major public agenda neither by the newspaper nor by the editorial policy of the press over the study periods. Therefore it could be concluded that under the current coverage, environmental awareness would remain very low; by implication, environmental mismanagement due to limited know-how would continue to affect the quality of environmental resources in the country.

From the results it is possible to conclude that given the current trend of environmental reporting, the journalists would remain environmentally illiterate. The study further concluded that unless environmental awareness is urgently created, public awareness would remain low and there would be further environmental degradation. Therefore, the study recommends that measures such as identification of awareness obstacles, setting environment

issues as agenda, training and sensitizing of journalists on environment issues, and enlightened press management should be given due attention.

The specific recommendations of the study are as follows:

- Awareness obstacles should be identified first; only then will concepts of environmental issues that require coverage stand any chance of success. Trainings of journalists on various environmental issues and in professional journalism itself are imperative; it is when journalists themselves are aware that they can play a role in creating environmental awareness. Therefore, the newspaper should seek mechanisms of getting its journalists trained in the basics of environment issues and enhancing their awareness about the environment problems of the country and the globe.
- Enlightened press management may be the bottom line in better coverage of environmental issues. Many editors and reporters of environment issues believe real changes can come from the institution for which a journalist works. Therefore, Addis Zemen's editorial board should reevaluate the editorial policy itself to include more focus on environment issues.
- Different programs should be planned in order to expose journalists to unexplored resources on the environment – the effects of environmental degradation, the requirements of new environmental laws, the requirements of conveying ratified environmental laws and the requirements of the inclusion of experts' explanations and government officials in the coverage.
- The impact of environment resources and human activities are news stories that need to be told in a manner that is understandable to the public. In-depth reportages may be a good tool to tell such stories. Journalists must deal appropriately with their sources (experts, the government, pressure groups, and the public), the audiences (reading public) and their immediate supervisor. Stories about the effects of environment issues on ordinary people should also be delivered to make readers to grasp the complicated issues of environment.
- Information about environment should not only be a top-down perspective, but also should arise from people's needs. Addis Zemen can encourage greater public participation debates that shape public policy. As it has also been given the role of setting the agenda, it should assign a permanent section for environment issues to be covered regularly and to invite the reader to have their says. This is

in line with the agenda setting Theory of McCombs and Shaw as the selection of news is seen to have a powerful effect on what the public will think about.

- Addis Zemen should also assign a page or a column for environment issues so that environmental NGOs can subsidize environmental pages. It may also hire freelancers from various amateur journalists' clubs and may use them as beat reporters after giving trainings on environment issues.
- Both journalists and policy makers need to learn each other's languages so that the newspaper actively participates in communicating ways to build public empowerment. Addis Zemen should seek means of working in cooperation with such bodies; it should develop channels of communication and exchanging environmental information.
- Addis Zemen should also use diversified sources so that stories could be more reliable and balanced. EPA for example has a newsletter and a biannual magazine called Tefetro (Nature) from which journalists can get environmental information. Addis Zemen should also create information exchanging channels with other media institutions – print, broadcast and electronic as well as government and non-government media.

## **ENVIRONMENTALLY SAFE FOREIGN TRADE LIBERALIZATION IN DEVELOPING COUNTRIES**

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According to the peculiarities of the impact of global trade liberalization on the environment in developing countries, we have offered the main ways to ensure environmentally safe trade liberalization in developing countries (Table 1). We have grouped them into five main areas and suggested remedies to prevent environmental losses from trade liberalization for each of the areas. These tools include conducting internal economic reforms, reforming national system of environmental protection, involving wider public of the country and changing foreign economic activity orientation of the country from economic to eco-economic.

Table 1. Ways to ensure environmentally safe foreign trade liberalization in developing countries.

Main directions	Means
Structural reform of the economy	to adopt long-term development strategy in order to change the structure of national economy to provide sustainable development of resource industries (to improve natural resources management, provide transparency of the market, foster diversification, create infrastructure and political foundation) governmental investments in education, workforce requalification, R&D, infrastructure
Pollution internalization	to include externalities in the price of the goods to cancel subsidies in environmentally harmful industries to establish proper private property rights to form adequate resource prices and to eliminate free rider problem to register and evaluate natural resources
Ecologically conscious international integration	to sign environmental side agreements to conduct environmental assessment of trade agreements before signing them integration of environmental regulation on regional and global levels
Environment protection reform	to keep to the principle of parallel reforms (to conduct foreign trade liberalization with simultaneous internal ecological policy reformation) to form institutional structure, which will effectively provide environmental protection to switch from command and administrative measures of environmental protection to market measures to register natural resources and to control the use of them
Environmental awareness formulation	to introduce ecological education to cultivate ecological consciousness and to foster active civil position formation in the sphere of environmental protection public involvement in environmental protection

The methods of direct trade regulation include: application of sanitary and phytosanitary standards to goods, a variety of technical barriers to trade,

prohibition of trade in some goods or introduction of higher tariffs on their exports or imports. Other measures are not directly related to the transboundary movement of goods, but they have an impact on international trade through the influence on the formation of goods prices on the world market, on the supply and demand.

## **TOXIC CHEMICAL POLLUTION OF WATER RESOURCES AS A THREAT TO THE SUSTAINABLE DEVELOPMENT**

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Water pollution by oil and oil products is an additional source in stress to aquatic organism and it has a great impact on wetlands .Oil pollution of water resources has transformed today into a problem of global proportions. Pollutants such as oil are the greatest dangers because it doing a toxic effect on organisms of neuston, pleuston, plankton and benthos.

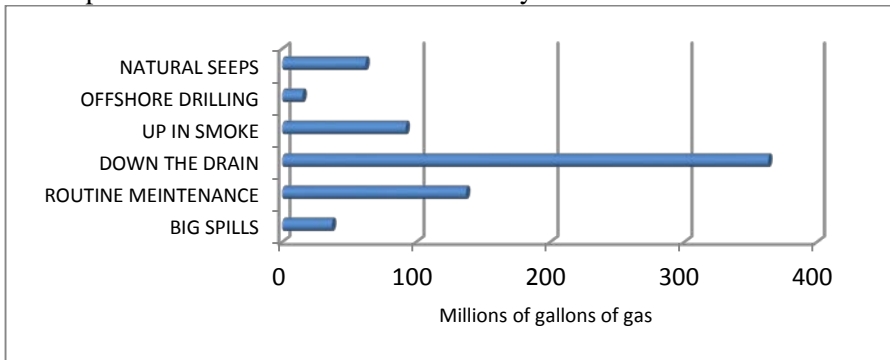
Nearly 40% of oil products that fall into the water form a stable oil emulsion, the same percent deposit on the bottom and 20% form a surface film. Covering the surface of the water, oil, particularly heavy fraction and emulsion, prevent movement, breathing and nutrition of small aquatic organisms. Oil can stick to the shells of aquatic animals, algae. Many hydrocarbons that penetrate the leaves and stems of plants can disrupt the structure of intracellular membranes that regulate metabolism processes. Oil film has a detrimental effect on organisms, primarily aquatic organisms that are in the early stages of ontogeny. Paraffin often cause a narcotic effects in protozoa. The graph below shows how many millions of gallons of oil each source puts into the oceans worldwide each year (table 1).

Especially we want to highlight the side effects of the products that are developing today to eliminate oil spills on the water surface. So an attempt to deal with the Gulf of Mexico oil pollution by dint of the first synthetic microorganism ended really sadly. Twenty scientist have been able to bring so-called "minimal bacterial genome", named Cynthia bacterium. In 2011 scientists launched Cynthia in the Gulf of Mexico: oil slicks began to lose weight rapidly, and the pollution area began decrease steadily. However, very soon bacterium abandoned oil and switched on living organisms. The



result was a mass death of fish off the coast of North Louisiana (over 100 000). People who bathed in Gulf of Mexico, covered with sores and died in a few days. The bacterium can not be destroyed even by antibiotics and it is the most terrible thing. [1]

Table 1. The graph that shows how many millions of gallons of oil each source puts into the oceans worldwide each year



It is urgent today to assess the ecological and economic risks that occur in shale gas production. We know that in 2012 Anglo- Dutch company Shell began production of shale gas in Donetsk and Kharkiv regions. The method of hydraulic fracturing that uses in shale gas productions is a threat of serious, unintended consequences of the negative impact on the quality of surface waters. The first, the chemical mixture that is pumps into the well consists of 596 chemicals, of which 96 are either completely unknown (SAS, TKN, MBAS). This solution contains a corrosion inhibitor, reducer of a friction, stabilizers clays, polymers, biocides , heavy metals like chromium, lead , cadmium , mercury, arsenic. During the fracturing layer chemical solution or even gas may bleed into the soil, what contaminate groundwater and surface water. Hydraulic fracturing leads to a multitude of borehole water dangerous contaminants : benzene, toluene, ethylbenzene, dymethylbenzolu . Introducing such water in the human body is extremely dangerous diseases such as pancreatic cancer , destruction of red blood cells, abnormalities in the bone marrow, a mutation in embryos and various neurological diseases. Statistics show that every thousandth hammer is alert. consequence of this is groundwater contamination within a radius of 1 km. But the greatest danger of shale gas is to use a large amount of water. For each freaking operation

required from 4 to 26 thousands cubes of water. In the calculations : for 1000 these wells we will take approximately 468.thousands cubes of water.

So, we consider that it is necessary to conduct `series of large-scale examinations to establish the risks of shale gas production in Ukraine and in the world.. Uncontrolled water resources pollution by gas, oil and other dangerous substances can lead to the fact that very soon humanity will have a question about to eat or to drink water because the water will be sorely missed. We sure that the favorable status of aquatic ecosystems should not be lost on the background of economic profit today because it is impossible to implement the project of sustainable development.

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## **RIN MARKET: PRICE BEHAVIOR AND ITS FORECAST**

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For the two recent decades one of the world's most important questions has been about ecology. More and more countries think about an ecological situation. So in 90s the Kyoto Protocol was signed and a number of countries created a market for emissions. It is good for stimulating the producers to reduce pollution. The main problem of this market is that it is very difficult to measure how much the company is polluting.

The USA solved this problem by creating a similar market in 2005. It is called the RIN market. RIN stands for Renewable Identification Number, but it is not only number, it is also a financial asset which a producer can trade like emissions. Because of similarity with emissions, many Americans call RIN a tax. It means that the government stimulates blenders to add ethanol to gasoline before selling it to the service stations. Every gallon of ethanol which was produced in the USA or was imported to this country must have one RIN, and every blender has own RFS (Renewable Fuel Standards), which specifies the minimum amount of RIN it must possess. A blender can

trade RINs in a way similar to trading emissions, and it is important that they can trade RINs separately from ethanol.

Both the emission market and the RIN market have many common characteristics, but there is one big difference. Unlike emissions, RIN are traded without the exchange, but it is reasonable to suppose that in some years it will be possible to buy or sell RINs on the exchange. As the importance of RIN trading is likely to increase, the goal of this paper is to research the RIN price behavior and to forecast the price using ARMA-t-GARCH models.

This paper analyzes prices of three RINs: biomass-based diesel (D4), advanced biofuels (D5) and cellulose (D6). The daily prices were taken from the site of a young American company EcoEngineers, which offers a wide range of RIN services like consulting, reporting and certification. This company presents prices only since the beginning of 2011, so the prices were analyzed from January, 2011 to September 2013 (690 observations for each series).

The paper shows that it is not important how to estimate these series (separately or together), because the estimations of parameters are very similar and the forecasted gaps are similar too. Also the common estimation using DCC-GARCH model made it possible to ascertain that these series have positive correlation in each pair of series. It means that no one can hedge others security, but this information can help to forecast, because if one series has shock, other series will change too. This information will help traders when RINs are traded in an exchange.

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# **THE ENVIRONMENTAL SERVICES MARKET OF UKRAINE: THE STATE AND FEATURES OF OPERATION**

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Well-being and health of society depends on the quality of the environment. Enhancing self-regulation prevents contamination of nature and its interaction with society. In recent years, Ukraine joined the globalization processes related to the conservation of life on Earth, where the environmental services market is of special importance.

Studies of environmental services, their diversity and efficiency were conducted by such scholars as O. Veklich, V. Kostyuk, V. Shevchuk, S. Litvak, A. Orel, B. Danilo more.

The purpose of the research is to study and disclose the essence of the issue of environmental services, the feasibility of their use and linking with the emergence of the market mechanism in Ukraine.

The relevance of this theme is that modern production, the market of goods and services - is not only able to meet social needs, but also to coordinate all of the processes. Therefore, the introduction of environmental thinking in the form of environmental services, greening is one of the factors to further secure life and prosperity of human activity and society.

Activation of economic activity, the active use of natural resources is a consequence of the growth of human needs and at the same time is a factor that motivates the emergence of environmental needs. Environmental requirements are rapidly becoming an important part of the life of society [3].

Gaps in the legislation governing the activities of companies that pollute the environment, can be explained by their weak activity against sustainable development. Recently, however the rate of development of material production, including areas of high and very high resource-toxicity was reduced, which had positive impact on the environment [2].

Environmental services are type of specialized services in the field of environmental protection, environmental management and environmental safety. These technologies, products and services are used for measuring, preventing, limiting, minimizing or neutralizing the harmful environmental

effects on the environment, as well as for reducing the risk of inappropriate use of natural resources [6, C. 25].

Table 1 – Classification of environmental services by their functionality

<b>Service Areas</b>	<b>Service Differentiation</b>
1 ) Technological field	program development and information supporting for nature conservation;
	environmental planning, regulation;
	instruments of environmental control on enterprises;
	"green" building
2) Social security	'green' tourism;
	preparation of environmental training, professional development;
<b>Service Areas</b>	<b>Service Differentiation</b>
3) The economic sphere	environmental management;
	environmental insurance;
	environmental monitoring;
	environmental policy;
	environmental consulting;
	assessment of emissions of pollutants;
	environmental certification;
	environmental audit;
	environmental education, etc.

The economic sphere providing environmental services is the most important at the present stage of development of Ukraine. The environmental market, in our view, is represented by mutually competitive global exchange of everything that has ecological value. The main forms of developed environmental market today include:

- The market of consumer goods;
- The market of capital goods;

- The investment market;
- Monetary and foreign exchange market;
- The labor market;
- The market of research and technical information;
- The market of environmental services.

The market of environmental services is the most significant and represents one of the priorities of the Ukrainian economy. It is now represented such areas as:

- 1) exchange of resource-saving technologies;
- 2) trade of pollution licenses;
- 3) the services of environmental management, auditing, marketing, environmental education;
- 4) environmental banking and insurance services and more.

To ensure the efficient use of limited resources innovative technology resource should be implement. The costs and risks of implementing innovative energy saving systems are related to three groups of factors: economic, social and environmental. The priorities are: investment for the purchase of energy-efficient systems and the costs associated with commissioning works the cost of disposal of old systems operating losses, etc.

The impetus for the development of the market and further the international exchange of environmental goods and services was in the 90's after adoption of the Marrakesh Protocol to the General Agreement on Tariffs and Trade, dated January 1, 1995, which not only included the lowering of tariffs and trade barriers, but also concerned introduction of environmental standards in production and sale of goods and services [6, p. 24].

An example of trade licenses and quotas on pollution is the introduction in Ukraine of the Kyoto Protocol - an international agreement on limiting emissions of greenhouse gases - which was carried out by the National Environmental Investment Agency of Ukraine. Activities of government concentrated around the priority as trade quotas unused allowable pollution [5]. It can be implemented in any country that exceeds the maximum allowable contamination.

Environmental security and diversity of services related to banking services are a form of liability insurance or users of high environmental hazards due to accidental contamination of probable environmental damage and damage to third parties, providing partial compensation for damages

sustained. The whole set of insurance relations can be divided into the following subtypes:

- 1) liability insurance in case of accidental pollution of the environment;
- 2) property insurance of financial losses caused by industrial pollution of the environment;
- 3) personal life insurance, health, disability, and retirement security of citizens in the event of occurrence of accidental pollution of the environment.

Environmental marketing is characterized by positioning products and services as environmentally friendly health marking of products and services with special means of distinguishing from each other.

Another feature of the functioning of the market for environmental goods and services in Ukraine may be limiting the types of economic activities that lead to various environmental problems. Production of organic food has a lot of social, environmental and commercial benefits: food security, improving the flavor of products, reducing of production costs, increasing profits of the enterprise due to the high cost of organic produce - they lead to environmental protection.

**Conclusion.** The market of environmental goods and services in Ukraine is based on the practical implementation of environmental activities. Therefore, for the effective functioning it must:

- Focus on the production of environmentally friendly products or provide environmental services, support and introduction of environmental technologies;
- Take the principles of rationality and avoidance of waste;
- Be based on environmental management;
- Take into account the requirements of environmental safety;
- Have an advanced system of environmental information;
- Provide interest of society in maintaining the balance of the environment, where it is able to restore;
- Adopt and implement legislation of legislation regulating the activities of companies that are pollutants.

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## **CORPORATE ENVIRONMENTAL RESPONSIBILITY AS A NEW CONCEPT TOWARDS SUSTAINABLE DEVELOPMENT**

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Environmental problems are often seen as unregulated negative externalities. In this case, environmental costs are considered as external, arising from economic activity, and these costs are generally not reflected in market prices.

On the way towards sustainable development significant changes in economic and social life are needed in terms of reducing the negative impact on the environment. In this case environmental aspects of business are also under consideration (including voluntary development and implementation of environmental programs by the companies).

Corporate environmental responsibility is known as the environmental perspective of corporate social responsibility [4]. Corporate environmental responsibility is defined as practices that benefit the environment (or mitigate the adverse impact of business on the environment) that go beyond that which companies are legally obliged to do [5].

Recent research has examined the adoption of environmental management practices by organizations indicating that companies are increasingly paying attention to their impact on the environment and adopting management practices to ameliorate or reduce their negative impact on the environment [11; 12; 13]. In recent years the environment has been one of the factors of the greatest interest in terms of the market's attitude towards corporate social responsibility [3].



Practicing corporate social responsibility with the environmental protection and sustainable development perspective can become the strategic decision that influences the internal development of the firms, the relationship among stakeholders, organizations, and governments [8].

Corporate responsibility can be used as the strategic intangible assets, which can be a source of competitive advantage [7]. Firms can take their corporate environmental responsibility as a key to gain the competitive advantage, reputation, and image of the company [2].

Company's reputation is an important factor of competitiveness in the market. Nowadays when the concept of sustainable development is becoming a key one, corporate reputation should also consider the impact on the environment and the introduction of environmental responsibility.

Moreover, firms should consider environmental protection as a competitive advantage rather than as additional charges or a pending threat [9]. In addition, the competitive advantages of environmental responsibility can be not only internal, but can also become external ones – social legitimacy, transparency and cooperation with business, society and the government [6]. As a result, the company can get public reputation and improve the brand image, and increase the value of its intangible assets [8].

In addition, both government and society get benefit from the introduction of corporate environmental responsibility, for example:

- 1) solution of the main environmental problems in the country;
- 2) compliance with legislation and global Economic standards, taking environmental issues into account;
- 3) public health preservation;
- 4) etc. [8].

According to the surveys made in Germany the main incentives of the companies to provide environmentally-friendly activities are the next ones:

- 1) environmental / social responsibility (30.5%);
- 2) legislation / state regulation (22.5%);
- 3) guarantee of the company's viability / risk prevention (12.1%);
- 4) company image (9.2%);
- 5) etc. (25.7%) [10].

Therefore, the role of the government is really great in this question. And corporate environmental responsibility has to become not just voluntary measures, but those supported and encouraged by the government [8].

Thus, in order to achieve sustainable development in the country and in the world, corporate environmental responsibility should not be isolated cases or an attribute that provides an appropriate reputation on international or domestic markets, but should become a life philosophy for the society, business and the government [1]. And companies should focus on all the aspects of sustainable development – economic, environmental and social ones.

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## **ANALYSIS OF THE SOCIO-ECONOMIC CONDITIONS OF RURAL GREEN TOURISM IN SUMY REGION**

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Today ecotourism industry - one of the fastest growing and profitable sectors of the world economy. This is due to the continuing increase in demand for travel and the relatively high level of profitability. In most countries, ecotourism plays an important role in the economy.

In developed countries, tourists every year more and more eager for this form of travel that would allow them to be alone with nature, breathe fresh air, change (at least temporarily) the stereotypes of urban life.

Purpose of research - analyze the socio-economic conditions of rural green tourism in Sumy region.

Viewing research [1,2,3] showed that in the scientific literature has not formed a unified approach to the definition of "green (eco) tourism." Arguably, main purpose of ecotourism is to prevent negative impacts on nature, increasing the motivation for tourists to participate in social and cultural development of the region, environmental protection and economic enrichment of the local population.

The global deterioration of the environment leads to an increase in the importance of green (environmental) tourism among other services, the field of recreation and entertainment.

Our region has great potential for tourism development in the Sumy area, but it lacks the infrastructure, advertising and promotion of this type of holiday. Since the amount of annual funding, which are incorporated in the Programme of Tourism Development in the Sumy region in 2011-2015

amount to 10 thousand UAH that is obviously not enough for the rapid development of green infrastructure (environmental) of tourism in the region [4].

In order to identify strengths, weaknesses, opportunities and threats of green (environmental) tourism in the Sumy region conducted SWOT analysis, Table 1.

The main catalyst for the provision of rural green tourism is agricultural homestead. The first homestead under the Green Tourism Development in Sumy appeared in Lebedyn district. To date, the program Sumy green tourism development in rural areas is already functioning for more than 10 estates (although the official website of the Union for Promotion of Rural Green Tourism in Ukraine in directory estates available only one guesthouse in the village of the second category Bezdryk.

Table 1 - SWOT analysis of green (environmental) Tourism in Sumy region

<p><i>Benefits (strengths) of the region:</i></p> <ul style="list-style-type: none"> <li>- Good geographical location;</li> <li>- Availability of recreational resources;</li> <li>- A rich historical heritage and cultural development of high level;</li> <li>- Favorable ecological situation in comparison with other regions;</li> <li>-availability features of ethnographic region.</li> </ul>	<p><i>Problems (weaknesses):</i></p> <ul style="list-style-type: none"> <li>- Lack of demand for green tourism ;</li> <li>- Underdeveloped tourism infrastructure;</li> <li>- Low quality of services, disparity of quality characteristics;</li> <li>- Inadequate funding of green tourism;</li> <li>- Lack of effective methods;</li> <li>- Regulation of prices of tourism products</li> </ul>
<p><i>Opportunities in the region:</i></p> <ul style="list-style-type: none"> <li>- Creating favorable conditions for the development of eco-tourism;</li> <li>- Development of new ecotourism routes;</li> <li>- Reconstruction of tourist facilities, car roads;</li> <li>- Organization of cultural and leisure tours for foreigners;</li> <li>- The development of youth tourism.</li> </ul>	<p><i>Threats:</i></p> <ul style="list-style-type: none"> <li>- Unstable political and economic situation in the country;</li> <li>- Discrepancy in prices, targets;</li> <li>- The level of demand for services may be insufficient;</li> <li>- Competition from neighboring areas;</li> <li>- Lack of information about recreational area.</li> </ul>

So green tourism in Ukraine has great potential. To date, its development is appropriate natural reserve fund, but need investment and organizational support. Especially effective is international cooperation. It is necessary to develop appropriate programs and submit them to international competitions. The unique natural and cultural potential of Ukraine is already interested in the United Nations, the World Bank and other international organizations. Such stakeholders will become more and more.

*Supervisor: Associate Professor of Economics. Prof. L.G. Melnyk*

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**THE INFLUENCE OF OUTDOOR AIR POLLUTION ON  
HUMAN HEALTH: ESTIMATIONS OF ECONOMIC  
DAMAGES**

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Human health depends on the state of the environment. According to the World Health Organization (WHO, 1994): “Environmental health comprises those aspects of human health, including quality of life, that are determined by physical, biological, social and psychological factors in the environment”. It encompasses the assessment and control of those environmental factors that can potentially affect health. It is targeted towards preventing disease and creating health-supportive environments. This definition excludes behaviour not related to environment, as well as

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behaviour related to the social and cultural environment, and genetics. In general environmental health is related to the theory and practice of adverse factors influence minimization.

Factors that determine human health are very diverse. However several papers (Bilyavsky, 2004, etc.) reveal that health quality is on 50% determined by the way life (nutrition, work and household condition, sports etc.); 20% are attributed to the quality of the environment and climate factors; 20% are due the genetic endowments and the rest 10% are attributed to the quality of healthcare system. In other words, all but genetic endowments are directly or indirectly related to economic factors.

Melnik (2006) described the influence of environmental degradation on efficiency of economic system. The environmental degradation causes loses in agricultural and forest industries; causes corrosion of industrial equipment; stipulates loses related to the worsening of workers health status, and higher mortality rates. Overall bad environmental quality stipulates such expenditures as:

- Additional expenditures on conditioners, filters in order to protect people from dangerous chemical substances
- Additional expenses to protect equipment, (the use of anticorrosion metals); selection of more resistible agricultural plants. The last factor includes costs on R&D due to the fact that more “stable” agricultural plants are associated with genetic engineering
- Additional cost to compensate for the reduction in productivity (costs of labor flow, medical insurance, the use of mineral fertilizers, etc.).

It is also necessary to mention that opportunity costs are rarely taken into consideration. Due to degradation of the environment some sensitive production should be reduced (usually agricultural products and some manufacturing products). In fact, the highest opportunity costs arise due to closing of such industries as recreation and tourism.

There are several problems in analyzing the influence of outdoor air pollution on health. First of all, it is difficult to state real cause-effect of the relationships. Additionally, placing monetary values on those effects, either health or productivity is often not easy work and special approaches have to be used.

The theoretical relationships in environmental health model could be represented by general health production function (Naveen, 2012):

$$H = H(Q, M, A; E) \quad (1)$$

Where,  $H$  – indicates the health status measured in level of illness per 1000 of population;  $Q$  – Level of air (radioactive) pollution;  $M$  – Refers to mitigating activities number and visits to doctors, laboratory tests, etc.;  $A$  – is averting activities extra miles traveled per day to avoid polluted areas in the city, living in parks or near sea zones, etc;  $E$  – is a vector of economic parameters.

In order to find *direct economic damage* from pollution (the illness costs) it is needed to multiple numbers of pollution caused diseases on average illness duration in days (every specific illness has different duration) and on average cost per day (different for different illness). The *indirect damage* could be calculated as not produced regional product. There are also alternative ways to estimate the health effect, for example, Disability-adjusted life years (DALYs). The last is widely used by WHO and measured as present value of life-time lost due to ill-health, disability or early death. One DALY can be thought of as one lost year of "healthy" life. The sum of these DALYs across the population, or the burden of disease, can be thought of as a measurement of the gap between current health status and an ideal health situation where the entire population lives to an advanced age, free of disease and disability. One of the positive sides of DALYs is that mortality and morbidity are combined into a single measure.

The proper estimations of economic damages related to outdoor air pollution have a significant policy direction in terms of placing monetary values for pollution. Pollution as a negative externality could be internalized by setting Pigovian taxes. The last are properly levied through estimation of all economic damages (including health damages) related to negative externality.

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## **ECOLOGIZATION OF THE INTERNATIONAL RELATIONS IN THE CONTEXT OF SUSTAINABLE DEVELOPMENT**

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Relevance of the research is due to the fact that the scientific and practical point of view, the problem of the optimal interaction of international economic relations management of Ukraine and its ecological and economic potential, which requires new approaches to the development of international economic relations strategy under the conditions of market transformation economy of Ukraine is not enough investigated.

Under the current economic conditions, the processes regulating international economic relations of Ukraine require a detailed study on the basis of environmental factors that play a crucial role in reforming and improving the use of modern farming system especially today, when after the elimination of the state monopoly on foreign trade activities, businesses and organizations received the opportunity to establish direct contacts with foreign business partners. The internationalization of commercial and economic activity determines the need to develop a clear and effective mechanism for the regulation of international economic relations of Ukraine on the basis of environmental factors, carried out by relevant governmental and non-governmental organizations.

The study of the environmental factors role in shaping of international relations, issues of ecologization of different spheres of social life in the context of sustainable development is depicted in works of Ukrainian and foreign scientists, including V. F. Gruschenko, L. S. Hryniv, B. M. Danilishin, K. O. Dergachov, V. S. Kravtsiva, L. G. Melnuk, V. V. Sabadash, I. M. Synyakevych, T. U. Tunytsya, Ye. A. Yerasova, M. M. Lebedeva, V. M. Morozova, J. McNeill, M. Pyetrasya, K. Ksyenzhopolskoho and others. However, further studies need the new scientific approaches to the development of the strategy of International Relations with a view to putting into practice the concept of the sustainable (balanced) development.

The term "ecologization", recently non - widespread, gained great popularity in the late of the twentieth century. New concepts are introduced



the scientific revolution, including the "ecologization of Social Development," "ecologization of the economy", "ecologization of the international trade", "ecologization of the production" and so on. In foreign scientific literature of early 1990s there are the concepts «greening of world politics», «greening of international relations».

By "greening of international relations" we understand a process of steady and consistent dissemination of ecological ideas, approaches and concepts for all types and forms of international relations in order to protect the environment and environmental management, ensuring international security and environmental transition to a qualitatively new socio-economic model of the global community.

Centers of stabilization and destabilization of the environment were formed due to the rapid economic and technological development in certain regions of the world in the late twentieth century. North American (U.S., Canada and Mexico partially) European (Western, Central and Eastern Europe, as the European part of Russia) and Asian (China, India, Japan, Korean Peninsula, Malaysia, Indonesia, Philippines) belong to the centers of destabilization. Northern Europe (Scandinavia, northern European Russia) and Asia (South, East Siberia, the Far East, in addition to the southern regions), north of Canada, Alaska, South America (Amazon basin and adjacent areas), Australia (except eastern and southern parts) and the ocean belong to the centers of the stabilization [2].

The current level of cross-border pollution of the environment, the global nature of a number of environmental problems, the solving of which requires the holding at the international level adequate preventive measures, lead to the emergence of new non-traditional issues in international relations, such as:

- the development and operation of a global system for monitoring of the environment and its individual components;
- creating of conditions for good governance in the field of environmental protection;
- the development of international standards for environmental management;
- the incipience of a system of international environmental security;
- implementation in practice of international relations of economically efficient mechanisms of the liability for the environmental violations that can cause degradation of the components of the environment, and eventually lead to the loss of the ecological balance;

- public access to the reliable environmental information;
- coordination of the international efforts to the transition to the model of sustainable development of human civilization.

The mechanism of the state regulation of international economic relations of Ukraine on the basis of environmental factors can be represented as a set of software and coordination, financial, economic, organizational, economic and legal forms, methods, principles, tools and instruments that are used in the practice of international economic relations of Ukraine. Its main objectives are:

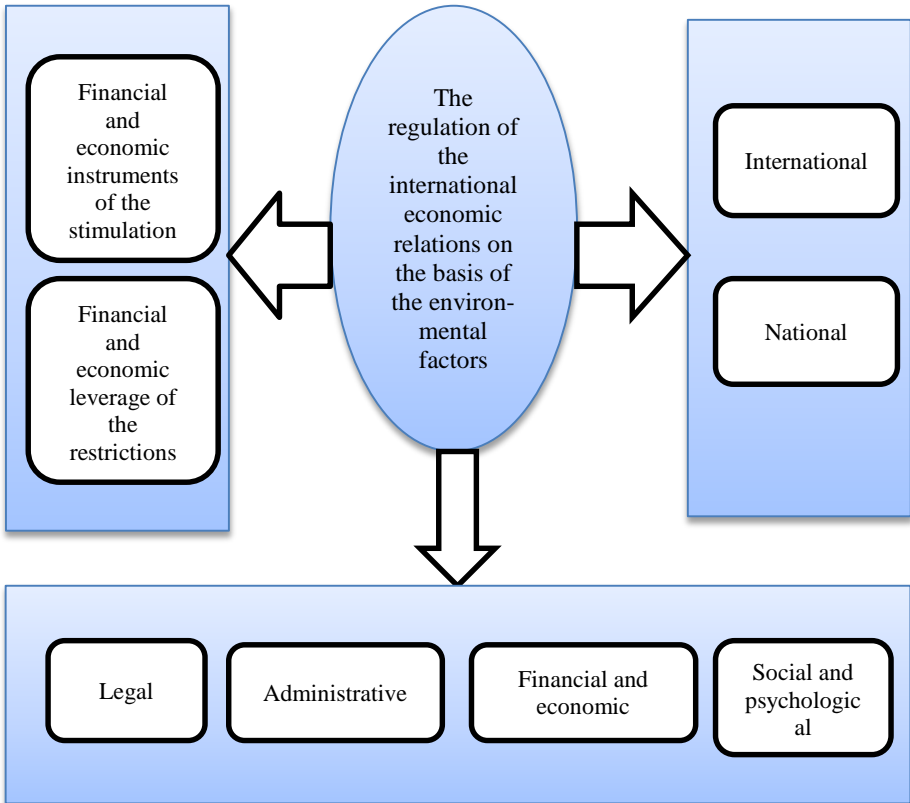
- 1) the economic assessment of "export-import" impact on non - environmental products, technologies and services and the development of appropriate instruments of regulation;
- 2) taking into the account the environmental factors and limitations in the theory and practice of international trade, the study of the influence of national environmental and economic policies on the competitiveness of domestic products, services and economic system as a whole;
- 3) theoretical reasoning and the development of the relevant international environmental and economic policies to meet the requirements of sustainable development [1].

Government regulation of international economic relations on the basis of environmental factors can be carried out by a certain set of specific methods, forms and tools (Dr. 1).

The state law regulation is carried out on the basis of economic legislation through the system of adopted norms and rules. That is legal methods with appropriate institutional support cover civil and procedural law, the state arbitration. The extension and continuation of legal methods can be considered the administrative methods that define the economic subjection of international economic relations, regulating the ownership of the property and performance, and the mechanism of the solution of the conflict socio-economic situations in court. The administrative management techniques include various "measures" of the control of income, prices, discount rate, quotas, licensing, and so on. These measures include the administrative methods because it is not based on economic interests and incentives, that they implement, but it is based on the "strength order" [3].

Therefore, to implement the concept of the sustainable development, which is recognized as guiding of the future prosperity of human civilization, ecologization of all types and forms of international relations, which requires

the introduction of internationally effective management system that will operate on the basis of ecological imperative is objectively necessary.



Drawing 1. Methods, forms and levels of government regulation of international economic relations on the basis of environmental factors

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## **WAYS OF SOLVING MARITIME ECONOMIC AND ECOLOGICAL PROBLEMS OF THE COASTAL REGION**

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It is known that the State's territory includes land, subterranean waters and air space. National water area also consists of internal and territorial waters, surrounding the coast of the state. Continental shelf is an integral part as well, with its natural resource potential (ERP) it is also a part of a state property. Established by coastal States, bounds of the shelf are final and binding, they are recognized by international maritime agreements. Thereupon, in the domestic economy considering shelves as a full-fledged Ukrainian territory, while respecting international human rights, consequently we find that more than 100 000 km<sup>2</sup> of Ukrainian shelf territory (namely this area has Ukraine in the Sea of Azov and Black Sea region) is not under supervision of the public system management.

The current Administrative-territorial management (або management organization), is not able to provide required interaction with the ecosystem of shelves, for the following reasons.

In the first place, there is no integrated management of interdisciplinary anthropogenic impact on coastal areas and ERP shelves, as well as the scale character of the enterprises' development of various ministries and departments. As a result, they have worsened the overall quality of the marine environment, and for this reason they started to reduce the effectiveness of one another and the complex as a whole.

Secondly, there is no single management of national marine areas. Territory of the both Ukrainian shelves and their ecosystems are divided by administrative regions into five parts. Therefore, this part of the sea continental shelf is conventionally divided into five marine appendages of these areas, without them even having the area status, nor formal, nor well-defined maritime interregional boundaries. It is expected, that the coastal area should monitor the impact of their economic activities on the shelf ecosystems and their ERP by themselves. However, each region cannot provide rational usage of ERP and maintain a stable quality of the marine environment in the exclusive maritime economic zone of Ukraine.

Thirdly, internal ownerless of maritime economic zone has its continuation at the external borders as well. Both shelves territory of Ukraine are external border areas and are constantly under the influence of "foreign" productive forces. It is implemented in different ways, through runoff rivers Danube, Dniester, Don and other carrying untreated effluents ; accident marine vessels ; Introductions - deliberately or accidentally introduced from other sea organisms that adversely affect the livelihoods of local ecosystems, etc. Also, periodically and international conflicts are arising. For example, numerous cases of poaching Turkish fishermen in the territorial waters of Ukraine or claim neighbors on Serpents Island , etc. that is, there are no government, defending the whole complex of local interests at the highest levels.

It is necessary to create the organization of administrative management of the regional level for shelf areas of the Black Sea and Sea of Azov. Research suggests that their absence is one of the main reasons for the development and aggravation of social, economic and ecological problems in coastal areas. Shelf State Administration will serve as the connecting link. On the one hand, in order to implement the state local power, on the other hand, to organize maritime complex and manage its vitality and development. We assume that monitoring and implementation of social-economic development programs for Ukrainian Black Sea region, as well as security and protection from pollution and depletion of Black Sea and Sea of Azov will be more effective if the management of maritime activities in the exclusive (maritime) economic zone of Ukraine will implement some "specialized" basin shelves administrative centers, concentrating all their efforts on marine problems.

Improving the management of marine environmental organization provides a radical restructuring of the industry organization in the marine sector and the creation of marine economic complex (MEC) as an integral subsystem of a national economic complex. Complexation should be consistent with the fundamental ideas on which the organization of territorial production complexes (TPC) is based. MEC should also be considered as specialized TPC, formed by joining two subsystems. One is that the totality of enterprises, organizations and institutions operating in coastal areas need to identify those that are relevant to the maritime industry and subordinate them to the basin created by state administration. Another obstacle is that the same structure to be preferred and those plots at these businesses are located. This question is closely related to the need to determine the internal and

external territorial boundaries and borders MEC shelves jurisdiction governors.

We assume that the coastal strip three kilometers wide can detect "overland" border territory of MEC, because this is the very place where all enterprises of the maritime industry operate, as well as inter-industry and inter-regional division of MEC takes place. The presence of the contact zone on the coast gives reason to believe in such point of view.

Along with the creation of MEC as control objects, their "subjects" of management should be created as well. Here it is necessary to take into account that currently the nodal units that are essential for control and guarantee of the stable operation of MEC, exist in practice.

## **CONSEQUENCES OF GLOBAL CHANGES FOR EMERGING SOCIAL AND ECONOMIC SYSTEMS: ETHIC AND ENVIRONMENTAL COMPONENT OF TRANSBORDER COOPERATION**

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Research question. Examining consequences of global world changes both for national social and economic systems of countries and for emerging social and economic systems such as euroregions, countries that are partners in transborder cooperation, transnational corporations etc., and stressing the importance of ethic and environmental component is the main task of given paper. New changes that are caused by new policy of new leaders in economics and in society result in advantages and disadvantages both for modern generations and for future ones. Although economic aspect of mentioned policy and efficiency of social and economic systems activity is very important but the environmental ethic component should not be ignored. And this aim for the given research explains the actuality of project.

In globalization era new types of international cooperation became significant. One of such types of cooperation is transborder cooperation. While implementing this cooperation into practice the borders of countries are gradually disappeared. Number of economic and social advantages can be named, such as free trade zone creation, making easier crossing the border for citizens living at the border territories etc. But apart from advantages in social and economic sphere we face social and environmental aspect of

transborder cooperation. This aspect means not only disadvantages but also advantages of transborder cooperation and new policy of governments connected with this type of cooperation. And we should compare the results of these positive and negative effects to estimate the efficiency of transborder cooperation and to act in right way.

Hypotheses. Any activity or any regional development cannot be considered efficient if it is not sustainable. But what should be understood as sustainable regional development? What are the strategies for regional development that cause benefits not only from economic but also from ecological point of view? The aim of my research is to suggest strategies of ecologically efficient transborder cooperation that provide benefits for ecological systems of regions of bordering countries and are appropriate from economic point of view. In the given research author will define what should be meant under the ethic and environmental component of transborder cooperation and under emerging social and economic systems. It is suggested by author that both existed social and economic systems of countries and emerging social and economic systems should take into consideration the strategy for sustainable development achievement. Author proposes that this strategy can be realized due to following next principles and implementing them one by one: decreasing unsustainability of social and economic systems, creating sustainable social and economic systems, creating of totally new type of renovated social and economic systems.

Data for analyses. In given research author is going to analyze environmental and ethic consequences for transborder cooperation and reasons for their existence. Author would like to discuss the question of environmental problems “export”, problems of their distributing from territories of developed countries to developing. So, the data on types and volumes of such environmental damage “exporting” is needed for making a survey. This question arises often nowadays and is closely connected with social and ethic component of international cooperation. The problem of future generations’ rights will be characterized in research. One of the main categories in environmental ethic is category of nature values. And this category plays an important role while international cooperation and particularly while transborder cooperation. For example, nature values can have basic and additional significance. Namely, national parks that are situated on the territories of countries that border can play peacekeeping role and it is called additional value. In research data connected with nature values and its connection with economic and environmental aspect of

transborder cooperation will be analyzed. Author will examine the possibility to improve scheme of transborder cooperation taking into account ethic and environmental components.

Methods of analyses. Theoretical bases for complex analysis of regional development directions that allow foreseeing potential environmental and economic consequences will be improved and methodical approaches to transborder environmental-economic efficiency estimation based on the integral environmental impact damage index will be suggested. Among the suggested tools are: creation of complex transborder cooperation mechanism that consists of components and connections, which are necessary for such cooperation; CLD (causal loop diagram) method implementation to improve the efficiency of the decisions taking while transborder cooperation; creation of complex system of environmental and economic indexes that allow to analyze efficiency of transborder cooperation and to suggest strategies to increase it. So, author is going to use comparative analyses (compare statistical data on environmental and social aspects of transborder cooperation), quantitative methods (creation of indexes for analyses and making calculations for having possibility to analyse and suggest strategies for future development), graphic methods (diagrams building), Causal loop diagram method for analysing interconnections between social, environmental and economic decisions while transborder cooperation, gravity method (using gravity models for analysing the nature of transborder cooperation in each case). The logic-structural framework of transborder cooperation is going to be created.

## **ECOLOGICAL AND ECONOMIC SECURITY OF AGRICULTURAL ENTERPRISES AS A FACTOR OF SUSTAINABLE DEVELOPMENT**

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The universe appears to us an open system. The components of the system are in constant interaction. Systems theory has been studied by many scientists in the world since ancient times. Each of them put some contribution to the concept.



Patterns of sustainable development and the transition from one state to another as a characteristic quality system is a common approach to all scientists different times. The development is a necessary condition for the existence of a certain subject in today's environment. Sustainable development requires the safety of the subject.

Branch of agriculture is one of the leading in Ukraine. Welfare of the country depends largely on the development of agriculture. Providing of economic safety of agricultural enterprises is important for the development of the industry and individual companies. The result of the agricultural enterprise depends on many factors external and internal environment.

Specificity of agriculture caused by its close relationship with the climatic conditions. Safety of agricultural enterprises considered only in terms of economic security by examining only economic performance so far. Economic factors have a significant impact on the safety of agricultural enterprises. But on the road to sustainable development should take into account the impact of environmental factors on the production process in agriculture.

World experience of sustainable development operation of agricultural enterprises originated in the 90s last century. Commission on Sustainable Development, UN (CEB) first considered this question at its third session in 1995, when she was awarded the slow pace of sustainable agriculture and rural development in many countries. The problem of sustainable agriculture has also been submitted for consideration in 1997 as part of the five-year review of the implementation of Agenda XXI century, agreed at the World Summit, held in 1996, the Summit of Food. The objective was reinforced by the adoption by the Heads of State and Government in September 2000 Millennium Declaration.

Model of ecologization the economy embodies the ideas of noosphere V.I. Vernadsky. In the second half of the last century in the international arena is increasingly referred to the relationship of economic and natural processes and the need to conduct ecologically oriented economy that was mentioned in the Declaration of the UN Conference (Rio de Janeiro, 1992.) And "Rio +20" (13-15 June 2012. Rio de Janeiro, Brazil).

Conferences have been devoted to the sustainable development of the world economy in close contact and interaction with the environment.

The National Center for business and cultural cooperation " Ukrainian House" November 7, 2013 was held a round table on " Integrating environmental component in the agricultural sector" (Kyiv). The meeting

discussed a number of issues including: environmental component in the "Strategy of development of the agricultural sector for the period up to 2020".

So the link between economic and environmental factors in agriculture actively debated in the world. Path of sustainable development are searched. Thus the ecological and economic security, agriculture and individual farms appears essential to sustainable development.

Achieving the status of ecological and economic security of agricultural enterprises is possible with the effective implementation of the planning, production and the efficient implementation of production. To do so required in the analysis of the current state of the external and internal environment, taking into account possible future state of the system for introduction of the necessary changes to adapt to environmental changes.

The prediction of the system is possible with the information collected about the state of the environment in the past and present with its subsequent analysis and taking into account the characteristics of for doing agricultural activities.

Research, analysis and prediction of the behavior of ecological and economic security of agricultural enterprises will enable efficient operation and sustainable development of enterprises in particular, the agricultural sector single country and world agricultural production in general.

Environmental components of the security farms are a set of climatic environmental conditions: the quality of soil, light, heat and humidity of a given territory, the number of hours of sunshine, solar activity, the sum of active temperatures, rainfall, etc.

Depending on the condition of these conditions there is a large number of security threats result of agricultural activities. This is primarily drought, unfavorable conditions wintering of winter crops drought, heavy rains, storms, loss of winter crop plants and animals, mass propagation of parasites epizootic, epiphytotics pathogens of crops, etc. These are accompanied by a decrease in soil fertility, loss of crops, reducing grain reserves in the world and as a result of the deterioration of living and significant losses of agricultural.

Only early prediction of these phenomena may provide an opportunity to take measures to protect agricultural crops and ensuring ecological and economic security of farms.

The economic components of farm safety: the state of the economy of country and the world (financial, political, social, legal framework),

performance (physical infrastructure, available resources, human resources, etc.), state consumer protection (consumer needs competitiveness of a particular type of product). A major risk factor is the condition of the economic crisis, research and forecasting which since ancient times care researchers in the world.

Thus, the effective implementation of production processes of agricultural enterprises requires analysis of the current state of the external and internal environment, taking into account possible future state of the system.

Collecting and analyzing information on the status of ecological and economic security will enable prediction of the system in the future. Quick orientation and adaptation to environmental changes will enable the effective functioning and is essential for farms and agriculture in general.

## **STRATEGIES FOR MANAGEMENT OF WATER RESOURCES FOR MAINTAINING THE ECOLOGICAL FUNCTIONS OF WETLANDS**

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The purpose of management strategies is to support a better allocation of water to the wetlands resources so that they can receive enough water, in quality, quantity and timeliness suitable to continue to provide their goods and services. The following **strategic guidelines** are explained below:

**Sustainability as a goal.** Adequate water has to be provided to wetlands to sustain the functioning of these ecosystems, respecting their natural dynamics for the benefit of future generations. Where water requirements are not known, or where the impact of reducing water allocation to wetlands is unclear, the precautionary approach should be applied. The wetland ecosystem is the resource base from which water is derived. It should be managed to protect the resource base in order to provide goods and services in a sustainable manner. This requires sufficient water allocation to maintain wetland ecosystem structure and function. This is directly compatible with the “wise use” concept embodied in the Ramsar

Convention, which has been defined by the Conference of the Parties as “the sustainable utilisation of wetlands for the benefit of mankind in a way compatible with the maintenance of the natural properties of the ecosystem”.

**Clarity of process.** The process by which decisions are made on the allocation of water should be clear to all stakeholders. Water allocation has often been a contentious issue and this is likely to increase in future as competing demands rise and available water resources may diminish due to climatic change. In many cases stakeholders have not understood why a particular allocation decision was made, leading to suspicion and mistrust of decision-makers. Whilst it will not be possible to please all stakeholders in any water allocation decision, by ensuring a transparent process in the decision-making the outcome can often be less contentious and more acceptable.

**Equity in participation and decision-making factors.** There should be equity for different stakeholders in their participation in water allocation decisions. There should also be equity in the factors that are considered in decision-making, including the functions, products and attributes of wetlands. Decision-making is often a complex process requiring consideration of many factors and competing demands. Some water users may feel that their requirements have been given less weight than others. Whilst weightings may be applied to different demands for legal or policy reasons, no demand should be ignored. In any decision, ecological and social issues should be considered equally with economic considerations.

**Credibility of science.** Scientific methods used to support water allocation decisions should be credible and supported by review from the scientific community. Science must be based on appropriate hydrological and ecological data, including adequate baseline ecosystem records. The best available knowledge and science should be employed, which should be updated as better knowledge becomes available from research and monitoring. However, lack of perfect knowledge should not be used as an excuse for inaction. The precautionary approach should be applied.

**Transparency in implementation.** Once procedures for water allocation decisions have been defined and agreed, it is important that they be seen to be implemented correctly. This requires a transparent implementation processes, so that all interested parties can follow the choices made at each step, have access to information on which they are based, and recognize agreed procedures.

**Flexibility of management.** Like many ecosystems, wetlands are characterized by complexity, changing conditions, and uncertainty. It is essential that an adaptive management strategy be adopted, which requires plans that can be changed as new information or understanding comes to light.

**Accountability for decisions.** Decision-makers should be accountable. If agreed procedures are not followed or subjective decisions can be shown to be contrary to the spirit of the above principles, decision-makers should provide a full explanation. Stakeholders should have recourse to an independent body if they feel that procedures have not been followed.

**Water related guidelines related to wetlands**

<b>Scientific and technical guidelines:</b>	
Water resources allocations management	<ul style="list-style-type: none"> <li>-Determination of environmental water requirements for estuaries, coastal and near-shore wetlands.</li> <li>-Determination of environmental water requirements for rivers.</li> <li>-Determination of environmental water requirements for non-river inland wetlands.</li> <li>-Environmental flow determination and implementation.</li> <li>-Water allocations: worked examples and case studies of determination and implementation (all wetland types).</li> </ul>
Reservoirs and human-made wetlands	Wetlands and water storage interactions: guidance. Wise use within water resources management context, and human-made wetlands.
Groundwater management for maintaining wetland ecological character	Groundwater: initially planned to draft detailed technical and operational guidance for management of groundwater associated with wetlands.
Wetlands and water quality management.	Management of water quality in wetland ecosystems; water quality requirements for protection of wetland ecosystems; management and mitigation of water quality impacts on wetlands.
	Water resources management in dry and sub-humid lands.
	Vulnerability Assessment.
Ecological character (water supply as a product) and assessing	Integrated framework for inventory, assessment & monitoring
	Conceptual models on ecological character.
	Further work on change in ecological character, including limits of acceptable change.

change in ecological character	
Indicators of Convention effectiveness at river basin level	Monitoring and evaluating water-related aspects of ecological character, including indicators of ecological character and wetland management at site level and at river basin level. Operationalising the indicators of effectiveness, and generating regular reports.
Designating Ramsar Sites, identifying wetland types and functions, especially hydrological functions	Rationalising the Ramsar information sheet, guidance on criteria and description of ecological character
	Reviewing systems of wetland classification.
EIA on river basin scale	Guidelines on Environmental impact assessment of wetlands
<b>Policy, governance and institutional aspects:</b>	
Developing wetland policies	Preparation of a single, integrated Handbook which brings together all Ramsar's core water-related guidance.
	Review and strengthen (including with some operational detail) specific water sector aspects of non-core guidance on law, policy and institutions
	Provide new core guidance on developing water sector policy that can adequately address dependencies between water management and wetland ecosystems.
	Development of more detailed operational guidance on a number of the individual components of RBM.
	Development of more detailed operational guidance on a number of the individual components of river basin management.
	Strategy for engaging in the global water debate.
Participatory management	Further consideration of characterising and better targeting audiences for technical guidance, and further monitoring uptake, use and utility of guidance.
<b>Planning frameworks:</b>	
River Basin Management (RBM) guidance	Identification, analysis, tracking and reporting of RBM case studies
	Critical path application of RBM case studies
	Implementation of river basin management plans

Waterresourcesdevelopmentplanning:	Strategy for mainstreaming natural wetland infrastructure into Integrated Water Resources Management
	Detailed guidance on managing water-related aspects of wetlands under conditions of climate change and desertification. Implications of climate change for planning, water resources management and environmental flows.
	Additional guidance on cross-sectoral policy and legislation (including all the water use sectors) for addressing water-related aspects of wetland management.
Integrated CoastalZone Management	Integrated water and coastal management - case studies

**IMPLEMENTATION OF ENVIRONMENTAL MANAGEMENT  
ON THE CRIMEAN ENTERPRISES  
(EXAMPLE OF PJSC "CANNERY BY S.M. KIROV")**

***Kiril Melnik***  
*Simferopol*

Creating an effective management system for the enterprise ensures attainment of the current level of economic development and stability. The EMS standards are based on ISO 9000 and ISO 14000. Environmental Management System is the- part of the organization's management system used to develop and implement the environmental policy. Gap-analysis used to identify major successes and focus on the priority issues of leadership in order to adjust future plans to implement an environmental management system.

For an objective evaluation of the effectiveness of management is necessary to compare the results of measures to introduce an environmental management system .The experience of many companies' shows that the introduction of an environmental management system is a very effective measure and creates a number of competitive advantages for the company.

First, with the objective of production quality and environmental friendly product with minimal harm to the environment, the company not only increases the efficiency, but also it increases the competitiveness of their products, both at the national and international markets.

Secondly, EMS on the company indicates the stability of the enterprise and its economic opportunities, as well as a priority for foreign investors. Unfortunately, it's quite expensive to implement this system and many companies couldn't invest in the implementation of the EMS, but that does not mean that they should not care to improve the quality of their products and improve the image of their company.

The large industrial production is concentrated in the northern Crimea (such plants as JSC "Crimea TITAN" and JSC "Crimean Soda Plant"). These companies do the most damage to the environment and require implementation of EMS. Despite the fact that the waste processing industry objects less technological, air emissions, industrial waste, and the disposal of industrial waste should be under strict control. According to the data of the Ministry of Agrarian Policy of the Crimea, in the autonomy only 35 companies certified according to ISO 9001 and ISO 14001. All listed businesses are leaders in the industry have shown good results of product quality and minimization of environmental risks. In my paper, I have considered on the Simferopol cannery named by S.M. Kirov, whose current economy at a loss. Factory is engaged in the processing of raw meat and raw fish. Factory direct competitor and leader in this market is OOO "Proliv". It has higher quality products which certified according to ISO 9001.

The only way to deal with the current crisis the company sees by the introduction of an environmental management system and product certification according to ISO 9001. Through these activities to improve the image of the plant, increase the demand for products and attract foreign investors. By the given parameters of ISO 14001 experts concluded that the formal SEM on the plant is introduced by 59.3 %. Experts indicate a need to strengthen control over the EMS from management. Perhaps today environmental issues are not relevant for the enterprise, but systematic management activities and landmark efficient and eco-friendly production will not only get out of the crisis, but also help to establish a stable operation of the plant, creating new job places, as well as give an opportunity to compete on the product foreign markets.



## **THE ROLE OF ECOSYSTEM SERVICES IN PROVIDING SUSTAINABLE DEVELOPMENT**

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Aggravation of environmental problems creates the conditions under which business entities legislative and executive authorities, other parts of society forced to move to new concepts of interaction between economic stakeholders in order to create an environmentally harmonious relations that would meet the criteria for sustainable socio-economic development.

Ecosystem services that are changing exert an indirect effect on livelihoods, income, local migration, and sometimes may even lead to political conflicts. The result of it for economic and physical security freedom, choice and social relationships affect the well-being and health, the availability of medical services and medicines and access. Ecosystem services is a function of ecosystems that provides some economic benefits to people who use these services, and are based on the nature of providing various kinds of regulatory functions receives the uncountable benefits of that it is possible to conditionally call "goods" and "services" such as food, timber, clean water, energy, protection from floods and soil erosion. Welfare of all groups of the human population in the world radically and directly depends on ecosystem services. Despite this, we have a lot of environmental problems: a sharp decline in many benefits, catastrophic decline of biodiversity all over the globe; total disappearance of forests in 25 countries; loss more than 90% of own forest vegetation by 29 countries; destruction of tropical and subtropical bogs since 1950s, raised through fishing 30% of coral reefs, loss of 80% of biocenosis through conversion to aquaculture land some countries.

The Millennium Ecosystem Assessment (MA) report 2005 defines Ecosystem services as benefits people obtain from ecosystems and distinguishes four categories of ecosystem services, where the so-called supporting services are regarded as the basis for the services of the other three categories. The following lists represent the definition and samples of each according to the MA:

Supporting services: ecosystem services "that are necessary for the production of all other ecosystem services" nutrient dispersal and cycling seed dispersal Primary production. Provisioning services: "products obtained

from ecosystems" food (including seafood and game), crops, wild foods, and spices raw materials (including lumber, skins, fuel wood, organic matter, fodder, and fertilizer) genetic resources (including crop improvement genes, and health care) water minerals (including diatomite) medicinal resources (including drugs, pharmaceuticals, chemical models, and test and assay organisms)energy (hydropower, biomass fuels) ornamental resources (including fashion, handicraft, jewelry, pets, worship, decoration and souvenirs like furs, feathers, ivory, orchids, butterflies, aquarium fish, shells, etc.)Regulating services: "benefits obtained from the regulation of ecosystem processes" carbon sequestration and climate regulation• waste decomposition and detoxification purification of water and air pest and disease control Cultural services: "nonmaterial benefits people obtain from ecosystems through spiritual enrichment, cognitive development, reflection, recreation, and aesthetic experiences" cultural (including use of nature as motive in books, film, painting, folklore, national symbols, architect, advertising, etc.) spiritual and historical (including use of nature for religious or heritage value or natural) recreational experiences (including ecotourism, outdoor sports, and recreation) science and education (including use of natural systems for school excursions, and scientific discovery

Note that there are various working definitions of ecosystems services in the literature. The most recent revision by TEEB to synthesize work in this field and prevent double counting in ecosystem services audits, has revised the MA definition to remove "Supporting Services" and replace it on the one hand with "Habitat Services" and on the other hand with "ecosystem functions" that "are defined as a subset of the interactions between ecosystem structure and processes that underpin the capacity of an ecosystem to provide goods and services".

The problem of providing a sustainable development is directly connected with the whole complex of economic and socio-economic characteristics. It means that the parameters characterizing a sustainable development, have to include both social, and an economic vector. And each of them an extremely important role is played by ecological factors to support the physiological functions of human or the personality traits of "socio" (contact information on holistic natural systems).

The methodological approaches to assessing ecosystem services are:

1) costly approach involves evaluation of the largest costs of production, development, introduction into the economy and natural resources. However, this approach does not encourage environmental

management for better quality of life and accessibility by making the use of a lower estimate than the worse the quality resource;

2) resultant approach makes it possible to carry out an economic assessment of the resources that provide income. The disadvantage is that not all resources while using make income;

3) costly resource approach is based on the combination of costs of the development of resources and income from their use;

4) the rental approach is considered the most objective because the best resources get top marks for the same costs;

5) reproduction - economic evaluation in this case is the aggregate costs of reproducing resources in a particular area;

6) monopoly-departmental approach is a kind of costly. The essence is that the amount of payments must comply with financial costs of specialized agencies that are involved in the management of natural resources;

The rental approach is most widespread in economic practice to an assessment of natural resources. Rental approach is cornerstone of officially accepted technique of a monetary assessment of lands of agricultural purpose and settlements.

Analysis of the value of ecosystem services can also be performed using qualitative, quantitative and monetary estimates. Qualitative assessment typically focuses on such terms as social benefits of recreation, health, life safety and others. As a result, quantitative assessment receive an information about the number of abstract threats to health, the volume of high-quality water supply and so on. Monetary assessment involves determining the size of damage from water pollution, the level of income from tourism, pharmaceutical, in which were used ingredients of natural origin.

# SUSTAINABLE DEVELOPMENT ON A BASIS OF GREENING OF PRODUCTION-CONSUMPTION CYCLE

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The "greening" of the economy implies a targeted process of economic transformation aimed at reduction of ecological impact on the environment. The concept of greening is realized through a system of organized measures, innovations, restructuring, technological transformations, and environmental policy activities at macro- and micro levels. Special attentions in greening the economy is devoted to the environmental innovations, as they are both profitable and environmentally friendly.

Important components of innovative environmental activities are forming of conceptual directions of greening tasks (Fig. 1).

Resource economy	→	Ecological management of material flows
Waste material use	→	Recycling material use
Waste energy use	→	Energy saving
Orientation on products	→	Orientation on functions
Nature protection; reaction on consequences	→	Nature saving; reasons elimination
Over limit environment use	→	Balanced environment use
Management of natural processes	→	Natural integration with the environment
"Waste" mentality		"Saving" mentality

Figure 1 – Conceptual directions of greening tasks forming

Based on the production-consumption cycle, it is easy to conclude that to reduce environmental press can bring the refusal of the most damage intensity consumer products (those that have the most ecodestructive chains),

shortening of the chain (replacement of primary natural resources on those that waste recycled), production efficiency (increasing the depth of use of material and energy resources) and, finally, the overall reduction of material and energy consumption of commodities.

The concept of product life cycle can be described as a process of continuous improvement of stress environmental characteristics on the environment at all stages of the product life cycle.

The main stages of scientific and methodical approach to the greening of product life cycle are:

1. Formulation purposes of product life cycle greening including stakeholders' views.

2. Inventory of the product life cycle, which includes collection and processing of relevant environmental information in accordance with certain segments of product life cycle making the greatest destructive environmental impact.

3. Formation of the ecological balance of products that have to evaluate energy and material resources used for the production of the item, as well as emissions and all kinds of environmental damage that have been identified in the previous stage.

4. Evaluation of the overall impact on the environment and calculation of ecological capacity level of different products to be compared. Impact assessment on the environment of the separate life cycle stages of different products to be compared can be carried out as follows:

$$P_e = \left( \sum_{i=1}^n \sum_{j=1}^m (A_{ij}'' \cdot \alpha_{ij}'' - A_{ij}' \cdot \alpha_{ij}') / P' \right) \cdot \left( \frac{T'}{T''} \right) \cdot \left( \frac{F'}{F''} \right) \cdot \left( \frac{R_{ren}'}{R_{ren}''} \right) \cdot \left( \frac{Rec'}{Rec''} \right), \quad (1)$$

where  $P_e$  – level of ecological capacity of initial goods which is analyzed;  $i=1 \dots n$  – a kind of natural resources which is withdrawn and used at a certain stage of life cycle;  $j=1 \dots m$  – a kind of influence on the environment at a certain stage of life cycle;  $A_{ij}'$ ,  $A_{ij}''$  – indicators of influence on the environment of initial goods and the compared sample at a certain stage of life cycle, units;  $\alpha_{ij}'$ ,  $\alpha_{ij}''$  – indicators of per unit losses from influence on the environment of initial goods and the compared sample at a certain stage of life cycle, hrn;  $T''$ ,  $T'$  – useful life of corresponding kinds of goods, years;

$F'$ ,  $F''$  – quantity of the functions inherent in corresponding kinds of goods;  $Rec'$ ,  $Rec''$  – a share of a waste which is exposed to a reuse at certain

stages of life cycle of corresponding kinds of goods;  $P$  – volume of production of initial goods, hrn.

5. Definition an order and strategy formulation to improve each stage of the product life cycle by environmental SWOT-analysis.

6. Implementation of an integrated strategy of the product's life cycle, monitoring, evaluation of results and preparation of environmental report, aimed at establishing linkages with stakeholders.

7. New goals formulation of product life cycle greening.

## **FOREIGN DIRECT INVESTMENT INFLOW AND ITS ENVIRONMENTAL EFFECTS IN DEVELOPING ECONOMIES**

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Currently, there is a major threat to the earth's environment which is due to the increase in environmental damages, and welfare losses as a result of green house gases such as carbon dioxide and nitrous oxide, wars and political instability in the world. In addition, the climate is changing, scarce species as well as resources in general are depleting. Among others, foreign direct investment (FDI) is the major factors that may lead to this result.

After the Second World War there was a high need for economic integration, towards economic prosperity and liberalization that leads to the establishment of the most important international organizations, such as IMF, UNCTAD, OECD (organization of economic cooperation development) and so on.

Foreign Direct Investment (FDI) has positive effect on host country's development efforts. In addition to being the main source of external capital, the inflow of foreign investment also helps in filling the resource gap between the targeted investment and locally mobilized savings, FDI can increase the productivity of the host country as more advance managerial techniques from foreign firms spread to local firms, multinational firms and cooperation are usually at the technological frontier and have access to latest and most advanced technologies. When they invest at the same time, it is expected to transfer these technologies which will be spread to other firms in the host countries. Foreign direct investment also helps to develop managerial and

specialized technological skills, in process of learning by doing in the host country.

As competition becomes more global, people are concerned that relatively lenient environmental regulation and lax enforcement in developing countries give them a comparative advantage in pollution intensive goods. Lowering trade barrier may encourage a relocation of polluting industries from countries with strict environmental policy to those with lenient policy. These shifts may increase global pollution or lead to race-to-the-bottom environmental policy practices.

Trade and foreign investment has caused great concerns as the pollution in different country increases with the expansion of the economy. Also many of developing countries have experienced rapid industry growth during the period of economic reform. While this growth has increased incomes and reduced overall poverty levels, it has been accompanied by serious environmental damage. Industries are primary source of the environmental problems since they are the source of most dangerous gases such as Sulfur dioxide SO<sub>2</sub>, Carbon Monoxide CO, Nitrous oxide and Carbon dioxide.

Baek and Koo (2008), using co integration analysis and a Vector Error Correction (VEC) model, examine the short and long run relationships among Foreign Direct Investment (FDI) economic growth and the environment in China and India. The results show that FDI inflows play a pivotal role in determining the short and long-run movement of economic growth through capital accumulation and technical spillovers in the two countries. However, a FDI inflow in both countries was found to have a detrimental effect on environmental quality in both the short- and long-run. Also, they found that, in the short-run, there exists a unidirectional causality from FDI inflows to economic growth and the environment in China and India a change in FDI inflows causes a change in environmental quality and economic growth but the obverse does not hold.

Through the release of industrial waste, for example from mining, metal and oil refining activities, into streams and rivers, from where it may make its way into the ocean. A variety of toxic metals can affect aquatic and marine life and may accumulate in the food chain, posing a threat to humans. Another major source of water pollution is fertilizers, which can be washed into rivers and lakes from farmland, causing a phenomenon known as eutrophication. Nitrates and phosphates, present in fertilizers, can promote uncontrolled multiplication of algae in lakes, reducing water quality and oxygen levels, and destroy aquatic life. Gases emitted from heavy industries are source of acid

rain, which react in the atmosphere, resulting to acid rain that kill plants, fish and destroying old buildings, which are for most, important heritage for tourism business.

Another case of major concern is that, most of Multinational National cooperation's tend to exert influence on politics of host countries especially developing countries. MNCs deregulate all rules which are not in the favor of their business atmosphere, force false propaganda in international sphere and or create violence when are not satisfy with behavior of certain political leader which do not act on their behalf of satisfaction. Such examples are; division of Sudan to South and North Sudan, Iraq war which lead to the use of WMD and over thrown of sultan of Zanzibar Khalid Bin Barghash in 1896 to replace him with his cousin Hamoud Bin Mohamed which British thought it will be easy for them to work with him.

In conclusion, promoting FDI for economic development, should be associated with stringent environmental laws and policies, high penalties to companies which do not act under environmental laws, investing more in risk-free technologies and to spread public awareness through media about methods of preserving environment and the effect of hazardous substances on threatening living lives.

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**ENVIRONMENTALLY SAFE AND RESOURCE SAVING  
TECHNOLOGIES AS A METHOD OF INCREASING OF OIL  
CROP PRODUCTION COMPETITIVENESS**

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Insufficient management of land of agricultural purpose, which have seen recently, leads to worsening of the quality structure of the soil, its degradation and reduction of fertility. Common thing was a short-term lease



of land and growing monocrops such as sunflower during several years together (planted area under sunflower grew by 3.2 times from 1990 to 2012 (from 1636 ha to 5194 ha). Ukraine has taken the first place in the world since 2009 by the amount of production of sunflower seeds. 20% of the world acreage under sunflower crops is concentrated in the country. However, yielding capacity of oil crops in Ukraine is much lower than in European countries. The causes of low productivity are inobservance of basic requirements of crop rotation and technology of crop planting as well as slight attention to hybrid selection and quality of seeds.

Traditional crop rotation is broken in many farms. Specific amount of sunflower in the acreage under crops exceeds 30%. (Scientifically-based saturation standards of rotation should be in the range from 0.5% in Polissia region to 15% in Southern Steppe region). This leads to the fact that sunflower is grown in the same field after sunflower in 2-3 years which is not acceptable. Such oversaturation of crop rotation with sunflower, especially in farms with small-acreage, where a set of crops is reduced, the use of specialized short-term crop rotation, sowing with non-dipped seeds, other technological breaking in growing leads to worsening of phytosanitary state of crops of this plant, promotes deep drying of soil, decrease of fertility and accumulation of infection pathogens in soil, on plant leavings and infected shoots of drops.

Scientific principles of the rotation structure include proper selection of precursors and the optimum combination of the crops of the same species with keeping of admissible periodicity of their return to the same field. Such rotation structure primarily performs a basic biological function as phytosanitary and allows reducing the amount of used pesticides. Allowable ratios of periodicity to return crops to their previous growing area for sunflower is not earlier than in seven years, rape and soybeans are not earlier than in three years. Today, farms do not provide ecological and economic assessment of crop rotation and do not pay any penal sanctions for lack of crop rotation projects and keeping proper conditions of land use.

Traditional technology for crops growing requires too much fuel and human labor, which in modern conditions is unacceptable from both an economic and environmental point of view. In these circumstances, using of resource saving technologies is a question of urgent importance. Saving agriculture is preserving of the soil as a living ecosystem that has developed in its natural state before human intrusion, with increase of organic matter in the soil. Soil fertility has to be increased after getting every harvest of crops

and yielding capacity of the following crops has not been grown at the expense of applying fertilizers in additional quantities but by increasing of soil fertility. It is possible to achieve such result by using modern system of agriculture as No-till.

Applying of agricultural system as No-till promotes returning the soil to its previous natural condition without any using of mechanical tillage. Today, this agricultural system is used in the area of 124 million hectares in global agrarian sector. They are mainly the countries which take leading positions in the production of agricultural products, such as Canada, the USA, Brazil, Argentina, Australia and others. Brazil made production of grain crops twice bigger during the period from 1991 to 2004, while the area was increased only by 9%. This increase happened with the use of No-till system. Results show that it is possible to get benefit in economy, social sphere and environmental protection by using this system. Economic advantages consist in reduction of charges on growing due to reduction to the amount of technological operations during growing of agricultural cultures. The productivity here can be at that level that turns out after traditional to technology, but a profit grows through less charges. Ecological advantages are this increase of content and improvement of balance of organic substance and moisture in soil, maintenance of structure of soil, reduction of threat to erosion. In accordance with her must change and system of agriculture side reduction to labour intensiveness of unit of mine-out products at a simultaneous increase her general amount. Accordingly social advantages this reduction of business hours, employment, creation of possibilities for people to take up other businesses.

Basic principles of soil saving agriculture are the same for different regions and climatic zones:

- applying of subsurface tillage by keeping crop leavings and chopped straw on the soil surface;
- use of crop rotations that include marketable crops and crops that improve soil fertility;
- optimal proportion of agrarian and technical, chemical and biological methods to protect agricultural crops from weeds, diseases and pests;
- use of qualitative seeds.

No-till system is often defined as a production system with minimal breaking of the soil surface. It allows producing more crops by lower cost of soil and water, fertilizers, pesticides, energy sources and labor. In addition, environmental aspect is quite important because constant use of No-till

system allows restore soil fertility, stop erosion; reduce emissions of carbon dioxide into the atmosphere. Production expenses and production costs are reduced by refusing from the mechanical tillage, and therefore, its competitiveness is increased.

Summarizing, it is necessary to say that production of competitive products of oil crops can be possible only on the basis of constantly growing crops, by optimal proportion of crops in crop rotation and by using of new resource saving technologies for growing crops.

## **PLASTICULTURE**

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Simply put, Plasticulture is the combination of two words, plastic and agriculture. It is defined as the use of plastic in plant and animal agriculture. The first use of plastic film in agriculture was in 1948 in an effort to make a cheaper version of a glasshouse. Professor E.M. Emmert built the first plastic greenhouse, a wooden structure covered with cellulose acetate film. He later switched this to a more effective polyethylene film which has been used in large scale agricultural production around the world till date.

The plastic materials themselves are often and broadly referred to as "ag plastics." Plasticulture ag plastics include soil fumigation film, irrigation drip tape/tubing, nursery pots and silage bags, but the term is most often used to describe all kinds of plastic plant/soil coverings. Such coverings range from plastic mulch film, row coverings, high and low tunnels (polytunnels), to plastic greenhouses.

Polyethylene (PE) is the plastic film used by the majority of growers because of its affordability, flexibility and easy manufacturing. It comes in a variety of thicknesses, such as a low density form (LDPE) as well as a linear low density form (LLDPE). It is currently in use in The United States of America, China and some other countries in Africa and the Middle East.

These plastic products have numerous purposes. In short, plastics make agriculture more productive and efficient by cutting costs and saving time. They also conserve precious natural resources, such as water, nutrients, fossil fuels, and many forms of energy, especially sunlight. In some cases, plastic

can be used to limit sunlight and retain moisture, especially in arid regions. Plasticulture also reduces competition from invasive weeds and insects.

In addition, Plasticulture has a couple of disadvantages which include a greater initial cost, increased management and monitoring, special machinery and supplies needed to install the plastics and lastly a difficult removal process.

In conclusion, Plasticulture is of a great benefit to Agriculture because it not only reduces pollution in the sense that plastic waste materials are used for an efficient agricultural system but it also helps to preserve soil nutrients which in turn increases productivity.

## **PROBLEM OF OIL SPILL IN NIGERIA: CAUSES AND SOLUTIONS**

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Oil spill is a type of pollution that occurs mostly on water as well as on land and can have devastating effects on plant and animal life, and the environment. It occurs mainly as a result of human activity (exploration and transport of oil) and is the release of oil/liquid petroleum hydrocarbon into the aquatic environment such as oceans and coastal waters and on land. Spills may occur of crude oil (unrefined oil) from tankers, oil rigs and platforms and oil wells as well as during the transport of the refined petroleum product in vessels and tankers.

Oil spills largely affect the plumage of birds and fur of mammals by penetrating it and thereby affecting its insulation abilities thereby making them less able to adapt to temperature fluctuations and less buoyant in water. Oils may also blind certain animals which reduces their ability to avoid predators and they may this be killed, which can lead to that animal species being endangered. Plankton, larval fish, seaweed, oysters and bottom dwelling organisms are strongly affected by oil spills because sunlight cannot penetrate through the oil slick to the bottom of the ocean and therefore affects producers. When microscopic plants cannot photosynthesize and manufacture their food, they cannot release oxygen for the bottom dwelling aquatic organisms which leads to their death. When these organisms die, fishes cannot feed on them so they die as well, humans that have fish farming

as a means of livelihood have their livelihoods denied them and may have to relocate. The biodiversity of a place where a spill has occurred is greatly affected.

Oil spills occur largely because there is a demand for oil has a source of energy. Oil is used in one way or another in our day to day activities.

Hundreds of oil spills reported in Nigeria every year are ruining the environment and putting human lives at risk. Oil spills in the Niger Delta are the result of pipeline corrosion, maintenance issues, equipment failure, sabotage and theft. There was also one that happens in Isawo Ikorodu, Lagos in 2013. It was a result of pipeline corrosion, sabotage and theft.

Oils spill clean ups can be carried out using a variety of approaches, depending on the type of oil spilled, layout of the spill area, the temperature of the water etc. Some bacteria such as Sulfate reducing bacteria which are anaerobic (can survive without oxygen) can be used to clean up oil spills they are oil consuming bacteria. This is called a bio-remediation approach because it entails the use of micro organisms to biodegrade/eats up the oils.

Controlled burning is also another approach that has been used to clear out oil spillages but it brings about air pollution issues.

Bio-remediation accelerator is another approach which entails using chemicals to chemically and physically bond the hydrocarbon oil molecules. But this creates air pollution issues.

Dispersal agents have been used on oil spills as well, this prevents the oil suspension from forming clumps or settling, thereby rapidly dispersing the oil over a large surface area from which water soluble micelles are formed.

The use of a centrifuge has been commonly employed and works by sucking up oil and water after which the oil is separated from the water and the water pumped back into the ocean. The downside of this approach is that some oil may be pumped back into the ocean along with the water.

Finally, the best approach may be to do nothing and let nature take its course. This is actually a remediation approach and is regarded to as natural attenuation. This is particularly ideal in certain ecologically sensitive areas where the use of micro organisms may significantly affect the balance and biodiversity of the environment, such a wetlands.

## **MARKET FOR ECOLOGICAL SERVICES**

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In its strictest sense, a market is a regular gathering of people (whether in person, on the internet, or via other forms of communication) for the purpose of buying and selling goods and/or services. The emphasis is on the term regular. If the gathering is between two people, and it only happens once, and is the only one of its kind, then it is not a market.

Environmental markets, ecosystem markets, and Payments for Ecosystem Services (PES) are all terms that are used to refer to the entire suite of economic tools used to reward the conservation of ecosystem services. Confusingly, each of these terms also refers to a more specific subset of these tools. People use the term environmental markets pretty loosely to mean all markets that have been set up to fuel environmental improvements of some kind. Markets for renewable energy, sulfur dioxide emissions reductions, and organic food might all be termed environmental markets. Ecosystem markets is a slightly narrower term that usually refers only to those markets that trade permits or credits related to ecosystem services. The trouble comes when the moniker "environmental market" or "ecosystem market" is used to describe conservation payments that aren't really part of a "market."

Economic tools that fall under the term PES (Payments for Ecosystem Services)

We will now look at the various economic tools in the policy toolbox today. There are six main tools currently in use:

**Direct Public Payments:** Direct public payments are payments the government makes directly to providers of ecosystem services. This form of payment for ecosystem services is the most common, with governments around the world paying rural landowners to steward their land in ways that will generate ecosystem services. The Conservation Reserve Program in the United States, for instance, pays out over US\$1.5 billion to farmers each year in exchange for their protection of endangered wildlife habitat, open space, and/or wetlands. China has a similar program in place to fund erosion control, while Mexico and South Africa target their payments toward stewards of watershed services.

**Direct Private Payments:** Direct private payments function much like the public payments described above, except that non-profit organizations or for-profit companies take the place of the government as the buyer of the ecosystem service in question.

**Tax Incentives:** Tax incentives are a form of indirect government compensation for landowners protecting ecosystem services. In exchange for committing resources to stewarding ecosystem services, individuals receive tax breaks from the government. Tax incentives are used, for instance, to encourage landowners in the United States to put their land under conservation easements.

**Cap-and-Trade Markets:** A cap-and-trade program is one in which a government or regulatory body first sets a limit or "cap" on the amount of environmental degradation or pollution permitted in a given area and then allows firms or individuals to in order to meet the cap.

**Voluntary Markets:** Voluntary markets are markets in which buyers and sellers engage in transactions on a voluntary basis (i.e. not because they are forced to trade by regulation or in order to meet a mandatory cap). Generally, businesses and/or individual consumers engage in voluntary markets for reasons of philanthropy, risk management, and/or in preparation for participation in a regulatory market.

**Certification Programs:** When consumers buy certified products, they are paying not just for the product itself, but also for the manner in which it was produced and brought to market. Since such production and transport are often expensive means of production and transport, price premiums associated with certified products can be considerable. When consumers choose to pay the price premiums associated with products that have been labeled as ecologically friendly, they are choosing, in a sense, to pay for the protection of ecosystem services.

**Conclusion.** Governments play a critical role as the principal buyers of many ecosystem services and as catalysts for many private-sector direct-payment schemes. Without constructive intervention through enabling conditions, monitoring institutions and adequate governance, the market, even though based on very accurate valuation methods, is a recipe for disaster. It should not be forgotten that payments for ecosystem services will, in most cases, cover only a modest share of the total costs of good ecosystem management. However the payment for ecosystem services could prove to be a catalyst in the future.

## **EUROPEAN SCORE AT ENVIRONMENTAL PERFORMANCE INDEX AND APPLIED CASE**

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Environmental Performance is a considerably recurrent topic, attracting the interest of the world policy makers. However, the aftermath of the 2008 global financial crisis is definitely creating additional barriers to achieve the ecological objectives agreed. Thus, there is a demand to discover factors of influence of this fact in order to assess vulnerabilities and path the way for their mitigation.

Released biennially by the Yale Center for Environmental Law and Policy (YCELP) and the Center for International Earth Science Information Network (CIESIN) at Columbia University, the Environmental Performance Index (EPI) gives decision makers access to important environmental data allowing countries to compare their performance to neighbours and peers. It takes in account aspects such as Health Impacts, Air Quality, Sanitation, Water Resources, Agriculture, Forests, Fisheries, Biodiversity, Habitat, Climate and Energy.

Given the rankings and scores published at the EPI 2014, the author of this abstract aimed to compare them with an array of economic and geographic indicators, checking a possible correlation between factors.

Countries such as Bangladesh or India are recurrently referred as case examples of overloading of environmental resources due to a very high rate of human concentration among urban areas. In fact, in the European Union countries, population density does not seem to be directly influencing their environmental performance, as the correlation coefficient is  $-0,031$ . Luxembourg, even being the 6<sup>th</sup> most dense countries in Europe could attain the second place in the EPI, just below Switzerland.

Global Innovation Index published by the INSEAD gives an insight about the level of enablement of an innovation framework which has the main pillars of study on Institutions, Human Capital & Research, Infrastructure, Market Sophistication, Knowledge & Technology Outputs and Creative Outputs.



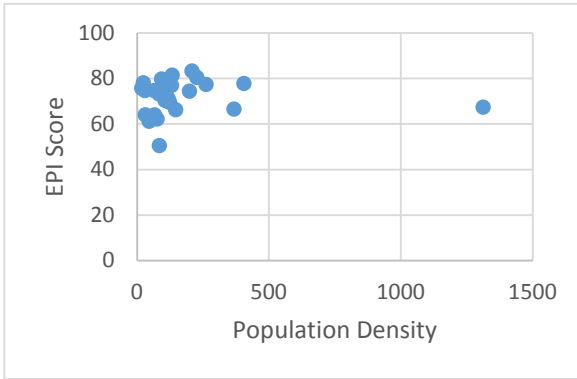


Figure 1 - EPI Score and Population Density (pop/km2); source: Eurostat and epi.yale.edu

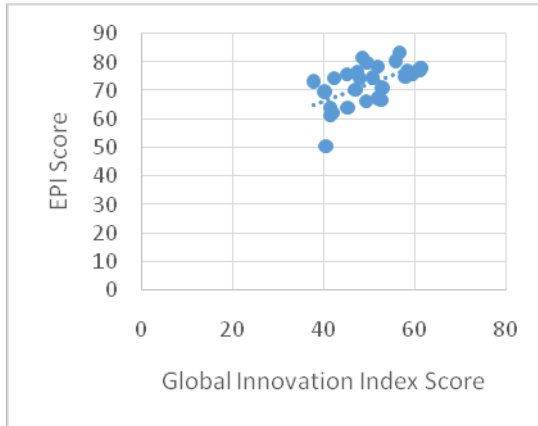


Figure 2 - EPI Score and Global Innovation Index Score performances; source: globalinnovationindex.org and epi.yale.edu

It is the belief of the author that innovation rates can be a proxy to predict environmental performances, as part of the creativity emanated by innovation process is directly used to develop cleaner and more efficient mechanisms that have a multiplying effect on environment preservation. This is somehow showed at the value of the correlation coefficient, +0,583.

The value of innovation in all of its vectors cannot be underestimated, and that is the reason for some countries and organizations to act with large investments.

Junior Achievement Portugal is a non-profit organization which aims to bring a sustainable entrepreneurship mindset to Portuguese high-schools. Groups of students are encouraged to form junior enterprises which create a real idea of business based on environmental respect principles which culminates with the production of goods or services for public sale. Crowd funding is made around school areas and the mission of these junior organizations is directly supported by the President of Portugal, which exempts them from paying income taxes. The project lasts one year and students are expected to gain business know-how and a more respectful environmental consciousness.

In 2011, the runner-up of the National Prize of Youth Entrepreneurship was a team which produced portable solar ovens for all-year round cooking. They sold more than 400 units and were invited to be present at various European fairs.

It is believed that this concept is energetically generating a truly informed and socially active generation and should be exported to third countries.

In short, we may think that environmental consciousness should not be seen as an unavoidable evil, but as an emergent need which can boost our potential and creativity.

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# **SUSTAINABLE DEVELOPMENT STRATEGY AND THE EUROPEAN MODEL "ECO-SOCIAL MARKET ECONOMY" AS A BASIS FOR COMPETITIVENESS IN THE MODERN ERA UKRAINE**

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In Ukraine, recent years were marked by the attempts to find the ways to stimulate economic growth in order to find the way out of an ecologic-economical crisis like from a great depression. Developed countries seek to restore high level of competitiveness, reduce unemployment, especially among young people. It is evident nowadays that information technologies have a major impact on the world economy. The more technologies get in different spheres, the brighter are their manifestations. Developing countries focus on innovation as a way to keep the high rate of economic growth and a way to try to get into the category of the countries with high level of environmental, economic and social well-being.

According to R. Costanza and H. Daly, contemporaries are not responsible for the happiness and well-being of future generations, but they have to leave for their descendants natural capital which could ensure happiness if used wisely [1]. This leads to the problem of perception and definition of what future is. H. Jonas points to the extremely abstract concept of the future and difficulties in giving a clear definition to it. First, he says, it is caused by the fact that ethics still does not take into account the conditions of human life and a long-term future, even the conditions of existence of the human race. Second, the future is not present in any of the (political or governmental) bodies. There is nobody who could lobby something that does not exist, and unborn are simply powerless. Thus, the duty to report to these unborn does not fit into the political reality of today's decision-making process. When report is demanded, guilty people will not be around anymore.

It appears that the immediate future for today's generations is more valuable than distant future. After breaking a certain threshold, the distant future begins to be devalued by contemporaries. In general, a realization of the need to respond to future generations, which ensues from the definition

of sustainable development, generates significant theoretical problem of determining the principles of equality between present and future generations from the ethical, social, economic points of view. Therefore, the question arises about fair distribution of natural resources and other benefits

Ukraine inherited from the Soviet Union technologically out-of-date, environmentally harmful economy that consumes a lot of resources, as well as totally neglected environment. In the years of independence, Ukraine has not managed to overcome these inherited negative tendencies. Manifestations of that include an increase in resources and energy consumption in production, further environmental degradation, and depletion of the natural resources base, worsening of the people's health, and sudden deterioration of the demographic situation in the country.

Despite the necessity for a fundamental change in the relationship between humans and nature, which humanity faced at the beginning of the new Millennium, the doctrine of "sustainable (environmentally sustainable) development" has not been spread widely in Ukraine and has not been reflected in either public policy or economic practice. Documents and principles adopted at the UN Summit on Environment and Development in Rio de Janeiro (1992) and Johannesburg (2002) have not become ideological foundations of the authorities in Ukraine. They have not been implemented efficiently in the legislation and government programs and remain to be little known in political and business circles.

In 2013, experts of the World Economic Forum and INSEAD Business School published the GTR report on the current state of information and communication technologies in the world. Despite having a strong IT- sector, the level of their penetration in the economy was lower even in comparison to other former USSR countries. (73rd place out of 144 countries). Finland, Singapore, Sweden, and the Netherlands had the highest rates of Networked Readiness. Meanwhile,

Ukraine's place in the ranking indicates a lag in the rate of development of information society and the need for policy changes to extend the IT-infrastructure [2]. This is confirmed by the Global Innovation Index (Global Innovation Index), which is calculated by INSEAD (World Business School) [3] with the WIPO - World Intellectual Property organization [5]. IT development is correlated with the innovative development, in which Ukraine also continues to be behind other countries.

During the summit of the World Economic Forum in Davos, in 2001, Environmental Sustainability Index was presented. This Index allows to

assess progress towards sustainable development through 22 indicators, which cover together 67 diverse parameters. Ranking of the countries according to the Environmental Sustainability Index is based on the comparative analysis of indicators for different countries and provides a generalized assessment of the situation for them. Out of 122 countries that were included in the Environmental Sustainability Index in 2001, Ukraine was on the 110th place. The five world leaders included Finland, Norway, Canada, Sweden, and Switzerland. In 2002, this index was calculated for 142 countries. The top five world leaders did not change, but Ukraine dropped even lower, to the 137 place among 142 countries.

Issues of the coordination between various government information systems and resources, with technical means of citizens and businesses, require some efforts for harmonization of the standards and regulations for this interaction. National policy in the information sector should focus on decision-making that will ensure the sustainable development of the information society and significant cost reduction. Having high human potential and educated population, Ukraine fulfills minimal plan.

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## **PROSPECTS FOR DEVELOPMENT OF ALTERNATIVE ENERGY**

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The problems of operation and development of the energy markets have been gaining importance in the world and require the innovative

solutions. Such as the limitations and deficit of energy resources, as also the monopoly of the world market for the energy resources is a global problem. It should be noted that the energy monopolists (USA, Russian Federation) argue that the next 50 years, the traditional energy resources (oil and gas) will account for the largest share of the world energy consumption. According to optimistic forecasts of leading scientists, by 2020 the share of the alternative energy should increase to 12.9 % in the world energy balance.

The world leaders' are increasing the share of the renewable energy in the total energy consumption. They create the favorable conditions for the development, financing and implementing the ecological projects for using alternative energy sources (tabl. 1). For an example UK energy suppliers have a target to source 15.4% of its energy from renewable sources by 2016. The leaders in the renewable energy sources in Europe are Germany, Denmark and Sweden. In these countries, the level of renewable energy sources development is very high. Aiming to the development, it is good to have as examples the best possible technological solutions and draw on the knowledge of more experienced countries.

Table 1 – The electricity generated from renewable sources (% of gross electricity consumption) 2009–2012 years

<b>Countries</b>	<b>2009</b>	<b>2010</b>	<b>2011</b>	<b>2012</b>
<b>1. EC (27) including:</b>	18,8	19,7	21,8	22,9
<b>1.1. Germany</b>	16,8	18,1	21,3	22,4
<b>1.2. Poland</b>	5,9	6,7	8,2	9,5
<b>2. Ukraine</b>	2,2	1,97	1,9	2,02

Thus, most of Ukraine's primary energy consumption is fueled by natural gas (about 40%), coal (about 28%), and nuclear (about 18%). Only a relatively small portion of the country's total energy consumption is accounted for by petroleum and other liquid fuels and renewable energy sources. In Poland the share of coal consumption in the energy balance is 55 %. But after Poland joined the European Union (2005), there the share of using the renewable energy in the energy balance have begun to decrease. They develop and research the new effective technology to use renewable energy sources.

According to the official statistic in Poland in 2005 – 7.2 % and in 2010 – 10.2 % were produced from renewable resources. The goal in 2030 is 16 %. For Ukraine the goal in 2030 is 18 %.

The comparing analyzes the structure of electricity production from renewable sources in EU, Germany, Poland and Ukraine, we can make some conclusion that in Germany the electricity is mostly produced from wind energy, solar energy and biogas. In Poland it is solid biomass, hydropower and wind energy. In Ukraine it is hydropower and wind energy

In Ukraine hydroelectric power plant (HPP) is more prevalent. However, the increase in the share of electricity generated by hydropower plants is accompanied by raising the eco-destructive impacts on the environment, including:

- building hydroelectric dams rivers seriously violates the aquatic ecosystem. In the first place it directly relates to the countries dominated plains. For example, in Belarus the height difference between Dzerzhinsky hill and valley near Minsk Neman is less than 250 m;

- the varied eco-destructive impact for the living organisms rivers. Since fish cannot pass through the dam to the place of their usual spawning grounds, which are also still become unsuitable for spawning. Also, a lot of the living organisms rivers are perished by the turbines blades.

- lack or high level of physical wear appropriate treatment facilities in reservoirs causing accumulation of pollutants from sewage and fertilizers that were washed from fields.

The share of other alternative energy sources (solar, wind, biomass, etc.) –currently provide far less than 5 % of global energy. While in Western Europe and East Asia, the figure is close to 10 %.

It should be noted that the effectiveness of alternative energy sources is largely dependent on climatic conditions natural environment. So, unfortunately, it is impossible to get solar energy at the surface of the Earth around-the-clock at any time of year, especially in temperate latitudes. The strength of winds can be not enough for powerful wind turbine . Although it is assumed that in this case, it is appropriate to use batteries.

In order to determine the effectiveness of the use of batteries in homes was determined required amount of energy to heat the building area of 100 m<sup>2</sup>. According to the rules, if the atmospherical temperature will be 20 C, the required power to 16.6 kW. That is a day we will spend 398.4 kW/h. The average accumulator – 60 A/h. with 12 V, after a full charge is capable to give 0,72 kW/h. So we get 553 accumulators or about 10 tons of accumulator per day. Thus we need more accumulators for the full energy supply and besides, it is necessary to replace them every few years. According to the results of modern research the serial battery power

consumption have low energy-output ratio, which results in high costs for their use.

Results indicate that the proportion of alternative energy in the world is being increased every year. Also, the technic and technology of their using are being improved. However, it should be noted that the costs of alternative energy sources are high. Therefore, further research needs to find modern environmental and economic mechanisms that ensure a reduction of the cost of using alternative energy sources.

## **PLASTIC RECYCLING TECHNOLOGY IN TANZANIA**

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Tanzania, officially known as the United Republic of Tanzania, is a mid-sized country in Eastern Africa bordering the Indian Ocean. It is home to a population of about 46.1 million people. Tanzania has a tropical climate, temperature range between 10°C and 32°C.

Currently, With more than 10 bottled water companies, high supply competition in commercial cities and consumption of water bottles have significantly increased, moreover, majority of entrepreneurs in Tanzania own small shops and retail business, door to door and moving shops, the amount of plastic bags and plastic material waste have been a considerable threat toward environment protection.

Everyday, tons of plastic waste in the form of water bottles and plastic packages are dumped in roadside drains or burned in landfill sites or on vacant land. The impact of plastic waste on communities and the environment is significant and far-reaching.

Plastic waste clogging drains and waterways can lead to flooding and the pooling of stagnant water, which reduces water quality and provides a breeding ground for malaria carrying mosquitoes and other epidemic diseases such as cholera and typhoid. In addition, the burning of plastic waste at dumpsites occurs at a low temperature, which releases plumes of toxic smoke and creates hazardous ash that contaminates the surrounding environment.

Plastic recycling technology enables the process of recovering scrap or waste plastic and reprocessing the material into useful products,



sometimes completely different in form from their original state. For instance, this could mean melting down soft drink bottles and then casting them as plastic chairs and tables. Plastics are also recycled /reprocessed during the manufacturing process of plastic goods such as polyethylene film and bags. A percentage of the recycled pellets are then re-introduced into the main production operation.

In Tanzania, since 2001 several companies and local industries engaged in the use of plastic recycling technology. The process starts from collection of plastic materials from streets, mainly PET plastic materials, hard plastic materials, clean & unclean plastic packaging. Then these materials will be processed for resell in manufacturing companies/industry.

In addition to significantly reducing their own ecological footprint, recycling provided an income by paying rebates to economically disadvantaged local people who collect and deposit recyclable plastics to one of the collection points. This technology lead to a significant reduction in the amount of waste plastic littering urban areas and also provided basic and easily accessible economic opportunities for thousands of people.

Table 1– Average price for recyclables materials in Tanzania.

Average price for recyclables materials		
Recyclable material	Buying price from local business (Tsh)/kg	Selling price to industry (Tsh)/kg
Plastic bottles(PET)	400	550
Hard plastic bottles	250	350
Packaging plastics (clean)	300	400
Packaging plastics (unclean)	200	300

*Note: 1,600 Tsh is approximately 1 Us Dollar.*

In conclusion, the use of recycling technology in a developing country like Tanzania should be taken more serious by the government entities, not only because it helps to prevent diseases and provide jobs to local people but also it is so important toward sustainable development. Arguably the government should impose more strict policies and laws which include

penalties for individuals and strict measures like dissolution of enterprises or industries which produce plastic wastes without proper disposal method.

Taking into account the benefits obtained from plastic recycling technologies, government ministries should invest more and promote the importance of this sector to the community.

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## **DIRECTIONS OF ECOLOGICALLY ORIENTED LOGISTIC MANAGEMENT IN THE REGIONS**

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The development of the region is analysed as a revolving process, which includes production, exchange, distribution and consumption of goods and services. The regional reproduction process is a restored circulation of labor, material, financial and information resources available in the region.

Thus, the development of a new, scientifically-grounded regional policy concerning the most efficient use of natural resources, scientific and technical potential can be considered as one of the perspective ways to solve the key problems of nowadays.

Hence, the examination of the directions of ecologically oriented logistic management is an important task for the improvement of the environmental situation in the regions, as shown in figure 1.

The concept of eco-logistics or "green logistics" - is a relatively new trend, which aims at reducing the negative environmental impact, caused by the logistic activities, as well as at minimizing the use of non-renewable resources through the effective flows management in the eco-systems.

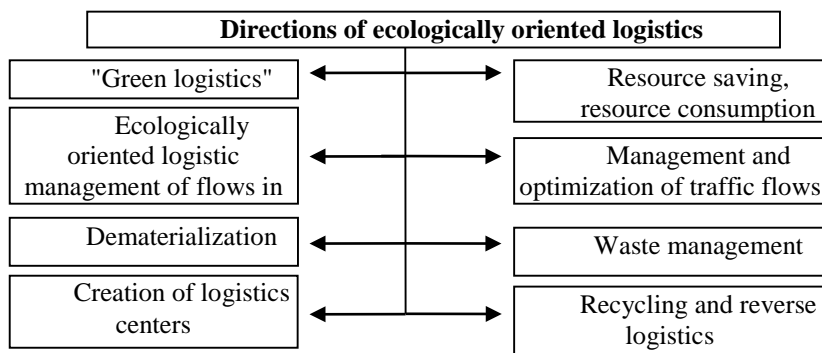


Fig. 1 - The main directions of ecologically oriented logistic management

The eco-oriented logistic management of flow processes in the region assumes managing material, financial, labor and information flows, which is based on the efficient usage of resources within all the stages of the logistic process with the minimal ecological and economic costs and impact on environment.

Another important direction, presented at figure 1, is the resources saving. The main reasons of this area activation are a significant increase in production volumes, partial use of these outputs resulting in wastes and their accumulation, which leads to the resources depletion, increased pollution of environment and global worsening of ecologic problems. Hence, the logistics of resource saving and resource consumption should be focused on minimizing the use of resources without reducing the volumes of provided services and consumer demand satisfaction.

Particularly, consistent with the researches by I. Skorokhod, N. Rebryna, in order to maintain a regional ecologic and resource security it is necessary to:

- introduce the resource-saving concept of logistics, which would provide an opportunity to reduce the consumption of natural resources;
- use secondary resources;
- conduct the development of resource-saving technologies.

For example, there are many opportunities to reduce the consumption of non-renewable resources in warehouses, in particular through the use of wind turbines and solar panels, natural cooling systems and innovative lighting systems. So-called warehouse-accumulators, which are cooled or

heated by extra 2-3 degrees when the electricity usage is minimal in order to reduce the load on the grid during the peak hours, are becoming more and more popular.

An application of logistics in managing the flows at enterprise, and optimization of traffic flows has also an important role in reducing wastes and pollution.

Another significant method of ecologically-oriented management to reduce an eco - destructive influence is the creation of logistic centers, which would enable to control effectively traffic flows, decrease traffic load in the cities, as well as meet customers' needs with the minimal ecological and economic costs.

Thus, in order to reduce the eco-destructive impact on environment it is suggested to use the whole set of the available logistic infrastructure possibilities, and as a result, to increase the regional level of environmental management and ensure sustainable development of the regions. With the worsening of environmental problems the logistic activity has started to focus more on the effective flow management aimed at mitigating the human impact, use of environmentally-friendly transport, production waste management and recycling etc.

Therefore, according to the analyses of the parameters, which characterize the level of eco-destructive logistic influence in the regions of Ukraine, it is found that the highest eco-destructive impact on the environmental systems is experienced by Dnipropetrovsk, Donetsk, Kyiv, Kirovograd, Lviv and Sumy regions, as well as the city of Kyiv. In order to address these disproportions it is necessary to use all of the tools and directions of ecologically-oriented logistic management at the regional level and establish the regional logistic centers. They will provide an opportunity to optimize transport flows in the regions, which consequently will significantly reduce the negative impact on the environment.

At the same time, the above-mentioned approaches to the problem are impossible without an active policy, implemented by regional executive bodies, local authorities and governmental bodies in general.

## **THE EVOLUTION OF ENVIRONMENTAL AUDITING IN UKRAINE**

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Environmental policy shapes the future tendencies and ways of the regulation and govern environmental issues. According to McCormick environmental policy is defined as “any action deliberately taken to manage human activities with a view to prevent, reduce, or mitigate harmful effects on nature and natural resources, and ensure that man-made changed to the environment do not have harmful effects on humans” (McCormick 2001:21). To realize and regulate these activities different instruments of environmental policy have evolved and used around the world. Policy instruments are seen as “a set of techniques used by the executive power of a country to implement its policies” (Ryden and Karlsson 2012). Environmental auditing is one of such tools, which was developed in the 1970s in North America, “as management tool to examine and evaluate the compliance of facilities and operations with (increasingly numerous and complex) environmental laws and regulations” (Hunt and Jonson 1995:70) and then spread to the United Kingdom (UK), continental Europe and around the world. Environmental audit is a flexible tool of environmental policy that includes different stages of planning, risk assessment, testing, evaluating, concluding and reporting stages (Collier 1995).

The concept of environmental auditing is rather new for Ukraine while it has been widely used in developed countries for more than 40 years. The main document, which regulates environmental audit in the country, is the Law of Ukraine “About Environmental Audit”, which was adopted in 2004. However, in the Union of Soviet Socialist Republics there was no environmental auditing legislation at all (Mishchenko and Grycuk 2008). At that time there was no necessity for environmental audit as other tools were used for controlling hazard pollutants and protection of the environment, such as environmental impact assessment and different emission standards and limits. In addition, environmental audit could not play the same role in the USSR as in Ukraine now. There were several peculiarities if the establishment of environmental auditing concept in the country. Firstly, the change of property ownership is one of the reasons of establishing environmental audit in Ukraine, but in the mid-1980s there was only governmental ownership for all plants and factories. Secondly, there was no

environmental insurance of industries, which is necessary during different business transactions nowadays as it helps to insure possible risks of any industrial activity. Thirdly, after Ukraine got independence, it became attractive for foreign investors, who wanted to know the impact on the environment of the factory or plant.

In Ukraine there were many problems that created a need for national environmental audit, such as: an increase of emergency situations and anthropogenic impact on the environment; changing of property ownership (privatization) and searching for responsibilities of past environmental contamination and preventing economic losses in the future and the restriction of environmental legislation (Volosko-Demkiv 2013). Environmental audit as an environmental management tool helps to meet several goals such as environmental protection; improving the environmental performance of the company and decreasing impact on the environment; increasing company's competence on the market; and covering investments risks (Mishchenko and Grycuk 2008). Two classifications of environmental audit are presented in Ukraine. Firstly, it can be mandatory or voluntary. If a company initiates an environmental audit on its own and chooses any environmental auditor and criteria. It calls a voluntary environmental audit.

There were different conditions for creation and various ways of implementation of environmental audit in Ukraine and in the international practices. However, it is an important instrument of environmental policy, which is used for governing environmental issues. The Ukrainian environmental regulation faces many challenges not because of bad legislation but because of the weak practical implementation of laws due to legal mechanisms and administrative function of regulatory authorities (UNDP Ukraine 2007). Furthermore, the unstable leadership of key ministries is a major obstacle to the systematic implementation of the principles of sustainable development, environmental policy and European integration (UNDP Ukraine 2007). A development of the "State Environmental Policy for the period till 2020" in 2007 was a fundamental step for establishing a current environmental policy and future plans in Ukraine. Sustainable development is the main goal of this strategy, where environmental policy is a fundamental basis. Integrating the environmental component should be mandatory in all areas of economic activity for the environmentally sustainable development of the country (State Environmental Policy for the period till 2020 2007). The strategic course of Ukraine's integration with the European Union necessitates the introduction

of environmental management systems in enterprises. Environmental certification, standardization, and environmental audits are usually components of these codes.

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## **CORPORATE SECURITY ORGANIZATIONS**

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*An analysis of the current domestic and foreign literature on corporate governance. The questions of analysis, dynamics and control risks associated with the operation and development corporations that allows you to explore a range of challenges, threats, hazards that affect the structure and development of corporate security. Analysis of research on the creation and development of a new direction - a corporate security.*

**Keywords:** *security, economic security, economic security system, the structure of corporate security, corporate security, management of economic security.*

Consolidation of business through a combination of capital resources and market power are subject to special attention of scientists and regulators economy for many centuries.

Corporate Security in the new economy of management should be focused on protecting their own functional and structural integrity. Ensure corporate security on factors external and internal threats should be directed to the efficient organization of the control system.

The study of economics of the twentieth century is closely linked to the study of corporate security, its structure, values and role in creating an effective system of regulation of the optimal economic order, addressing fundamental issues of enterprise development [1].

Corporate security is a complex system that is interconnected and interacting with global, national and regional security systems. The corporate security fully complements the political security (protection of corporations from internal and external threats to the state and government), part of the economic security (security corporation from internal and external economic threats from other states and corporations). Currently, corporate security associated with intellectual and information security [2].

Modern Ukrainian corporations operating conditions impose new criteria and the system of corporate security, which should have not only the ability to respond quickly to threats and challenges, but the potential for prevention.

The concept of corporate security that exists today reflects the current political, economic and social situation in the country and requires appropriate treatment. Ukraine has to deal with new challenges and threats, risks that have a direct impact on corporate security. Accordingly, the management need to adapt and modernize policies to ensure corporate security in general and in particular the economic security [3].

The emergence of new challenges regarding corporate security due to: upgrade logic creation of corporate security, the location of the entity, the negative impact of the emergence of global risks to the organization of corporate security, the change of social structure, the increasing power of international corporate institutions.

In corporate security systems influencing a large number of factors: psychological, technological, information, social and cultural. [4]

The increasing role of corporate security in modern conditions caused by economic developments of modern Ukraine, as well as social and cultural events, modernization of management staff.

Quality management system of corporate security should provide security at all levels of the hierarchy systems. At present, it is important to entirely new requirements of corporate security: from mechanisms to



respond to threats to ensure the timely prevention. Doing so makes the organization flexible and less vulnerable. Activities of modern corporate organization based on a common system of socio- moral values, which is a major target in the regulation of economic activity, according to the organization created the basis for the corporate security.

Fundamental scientific research of corporate security offers a large number of interpretations of the term, common vector which is directed to the corporate security as a system of measures aimed at protecting the organization from internal and external threats. In fact, this provision of protection of economic activities of the corporate organization. This activity is effective, but it is the first source of threats to corporate security organization.

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**ECO-LABELING AS AN INSTRUMENT  
OF EFFECTIVE ENVIRONMENTAL POLICY**

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At the present stage of social and economic development environmental imperative plays a significant role in the procedures of forming patterns of production and consumption, affecting the establishment of economic and environmental pillars of public safety and ensuring compliance with the principles of greening social development. Therefore, it is reasonable to study the methods and tools of environmental policy in terms of their economic and environmental performance and legal powers.

One of these tools is an effective environmental labeling of products (services), which is fairly common in the industrial policy and the consumption of economically developed countries. The purpose eco-labeling is bringing to consumers about the possible negative impact of products on the health of the individual and the environment in general. This approach is implemented through specific information and economic mechanisms that provide the consumer with information about the product, its quality and safety. It uses special "Eco-label", which are increasingly found on product packaging (information on the composition of the product, manufacturing techniques and consumer characteristics, time use, recycling opportunities, etc.). Display the full inform on wide range of parameters and product characteristics are not comfortable and are not appropriate, because Eco-label shall contain only the key, most important information about the product. The presence of such symbols on the packaging indicates that the product properties meet certain regulatory documents regulating the quality and safety of the product and the process of assigning a current sign eco-labeling. It should be noted that environmental labeling – a voluntary method of certification according to the international standard ISO 14024 [1], but the procedure is still outstanding image effect. International Organization for Standardization (ISO) recognized three types of enhanced voluntary eco-labeling.

Development Programme in Ukraine eco-labeling corresponds to the first type – the voluntary, based on different criteria and implemented by third parties, which authorizes the use of labeling on products, thereby informing about environmental priority products within the relevant group/category, namely eco-labeling is in its infancy [1].

The main incentive of eco-labeling procedures in the country are: the need for consumption of environmentally friendly products/services, the priority of the environmental component of sustainable development concept, the possibility of obtaining additional economic benefit.

It should also be noted that eco-labeling – effective means of preventing environmental conflicts as information plays an important role in the study and environmentally oriented solutions.

Today in Ukraine with the support of the public authorities and civil society initiatives and environmental organizations launched the activities of the Program, which aims to further the implementation, development and distribution procedures eco-labeling, including Ukrainian program "Implementation of environmental measures by enterprises and

organizations to meet the requirements of international and European standardization system and Certification"; environmental labeling program, which was initiated by the All Social Organization "Living Planet" and the relevant committees of the Verkhovna Rada of Ukraine.

Among achievements should highlight the fact that the Ukrainian sign environmental labeling "Environmentally friendly and safe" are included in the International Registry of Global Eco-labeling Network (Global Eco-labeling Network) and found to 35 countries, including the EU in a global competition is an important factor in increasing the competitiveness of Ukrainian products on the world market and a key selection criterion for many consumers [2].

Urgent task of the national economy in adopting eco-labeling today are:

- to implement effective practical tools of economic incentives in the manufacturing sector,
- expanding educational opportunities and information to support eco-labeling among consumers (population),
- growing environmental consciousness of consumers, improve quality of life,
- economic support environmentally oriented producers and consumers, improving the legislative and legal support procedures eco-labeling.

Economic and environmental impact of the introduction and use of eco-labeling be expected in the medium to long term, subject to gradual implementation – defined organizational and economic problems by joint efforts of producers, consumers, state and public organizations.

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## **LAND ACCOUNTING AS THE INSTITUTIONAL FRAMEWORK FOR SUSTAINABLE DEVELOPMENT**

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Land as means and subject of the work, spatial basis is a driving factor of sustainable development, which conducted Ukraine to face an urgent problem of modernization of land administration systems towards the newest type. One of the key components of effective land administration as the institutional framework for sustainable development territories of any scale is the administration of information of land resources and land use.

The main task of this research is to substantiate directions of the improvement of land accounting in the State Land Cadastre as the institutional framework of the sustainable development.

The accounting as a special administrative function is an important part of land administration mechanisms with the purpose to ensure the optimal use and protection of land any certain purpose regardless of the form of ownership and management [1, c. 57]. The managerial accounting function of quality and quantity of land in Ukraine entrusted to specially authorized executive body on issues of land resources – the State Agency for Land Resources of Ukraine. The effectiveness of administration depends on effectiveness of accounting, reliability and faithfulness of information base.

The accounting of quantity and quality of land and land holdings depends on the following components:

1. Collecting of data of land resources, land holdings and land use – is a function of accounting characteristics of land resources, land holdings and land use in the process of land management and management of the State Land Cadastre, which is performed in the managing object manual or automated.

2. An information formatting – the creation of information in the process of land management and its transformation to a form suitable for transmission via communication channel in the control system and/or processing in automatic mode.

3. The transmission of the information of land resources, land holdings and land use is carried out in various ways, including automation. The main requirements of the data are timeliness, reliability and security of the information exchange.

Thus the accounting quantity and quality of land, land registration and legal regime is carried out as part of the State Land Cadastre and is a system of functions that provides systematization, storage and provision of information and includes input-output, registration, conversion forms, search, display, copying, classification, statistical analysis, sampling, receiving aggregated data, privacy and integrity of information [2, c. 47].

Harmonization the contents of the main accounting concepts and categories used in the sphere of land use and environmental protection, eliminating terminological uncertainties regarding land accounting in Ukraine as the institutional framework of sustainable development will ensure effective land and land use administration.

Using satellite (spatial) data we can obtain a consistent and more exact dynamics images of the various categories of land. Comparing the statistics data to the spatial images of territories we can observe substantial differences between the real situation on places and the soothing statistics. The current divergence of the land accounting and ignoring of the spatial aspects, in our opinion, cannot fully take into accounting all directions of land use sustainability – environmental, social and economic in decision-making.

An integrating of the spatial approach to administrative decisions informational support of land in combination with traditional base of land statistical data will provide the completeness output of information to make optimal decisions, promoting, except of financial and economic efficiency, conservation and restoration of natural resources and ecosystem services.

The institutional basis for sustainable development foresees the introduction of complex multi-functional model of land administration, which will allow to decide on the effectiveness land use and development of land use. This model provides an approach to management in order «from the common to the private» («from the national to the local»), in which the specified subsystem all elements must be integrated into the function of the national, regional and local part (territory of village councils) and levels

«from the private to the common» (from the land plot to the country territory) in which the items should serve as the local (local and economic) levels.

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## **ENVIRONMENTAL WARFARE**

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It is the middle of day, and the sky is plain black. Smoke is everywhere—black, smothering smoke. The earth is spewing burning fire that bathes the darkness with bright orange-red. Drops are falling from the sky, but not rain drops. A scene from a science fiction movie? Or maybe an artistic take on what hell might look like? No, these are the Kuwaiti oil fields burning after being set on fire by the retreating Iraqi forces following the end of the Persian Gulf War. It was an act of sabotage that was aimed to impair the Kuwaiti oil production and subsequently their economy, but it ended up causing an environmental disaster of devastating consequences. One billion barrels of oil burned to flames over the course of around 10 months.



*Oil lakes in Kuwait set aflame*



*Satellite picture of burning Kuwaiti oil fields.*

Today, many years later, Kuwait is still struggling with the aftermath of the catastrophe. Reports have been coming out of Kuwait over the last two decades of increased rates of lung diseases, cancers, and breathing difficulties. Johnathan Lash, who once was the president of the World Resource Institute, said with regards to the incident: “What many recall as a short-lived conflict resulting in the liberation of Kuwait was an environmental disaster -- one from which the region and its people have yet to recover.”

Around the same time period, another war-related disaster hit the region: the Gulf War oil spill. Described as the largest oil spill in history, the spill was an act of strategic sabotage that caused around 4,000,000 to 6,000,000 US barrels of oil to leak into the gulf. Recovery was slow, and the effects of the spill lingered for over a decade.

These two cases of ecological assaults were probably more concerned with inflicting an economical damage rather than an environmental one. But, that is not always the case. In 1988, 5000 people from the city of Halabja in southern Kurdistan, Iraq, were killed, and another 10,000 were injured in what is described as one of the worst genocidal massacres in history. The attack was carried using internationally prohibited chemical weapons that continued to cause damage for years to come. To this day, children are born with deformations and congenital defects as a result of the chemical genocide.



Jian Aziz Ali was born the day of the attack. She studies Sport Education at Halabja University and plays volleyball in the Halabja city team. Here she's holding her son, Arish Aziz Ali, who was born with a congenital malformation of the right foot. (I.B. Times).



Aram Karim Hama Hussein (left) and Ana Karim Hama Hussein, who were born with microcephaly, and are unable to walk or speak.

The more recent Iraqi war of 2003 is itself not devoid of environmental devastations. The purported use of depleted Uranium and white Phosphorus in military assaults by the U.S. army has led to the manifestation of birth defects and cancers in afflicted areas—most notably Fallujah and Basra. Dr. Samira Alani in the city of Fallujah reported: *“it’s common now in Fallujah for newborns to come out with massive multiple systemic defects, immune problems, massive central nervous system problems, massive heart problems, skeletal disorders, babies being born with two heads, babies being born with half of their internal organs outside of their bodies, Cyclops babies literally with one eye -- really, really, really horrific nightmarish types of birth defects.”*

A September 2012 study published in the Bulletin of Environmental Contamination and Toxicology reinforces Dr. Alani’s assertions: *“Between October 1994 and October 1995, the number of birth defects per 1,000 live births in Al Basrah Maternity Hospital was 1.37. In 2003, the number of birth defects in Al Basrah Maternity Hospital was 23 per 1,000 livebirths. Within less than a decade, the occurrence of congenital birth defects increased by an astonishing 17-fold in the same hospital.”*

These sickening war crimes and war consequences point to a vitally weak link in the international policy that falls short when it comes to dealing with the environmental consequences of warfare. When the UN’s Special Commission was set up to eliminate Iraq’s WMDs after the 1991 Gulf War, it did not succeed in removing the chemical weapons that were subsequently used in the Halabja massacre. All these warning signs call for the immediate need of an international environmental policy overhaul to make amends that take in consideration all possible consequences when forging external policy.

## **MANAGEMENT OF COST-EFFECTIVE USAGE OF RESOURCES IN A STEADY ECONOMIC DEVELOPMENT**

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Economic and social development of the country and resolving of environmental problems is impossible without transition to more effective model of social production and consumption as well as without facelift of



the usage of resources. Expanding and extension of cost effective usage of resources promotes the transition of Ukraine to more balanced model of development and accelerates the process of integration into the global world economy.

Recourse saving is one of the most effective ways to develop the economy. It brings together the key elements of production: energy, materials and technology.

In a process of shifting to the cost-effective usage of resources of an enterprise will go through the following steps:

1. development and implementation of recourse saving technologies;
2. creation and further usage of brand new highly efficient materials, that can substitute their natural alternative;
3. reduction of material consumption in a social production by creating the best possible structure of raw-material base and fuel and energy sector;
4. improvement of the product quality that leads to an increase of its operational period or reduction of its consumption volumes;
5. reducing wastage of raw-material and energy resources at all stages of their production, processing and usage;
6. waste processing at all stages of the production;
7. all-in material usage for waste minimization.

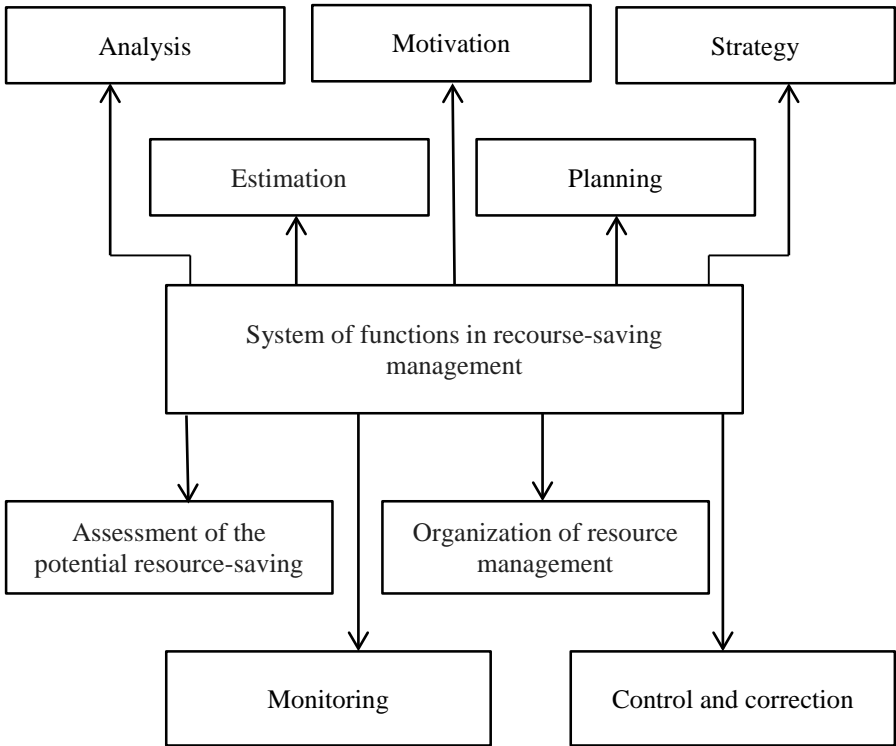
The most efficient recourse-saving activities are achieved at the micro level. They can be accomplished not solely through production efficiency, but as well through the management processes.

Efficiency of the resource-saving management depends on the system of the governance. It can be observed through the principle of the system functional completeness, i.e. separation of functions that can ensure an efficient implementation of the recourse-saving management.

These functions will form a strategy for the further development of resource-saving management system, thus they should meet the following requirements:

1. Recognition of the importance of resource-saving processes and its subsequent reflection in objectives and strategic plans of the enterprise
2. Understanding the potential economic, social and environmental benefits for an enterprise of implementing the recourse-saving policy.
3. Calculations of estimated total costs related to the resource-saving measures and prevented economic damage resulting from their implementation.

4. Control of resource-saving system to secure its suitability to the set goals in order to improve the efficiency of financial and economic activity of the enterprise and the environment.



Pic. 1: System of functions in resource-saving management at the enterprise

5. Ensuring an effective motivation, implementation of demonstrational and training programs on cos-effective usage of recourses.

6. Development of a waste management system by favoring recycling aspect and reducing dependence on non-renewable energy sources.

## **GREEN ECONOMY AS FACTOR OF POSITIVE TRANSFORMATION UKRAINE'S DEVELOPMENT**

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Nowadays, one of the important challenges of humanity is saving the environment. Consumer attitude led to depletion of natural resources, which increase the necessity of search a new solution of this actual problem. Global organizations focused on promoting recovery of the financial system, overcoming the economic recession, conversion of the post-crisis development to environmentally safe and sustainable, increase of the number of jobs. A package of government investments, fiscal incentives, political reforms and price formation reforms aimed at transition to ecologically focused green economy.

According to the UNEP report, green economy is – low-carbon economy which efficiently uses resources and meets the interests of the entire society [1]. As well known, green growth – is the main driving tool of green economy in manufacturing, agriculture, construction, energy, transport, tourism, finance, in the waste management sector and ecosystem services.

The problems of resource economics affecting all countries in the world, and especially they are relevant for the energy-dependent countries, such as Ukraine. It should be noted that for our country, the concept of green economy is actual, and today the policy of Ukraine aimed at rational use of resources and protection the environment.

Modern development of Ukraine characterized by a high level of energy intensity, that caused by energy-intensive structure of national production and a high level of physical and moral depreciation of fixed assets. Also, Ukraine is energy depend on imported energy, due to the lack of its own resources [2].

The most significant problems of transformation to the concept of green economy in Ukraine are needs of huge investments and effective capacity development for resource-saving technologies. That why an actual problem is the implantation of the principles of green economy and their financing [3].

Integrated approach to the increase of production efficiency based on cleaner production instruments [4]:

- production efficiency (optimization of productive use of natural resources);
- ecological management (minimization of the environmental impact through reduction of wastes and emissions);
- human development (minimization of risks for people and communities and support of their development).

There are such actions that may be used: 1) green policy for products; 2) green policy for factories and plants; 3) green policy for solutions; 4) green policy for management [5].

Thus, to create a positive transformation of modern development in Ukraine is need to implement the principles of green economy (fig. 1).

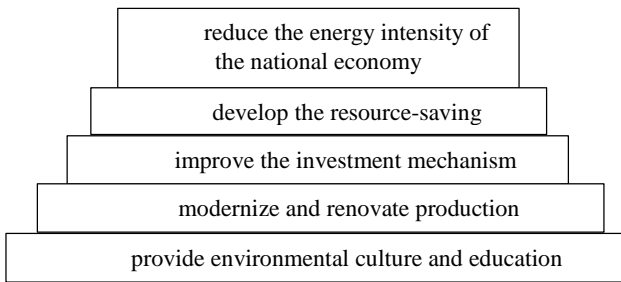


Figure 1. The main principles of green economy for Ukraine

The concept of green economy can be a source of decision the modern problems and stabilize economy in Ukraine. Renewable energy, energy saving technologies, effective environmental policies will help to increase the quality of life. Mutually beneficial cooperation with other countries in the field of green economy can provide more opportunities for increasing energy efficiency.

In our opinion, implantation of the principles of green economy has to be accompanied by revision of each and all current national target programs, branch and regional strategies.

Promoting the transfer of Ukrainian development to the principles of green economy is a key task and has to be focused on:

- 1) boosting the demand for green products and eco-innovations;
- 2) gradual adoption of higher energy and environmental standards;
- 3) introduction of an environmental management system and corporate social responsibility into business;
- 4) introduction of special sections into higher educational institutions.

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## **ENVIRONMENTAL INSURANCE AS A TOOL FOR FINANCIAL SUPPORT OF SUMY REGION SUSTAINABLE DEVELOPMENT**

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Humanity for its existence is constantly in contact with environment. Anthropogenic influence on environment has both positive and negative effects. Among the negative effects of recent decades, atmospheric and water pollution, soil cover degradation, destruction of stockpiles of biological resources, violation of the stability of ecological systems and many others become more and more widespread.

The tools introduced by the government to comply with environmental safety entities are not completely effective in conditions of contemporary globalization.

Currently on the road to sustainable development of our region, there are two main obstacles. Specifically they are:

1. Eco - destructive impact on the environment that causes by the production activity of business entities.
2. Imperfect financial mechanism of environmental protection activities.

Let us examine the quality of the environment in Sumy region in 2013. The main polluters of air and water resources were: Branch management of main gas pipelines "Naftogaz Ukraine" that produced 8529,1 tons of pollutants (28,2% of the total), Kachanivskiy "UkrNafta" – 4420,3 tons (14,6%), "Sumyteploenerho" - 4648,9 tons (15,4%), "Sumyhimprom" – 3353,7 tons (11,1%), "Okhtyrkanaftogas" "Ukrnafta" – 2398,1 tons (7,9%), "Poltavanaftogas" – 1123,1 tons (3,7%)

Current state of surface water area was also characterized by businesses' anthropogenic pressure. In 2012, the total wastewater discharge at surface water bodies in comparison with 2011 increased to 5.93 million m<sup>3</sup> (from 51.84 to 57.77 million m<sup>3</sup>)[3].

Because of extensive development of agriculture, water and chemical meliorations, take place intensive development erosion, compaction of the arable soil, reducing its fertility, weakening the stability of the natural landscape take place.

Thus, we see that the quality of the environment is not satisfactory. It is therefore advisable to consider a financial mechanism that provides environmental protection operation field in Sumy region. The basic elements of this mechanism are:

- fees for the use of natural resources;
- payments for environmental pollution;
- the system of financing environmental activities;
- auction trade permits pollution;
- system of environmental insurance;

If we compare the revenues of the regional budget in this area with expenditures, we can define, for example, that in 2012 revenues amounted to 116 438 thousand UAH, and the costs of environmental protection – 189,1 thousand UAH. In 2013 the expenditures for environment protection were absent.

Thus, under conditions of uneven amount of payments paid by entities to the regional budget and expenditures for environmental protection, public sector must work in the direction that is related to the development of environmental insurance. Environmental insurance refers to a type of compulsory insurance, which provides responsibility insurance for business whose activity is highly hazardous in case of causing by them harm to third parties as a result of accidental pollution. The purpose of environmental insurance system is the establishment of additional environmental insurance funds to compensate losses arising from third parties and the insured person

as a result of an emergency or sudden environmental pollution and promoting measures to help accidents' prevention for the insured person.

In addition to task of damage compensation, environmental insurance encourages to conduct preventive environmental measures. And the motivation for both sides of the insurance process is profit insurer: the smaller emergency (sudden, unintended) pollution of the environment, the greater profit of the insurer.

Thus, environmental insurance is designed to address two particularly important environmental problems: create additional sources of funding for environmental protection activities and provide partial compensation of accidental pollution of the environment, without applying budget means and using market mechanisms to attract commercial ones.

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## **WOODLOT MANAGEMENT AS A PART OF INTEGRATED RESOURCE MANAGEMENT: HOME STUDY FOR SUMY REGION**

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Forests are our wealth. That's why we need to care for and protect them. For this purpose it can be used the modern concept of woodlot management.

Sumy region with its area of 23,800 km<sup>2</sup> is rich in forests. They occupied 17% of its territory [1]. In northern part of the region there are dominated mixed forests (pine, birch, oak), in the central and southern parts – island forests (mainly maple, ash, oak groves).Therefore rational use of

forest resources by applying the concept of woodlot management is actual for Sumy region.

Woodlot management is the important component of the regional system of Integrated Resource Management (IRM). IRM is a means of realizing many benefits from a forest or other natural area, and making sure the renewable benefits for future generations. It examines the relationship between various types of resource use and the effects that one resource has on other resources. With IRM all resource values are considered when making decisions [2].

IRM does not necessarily mean more wood, more wildlife or more money, but it does help keep these things in proper balance. It is very important for forest management. However regional authorities are interested in these changes. But they should be aware that by using this process, all objectives do not have to be met on all sections of woodlot.

IRM involves four C's: compatibility, conflict, compromise, and consultation. It brings compatible ideas together and allows regional authorities to meet several goals at the same time, while minimizing conflicts. It sometimes requires compromises and consulting population and enterprises that live and work near [2].

Within the frameworks of IRM potential activities and values from woodland can include: recreation (e.g. hiking, biking, skiing); wildlife habitat; forest products manufacturing; intrinsic or existence values; non-timber forest products; biodiversity; soil and water conservation; gravel extraction; Christmas trees. With regard to these activities and values plan of woodlot management must include a number of important components of IRM. They can be represented in 6 Basic Steps (Table 1).

According to the presented plan the first step can be done to improve the territorial property for personal recreation or make it accessible for community use. In order to identify resources (step 2) it should be obtained some recent aerial photos to determine the location of open water, non-forested areas, wetlands, and softwood and hardwood cover types. The next step is to make the list of goals more realistic by setting priorities. After this it is important to work with neighbors on the cooperation base, because ecosystems are not restricted by property boundaries and their sustainable development is a common care of different territorial authorities. The next fifth step includes several types of activities and measures to maintain the state of the ecosystems. The final step is to develop an IRM Plan on four major sections, listed in Table 1 [3].



Table 1 – IRM in Six Basic Steps [2]

Step	Characteristics
1. Set Goals & Objectives	Goals are a list of things that local authorities are doing or would like to do on territorial ownership. Also the aim may be to improve tree quality and increase wildlife habitat quality. It should be prepared a list that includes what want to do on site and what are doing already. These goals can be grouped according to specific resource benefits such as: timber, wildlife, aesthetics or recreation
2. Identify Resources	A key to practicing IRM effectively is getting to know woodlot and working with territorial property. Woodlot resources can include things like beaches, scenic locations for campsites or cabins, timber quantity and quality. Personal resources can include time, support, financial resources, expertise and equipment
3. Set Priorities	List of goals should be compared with the available resources to the territorial property and it should be chosen realistic priorities. To set priorities, a great attention must be paid to complementary and conflicting goals and objectives. The more goals of activity fulfill the more worthwhile the activity becomes. Conflicting goals require separate areas or considerable effort to achieve
4. Work With Neighbors	Ecosystems do not stop at property boundaries. Thus, ecosystem management requires cooperation among landowners. If one person protects an area along a property line while the other clear-cuts to the edge, the opportunity for a significant wildlife corridor or recreation area will be lost
5. Things to Consider for IRM Plan	The primary emphasis with IRM is on the condition in which the ecosystem is maintained
6. Develop an IRM Plan	Consists of four parts: Introduction (Woodlot location, Woodlot history, Goals & Objectives); Woodlot Description (Map, Boundary line conditions, Significant features, Stand or ecosystem descriptions, including ecosystem health); Recommendations (Zoning, Schedule of activities, Operating plan); Summary (Sources of further information, Record keeping information).

Depending on objectives and resources of Sumy region, practical implementation of presented IRM plan for woodlot management allows developing such directions as Recreation & Aesthetics, Protect Areas,

Minerals & Aggregates, Roads & Trails, Community use, Wildlife management at the territory. Due to the large area of forests in Sumy region, applying of IRM/woodlot management concept can provide the sustainable development of forest resources and increase their integral quality.

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**ABOUT SYSTEM-PARAMETRIC FORMALIZATION OF  
ECONOMIC AND ECOLOGICAL PROCESSES**

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One of the important problems of the present economic and environmental studies, in our opinion, is development of theoretical and methodological bases of analysis of complex economic and ecological interactions. At the same time the complexity of analysis of such processes is increasing: on the one hand, if it is necessary to take into account, at least indirectly, nonlinearity and other uncertainties; on the other hand, if it is necessary to provide a system-parametric description of the "image" of the object (process). These problems were highlighted in the papers, which addressed economic and environmental problems of the Black Sea and Azov basin and coastal regions.

Development of scientific bases of system-parametric formalization of complex economic and ecological processes (EE processes) can be provided with the help of coevolution of methodology of parametric general theory of systems (PGTS) of A. I. Uyomov and the methods of Matrix-Incidence Analysis. According to PGTS, EE processes as the objects of

research can be presented with the help of the terms of the language of ternary description (LTD) – interconnected parameters "thing", "properties" and "relationship".

Matrix-Incidence Analysis is considered as a method of studying of binary relationships (interactions) between objects (economic, ecological, social) using parameters that characterize their specific incidence. This type of analysis is based on the mathematical theory of matrices.

In the Matrix-Incidence Model (MIM) incidence is considered in the following conceptual and categorical outline: incident (incidence) in the mathematical context is associated with "relation of accessory"; in the MIM incidence with a "plus" is considered as a demonstration of a positive synergetic affect and defined as an "interest" ("resource of development"); incidence with "minus" is considered as a demonstration of the negative effect and defined as a "threat" ("anti-resource of development")

Relatively simple model of formation of scientific and applied bases of Matrix-Incidence Analysis and System-Parametric formalization of economic and ecological processes can be presented by the following three blocks and respective directions of studies.

I. Methodological bases of System-Parametric Matrix Analysis of the objects of study of economic and ecological processes (Variant and invariant concepts of matrix analysis; Principles of System-Parameter Matrix formalization; Matrix models of integrated analysis of economic and ecological systems (EE systems)).

II. Methodological and methodical bases of Incidence Analysis of EE systems (Conceptual apparatus of Incidence Analysis; System-parametric concepts of Incidence of EE systems).

III. Applied basis of Matrix-Incidence Analysis of parametrically determined system (object) of studies (Matrix-Incidence Analysis of EE systems at the level of enterprises, branches, areas (cities), region, country).

Matrix-Incidence Analysis methods can be scientifically and practically efficient for environmental projects feasibility studies, expert assessments of environmental projects, scenario analyzes in the process of socio-economic and economic-ecological foresight.

It should be taken into account complexity and non-linearity of the EE processes that determines the need of comparisons of options using several criteria (it should be noted that the single-criteria optimization for such systems is unproductive). Decision making options for the discussed problems (management of EE systems) is related to multi-criteria

optimization, which can be successfully implemented using the following models: 1) models of interests coordination, which allow to take into account processes and mechanisms for obtaining compromise decision, sustainable and fair; 2) models of Pareto-optimality in the assessment of EE systems with several indicators - optimality criteria, on the basis of which assessment of the quality of social, economic or ecological object is made.

In the final part of the discussed problem of Matrix-Incidence Analysis of complex systems we would like to stress an important issue of system methodology of MIA of higher order, which is related to object cognition and ways of cognition, which, according T. Kuhn and S. V. Stepanenko can be defined as a "Methodological Matrix."

Conceptually-categorical nature of "Methodological Matrix" in the above mentioned context can be defined as the set of methodological principles of studying and way of studying which help to obtain, structure and accumulate the knowledge. This set includes the following: a) general scientific approaches to be followed at the present level of the historical development of science and which represent a type of domination of certain scientific paradigm; b) fundamental theoretical principles of the science, taken as axioms and used in the process of cognition as a type of control points forming a systematic presentation of the object of studies; c) main directions of scientific analysis, in particular, identification of the object and subject of scientific research; d) methods of cognition in accordance with the features of scientific object; e) criteria to determine the level of scientific value of knowledge obtained.

## **THE DAMAGE OF ECOSYSTEM DUE TO UNCONTROLLABLE MINING IN BANGKA BELITUNG PROVINCE, INDONESIA**

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Bangka Belitung is one of newly formed provinces of Indonesia. This province was officially formed in 2001, and it has been a largest tin-producing province in Indonesia. Initially, tin was a particular commodity that could be mined or exploited only by Indonesian government. However, the government issued a new regulation in 1999, which stated that tin was

not a particular commodity and it could be minded by anyone. This regulation brought positive outcome especially to the resident of Bangka Belitung Island, so they could reap the benefit of their own natural resources. In addition to positive outcome, the regulation also brought more dangerous negative outcome because traditional or conventional tin miners tend to use dangerous material or chemical substances in the process of their mining activities. The usage of dangerous material or chemical could lead to threatening environmental damage such as mining holes, polluted ground water, and accumulated acid chemical substances, which all contribute to the impairment of water quality. Such activities also produced other chemical substances such as zinc, copper, arsenic, and lead, which all of them could be dangerous to human health and forest environment. The illegal and conventional miners were initially the labor of previous mining company who tried to freely conduct uncontrollable mining activities, and they searched their own mining sites to forest without official permits. These illegal miners exploited in unregulated mining sites without thinking its long term effect, and it brought damage to the ecosystem of forest.

Since the government ratified the system of regional autonomy, which delegated the authority to the local government, the controlling role of the local government was automatically increased. The condition negatively allowed small and middle scale of mining companies in Bangka Belitung to produce pollution, which damaged the environment. The corrupt government tended to be tolerant to bribery, and the condition favored irresponsible companies to conduct dangerous mining activities. On the other hand, mining is one of the most potential economic sources for the people who live in Bangka Belitung province, and if their mining activities must be regulated with stricter rules, then economic life of the people could be disturbed or interfered. The central government of Indonesia has repeatedly tried to deal with the issue, but the problems still remain because tin mining is a complicated economic life for people or residents of Bangka Belitung, the companies, and the government itself. In addition to the root of the problems, some presume that there are foreigners' interventions in this industry because most of the notable companies are owned by foreigners.

# **THE HAMELMALO AGRICULTURAL COLLEGE ENVIRONMENTAL SOCIETY; AN INDIGENOUS SOLUTION TO GLOBAL CHALLENGES**

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The Hamelmalo agricultural college environmental society (HACES) is a college based organization founded to facilitate the establishment of vital development projects in predominantly rural, disadvantaged communities throughout Eritrea.

HACES plays a facilitative role in the process, enabling local communities and neighborhoods who chose to do so, to identify, plan and implement the socio-economic and environmental projects they most need in a democratic manner. This ‘bottom-up’ participatory approach delivers not only projects but training. Communities therefore receive the tools to create their own autonomous projects in the future – the essential goal of sustainable human development.

HACES’s organic agricultural project spans the entire development process from nursery to market. Among other things this includes the securing of product organic certification, from which farmers receive direct income benefits; utilizing biomass waste to create further products such as clean energy briquettes and reinvesting in agricultural and human development projects.

HACES takes care at every level to prioritize the most marginalized. This pervading ethos of inclusivity was very much in evidence on its projects. There are hundreds of people across Eritrea who can speak of their first time planting a tree under the HACES auspices. The initiative represents different strata of Eritrean society, from national and provincial dignitaries to agricultural workers, from teachers to schoolchildren – the next generation to take care of our earth and find sustainable methods of conducting our lives. The choice reflects very well our role, demonstrated in innumerable activities, to connect the as-yet-unconnected to opportunities for growth and development: to economic and communal participation, to clean drinking water, to education – and to each other.

Projects then are seen as gateways to further initiatives, deeper meaning, broader impact and the delivery of vital messages to the global public. We must – and will – continue to deliver with continued passion and

commitment, dedication and precision, with faith in the Eritrean people and in humanity.

Setting the stage for the rest of the planting season; at a time when the a country is threatened with drought, much-needed rain began to fall at many locations – a most promising sign for the health of the trees and local agriculture and, one likes to think, for the future in general.

Bringing the idea to fruition has, and will continue to be, an exercise in enhancing and affirming life, in terms of its impact on the environment and on society. Worthy of note in this context are two unique features; the opportunities afforded to the foundation and the spirit of cooperation existing between diverse communities within and beyond Eritrea.

## **KNOWLEDGE MANAGEMENT FOR SUSTAINABLE DEVELOPMENT ACHIEVEMENT**

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**Abstract.** Knowledge management is an effective mechanism to achieve sustainable development. Tasks assigned to analysts, can be solved using the experience of leading countries of the world. In this article the framework of knowledge management, which takes into account the investigated domain, is suggested. In the proposed framework a scenario-oriented approach is used to form possible analytical activities scenarios that are based on experience.

The accumulated experience of countries that are on track to achieve sustainable development or have already achieved it can be used to achieve sustainable development in Ukraine through their experience. Next knowledge can be investigated for that: methods and working models of sustainable development achievement.

Knowledge Management - a process aimed to support knowledge at the appropriate level and aimed to develop a new knowledge by goals (development of new products, technologies, etc.). Knowledge management technologies are often defined in terms of their ability to help process and organize textual content and data so as to enhance search capabilities and to

garner meaning and assess relevance so as to help answer questions, realize new opportunities, and solve current problems [1].

At present, only the first steps are being made to develop structures for representing and using knowledge about the processes that need to provide a flexible response and the current situation, with both in its assessment and in prediction to select the best continuation scenario [2].

The KM framework consist of next elements (figure 1):

1. Formation by analysts goals to achieve sustainable development, specification of the regional level.
2. Identifying tasks that must be done to achieve the goal: tasks are formed on the basis of knowledge about the area of research and knowledge about the processes.

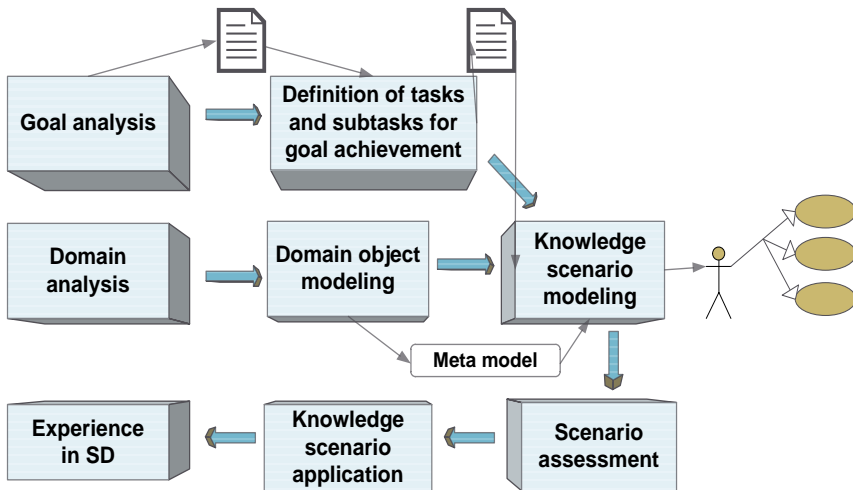


Fig 1. Knowledge management framework in sustainable development achievement

3. Analysis of domain formation and domain object model description. Description of Domain– it is the stage where domain object model is being constructed.

4. Simulation of analytical activity scenarios analytical based on constructed domain object model and study ways to achieve sustainable development, using the accumulated experience in solving similar problems in other countries. Scenario modeling goal is to inspect the behavior of a complex system (i.e., the enterprise, economic and ecologic system and



region) under some given hypotheses called scenarios. Analytical activity consists of regular collection and processing of information that can be used to support decision making and to study and investigate objects and processes features. Analytical activity scenarios specify the order of analytical activity implementation with the aim of getting necessary information for sufficient decision-making.

5. Assessment of Knowledge is an important step, but poorly explored. At this stage the accuracy of the knowledge and expertise match stated objectives and available resources. If the search produced several similar knowledge is necessary to determine what are the most adequate for the specified conditions.

6. Application of knowledge is performed at the state / regional administration.

7. Knowledge applied to meet the objectives and goals are experience and can be used in the future.

The next step is to examine the objectives of knowledge management and its structure and determine the nature and structure of knowledge with respect to the level of achievement of sustainable development.

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