ISSN 2307-647X

Economics for Ecology

ee 21st

ISCS 2015

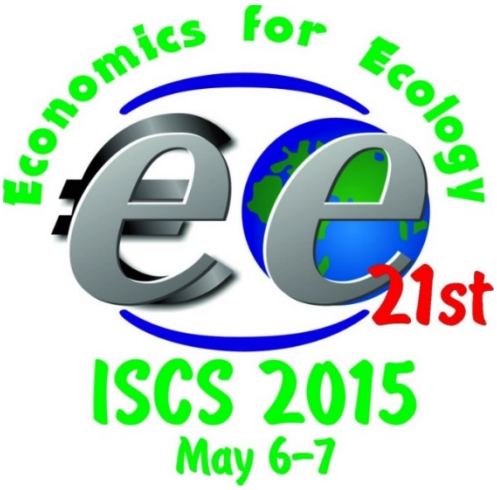
May 6–7

Papers presented at 21st International Scientific Conference in Sumy

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

21st International Scientific Conference

"Economics for Ecology"
ISCS'2015



Економіка для екології

Матеріали
XXI Міжнародної наукової конференції

(Україна, Суми, 6–7 травня 2015 року)

Суми
Сумський державний університет
2015

УДК 502.15(043.2)
ББК 65.9(4Укр)28
Е45

Рецензенти:

Є. В. Мішенін – доктор економічних наук, професор ДВНЗ «Українська академія банківської справи НБУ»;

Л. І. Михайлова – доктор економічних наук, професор, завідувач кафедри менеджменту ЗЕД та євроінтеграції Сумського національного аграрного університету

Рекомендовано вченою радою Сумського державного університету
(протокол № 10 від 9 квітня 2015 р.)

Е 45 **Економіка** для екології : матеріали XXI Міжнародної наукової конференції, м. Суми, 6–7 травня 2015 р. / редкол.: Д. О. Смоленніков, А. А. Іскаков. – Суми : Сумський державний університет, 2015. – 106 с.

ISSN 2307-647X

Матеріали XXI Міжнародної наукової конференції (м. Суми) «Економіка для екології» присвячені проблемам довкілля та економічним методам їх вирішення. Проаналізовано можливі механізми досягнення стійкого розвитку.

Для студентів, аспірантів, молодих учених економічних та екологічних спеціальностей вищих навчальних закладів освіти і широкого кола читачів.

УДК 502.15(043.2)
ББК 65.9(4Укр)28

ISSN 2307-647X

21st INTERNATIONAL SCIENTIFIC CONFERENCE

"ECONOMICS FOR ECOLOGY" (ISCS'2015)

May 6-7, 2015, Sumy, Ukraine

The conference organizers:	• Sumy State University, Faculty of Economics and Management • Sumy Local Youth NGO "Council of Young Scientists"
Support	• EU and UNDP Project "The Community Based Approach to Local Development - II Project (CBA)"
The topics of the conference:	• State Environmental Policy • Problems of Education, Ecological Education • Rational Economics and Saving Technologies • Informational Economics • Greening Economy, Greening People • The Mechanisms to Reach Sustainable Development • Regional Ecology • Ecological Economics and Marketing in the Context of Globalization • Interrelation of Economy and Culture • The Role of NGOs on the Way towards Sustainable Development
The conference is directed to:	students, young researchers, representatives of youth organizations and NGOs
Conference languages:	the official conference language is **English**
Conference place:	Sumy State University

Please contact Organizing Committee for information:

Address: Ukraine, 40007, Sumy, R.- Korsakova str. 2, Sumy State University, Faculty of Economics and Management
E-mail: iscs@ua.fm, iscs@econ.sumdu.edu.ua
Web: http://iscs.fem.sumdu.edu.ua
VK: http://vk.com/iscs2015
Fb: http://facebook.com/groups/iscs2013
Twitter: http://twitter.com/iscs2013

THE ORGANIZING COMMITTEE DOES NOT ENTAIL ANY RESPONSIBILITY FOR THE CONTENTS OF THE THESES

The Conference Organizers

Організатори конференції

Sumy State University, (Faculty of Economics and Management)

Address: Ukraine, 40007, Sumy, vul. R.-Korsakova str. 2
Phone: +380-542-687832
E-mail: info@def.sumdu.edu.ua
Internet: http://fem.sumdu.edu.ua

Сумський державний університет (факультет економіки та менеджменту)

Адреса: Україна, 40007, м. Суми, вул. Р.-Корсакова, 2
Тел.: (0542) 687832
E-mail: info@def.sumdu.edu.ua
Internet: http://fem.sumdu.edu.ua

Sumy Local Youth NGO "Council of Young Scientists"

Сумська міська громадська організація «Рада молодих вчених»

Підготовку та видання матеріалів конференції здійснено за підтримки проекту “Місцевий розвиток, орієнтований на громаду”, який фінансується Європейським Союзом та співфінансується і впроваджується Програмою розвитку ООН в Україні. Думки, висновки та пропозиції, які містяться у цих матеріалах, належать авторам і не обов’язково відображають погляди Європейського Союзу чи ПРООН.

The Conference Sponsor **Спонсор конференції**

Company "Eco-Product"

ТОВ «Завод «ЕКО-продукт»

http://eko-product.sumy.ua

ISCS'2015 Organising Committee

Olha Prokopenko, Professor, Dean of Faculty of Economics and Management (FEM), Sumy State University (SSU)
Leonid Melnyk, Professor, Head of Chair of Economics and Business Administration, SSU, President of Economic Research Centre
Denys Smolennikov, vice-dean of FEM, SSU
Nadiya Kostyuchenko, associate professor, Chair of Economic Theory, SSU
Yevheniia Ziabina, PhD student, Chair of Economics and BA, SSU
Ludmila Kulyk, PhD student, Chair of Economics and BA, SSU
Anastasia Bavykina, co-chairlady, student, FEM, SSU
Andrii Iskakov, student, FEM, SSU
Olha Bachal, student, FEM, SSU
Tetiana Yakushko, student, FEM, SSU
Zhanna Pronikova, student, FEM, SSU

Program of the
21th International Scientific Conference in Sumy
"Economics for Ecology"
(May, 6-7, 2015)

Wednesday, May 6

09:00-10:00 – ***Registration + morning coffee*** *Training building M (room 412)*
10:00-10:30 – ***Conference opening,*** *Training building M (room 412)*
10:30-13:00 – ***Plenary Session,*** *Training building M (room 412)*
13:00-14:00 – ***Excursion to university library***
14:00-15:00 – ***Lunch Break***
15:00-17:00 – ***Workshop*** *Training building M (room 412)*
17:00-18:00 – ***Conclusions of workshops,*** *Training building M (room 412)*

Thursday, May 7

10:00-16:00 – ***Tour around the city Sumy***

SORCE

STUDENTS ORGANIZING CONVENTIONS EVERYWHERE

http://sorce.info/

Organizing Committee of ISCS is the Students Organizing Conventions Everywhere (SORCE) member. SORCE is the network of festivals and conferences organisers all over the world. Please visit the SORCE

TABLE OF CONTENTS

CRITICAL DISCOURSE ANALYSIS OF MEDIA PRESUPPOSITION IN REINFORCING IDEOLOGY: THE CASE OF HAMLIN FISTULA ETHIOPIA

Yirgalem Abebe
Addis Ababa University, Ethiopia

Background of the Study

It was in 1974 that Addis Ababa fistula hospital (AAFH) started caring for women with childbirth injuries. The hospital is located in Addis Ababa, the capital of Ethiopia. It is the only hospital of its kind in the world dedicated exclusively to women with fistula repair—a condition common in developing world where the maternal health provisions are poor. It treats all patients free of any charge. The patients are usually the poorest of the poor, divorced, or abandoned by their husbands or partners ostracized by their parents and community as a result of obstetric fistula. It also provides a residential facility where patients with irreparable damage can live long term. It is a registered charitable non-governmental hospital run on donation because of the need of the women, and has proven success in treating this condition. For instance, the hospital gets aid from USAID and it has promised to keep supporting it too; that would help the hospital in improving maternal and child health mortality, which is the main goal of the millennium development.

The present Hamlin Fistula Ethiopia (HFE) was previously called Addis Ababa Fistula Hospital (AAFH) and was established by Dr. Reginald and Catherine Hamlin to treat and provide care for women with obstetric fistula. It remains the only medical centre in the world committed utterly to fistula repair. The hospital runs five fistula hospitals strategically located in regional states in Ethiopia (i.e. in Bahr Dar, Mekelle, Yirgalem, Harar, and Metu); the Hamlin college of midwives, trains local midwives to help prevent obstetric fistula and improve maternal health; Desta Mender is a farming training facility outside Addis Ababa where long-term patients live and can learn micro-business skills. Fistula victims are usually shunned so severely due to their odor that even other patients refuse to be near them. In short, women who develop fistula are often abandoned by their husbands, rejected by their communities, and forced to live in an isolated existence.

Fistula has been eradicated from the developed countries at the end of the 19th century when caesarean section became widely available; but

obstetric fistula continues to plague women throughout the developing world. It is estimated that there are 100,000 new fistula cases each year, but the capacity to treat fistula is only around 6,500 per year. The United Nations Population fund (UNFPA) estimates the world's population of fistula sufferers at more than two million. In a study made in 2005, the hospital estimates 40,000 women living with obstetric fistula in rural Ethiopia. From 1974 to date, some 30,000 women have been operated on and of these, there are long-term chronic patients who require lifelong assistance, which numbered approximately four hundred. It is estimated that 9,000 women develop obstetric fistula each year, and up to 100,000 women are living with untreated fistula in Ethiopia. The combination of prolonged and obstructed labor, especially among young, poor, and under-nourished women and lack of skilled attendance at birth are the main challenges to obstetric fistula reduction in Ethiopia (Duby and Hailey, 2013).

The media, both broadcast and print serve as valuable sources of information and powerful modes of communication. This power controls much of what people understand of events that occur around the world on a daily basis. The way information is transferred to its recipients comes through various forms of communication, all of which is framed to meet the goals of the providing source. In social theory, a 'frame' consists of a schema of interpretation, collection of anecdotes, and stereotypes that individuals rely on to understand and respond to events (Cissel, 2012, p. 68).

In view of that, once own media couldn't deny the fact that, the establishment of Hamlin Fistula Ethiopia (HFE) is a major contributing factor for the reduction of obstetric fistula in Ethiopia. The media in Ethiopia would have a role in such improvement. The discourse about Hamlin fistula Ethiopia commitment for the reduction of fistula, has sometimes gained an increasing attention in the media; many journalists and authors talk and write about it. The question, however, is the way such discourses are presented by the media.

According to Rogers (2004, p.10), critical discourse analysis (CDA) starts with the assumption that language use is always inevitably constructing and constructed by social, cultural, political, and economic contexts. In addition to this, as CDA researcher argued with regard to the implication of discourse on Fairclough and Wodak (1997):

CDA sees discourse – language use in speech and writing – as a form

of ‘social practice’. Describing discourse as social practice implies a dialectical relationship between a particular discursive event and the situations, institutions and social structures, which frame it: They shape the discursive event, but it also shapes them. That is, discourse is socially constitutive as well as socially conditioned – it constitutes situations, objects of knowledge, and the social identities of and relationships between people and groups of people. It is constitutive both in the sense that it helps to sustain and reproduce the social status quo, and in the sense that it contributes to transforming it (p. 258).

So that, this study is going to conduct a critical discourse analysis of some selected and available documentary films and articles presented on Hamlin Fistula Ethiopia for the fact that a particular media discourse might be broadcast and/or published for serving to achieve the ideological goal of an institution in our case HFE.

Analysis and Discussion

The aim of this study was to uncover, by means of critical discourse analysis, the major media presupposition made on Hamlin Fistula Ethiopia; and the way in which these discourses are used consciously or unconsciously in underpinning the ideological goals of the institution through a fairly or unfairly presupposed information/knowledge of journalists.

The study was tended to achieve the overstated objective by examining: What knowledge has the media presupposed in their discursive construction of Hamlin fistula Ethiopia? How is this knowledge presented in the media texts under consideration? What ideological goals does such presupposition attempt to achieve?

Critical discourse analysis was employed as both a method, theory and as a tool to examine a set of media outputs produced on Hamlin Fistula Ethiopia of which most of them emphasized on the role and contribution that the hospital is playing in curing obstetric fistula patients.

To that end, using convenience sampling technique, four media outputs (i.e. documentary programs vs. articles) were chosen as extracts them of both local and foreign- based media corporations. Two documentary films were selected, one of the films is internationally made programs by Angel Entertainment, and the other one is a locally produced documentary program by Ethiopian Radio and Television Agency (ERTA) whereas the other two data sources are from print media (i.e. from the local Ethiopian Herald newspaper and the internationally made online magazine

called TsehaiNY).

All these media outputs are critically analyzed based on the outlined analytical technique using in a systematic mode. For instance, indicating did it; first, the presupposed information/knowledge of journalists, then by distinguishing it with the new information stated in the documentaries and/or the articles. On the way, this presupposed and new information of journalists helped to know whether it is presupposed fairly or unfairly. This consequently assisted the researcher to explore the ideological underpinnings that the institution can achieve through conscious/unconscious presupposed knowledge of the journalists. Furthermore, viewing detailed linguistic items (phrases and words) helped to extract the hegemony of the media in advance.

Consequently, based on the analysis the study demonstrated that in respective of the foreign established documentary film and article; there were a consciously or unconsciously 'unfairly' presupposed information/knowledge of journalists that lead audiences to invest in too much processing effort for the amount of cognitive effect they wish to achieve. In a way, this would help Hamlin Fistula Ethiopia to underpin their ideological goals as a result.

Moreover, in critical analysis of the discourses, the study scrutinized that the targeted audiences of these internationally owned documentary and article were foreign audiences who didn't know Ethiopia very well. As subsequently this study found out, these media outputs were extracting our shameful scare of obstetric fistula patients to the outside world, which would consequently helped the institution to underpin its ideological goals that was fund rising. That was done at the expense of a consciously or unconsciously presupposed information/knowledge of journalists.

Whereas with respect to the locally produced documentary and article, with the exception of the documentary program, there was somehow fairly presupposed information by journalists which didn't lead audiences to invest in too much processing effort as it was observed in an internationally funded media corporation. Here, no any ideological message was communicated through presupposition, as there was no any unfairly presupposed piece of information.

As a result, what this study implies can be taken, the researcher believes, as a cautionary remark for media i.e.: the journalists' presupposition of information/knowledge could lead audiences to invest in too much processing effort which would consequently help a particular

institution to underpin its ideology.

References:
1. Cissel, M. (2012). *Media Framing: A Comparative Content Analysis on Mainstream and Alternative News Coverage of Occupy Wall Street*. Elon University.
2. Duby, F. & Hailey. J. (2013). *Joint AusAID and USAID Review of Support to Hamlin Fistula Ethiopia*. Canberra City: AusAID HRF
3. Fairclough, N. & Wodak, R. (1997). *Critical Discourse Analysis*, in T. Van Dijk(eds). Discourse and Social Interaction. Sage.
4. Rogers, R. (2004). *An Introduction to Critical Discourse Analysis in Education*. London, New Jersey & Mahwah: Lawrence Erlbaum Associates, Inc.

IMPLEMENTATION OF ORKHON YENISSEI WRITING SYSTEM AS A MODERN WRITING SYSTEM OF KAZAKH LANGUAGE FOR SUSTAINABLE DEVELOPMENT OF KAZAKHSTAN

Zhandos Aitymov
FernUni Hagen, Karagandy, Kazakhstan

This short abstract is about perspectives of implementation of traditional Kazakh writing system, which is known in some sources as Orkhon Yenissei writing scripts, Runs or Talass writings. It covers historical issues and modern situation as well as perspectives of implementation of Orkhon Yesnissei writing system in Kazakhstan. More attention to the writing systems of the world are needed.

The writing system which was used in Central Asia and North Asia (Siberia) is known as Orkhon Yenissei writing system, Runs or Talass writings. The names are coming from places of its use where the evidences where found. These evidences are stone books, monuments with writings found in Orkhon river bank (of Mongolia), Yenissei river bank (of Republic of Hakassiya, Russian Federation), Talass area (of Kyrgyzstan). The stone books – stones with texts were found as well in Kazakhstan, Armenia, Azerbaijan, Republic of Yakutia (Russian Federation) and in many parts of North Asia (Siberia).

Figure 1. Example of the letters formed into words and sentence that uses traditional Orkhon Yenissei alphabet. The writing starts from right to left.

Orkhon Yenissei writing system was used all over Central Asia and North Asia (Siberia). The first understandings of the texts of stone books where made by Dutch academician Vilhel Thompsen. Who could solve the meanings of the texts and suggested an alphabet. The alphabet was constructed around 5th century.

In fact, the writing system that was used in Mongolia, Kalmyk Republic (Russian Federation), Buryat Republic (Russian Federation) was Orkhon Yenissey writings system as well. So-called Todo Bichig, the old Mongolian writings system is a quite modern development of these nations as they were brought by Buddhism movement in the recent past.

There is a big need of harmonization of Kazakh language. On the way to achieve it, there are several tasks which is essential for sustainable development of language and country:

Implement Orkhon Yenissei writing system in the daily use in Kazakhstan; taking into consideration that only Kazakh language uses Orkhon Yenissei writing system. The other languages remain their writing systems: Russian language – Cyrillic writing system, Armenian language – Armenian writing system, Georgian language – Georgian writing system etc.

Dedicate and celebrate **International day of writing systems of the world** and make it world day that celebrated by United Nations UN and UNESCO.

Include the lesson of traditional writing system – in the curricula of secondary schools and universities; Under traditional writing systems we mean Kalmyk writing system, Orkhon Yenissei writing system, Buryat writing system, Old-Mongolian writing system.

Open Foundation Orkhon Yenissei writing system foundation that will advertise unique writing system and make seminars, meetings and cultural

events with other countries that successfully use traditional writings systems, like Armenia, Israel, Korea, Thailand etc.

Refernces:
1. The library of Orkhon Yenissei writing system. http://bitig.org
2. Old Turkic alphabet. https://en.wikipedia.org/wiki/Old_Turkic_alphabet
3. I.V. Kormushin. Drevnie Turkskie yaziki. Uchebnoe posobie. Supplementary book.
4. N.A. Baskakov. Turkskie yaziki. Yaziki narodov mira. Uchebnoe posobie. Supplementary book.
5. Todo bichig. https://en.wikipedia.org/wiki/Clear_script

THE MECHANISM OF FORMATION OF INNOVATIVE ENVIRONMENTAL AND ECONOMIC STRATEGIES

Kirill Bogach
National Mining University of Ukraine, Dnipropetrovsk

One of the tools that contribute to the implementation of European standards in the economy of regional nature, recognized environmental innovation, as an indicator of sustainable and balanced development.

Environmental innovations is interpreted as innovation, more efficient use of natural resources from an economic point of view, reduces the negative impact of human activities on the environment or contribute to the stability of the ecological system.

The concept of sustainable environmental development of the territory, based on the principles of optimal matching of society and the natural environment, the natural balance of the biosphere, environmentally oriented human activity, complexity and environmental soundness of decisions, ensuring the priority of public interest over private.

Economic development cannot be accompanied by dangerous pollution and degradation of the environment.

Imperfection of the mechanism of natural resources and environmental protection has become a deterrent recovery areas. In this regard, it is appropriate to approach to the implementation of projects to restore the ecological balance of areas, based on the principles of cooperation between the state and the private sector.

Can identify the following innovative eco-economic development strategies:

1. Development of innovative environmental management mechanism. This strategy involves the development of specific indicators to measure the dynamics of nature and qualitative changes in the use of natural resources and nature conservation.

2. Strengthening the innovative partnerships at the regional and interregional levels, including financial support for innovation in the regions, joint planning and setting priorities in innovation policy cooperation in the development and implementation of innovative projects, exchange of experience of successful projects and improvement of skills development in the field of innovation strategy and policy in nature.

3. Promote innovative creativity. The strategy is aimed at active and creative thinking senior managers.

INFORMATION SUPPORT FOR ENVIRONMENTAL ASSESSMENT OF THE ENTERPRISE EFFECTIVENESS

Valeriya Bohdan, Nataliia Karaeva
National Technical University of Ukraine "KPI", Kiev, Ukraine

Contemporaneous (modern) approach to raise ecological safety of economic activity has to be based on the operative recourses management methods with using the information technologies (IT). Complex number and using the information allow creating necessary analysis data base, forecasting and planning economical and ecological activity of enterprise, raise the basing of the creating strategies, gives the ability for modern correction of plans and budget of the enterprise.

Nowadays utilization of the information leads to cutting down the expenses and raise the production quality and effectiveness. For example, the valuation inculcation allow to cut down the expenses for the projects – from 10 to 30%; to short the time for introduction new products in the market – from 25 to 75%; to cut down the expenses for preparing technical documents – to 40%.

The IT for environmental assessment of the enterprise effectiveness can be divided to: software for statistical data processing, software for

economic analysis, software for formalistic primary information which is need for further leading ecological and economical evaluation and analysis managing the enterprise and GIS data using GIS technology [1] (table 1).

Table 1 - Functional possibility of the IT for Environmental assessment of the effectiveness of the enterprise

Type of the IT	Newest specimens of program product	Program product possibilities
Software for statistical data processing	BMDP, SAS, SPSS, STATGRAPHICS, RATS, MikroTSP, Minitab, STADIA, SYSTAT, ZOZAVR, EBPICTA	Business graphic; parametrical tests; non parametrical tests; categorical analysis; dispersive analysis; regressive analysis; time line analysis; multivariate methods.
Software of economic analysis	ATM Technologies, BS Integrator, IBM Informix, FinExpert, Symantec, Antaris	Complex system of managing the enterprise; business-attachments for financial automation the enterprise, staff management; financial and governmental program products.
Software in ecological tendency	«Ecol-Gas», “EOL” “Tandem”,“Inventarisation”,“NEORIST”, "NORMA6XML"	Program calculation of atmosphere pollution; Calculation of gross ejections pollution substances from unorganized sources atmosphere pollution etc.
GIS technology	Map–Window, JUMP, QGIS, ILWIS Open–, ArcGis, GrassGIS, MapInfo, gvSIG, SAGA	Visualization of spatial information. 3D modeling in environmental and economic problems. Modeling of the Earth's crust, visualization of satellite data.

Choosing the statistic package for data analysis and taking the necessary calculation deepens from the problems character, size of the data, which are processed, necessary equipment and user qualification.

Most of the statistic analysis can be very effective in solving with using the program processing the electronic spreadsheet Microsoft Excel. Specter of the possible statistic functions of the latest MS Excel almost don't give up the specialize programs of statistic data processing (more than 70 functions).

The structure of GIS unit includes: a spatial database that contains geographic information in order to construct of GIS model for sustainable development of regions and attribute information on the construction of EP level; geovisualisation (a set of intelligent maps and other geographic information, including interactive maps, 3D scenes, summary charts and tables, a publication on the Internet web maps); geoprocessing (set of tools to get new sets of geographic data with existing data sets with analytic functions application to them). GIS data processing using GIS technology has become a common powerful tool in the state and municipal government in many countries for decision making.

But we must to admit, that the main component of ecological and economical analysis is a complex valuation of condition and effectiveness of natural using and securing of the environment in a different economical sectors and on the all levels – from the exact enterprise to the separate regions and the all country in common, including utilization the exact nature resources an ecological interindustry base. Today in Ukraine were exploit not so many program resources, which helps to process information necessary for ecological and economical analysis of economic activity. In this situation there is a necessaries for exploit a specialized program needs ecological and economical valuation and analysis of economic activity.

References:

1. Караєва Н. В. Діагностика стану регіональних систем за рівнем сталого розвитку в умовах невизначеності / Н. В. Караєва, Л. О. Левченко, А. С. Панасюк, Т. О. Дерипаско // Управління розвитком складних систем. - 2013. - Вип. 14. - С. 158-163. - Режим доступу: http://nbuv.gov.ua/j-pdf/Urss_2013_14_31.pdf.

ECONOMIC ANALYSIS METHODS MOTIVATION TO PRACTICE ENVIRONMENTAL PERFORMANCE OF ECONOMIC ENTITIES

Victoria Boronos, Zhanna Pronikova
Sumy State University, Sumy, Ukraine

Today, the dynamic development of the world economy leads to an aggravation of the ecological situation. Climate change, water shortage, soil erosion, genetic and electromagnetic pollution and so lead to the fact that countries and the international community have to find new ways to reduce ekodestruktyvnoho human impact on nature. In this regard, each state independently develops methods for greening business.

The most common methods in the economy of nature is the economic, administrative, social and psychological. Most developed markets prefer economic methods, and psychosocial only reinforce their effect. Forced group of economic methods in Ukraine is quite common. It manifests itself in fines, penalties, environmental standardization, payments for environmental pollution (if the person is engaged ekodestruktyvnoyu activities); tax breaks, loans, government subsidies, price subsidies (for reducing the negative effects of ekodestruktyvnoyi activity).

However, economic methods require significant improvement. Should see the method for determining the size of fees and levying of charges for environmental pollution Ukraine, because as the analysis of the dynamics of the total amount of environmental charges currently not provided with the growing needs of the state in funding environmental and pryrodovidnovlyuvalnyh measures. Each year, state and local environmental funds loses a lot of money on eliminating pollution and restore ecosystems country. And the mechanisms of environmental funds is clearly transparent.

Environmental legislation of Ukraine provides that the production of environmentally hazardous products manufacturer cost too much and, as a result, he will lose competitive advantage. However, experience shows feedback, unfortunately, in most cases the producers more profitable to exercise fiscal environmental payments than to spend money on environmental protection measures. Moreover, the managers,

using the "connections", pay an environmental penalty set not complete or do not pay. Indicative is compulsory group of economic methods to stimulate greening of economic activity in Western Europe.

It aims at introducing environmentally friendly technologies. In the EU there are over 200 distinct mechanisms for the implementation of environmental legislation, used almost 150 kinds of environmental taxes structure and tariff rates are approved by national parliaments. In Germany, for example, developed and implemented a strategy of environmentally oriented management and environmental business, which is an important area of greening the economy. A must for all businesses is to go through environmental audits based on accepted national standards regulating it. If emissions of pollutants exceeding these rules, by such companies state applies penalties increases the rate of the loan, repealing tax breaks. A side effect of such regulation was spreading "environmental kolonizmu" - removal from the country of environmentally harmful bahatovidhidnyh and resource-intensive industries. To stimulate the growth of investments in environmentally oriented production, it is necessary that the economic efficiency of such projects was higher than ekodestruktyvnyh.

So for environmentally oriented manufacturers should introduce tax breaks, subsidies environmental goods prices, subsidies, grants, concessional loans, budget financing. Such measures provided for in Article 48 of the Law of Ukraine "On Environmental Protection", but the mechanism of their implementation in practice remains ineffective. This is due primarily to the lack of funds for environmental protection, which are distributed as a residual.

References:

1. Miller AI Scientific approaches to improving the motivation of environmentally oriented activities / OI Miller, A. Matsenko, J. C. Pronikova // Mechanism of regulation of the economy. - 2012. - № 3. - P. 58-65

2. Danilishin BM Scientific essays on environmental economics: monograph / BM Danylyshyn. - K: RVPS Ukraine National Academy of Sciences of Ukraine. - 280 p.

3. Luk'yanyhina OA Environmental Management system of territorial administration: Thesis. candidate. Econ. Sciences: 08.08.01 / Luk'yanyhina Elena. - Sumy, SSU, 2002. - 223 p.

TOURISM DEVELOPMENT IN UKRAINE

Svitlana Demianenko, Artem Vartanian
Odessa State Environmental University, Odessa, Ukraine

All prerequisites for development of the tourism industry in Ukraine exist. These include a convenient geographical location, favourable climate, varied terrain, a unique combination of natural and recreational resources, cultural heritage, specialised health-resorts. Combined with good value for money, all these factors confer a competitive advantage for Ukraine's tourist offer.

Ukrainian tourism is characterized by both positive and negative features including many problems that must be resolved by reforming state regulation:

• to improve management mechanisms of tourism industry.

• creating the legal framework of state regulation in the field of tourism, tax policy, privatization and corporatization,

• creating favorable investment conditions.

The main directions of state policy in the field of tourism:

• establish procedures for standardization, certification and licensing of tour operators;

• introduction of tourism statistical reporting;

• organization and development of scientific support of tourism, training, retraining and advanced training of tourism personnel;

• development of cooperation with foreign countries and international organizations involved in international tourism development,

• development and conclusion of international bilateral and multilateral agreements in the field of tourism and on the mechanism of their implementation.

The powers and involvement of the state in regulating tourism must be specified because they form the basic operating conditions of tourist activities nationally and internationally.

In order to support tourism development, the responsible state body must coordinate its efforts in a variety of industries - from transport and culture to health and social development of rural areas, to form a system of effective cooperation between the regions.

However, the recent economic and political crises in Ukraine, accompanied by the invasion of Crimea by Russia, and war with Russia,

will depress growth in the tourism sector in the immediate future. Many bookings for 2014 were cancelled and local people are seeking alternative holiday destinations now.

In previous years 95% Ukrainian tour operators were oriented on the outbound market. This year, due to depreciation of the hryvnia, the Ukrainian tourist market collapsed. Most Ukrainians can't travel abroad. Indeed, over the past few months the cost of trips increased significantly. Tour operators even took risky and unprofitable steps by selling tours below their cost price.

Therefore, to reach the goals of tourism development, state and regional programmes have to support tour operators who are more active in inbound tourism by decreasing some taxes, attracting foreign tourists to the country etc. in order to enhance both inbound and outbound tourism equally.

In order to improve the development of tourism industry in Ukraine the following main tasks need to be solved:

- to implement effective mechanisms for financial and economic regulation of the tourism industry;
- to identify ways, forms and methods of stimulating development of entrepreneurship in this area;
- to create an effective model of investment policy in the field of tourism taking into account the socio-economic interests of the country;
- to improve the organizational structure of the management sector of tourism;
- to ensure the efficient use and restoration of natural, historical and cultural environment;
- to adopt environmental regulations and adopt acceptable standards of development of tourism resources, to develop mechanisms of action and implement into the practice of management.

The basic condition of the state program realisation are direction of actions of central and local executive authorities, local self-government on creating and maintaining a favorable environment for the development of tourism in Ukraine. Therefore, local authorities within their powers approved targeted state, regional and other programs for tourism development.

A number of other Ministries, from transport to culture, education to environment, are also indirectly involved in the tourism sector through

provision and maintenance of visitor attractions, events, infrastructure, logistics, training and services.

The implementation of the tourism development mission should be in the following directions:

1. Further development and support of the current modern, well-developed and efficient tourist infrastructure, providing acceleration of tourist flows.

2. Increased availability of tourism to the public through lower prices for tour services.

3. Improving the competitiveness of the national tourist product of Ukraine and realization of recreational potential.

4. Increasing the level of complex security and stability of tourist system.

5. Improving the investment climate and increase the investment attractiveness of the tourism market.

In general, state support for the tourism development in Ukraine should be implemented in two directions - economic and organizational. Organizational measures of state support for the tourism industry of Ukraine should include:

- achievement of movement freedom (visa policy and customs formalities),
- protection and revitalization of natural and cultural heritage,
- preservation of World Heritage Sites located in Ukraine, and so on.

Organizational measures create favorable conditions for tourism activities and can be divided into measures to ensure the security and measures to regulate tourist market services (easy access to credit, proximity to infrastructure, etc.).

In addition, tourism development can be encouraged by the state through the social policy (regulation of working week and holidays, professional training, etc.).

Economic measures of state support should include the provision of direct benefits and to stimulate activities financially: taxes, grants, investments, etc.).

Due to the current economic situation in Ukraine, the tourist industry must now rely on itself. Therefore, as an option, it must be changed something in the approach to support the market

The basic principle of the creation of the national tourism organization is a public-private partnership. Advantages for participants - consolidation of state, communal and private resources, optimization of marketing costs. If all tourism market participants (state and local authorities, tour companies, hotels, air companies, resorts…) can cooperate, negotiate, and create favorable conditions for tourism, there is a chance to thrive. However, in this case, the state has responsibility only for coordinating the process; decision-making and responsibility is up to the industry itself.

SUSTAINABLE HUMAN DEVELOPMENT: INTELLECTUALIZATION ASPECT

Pavlo Denysenko,
Sumy State University, Sumy, Ukraine

Under modern conditions of "information age" and "knowledge society" it is fair to define human potential and its fulfilment as the main factors of regional socio-economic development. Both intelligence and creativity have much less material limits and is very promising in the context of sustainability. Even more interesting becomes the intellectual and innovative activities results for the regional development and environment in particular.

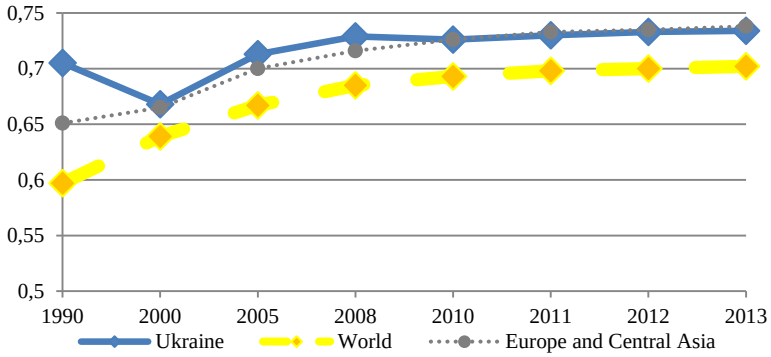


Figure 1 – UNDP Human Development Index value 1990-2013

Current official methodology for regional human development estimation consists of the following indicator groups: population reproduction, social situation, comfortable life, well-being, decent job, education (see Table 1). Environmental aspect of human development is included here into “Comfortable life” indicator block as integrated index of air, land and water use situation. Among the rest of socio-economic indicators health level parameters can be indirectly attributed to the ecological subsystem measures. In case of Sumy Region in 2013 (see Figure 2) we can see that “Education” and “Population Reproduction” indicator blocks have the highest level (closest to Kharkiv Region – first in HDI ranking 2013).

In the sustainability context we need to take into account along with general human development indicators the way natural resources are preserved and used. According to our hypothesis it is determined by the direction and intensity of the intellectual and innovative activities within regional economy (correspondent socio-eco-economic system).

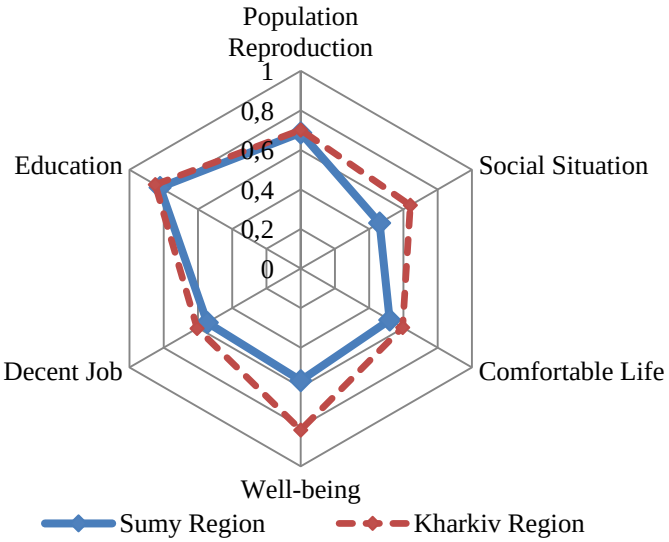


Figure 2 - Sumy Region Human Development Index in 2013

Thus regional development intellectualization process evaluation indeed should start with health, social safety, material well-being and educational training. But current and future professionals also need to be

able to bring their own development results into real life intellectual and innovative activities.

Table 1 - Human Development Indicators Structure

Block Title	Main Indicators	Comments
1 Population Reproduction	1.1 Birth rate coefficient; 1.2 Child mortality rate under 5 years old; 1.3 Average life expectancy, years.	Main fundamentals for other social and economic aspects and priorities.
2 Social Situation	2.1 Crime incidents per 100 000 of population; 2.2 Orphans per 100 000 of population; 2.3 Active tuberculosis illness new cases per 100 000 of population.	Complex and hard to assess level of social health, tension and safety, etc.
3Comfortable Life	3.1 Housing area per capita, m^2; 3.2 Integral indicator of environmental situation (air, land, water); 3.3 Amount of services provided per capita, UAH.	Living opportunities along with social infrastructure development and general environmental safety.
4 Well-being	4.1 Gross regional product per capita; 4.2 Share of households with savings and real estate purchases; 4.3 Relative poverty level.	The material base for development and for choosing the direction of it.
5 Decent Job	5.1 Employment level among 18-65 years-olds, %; 5.2 Average and minimal wages ratio; 5.3 Share of population under social security, %	The main form and stimulus for economic activity development in region
6 Education	6.1 Share of population older than 25 with at least basic level of education, %; 6.2 Average study duration for people older than 25, years; 6.3 Average EIE test score	Basic element of human potential fulfillment and its sustainable development.

So research productivity and efficiency parameters should be included – along with implementation rate. Separately can be assessed

innovation sustainability target with resulted positive effect on the natural resources use and correspondent environmental potential increase.

Literature:
1. Daly, Herman E. Ecological economics: principles and applications / Herman E. Daly and Joshua Farley. — 2nd ed., Island Press, 2011;
2. Human Development Report 2014: Sustaining Human Progress: Reducing Vulnerability and Building Resilience – UNDP, 2014;
3. Regional Human Development: statistical bulletin / State Statistics Service of Ukraine. – K., 2014.

REGULATION MECHANISM OF THE ENVIRONMENTAL SAFETY

Liubov Dovha
Sumy State University, Sumy, Ukraine

The main areas of improvement of the economic regulation mechanism of environmental safety is the modernization of existing regulators, carried out simultaneously with the development and implementation in practice of new market instruments. International experience shows that environmental management system depends on the efficiency of economic mechanism of nature, which is based on a balanced combination of regulators and enforcement of restrictive controls stimulating and compensatory [1].

The regulation mechanism of environmental safety - a set of methods and management tools that allow organized, regulated and coordinated processes of nature combined with production and socio-economic processes, provided the appropriate level of environmental safety of production and consumption, and playing quality of the environment [4; 5].

The regulation mechanism of environmental safety is includes the main parts of administrative control and economic instruments. Given the international experience in Ukraine to apply direct and indirect methods of ecological and economic regulation, including:

- establishing economic constraints on economic activity;
- creation of environmental certification services and other facilities;
- implementation in practice of the application procedure of environmental impact;

- licensing and other activities; - Complex ecological and economic expertise;
- creation of ecologically fair market, which does not benefit in competing products with the worst environmental performance;
- change in tax policy and sustainable use of the environment;
- introduction of environmental insurance (by the Law "On Environmental Insurance");
- introduction of environmental audits;
- incorporation of natural factors in the economic evaluation of economic decisions.

Environmental management related to local governments. Providing local councils powers as the main chain of government responsible for the complex economic, social and environmental development in their territories, defines the functions of local system of regional environmental management. His terms of reference should include specification and implementation of the national strategy in the field of environmental protection: the establishment of maximum allowable pollution and emissions, the use of economic regulators Nature (local taxes and tax breaks, subsidies, bonuses, compensation and penalty payments for damage caused); putting restrictions on industrial activities related to environmental protection; determine the order of ecological insurance companies.

The experience of developed market economies shows that the quality control environment system can be tough, confrontational type, or rather soft directed to the appropriate government cooperation with manufacturers on issues that are dealt with. In the first case, the economic mechanism involves fines and tax measures "intimidation" manufacturers who pollute the environment, the second - punitive sanctions are present, but the emphasis is on all kinds of benefits, costs encourage producers to prevent contamination. As a result, the most common are "mixed" systems that promote resource conservation and environmental protection. It is clear, that economic instruments must supported by real organizational measures.

Thus, organizational and economic mechanism of environmental management includes, therefore, systems such as:

- regional forecasting and programming of the environment;
- economic incentives for resource saving and environmental protection of the enterprise;
- arrangements to ensure that the environmental work.

The ultimate goal of this mechanism is the "greening" economic decision-making at the level of enterprises and organizations, which would provide environmental protection as an integral part of the internal business planning: companies that operate in accordance with internal criteria of economic efficiency (adopted under environmental legislation), eventually providing acceptable to society by a local program level of environmental quality and environmental safety.

Thus, the transition to sustainable development requires an environmental orientation of the economy, which is achieved by the widespread and continuous integration of environmental factors in management decisions. Implementation of the selected areas will monitor and regulate natural and industrial and environmental safety, develop economic mechanisms of security, including security of potentially dangerous objects and people living in areas of possible defeat in emergencies. An important organizational mechanism of strategic management is to increase the contribution of science and technology in the development of the economy, including problem solving environmental and technical and environmental safety and the associated changes in management, material production, and organization science. State and regional innovation policy in solving such fundamental problems for the country as security, ultimately, is to create the necessary conditions for the formation of innovative market and support it the priorities and critical technologies.

References:

1. Veklych A. Current status and effectiveness of the economic mechanism of environmental regulation // Economy of Ukraine. - 2008. - № 10. - P. 62.
2. Veklych O.T. Yaheyeva account of natural capital as a basic component of economic development // Economy of Ukraine. - 2005. - № 12. - P. 73-80.
3. Kyrsanova T.A. Kirsanov E.V. VA Lukyanyhyn Ecologically controlling / Ed. Lukyanyhyna VA - Sumy: Cossack shaft, 2004. - 222 p.
4. Pakhomov N., K. Rihter the Economic analysis of law ecologically // Questions of economy. - 2003. - № 10. - P. 34.
5. Natural resource scope Ukraine: problems of sustainable development and transformation / Under the editorship Cor. NAS Ukraine B.M.Danylyshyna. - K .: for "Nichlava", 2006. - 704 p.
6. Khlobystov EV Environmental safety transformation economy / NAS of Ukraine; Council of Productive Forces of Ukraine / [ed. ed. SI Doroguntsov]. - K .: Agency "Chornobylinterinform", 2004. - 334 p.

NUCLEAR ENERGY, ECONOMY & ECOLOGY

Elena Efremova
European Legal Service, Russian Federation

Modern civilization is inconceivable without electricity. Nuclear energy is one of the main sources of energy nowadays, so it requires a comprehensive research. The nuclear power sector is the most significant in France, Belgium, Finland, Sweden, Switzerland - in those industrial countries where natural energy resources are insufficient. The nuclear power has a significant advantage over the social, health and environmental costs of the fossil fuel use. Nuclear energy is the most concentrated form of energy. Nuclear power plants don't require a lot of space, they don't need a large plot like a wind farm. Nuclear power stations don't contribute to carbon emissions, so it doesn't contribute to global warming. Nuclear power is reliable. It doesn't depend on the weather. It has proven to be cost effective almost all over the world. However, nuclear power plants are potentially dangerous objects. That's why it's very important to comply with all of the safety requirements. The term "safety of the nuclear plants" is closely related to different types of damage, with possible harmful consequences of the accidents at the nuclear plants.

According to The Major Hazard Incident Data Service - MHIDAS, the major accident at the enterprises with the death of more than 25 people and wounded more than 100 take place on average every 2.5 years. As a rule, they occur mainly due to lack of knowledge and experience. As well the accidents can occur when some technologies have not been tested adequately.The accident at the nuclear power plant could kill more people than were killed in the explosion of the atomic bomb dropped on Nagasaki.

The consequences in the financial terms can also be catastrophic. The accident at the nuclear power plant can cause huge damage to the economy and the environment not only for the particular State, but also for the whole region. Nuclear accidents can spread 'radiation producing particles' over a wide area. This radiation harms the cells of the body which can make humans sick or even cause death. Illness can appear or strike people years after they were exposed to nuclear radiation and genetic problems can occur too. A possible type of reactor disaster is known as a meltdown. In the meltdown, the fission reaction of the atom goes out of control, which leads to a nuclear explosion releasing great amounts of the

radioactive particles into the environment. Here is the approximate cost calculation for the elimination of the consequences of the major accident at the nuclear power plant. As an example, consider the accident at the Hungarian nuclear power plant “Paks”.The data on the estimated cost depending on the deactivation factor are listed in the table:

Table 1 - The assumption for the costs of decontamination per capita: (in $ US)

DF <3-low-level contamination area;		**DF>8-high-level contamination area**	
decontamination factor (DF)	<3	<8	>8
decontamination	19 000	42 000	0-42 000
compensation	4 800		4 800-61 800
transportation	0	3600	3600
recycling	14 000	15 000	0-15 000
Total	37 800	60 600	65 400

Economic damage is mainly focused at the distances up to 500 km from the reactor. The population density in the range of 500 km from the atomic station "Paks"is on average 110 people per km2. Consider the most likely scenario. The distance of 500 km corresponds to the distance that was covered by the bulk of the contamination in the Chernobyl accident. Area sector harboring radioactive emissions at the distance of 500 km from the station is 30 000 km^2. When making a population density of 110 persons / km2, the number of people who fell under the impact of radioactive fallout will be 3,300,300. Decontamination, transportation of people, waste management and compensation will range from $ 125 billion up to $ 216 billion, depending on the extent of contamination. This amount is close to the cost of eliminating the consequences of the accident at the nuclear power plant "Fukushima" - $ 257 billion, according to the Japanese government comission (December 2011). The accident at Fukushima was estimated by the maximum, seventh level of danger - the same as the Chernobyl tragedy. The worst circumstances mean the release of large amounts of radioactive substances, strong winds and certain of its direction - for example, if the cloud of ejection spread to France and will cover the major cities, the fallout may fall at a distance of up to 1600 km from the plant, the area of contamination will be 307 200 km^2. Under such circumstances, the proportion of victims is estimated to be 33.8 million

people. Decontamination, transportation of people, waste management and compensation in this case would amount to $ 1 277 000 000 000. To $ 2 210 billion. It is worth noting that this option is unlikely.The main causes of the accidents at the nuclear power plants are classified as follows: - wear and tear, - corrosion, - operator errors, - the use of untested alternative technologies, - other reasons. There are some examples of the negative consequences of the applying the untested alternative technologies at the nuclear power plant. It's possible to recall the accident in Finland at the NPP «Loviiza» (VVER-440), the accident in Czech Republic at the NPP Temelin (VVER-1000), the accident in Ukraine at the South-Ukrainian NPP (VVER-1000) in 2012. In all these cases the causes were similar: violations of the integrity of the spacer grids, deformations of the fuel assemblies and poor corrosion resistance. It's the fact that the fuel for the reactors of VVER is a hexagon and it's made of the zirconium-niobium alloy. The incidents began to occur with the applying of the new fuel assemblies, manufactured by the Westinghouse company. These fuel assemblies are made of stainless steel and have the square shape. The nuclear fuel assemblies can't be interchangeable due to the different manufacturing technologies. Even small deviations from the geometric dimensions or replacement materials used can lead to distortion of the temperature field, local overheating and depressurization of the containment. IAEA also recommends not infringe the existing technical regulations on safety in the construction and operation of nuclear reactors.

Major accident on the International Nuclear Event Scale (INES 7) can occur as a result of deformation of the fuel assemblies during operation. Curvature of the fuel assembly creates additional difficulties for stroke absorber rods up to their full lock. In combination with the other factors, heat-bending assembly may cause an accident similar to the consequences of the accident at the Chernobyl nuclear power plant. The most likely incidents can occur to the level from 0 to 3 (INES). Such incidents don't cause much damage to the environment and population, but they can lead to undesirable economic consequences. Summarizing, we can say with confidence, that the solution of the environmental problems of the nuclear power is vital and we can't underestimate this fact, because it would be a terrible mistake! There are a lot of countries, where it is the only opportunity to get cheap energy, and not to depend on the conditions and political preferences of other states. Thus, the prevention of the accidents at the nuclear power plants is the main problem of the further nuclear power

development. It's always easier to prevent the accident than to overcome catastrophic consequences for years and centuries, not only for the nature, but also for all the humanity. Therefore, nowadays the safety and the prevention of the global environmental catastrophe must be the one of the major concerns for the international community.

MECHANISMS OF AGROLANDSCAPE ADMINISTRATION

Vasyl Golyan, Oksana Sakal, Olga Kalenska
Public Institution «Institute of Environmental Economics and Sustainable Development of the National Academy of Sciences of Ukraine», Kyiv, Ukraine

Agrolandscape is a complex concept, which includes the natural and anthropogenic landscape, and is formed by the interaction of potential natural complexes – areas where natural phytocoenosis replaced agrophytocenoses, which determines the resilience, with all elements of agricultural and engineering infrastructure [1, p. 27].

The basic principles agrolandscape management of territory are: ecological and landscape differentiation (zoning) agricultural territory based on ecologically sustainable use of land plot corresponding type of land; forming a system of crop rotation, determining the optimal composition and value of agricultural land based on the principle of ecosystems sustainability; normalization of anthropogenic stress; introduction of short dynamic crop rotation; preservation of ecological balance.

Formation of sustainable agrolandscapes intended to protect future generations from significant degradation of land resources, and therefore based on the concept of sustainable development in land use. Also note that one of the main principles formation of sustainable agrolandscapes, which occurs in the investigated methodological approaches [2], is optimization its structure and value of land.

Today in the agricultural sector the formation of long-term environmentally sustainable and efficient agricultural landscapes has special importance. It means that agrolandscape along with achieving potential productivity should perform equally protective environmental and aesthetic functions. This can be done in creating maximum ecological

diversity territory that is intensively used. Such a structure of territory will make it possible to counteract unilateral load, which arise in its economic development (tillage, fertilizer, pesticides, etc.), i.e. create the conditions to prevent soil erosion, water pollution and air quality, in other words, to ensure the sustainability of the landscape.

Paradigm further improvement of land relations should enforce the rule of public interest over individual. The principal mission of the reform process – society should be the main owner of the consolidated territorial land resources.

In economic terms land is a fundamental resource and a prerequisite for social development. It is important to note that formation the system of rational, economically, environmentally and socially balanced (sustainable) land use can only optimize relations concerning the economic basis of society – land ownership. In this case agrolandscape administration should take into account the interests of social and economic development while minimizing anthropogenic impact on these landscapes.

Mechanisms of agrolandscape administration combine instruments and methods of institutional, administrative and legal, financial and economic, moral and ethical impact in a single environment for economic, environmental and social aspects of sustainable nature use. Development of such mechanisms is a priority task and a basis for further action towards the conservation and restoration of agrolandscapes of the country.

Further use and development agrolandscapes should base on the following mechanisms:

1. *Institutional mechanism* – Constitution of Ukraine, laws and regulations concerning environmental protection, landscape and nature; international agreements, strategies, conventions and other cooperation in the sphere of environmental protection and nature management.

2. *Organizational and management mechanism* – licensing of economic activities on agricultural lands; certification of products and activities; monitoring and control; national and regional program use of agricultural landscapes; agrolandscape specialized zoning; land management, planning the territory of village / town councils, land administration.

3. Financial and economic mechanism:

3.1. Stimulation – rental approach to taxation; subsidies, grants and donations; tax incentives; compensation payments; investment; mortgage crediting; privatization; nationalization; insurance.

3.2. *Compensation* – taxation; environmental taxation; additional taxation; pricing; fines; compensation for loss of agricultural and forestry production; compensation to land owners and land users; responsibility for violation of land legislation; returning illegally occupied land; conversion ecological debt.

4. *Ecological mechanism* – European Ecological Network; publicity complex scientific and industrial research for the protection of soil fertility and reproduction; public environmental control use, protection and reproduction of agricultural landscapes; environmental audit; environmental certification; environmental standards, regulations, rules, limits; removal of property.

5. *Moral and ethical mechanism* (moral and ethical impact) – consultation; advisory services; ecologization of public consciousness; ecologization of educational and training processes; improving agro-ecological image of Ukraine.

Developing mechanisms of agrolandscape administration can provide improvements in the system of agrolandscape protection and restoration. From the economic point of view should be increased investment attractiveness land use, and with a more rational use of potential natural resources should be increased ecological stability of the natural landscape, which in turn will increase production efficiency. From the ecological point of view will be increased guarantee technogenic and ecological safety of human life, the preservation of the environment. In social aspect should be guaranteed property rights.

References:

1. Каленська О. Агроладшафти: поняття, суб'єкти і фактори трансформації / О. Каленська, О. Сакаль // Економіст. – 2015. – № 3. – С. 26–29.

2. Хвесик М.А. Інституціональна модель природокористування в умовах глобальних викликів: Монографія / М.А. Хвесик, В.А. Голян; Рада по вивч. продукт. сил України НАН України. – К. : Кондор, 2007. – 480 с.

CONSTRUCTIVE-GEOGRAPHICAL ASPECTS OF ANTHROPOGENIC ENVIRONMENTAL IMPACT ASSESSMENT IN UKRAINIAN REGIONS IN 2000-2012

Nadiia Gryshchenko
V.N. Karazin Kharkiv National University, Ukraine

The current environmental protection system in Ukraine is based on assessment of different kinds of impacts of human activities without considering anthropogenic factors. This refers to use of normative environmental impact assessment method and ecological expertise. To evaluate the complex impact of population on the territory, the methodology of ecological or environmental footprint can be used [1]. This methodology can help to implement principles of constructive geography in territorial management. Additionally, it is worth mentioning that the ecological footprint methodology can be used to improve a regional environmental management.

This study uses approaches of constructive geography and environmental economics. The former includes considering spatial aspects and complex environmental impact of population and mapping the results. The latter reveals to implementation of natural capital and natural rent concepts in geographical study. It is important to outline that in such a context the territory is considered as a natural asset, so it might be treated using economical approaches as well as geographical. Method of ecological footprint demonstrates the finiteness of natural capital, pointing to the size of the territory which is equivalent to the amount of resources and ecosystem services consumption.

The methodology was modified in order to calculate the indicator at the regional level to find out the differences in spatial distribution of anthropogenic environmental impact in Ukrainian regions [2].

The study took into consideration the following ecosystem services:

– Provisioning services - food production;

– Regulative services - the ability of forest areas to capture and store CO_2 and thereby regulate the climate; in the context of agriculture is also important to note the role of pollinators that provide regulatory services;

– Support services - providing space for infrastructure necessary to maintain the lifestyle of population.

An important aspect is that the territory is a natural capital according to environmental economics approach. Therefore, it is reasonable to determine countries, which are the donors of the natural capital, and countries, which are recipients of such a natural rent. Ditto applies to regions within a single state. Additionally, the land of a nature reserve fund is regarded as a producer of natural capital and ecosystem services, so although it is limited to utilization, these territories can compensate environmental impact through the provided ecosystem services and a high quality of the natural environment [3]. Thus, cultural ecoservices are partially considered within the study.

The ecological footprint was calculated for a typical citizen of Ukraine and each Ukrainian region in 2000, 2005, 2010, and 2012. The study has shown that Ukraine exports ecosystem services of its territory, which are materialized in production of plants growth and the quality of the environment.

The research confirmed that Ukraine as a whole, as well as most of its regions were recipients of ecosystem services in 2000-2012, so the population demonstrated unsustainable consumption. The calculation of footprint values at regional level showed the range from 101 to 105% of the bioproductive territory. In general, the largest ecological deficit, and therefore the least sustainable use of natural resources and ecosystem services of the territory is observed in Donetsk, Luhansk, Dnipropetrovsk, and Kyiv regions. Between 2000 and 2012, only one region – Kherson region in 2000, Kirovohrad region in 2005 and 2010, and Odessa region in 2012 – showed a positive environmental balance.

The temporal and spatial distributions of the environmental impact on the territory of Ukrainian regions were examined and analyzed. The anthropogenic impact on the environment over the studied period increased in the Eastern regions and slightly decreased in the Western and Northern regions. However, a decline of livestock's footprint and growth of fishery products' footprint was observed in some areas, compared to the year 2000. The regions were split into five groups based on the extent and dynamics of human impact on the environment during 2000-2012, including two groups with the highest anthropogenic environmental impact; two groups with median impact, and one group with minimum impact. Environmental impact in two groups demonstrated a growing tendency.

Considering the structure of ecological footprint, two groups of influencing factors were determined: the demand value for goods and

services and efficiency of resource utilization. Their effects were confirmed by correlation and regression analysis on the regional level. It was established that growth of income in some Western regions would cause lower increase in environmental impact, compared to other regions [4].

Thus, the consumption of population in the regions was unsustainable in 2000-2012, which means the ecosystems were not able to secure the demand for natural resources and ecosystem services. The greatest burden fell on forest ecosystems and areas of livestock development.

References:

1. Wackernagel M. Our Ecological Footprint : Reducing Human Impact on Earth / M. Wackernagel, W. E. Rees. – New Society Publ.,1996. – 176 p.
2. Грищенко Н. В. Оценка нагрузки на окружающую среду в Украине на региональном уровне методом экологического футпринта / Н. В. Грищенко // Геополитика и экогеодинамика регионов. – Симферополь: Таврический национальный университет имени В.И. Вернадского, 2014. – № 2 (10). – С. 489– 493.
3. Грищенко Н. В. Расчет экологического футпринта жителя Украины с учетом земель заповедников и природных парков / Н. В. Грищенко, И. Г. Черванев // Заповедники Крыма. Биоразнообразие и охрана природы в Азово-Черноморском регионе. Материалы VII Международной научно-практической конференции (Симферополь, 24–26 октября 2013 г.). – Симферополь, 2013. – 426 с. – С. 58–63.
4. Gryshchenko N. V. Spatial Relationship Between Environmental Impact and Welfare of Population in Ukrainian Regions / N. V. Gryshchenko, A. S. Tretyakov // Проблеми безперервної географічної освіти і картографії : Збірник наукових праць. – Харків: ХНУ імені В. Н. Каразіна, 2014. – № 19. – С. 113–117.

APPROACHES TO THE REGIONAL INVESTMENT ATTRACTIVENESS EVALUATION

I.M. Kobushko, O.O. Bachal,
Sumy State University, Sumy, Ukraine

The effectiveness of the regional investment policy is determined by the level of investment attractiveness (IA), implemented as part of the investment strategy. The lack of a generally accepted definition of the

"regional investment attractiveness" has meant that there is no single methodological approach to its assessment.

Research and practical works by O.M. Asaul, I.O. Blank [1] V.V. Homolska, K.V. Gurova [2] and others dedicated to analysis and investigation of the problem of the investment attractiveness. After analyzing the data sources, one can conclude, that many of the problems in assessing the regional IA, the studying of factors and increasing its reserves, forecasting, require more thorough consideration.

Today you can find a large number of approaches to assessing the investment attractiveness of the regions, industries and individual companies. It should be noted that researches of this subject gained considerable popularity, but they have different measurement indicators (Table 1). In Ukraine, there is no generally accepted method for assessing the regional IA, except the methodology developed by economist I. Blank in cooperation with investment company "Omega Inster".

Table 1 - Evaluation of the investment potential of the region by different methods [3]

By the method Blanca I. [1, p. 12]	**By the method of Russian researchers**	**By the method the Reform Institute**	**According to the World Bank**	**According to the method of S. Butkevych**
Overall development	Economic and natural resources potential	Economic Development	The gross regional product per capita	Assessment of regional economic development
Investment infrastructure	Market infrastructure	Market Infrastructure	The amount of fixed assets per capita	Assessing the level of infrastructure investment
Market relations and commercial infrastructure	Investment risks	Human Resources	Characterization of human resources	Evaluation of the market economy and infrastructure
Criminogenic, environmental and other risks		Entrepreneurship and local governments		Evaluation of the investment risk

The analysis of publications shows that the most reasonable and used is a hierarchical scheme of evaluation IA. Upper level - an umbrella integral index of investment advantages of the region, the second - integrated group indices eight aspects of life in the region, the third - the

partial integral indices that characterize the investment advantages of the region.

The overall index of investment benefits calculated cumulative method based on partial and integral group indices that describe various aspects of life in the region [3]. The calculation is based on its six partial integral indices: the productive potential of the region (providing justification for decisions on regional economic development), the employment potential of the region (providing justification for decisions on staffing workforce regional economy), the educational potential of the region (in addition to inform decisions about staffing employment resource economy of the region), the financial potential of the region (provides justification for action to ensure those regions) infrastructure markets in the region (helps in decision making to promote conditions of the infrastructure of the regional markets), and two integrated group indices: investment attractiveness of the region (helps inform decisions about the extent efficiency of the main elements of the production process at the region in basic sectors of the economy of the region), communications and commercial infrastructure in the region (helps to inform decisions regarding the development of communication and commercial structures in the region).

A review of scientific literature showed no common methods with the help of which, on the basis of legal, social and economic assessments one can scientifically proved distinguish effective vectors of regional development, stimulate their concentration and specialization, promising to carry out the reorganization of production facilities, productively, with a guaranteed return, increase their production capacity.

References:

1. Blank I. O. Investment management: [training course] / I. O. Blank. – K. : Elga-N, Nick-Center, 2001. – 448 p.
2. Gurova K. D. Economic reform (some aspects of implementation) / K. D. Gurova. – Kharkov: Folio, 2000. – 388 p.
3. Umanets TV Evaluation of investment attractiveness of the region using integrated index / TV Umanets. - [Electronic resource]. - Access: http://dspace.nbuv.gov.ua/bitstream/handle/123456789/19832/09-Umanec.pdf?sequence=1
4. Hutz MV Methodological approaches to evaluation of investment attractiveness / MV Hutz. - [Electronic resource]. - Access: http://www.economy.nayka.com.ua/?op=1&z=1682.

5. Savluk A. Evaluation of investment attractiveness of regions Ukraine / O. Savluk. - [Electronic resource]. - Access: http://visnik.knteu.kiev.ua/files/2013/05/3.pdf

SOIL POLLUTION AND ITS IMPACT ON THE PREVALENCE OF DISEASES OF POPULATION OF THE SUMY REGION

Anatolii Kornus, Olesya Kornus
Sumy State Pedagogical University, Sumy, Ukraine

Deterioration in the health of the population, the growth of the primary disease and the prevalence of different nosologies aroused the search for causes, which might cause such an increase. Most scientists are agreeing that this factor may be the quality of the environment. Therefore, finding and assessment of the linkages between different types of diseases and parameters of the environment is an important component of medico-ecological research. A direct correlation between the pollution of environment and level of morbidity prevalence of the population we established by the mathematical methods.

Ecological conditions of soil, in particular their radioactive contamination by Cs^{137} (Fig. 1), is most strongly influences to the prevalence of diseases of the endocrine system, especially nodular goiter ($r = 0.476$, $p = 0.04$) and hypothyroidism, particularly the postoperative hypothyroidism ($r = 0.67$, $p < 0.01$).

Postoperative hypothyroidism is also reliably correlates with the radioactive contamination of crop production by Cs^{137} ($r = 0.461$, $p = 0.04$) and Sr^{90} ($r = 0.507$, $p = 0.02$) (Fig. 2). In both cases, the big prevalence of these nosologies is in the Shostka district, where this problem is most acute.

No less acute is problem of soil contamination by heavy metals, especially Pb and Cd, given their negative impact on human health. With these contaminations with medium and large closeness of the relationship are correlate 12 diseases of such nosological classes: blood diseases and blood-forming organs (anemias), endocrine system diseases, digestive disorders, metabolic disorders (obesity), skin diseases (atopic dermatitis),

and diseases of musculoskeletal systems and connective tissue (gouty arthritis and podagra).

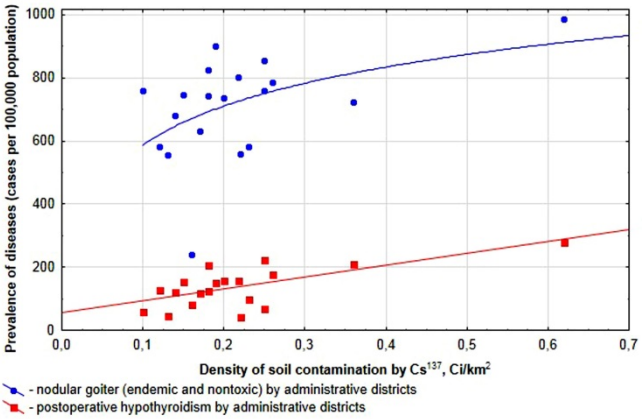


Figure 1 - Dependence the prevalence of goiter in the population of Sumy region from the density of soil contamination by Cs^{137}

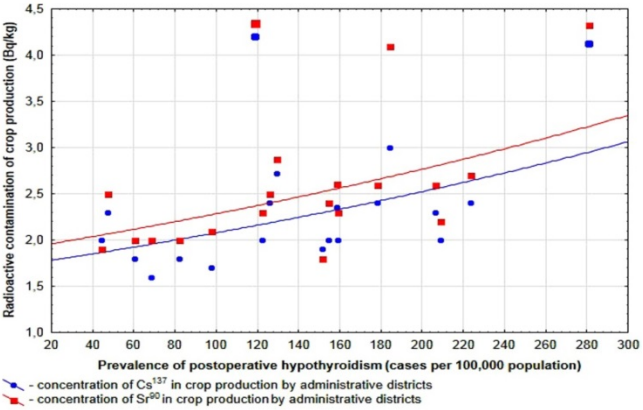


Figure 2 - Correlation between the postoperative hypothyroidism in the population of Sumy region and the radioactive contamination of crop production

However most closely with the content of Pb in soils are correlated the diseases of circulatory system: acute and repeated myocardial infarction ($r = 0.574$, $p = 0.01$), non-rheumatic involvement of cardiac valves ($r = 0.565$, $p = 0.01$), atrial fibrillation and atrial flutter ($r = 0.461$, $p = 0.05$) and

diseases of digestive organs (Fig. 3): duodenal ulcer (r = 0.539, p = 0.02), gastritis and duodenitis (r = 0.614, p = 0.01), diseases of peritoneum and bowel (r = 0.569, p = 0.011), cholelithiasis (r = 0.6, p = 0.01).

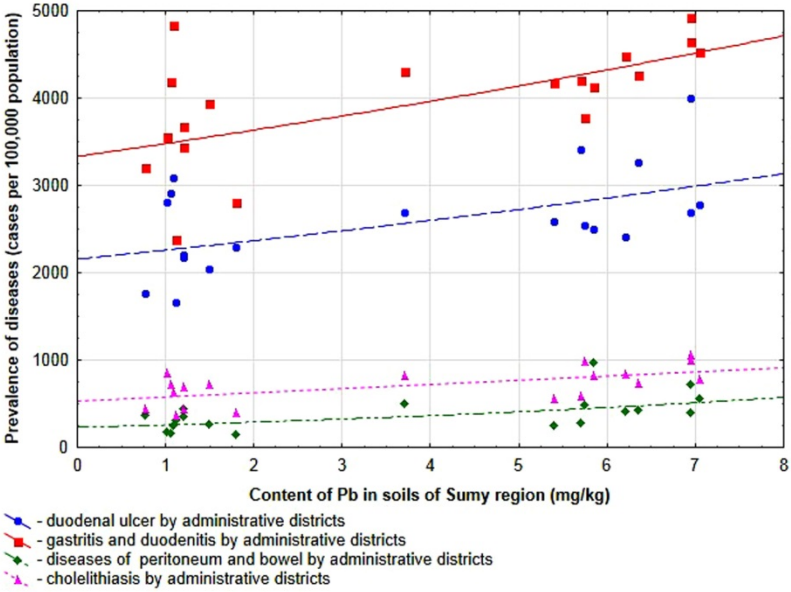


Figure 3 - The impact of soil pollution by Pb on the prevalence of diseases of the digestive system

Somewhat less noticeable is the impact on the prevalence of diseases another heavy metal – Cd. As in the case of Pb, there is a fairly reliable connection between the content of Cd in soils Sumy region and the prevalence of anemia, acute and recurrent myocardial infarction, non-rheumatic involvement of cardiac valves, atopic dermatitis. More close relationship we observe between the content of Cd and prevalence of diseases of the digestive system (Fig. 6): gastric ulcer and duodenal ulcer (r = 0.57, p = 0.01), gastritis and duodenitis (r = 0.68, p <0.01), dyspepsia (r = 0.509, p = 0.03), peritoneal and intestinal diseases (r = 0.59, p = 0.08), cholelithiasis (r = 0.6, p = 0.01).

ENVIRONMENTAL MARKETING OF NATURAL RESOURCES

Angelina Kovaka, Marina Barun
Kharkiv National Automobile and Highway University, Ukraine

Nowadays, more and more urgent need to preserve the environment, as the pace of consumption grow, and this causes irreparable damage to the biosphere. Therefore, many large companies began to think about the environmental safety of its products, which led to the emergence of such a thing as an environmental marketing, which is now becoming more popular.

Environmental marketing emerged in the 1990s. as a continuation of the socio-ethical marketing that emerged in the early 1980s. According to the concept of social and ethical marketing, task organization should be to determine the needs, the needs and interests of target markets and to ensure the desired satisfaction more efficient and more productive (than competitors) methods while maintaining or strengthening the well-being of consumers and society as a whole. This concept is the result of conflict with traditional marketing observed nowadays environmental degradation, scarcity of natural resources, population growth, inflation and negative state social services [1].

The main reasons for the greening of business - creating a positive image in the eyes of customers, shareholders and investors, as well as saving material and energy resources. 54% of top managers called the opportunity to form a positive corporate reputation main impetus for eco-friendly projects. Ecological orientation change of the manufacturing process is usually carried out by reducing the consumption of materials and energy per unit of production and are accompanied by cost saving. The ability to effectively address environmental issues not only affects the company's consumer confidence, but also for their loyalty. For example, the world's largest network of retail stores Wal-Mart, positioning itself as a "green company" faced with the fact that consumers do not consider her actions environmentally friendly. Consumers are not willing to buy those products that are positioned as environmentally friendly because they think it is not [2].

Often the concept of environmental marketing means that the company promoting their products or services, causing minimal damage to nature in the production, sale and recycling of goods. Thus, environmental marketing at the company indicates that the extraction of natural resources, the further stages of the production of goods, delivery to the consumer, the use of goods and waste disposal are absolutely safe for the biosphere.

In a broad sense, environmental marketing of natural resources - a new form of economic relations with the production, use, recycling and disposal of natural resources, designed to ensure a reasonable balance economic and environmental considerations into environmental management in a market economy. In a narrow sense, environmental marketing of natural resources can be viewed as a set of organizational and financial measures to optimize environmental management and conservation activities in the creation and development of the market of natural resources at the global, national, regional and local levels [3].

To reduce environmental pollution environmental marketing involves the following activities:

- the adoption of mandatory legislation mandating certain standards using natural benefits;
- furthermore, the concept of environmental marketing provides strict control and licensing of extraction of natural resources;
- economic incentives for producers aimed to ensure that they were interested in using environmentally friendly technologies;
- funding of research areas contributing to the development of new waste-free and safe technologies that will be used less harmful chemical compounds, methods of production, etc;
- economic development of the system of taxes and fines for pollution of nature.

References:

1. Smirnova E.V. Environmental Marketing // Practical Marketing, 2010. - № 4 (158). - P. 9-14.
2. Kotler F. Principles of Marketing / F. Kotler, G. Armstrong. - 12th edition. - M .: Pearson Prentice Hall, 2009 - 1072 p.
3. Sadchenko E.V. Environmental Marketing: concepts, theory, practice and prospects eveloping / E.V. Sadchenko, S.K. Harichkov. - Odessa, 2001. - 146 p.

EDUCATION FOR SUSTAINABLE DEVELOPMENT: THE ROLE OF UNIVERSITIES AND BUSINESS

Maryna Krasulya, Denys Smolennikov
Sumy State University, Sumy, Ukraine

The main preconditions to achieve a balanced (sustainable) development of the society are the science and education. They are simultaneously the most important tools for effective management and decision-making.

A strong, deep and branched scientific and theoretical basis as well as the widest educational and explanatory work are needed at all stages of developing and implementing of the concept of sustainable development (to ascertain the needs, formulate the ideas to practical implementation). Insufficiency of theoretical knowledge in the field of sustainable development illustrates governmental reluctance in many countries to listen to the scientists' estimates concerning the possible negative impact of decision-making by inadequately educated managerial staff (that was and remains one of the major causes of contemporary crisis in human relationship with nature) [1].

Education for sustainable development is a practice of teaching for sustainability [2]. Agenda 21 was the first international document that identified education as an essential tool for achieving sustainable development and highlighted areas of action for education [3].

Education for sustainable development implies four descriptors: sustaining, tenable, healthy and durable.

• Sustaining – it helps sustain people, communities and ecosystems

• Tenable – it is ethically defensible, working with integrity, justice, respect and inclusiveness

• Healthy – it is itself a viable system, embodying and nurturing healthy relationships and emergence at different system levels

• Durable – it works well enough in practice to be able to keep doing it [4].

Education for sustainable development requires establishing multilateral cooperation and partnership. Its main actors are governments and local authorities, non-governmental organizations, health sector, education and science, transport and agriculture, private sector, industry, the media, various communities, indigenous peoples and international organizations [1].

Higher education institutions bear a profound, moral responsibility to increase the awareness, knowledge, skills, and values needed to create sustainable future. Higher education plays a critical but often overlooked role in making this vision a reality. It prepares most of the professionals who develop, lead, manage, teach, work in, and influence society's institutions. Higher education has a unique academic freedom and the critical mass and diversity of skills to develop new ideas, to comment on society's challenges, and to engage in bold experimentation in sustainable living [5].

Business schools, schools of industrial and agricultural guidance, vocational schools include relevant topics related to sustainable development into their curricula. Industrial corporations include issues of sustainable development into their professional traineeship. The postgraduate training also provides specific courses in order to conduct special management skills for sustainability decision-making [1].

Nowadays professional and continuing higher education for sustainable development is designed to perform an important role in this regard. Such a training should be organized for all managers and professionals, and especially for those who are engaged in planning and management in order to gradually move from brown to green economy.

References:

1. Сталий розвиток суспільства: навчальний посібник / авт.: А. Садовенко, Л. Масловська, В. Середа, Т. Тимочко. – 2 вид. – К.; 2011. – 392 с.
2. McKeown, R. (2002) "Education for Sustainable Development Toolkit", retrieved 25/4/15.
3. http://en.wikipedia.org/wiki/Education_for_Sustainable_Development
4. Sterling, S (2008) 'Sustainable education - towards a deep learning response to unsustainability', Policy & Practice: A Development Education Review, Vol. 6, Spring, pp. 63-68.
5. Anthony D. Cortese - The Critical Role of Higher Education in Creating a Sustainable Future – Planning for higher education number 3, march-may 2003, 31. - http://www.scup.org/asset/48483/cortese.pdf

ECONOMIC ANALYSIS OF RESOURCE SAVING IN ENERGY USE IN ZIMBABWE

Oleksandr Kubatko, Tatenda Kodi Dereck Phiri
Sumy State University, Sumy, Ukraine

Zimbabwe is a landlocked country located in southern Africa, between the Zambezi and Limpopo rivers. It shares its borders with Zambia to the northwest, Mozambique to the east, South Africa in the south and Botswana in the southwest. Zimbabwe relies mostly on hydroelectric power. Although in rural parts of the country, 80-90% of the people depend on wood fuel and kerosene for cooking lighting. While food processing tasks like milling grain are usually carried out with diesel-powered system

Total electricity generation in 2009 was 7,900 gigawatt hours (Gwh). 53% of this was produced from renewable sources. Electricity consumption per capita in 2009 stood at 1,022-kilowatt hours (kWh). 33.9% of this total installed capacity was from hydroelectric plants. Much of Zimbabwe's electricity is produced at the Kariba Dam Hydroelectric Power Station (about 750 MW), at Hwange Thermal Power Station which has an installed capacity of 920 MW, and at three minor coal fired stations.

Problems faced with energy supply/capacity. Although national electricity access stands at 40%, access to electricity in rural areas (19%) is much lower than that in urban areas (80%) due to the prohibitive costs of extending national electricity grids. Capacity is a major concern in Zimbabwe. No new developments have occurred in the country's generation sector since the commissioning of the Hwange Coal Plant in 1988. Thus only about 60% of the country's installed capacity is available.

Furthermore, all coal-fired stations in Zimbabwe are in need of major upgrades as currently they have frequent production stops or are not producing at all. This has lead to frequent and long lasting blackouts in the country. Imports of energy from neighboring countries are not enough to solve the under capacity problem. As a result, power outages continue to affect the economic performance of industries and services. Small-scale power generators are used all over the country to ease this situation.

Energy Policy. The Zimbabwean government has plans to boost the electrification rate to 85% by 2020. To achieve this target, ZESA announced the following plans:

- Build another coal-fired power plant with a capacity of 1,400 MW

• Expand capacity at Hwange Power Station by 600 MW

These plans are being held back by the lack of resources ZESA has. In September 2011, an energy and power conference was held in Harare with the aim of boosting international awareness of the energy problems in Zimbabwe and thus attracts potential funding sources.

While a great deal more could be said about the relationship between industrialization and development the first reason to study manufacturing is that it is a key strategic sector. It has close ties to other primary sectors (agriculture and mining) and services (including commercial activities). A second, more obvious, reason is that industry is by far the largest consumer of commercial energy. Overall, manufacturing and commerce consume 45% of commercial energy, with higher proportions of total coal/coke and electricity consumption.

Zimbabwean industries can help improve the amount of energy consumption within the country, by developing energy policies and investing in more advanced technology which utilizes less energy during the production processes.

References:

1. The Beijer Institute. 1984. Policy Options -p--for Energy and Development - in Zimbabwe. Volume I1 Main Report Harare.
2. CIA. The World Factbook Zimbabwe: https://www.cia.gov/library/publications/the-world-factbook/geos/zi.htm
3. African Union/African Energy Commission. 2012. "African Energy Statistics 2012". Available at: http://www.afrec-energy.org/Docs/FR/PDF/2012/AEIS_FR_EN

THEORETIC CONCEPT OF ECONOMIC AND ECOLOGICAL CONVERGENCE

Oleksandr Kubatko, Oleksandra Kubatko
Sumy State University, Sumy, Ukraine

The issue on whether or not poor regions tend to catch-up richer ones plays a significant role in regional growth theory. The empirical growth models were relying more on available data such as real per capita income, savings and investment, government expenditures, exports, labor force and

its structure by industries, education variables like school enrollment, etc. The concept of economic convergence according to Matkoski and Prochanik (2004) should be address in two aspects. First, a tendency towards leveling (equalization) per capita incomes and growth rates among counties (regions). Second, tendency toward economic cycle convergence (that is ups and downs of economic cycles ideally should conform). Both convergence concepts are independent and tested separately. In our research we address only first part of the issue, for it is assumed that within boundaries of one country economic cycles should coincide due the equality of macroeconomic conditions.

In empirical researches there are basically four main approaches to study convergence processes: sigma convergence, absolute beta convergence, conditional beta convergence and stochastic convergence. Historically according to Sala-i-Martin (1994), first appeared sigma convergence approach, which compares standard deviations, variances for the different economic indicators across time for specific groups of countries (regions). Absolute convergence means that if the regions are fairly similar and under same conditions (e.g. within one country or Union) they should approach the same absolute level of steady state in all social standards (economic, ecological, social parameters). Conditional beta convergence means that it is not possible to achieve unique steady state by all countries (regions), due to the differences in national, natural or historic achievements.

According to Varblane and Vahter (2005) transition countries do converge in per capita incomes with developed ones. Thus, new EU members including Romania and Bulgaria managed to reduce per capita income gap against old members on 10–20%. Those remarkable results were achieved during one decade. Moreover the growth differential between “old EU” and new accession countries during 2001–2004 was about 2.2%.

The early studies in 1990s on economic convergence of transition economies to EU standards forecasted a time of span about 40–90 years. However according to Varblane and Vahter (2005), during last decade new EU countries managed to implement all structural reforms and considering the last tendencies in their development it will be needed 20–35 years to reach the EU income level. Additionally Iancu (2007) states that one of the poorest new EU countries Romania can catch up with leaders in 30–50

years depending on annual Romanian growth rates from 4 to 8 percent annually.

The speed of economic convergence in Ukraine is about two times higher than regional convergence in developed countries. The last point is basically explained by higher initial differences between regions in Ukraine and developed countries. Also we found presence of ecological convergence of Ukrainian regions. This conclusion is also supported by Ukrainian statistical data. During 1999-2010, nearly every region in Ukraine has shown an increase in pollution, and only few decreasing trends have been observed.

References:

1. Sala-i-Martin X. (1994). Regional Cohesion: evidence and theories of regional growth and convergence. Yale University. Economics Working paper 104
2. Matkowski Z., Prochanik M. (2004). Real Economic convergence in the EU accession countries. International Journal of Applied Econometrics and Quantitative Studies. Vol.1–3. PP. 5–38.
3. Varblane U., Vahter P. (2005). An analysis of the Economic convergence process in the transition countries. University of Tartu. P47
4. Iancu A. (2007). Economic convergence. Applications. Romanian Journal of economic forecasting. No4. Pp. 24–48.

ENVIRONMENTAL PRINCIPLES OF LAND USE AS A FACTOR OF ENVIRONMENTAL AND ECONOMIC SECURITY OF FARMS

Dariya Malykina
Kharkov National Agrarian University named after V.V. Dokuchaev, Ukraine

Activity of farms is complex and multifaceted process. Agricultural production system consists of many stages of the planning process, the production cycle to sales.

Ecological and economic security of agricultural enterprise is a condition that allows you to maintain resistance internal and external threats, describes the possibility of reproduction, development and satisfaction at a certain level, and provides effective sustainable economic result of the conservation of the ecological state of the means of production.

Orientation most farms in quick results and the profit in a given production cycle often yields negative results in the long run. This is caused by the depletion of the main means of agricultural production - land.

Land resources can be reproduced and be in a constant, but their number is limited. Their quality depends on natural processes, annual consumption and reproduction. The feature of the land is its inherent fertility. Fertility depends on the content of fertilizers in the soil, its physical and mechanical condition and environmental conditions. Unregulated irrigation can lead to salinization, waterlogging and soil erosion.

The ecological status of agricultural land significantly deteriorated and became threatening in recent decades.

According to the Ministry of Ecology and Natural Resources of Ukraine in Ukraine water and wind erosion experienced over 14.9 million hectares of agricultural land (35.2% of the total area).

There were serious problems with replenishment the bioenergy potential of soils. The total loss of humus mineralization and through soil erosion each year is 32-33 million tons. Humus destroyed in process mineralization. The volume of organic fertilizers affects the increase in humus content in the soil.

Crops have the ability to accumulate plant remains. You can adjust the flow of organic matter in the soil with plant remains by varying the ratio of the area under different crops rotation. Continuous cultivation of row crops without organic fertilizers would lead to a decrease in natural reserves of soil humus, while permanent grasses culture promotes the accumulation of organic matter and replenishes the lack of mineral compounds soluble nutrients.

The organization of land use, is an integrated system of activities and provides a resolution of legal, social, economic, technological, organizational, territorial and environmental objectives in land relations system should consist of the following measures:

- Implementation of norms and standards of environmentally sound agricultural land by the State;
- Rational use and protection of soil conservation and by farmers;
- Rationing of irrigation water, fertilizers and plant protection products, which should take into account the biological needs of plants and not to violate the ecological balance;
- The use of evidence-based crop rotation;

- Tillage with regard to preserving the quality of land;
- The introduction of scientific and technological progress, saving and safe alternative technologies in agriculture;
- Implementation in practice insurance of lands from lowering their quality;
- Motivation of farmers to preserve agricultural land resources;
- Audit of agricultural land.

Ecology and economy are key indicators of economic activity agriculture.

Ensuring environmental and economic security of agriculture in the long term requires careful using agricultural land while maintaining quality and soil fertility and support from the state.

INDUSTRIAL DEVELOPMENT AND ECOLOGICAL ISSUES IN TANZANIA

Tetyana Mayboroda, Laura Bashir
Sumy State University, Sumy, Ukraine

Industrial development can simply be referred to as the planning and building of new industries in special areas, therefore an industry can be defined as A sector of an economy made up of manufacturing enterprises in which the economic activity is concerned with manufacture, extraction and processing of raw materials, or construction.

Industrial development & ecological issues are at opposite ends in the spectrum regarding the health of the planet and its residents. While industrial development has improved the quality of life for people, it has come at a great ecological price.

Tanzania is one of the low income countries in the world. The economy is heavily dependent on agriculture. Topography and climatic conditions, however, limit cultivated crops to only 4% of the land area. Industry is mainly limited to processing agricultural products and light consumer goods.

The major industries in Tanzania are consumer industries like breweries, soap and textiles manufacturers. The mining and tourism industries are growing rapidly with the liberalization of the economy. Industry and construction is a major and growing component of the Tanzanian economy, contributing 22.2 percent of GDP in 2014. This

component includes mining and quarrying, manufacturing, electricity and natural gas, water supply, and construction.

Major minerals are gold, diamond and gemstones including tanzanite - a gemstone first discovered in Tanzania. Natural gas has been discovered at Songo Songo in southern Tanzania more ever Tanzania has set aside about one-quarter of its land area for 12 national parks, 17 game reserves, 50 controlled game areas and a conservation area. Other attractions for tourists include beaches and coral reefs along Indian Ocean coast, and the island of Zanzibar.

The development of this industrial sector has led to massive execution of industrial pollutants which has caused massive destruction in other words effects to the environment including the following:

1. Water Pollution: The effects of industrial pollution are far reaching and liable to affect the eco-system for many years to come. As a result, many of Tanzanian water sources have high amount of industrial waste in them which seriously impacts the health of our eco-system. The same water is then used by farmers for irrigation purpose which affects the quality of food that is produced.

2. Soil Pollution: Soil pollution is creating problems in agriculture and destroying local vegetation. It also causes chronic health issues to the people that come in contact with such soil on a daily basis.

3. Air Pollution: Air pollution has led to a steep increase in various illnesses and it continues to affect us on a daily basis. With so many small, mid and large scale industries coming up, air pollution has taken toll on the health of the people and the environment. Nearly all industrial processes, as well as the burning of fossil fuels, release particulates into the atmosphere. Much particulate matter is easily visible as smoke, soot, or dust; other particulate matter is not easily visible. Included with the particulates are materials such as airborne small particles of heavy metals, such as arsenic, copper, lead, and zinc, which are usually emitted from industrial facilities.

4. Wildlife Extinction: By and large, the issue of industrial pollution shows us that it causes natural rhythms and patterns to fail, meaning that the wildlife is getting affected in a severe manner. Habitats are being lost, species are becoming extinct and it is harder for the environment to recover from each natural disaster. Major industrial accidents like oil spills, fires, leak of radioactive material and damage to property are harder to clean-up as they have a higher impact in a shorter span of time.

5. Global Warming: With the rise in industrial pollution, global warming has been increasing at a steady pace. Smoke and greenhouse gases are being released by industries into the air which causes increase in global warming. Melting of glaciers, extinction of polar beers, floods, tsunamis, hurricanes are few of the effects of global warming.

The issue of industrial pollution concerns every nation on the planet. As a result, many steps have been taken to seek permanent solutions to the problem, Tanzanian government has enacted various measure to combat industrial pollution, various measure including Strategies, policies and plans.

In the industry-sector, a number of sustainable development initiatives have been initiated in Tanzania. These include, for example, the development of sustainable industrial development policy, reducing pollutants by adding effluent treatment and scrubbing units to existing processes in the chemical industry, and establishing a Cleaner Production Centre of Tanzania (CPCT).

Taka is a Swahili (local Tanzanian language) word for waste and Takagas is therefore gas from waste. The goal of the Takagas project is to reduce emissions of greenhouse gases (GHG) in Tanzania by substituting bioenergy (methane gas and electricity), produced from anaerobic digestion of industrial and municipal waste in the Dar es Salaam area, for fossil fuels. The project is being funded by the Global Environmental Facility (GEF) and the Danish International Development Agency (DANIDA). This project is a collaborative effort of the Ministry of Energy and Minerals, the Dar es Salaam City Council, and the University of Dar es Salaam.

As we see on Tanzanian example, the industrial development changes our life style and cultures, and each country and government is taking steps and measurements to control pollution caused by the industries by whatever means and to save the environment from pollution.

SOME ASPECTS OF ENVIRONMENTAL SITUATION IN SUMY CITY

Tetyana Mayboroda, Alina Krasnobaieva
Sumy State University, Sumy, Ukraine

Environmental problems arising at the present stage of development of Ukraine and leading to negative consequences is an important issue to

our attention. Sumy region is one of the areas that requires in-depth analysis and study of the environment.

A very important question is what do we breathe. Let's start with the fact that the state of air is checked by environmental inspection, sanitary and epidemiological stations. But no one provides complete information about air that is contained in Sumy. Today, the main air pollutants are cars. Perhaps the most suffering area is central part of the city. At peak hours it is impossible to breathe on Pokrovskaya Str. The second air pollutants are large industrial enterprises:"Sumykhimprom" and "Frunze ". These giants seriously loaded our lungs. A big plus for the citizens can be green filters: botanical gardens, parks, forest plantations, but they have recently been destroyed. For example, one of the environmental disasters is seen in Baumana Str. People cut down five hundred acacias for the construction of houses. The center of city has lost a green oasis in the estate Sumovskih in 2009. Felling of trees for the construction on Baranivka held at least since 2010. Today, no one keeps tight control over our air, important role of trees in oxygen saturation is not taken into account. At this rate we will need more air filters. Department of Environment and Energy Conservation Department of Infrastructure of Sumy informed that the content of dust, sulfur dioxide, carbon dioxide and nitrogen oxide, ammonia, formaldehyde was monitored for 3 fixed stations. In 2014 throughout October meteorologists selected and analyzed 1418 samples of air. Mean concentrations of dust, nitrogen dioxide and formaldehyde exceeded health standards in 1.6; 1.3; 1.1-fold, respectively. The rest of the components that were studied, were below the sanitary standards or meet them. But everything is not so bad as the situation with air.

Let’s consider the quality of water in Sumy. Sumy water is considered one of the cleanest water in Ukraine. In addition, in our city water is not chlorinated, because it is extracted from underground sources, and not nearby rivers. Water enters the apartment of six wells Sumy intakes: Novoobolon, Topolyansky, Luchanski, Prishibsky, Tokarevsky and Lepehovsky. Sumy extracts water from different depths: there is a well of the upper cretaceous, the depth of which 90-125 m, and wells that supply water from a depth of 612-630 m. Furthermore, there is a well whose depth reaches 930 m. Another feature of Sumy water is that it is saturated with iron. Alexander Chernyak (chief medical officer of the city) informed that daily monitoring of water is carried out on all intakes, some control companies take the water at these places. While water quality is very good,

is arising another question about pipes which are used for water flow. Most of the water plumbing of the city is worn, that's why water comes to people's apartments with bad quality. This is a very serious problem. We need to take care of water resources, because if not to pay more attention to these problems we may face the problem of lack of water in 15-20 years.

Summarizing the above mentioned we can say that the environmental situation in Sumy leaves much to be improved and changed. If in our city will remain current trend of water and air using and pollution, the environmental problem can become the main cause of the deterioration of the health of its population. That is why this subject should be studied in depth by authorized establishments of control, monitoring and protection as well as inhabitants shouldn't not pollute our water and air. Putting all efforts together we should make it cleaner for us and for the Earth.

DECISION MAKING FOR SUSTAINABLE DEVELOPMENT[1]

Leonid Melnyk, Iryna Dehtyarova, Adeosun Oyindamola Ibukun
Sumy State University, Sumy, Ukraine

At every stage in life, living beings are faced with the issue of what to go for or which one to choose. Life always presents us with questions of multiple choices wherein we have to choose from very many choices or alternatives put before us. To every case, issue, or problem, there is usually one choice that will perfectly solve or attend to the issue or problem at hand as compared to the other ways available. This can be because it will save time, or human resources or financial resources and sometimes all of them than the other options. The ability to choose among alternatives is *decision making*.

Decision making is the thought process of selecting logical choice from available options. A decision made can either make or mar the reason for making the decision. Therefore effort has to be made to seeing to it that the decision arrived at is an effective one. An effective decision is that decision that produces the desired or intended result at the end of the day.

[1]This article was prepared within the framework of the scientific research "Development of Fundamental Principles of Reproduction Mechanism of "Green" Economy in the Information Society» (# s/r 0115U000684), which is funded by the state budget of Ukraine

According to Brundtland Commission Report “Our Common Future”, Sustainable Development is a development that meets the need of the present without compromising the ability of the future generations to meet their needs [2]. Lack of effective decision making for sustainable development will lead to having unsustainable development. Some of the ways through which Governments and the civil society at large influence decision making for sustainable development are by Constraints (setting limits for every activity on the environment), giving incentives, and creating sustainable development awareness programs.

Constraints on decision making include regulations that guide and limit development options, such as emissions standards, permitting, land use controls and substance bans. Legislation may also provide incentives towards sustainable development (and dis-incentives away from unsustainable development) by influencing markets with economic instruments and tax breaks for “greener” development options (e.g. wind farms) and goods (e.g. low emission vehicles). Markets may act in favour of sustainable development but, unregulated generally favour unsustainable consumption. Ill- considered legislation and economic instruments can likewise encourage unsustainable natural resource use (that is perverse subsidies).

The availability of alternatives provided by markets, through Government action or by grass roots initiatives may also provide incentives encouraging changes in behavior. For alternatives to be attractive, it must offer opportunities that give equal or better quality of life. For example, a shift by commuters from private cars to public transport may be facilitated by convenient and affordable public transport options. Often times, alternatives can only be implemented if they go hand in hand with restrictions. For example, increased levies on private car use where a convenient and affordable public transport is offered.

Nature imposes its own constraints on development in terms of the availability of natural resources such as minerals, hydrocarbons, timber, air, and water. Natural resources constraints may be strengthened by legislation (e.g. quotas and bans) and amplified through markets, with more scarce resources attracting higher prices.

Awareness can be raised through education and training, providing more targeted information through advertising and campaigns, and having goods and services certified.

Impact assessments are formal, evidence– based procedures that assess the economic, social, and environmental effects of public policy. Impact assessments are also means through which awareness about sustainability (planning and policymaking) can be raised.

The constraints (set limits) still fail to meet up with the desired expectations for which they are set. People still see natural resources as common goods or free services that can be extracted or polluted. Legislation are sometimes poorly drafted, poorly implemented, has weak enforcement, compliance or limited penalties. The incentives are not convenient and affordable. They are most times not anything better off than the former. For example, household energy efficiency measures are often seen as too costly, and as having a long period before return on investment. There is lack of transparency and accountability in decision making and weak democratic institutions break the link between civil society and policy makers. These shortfall need to be addressed by removing perverse subsidies, promoting education for sustainable development, applying the precautionary principle more readily, and building democratic constitutions and governance.

Conceptualizing sustainable development as a decision-making strategy allows to actually “use” it, thereby moving beyond the rhetoric, and turning sustainability and its “action-guiding” power into an “action-generating” concept. To understand the linkages between sustainability and decision-making, and as such the realization of sustainable development as a decision-making strategy, at least the following three challenges should be considered: [1]

•Interpretation (sustainability should be interpreted considering its organizing principles, applied in a given socio-environmental context);

•Information-structuring (the inherent multi-dimensional complexity of sustainability should be structured into operational information units (for example indicators) and properly communicated in order to feed the decision-making process);

•Influence (sustainability information should exert a real influence on decision-making and on the actual implementation of sustainable development) [3].

Broadly speaking, the strategy for sustainable development is a long-term strategy. It refers to most fundamental and important goals, plans, intentions of economic agents to provide sustainable development on a certain territory. The essence of the strategy for sustainable development

can be briefly expressed in terms of two key features: goal setting and perspectives of economic agents; creation of a dynamic model of targeted, systemic human activity that takes into account the influence of external and internal environmental factors. Thus, we consider the *result strategy* and the *process strategy* for sustainable development.

References:
1. Hugé, J.; Waas, T.; Eggermont, G.; Verbruggen, A. Impact assessment for a sustainable energy future – Reflections and practical experiences. Energy Policy 2011, 39, 6243–6253.
2. Our Common Future.World Commission on Environment and Development (1987). Oxford: Oxford University Press. p. 27.
3. Waas Tom, Hugé Jean, Block Thomas, Wright Tarah, Benitez-Capistros Francisco and Verbruggen Aviel Sustainability Assessment and Indicators: Tools in a Decision-Making Strategy for Sustainable Development Sustainability 2014, 6(9), 5512-5534.

GREEN ECONOMY: BEST EU PRACTICES FOR UKRAINE[1]

Leonid Melnyk, Iryna Dehtyarova, Oleksandr Kubatko
Sumy State University, Ukraine

Sustainable development involves a complex interrelation between three components – economic, social and environmental. The concept of "green economy" is designed to provide a more harmonious co-ordination between these components, which would be acceptable to all groups of countries – developed, developing and countries in transition.

The concept of "green economy" is becoming more and more popular. It has been actively discussed by experts, politicians, non-governmental organizations. The concept of green economy, in the context of poverty eradication and sustainable development, will attract further attention as it will be one of two key themes at the United Nations Conference on Sustainable Development to be held in Rio in 2012 (Rio, 2012).

[1] Prepared within the framework of Jean Monnet program "Using best EU practices for sustainable economy forming in Ukraine" (UBEUP) 553 185-EPP-1-2014- 1-UA-EPPJMO-MODULE)

According to the UNEP report, green economy is – low-carbon economy which efficiently uses resources and meets the interests of the entire society. 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 "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.

Based on the production-consumption cycle, it is easy to define 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.

Europe is leading in implementing environmental policies for energy and resource efficiency. Figure 1 illustrates how European policy priorities relating to material resource use can be represented as a nested and integrated set of objectives.

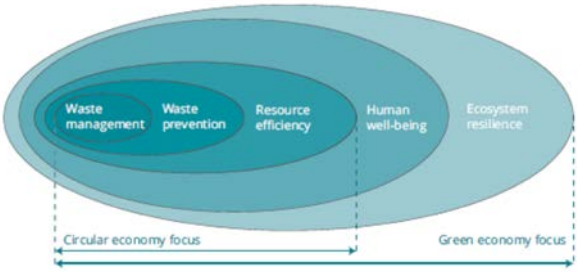


Figure 1 - European green economy policy priorities (The European, 2015)

The sectors of green economy: clean and alternative energy (renewable energy, bioenergy, hydrogen and fuel cells); energy

management and efficiency (power electronics, energy saving lighting, energy storage, advanced batteries, etc.); green building (construction and building materials, architecture, community design, green infrastructure, etc.); environmental protection; carbon finance and investment (venture capital, investments, carbon finances, etc.); knowledge (education and training, research and development, information and communication technologies, public administration, etc.) (BP, 2015).

The green economy will cause a change in occupations' employment demand or work and worker requirements such as tasks, skills, knowledge, and credentials. The most crucial perspectives of green economy forming can be achieved by the next directions as development of innovative techniques and technology in environmental field, environmental services in the field of environmental protection, management and safety, increasing of share of alternative energy resources in energy balances, recycling, ecotourism, eco-labeling etc.

References:

1. BP Energy Outlook 2035, London, United Kingdom, January 2015, 98 p.
2. The European environment – state and outlook 2015: synthesis report, European Environment Agency, Copenhagen EEA, 2015, 205 p.

FINANCIAL MECHANISMS FOR REGULATION OF ENVIRONMENTAL SAFETY IN UKRAINE

Larysa Nekrasenko
Poltava State Agrarian Academy, Poltava, Ukraine

Dependence on fossil energy sources, high fuel prices and poor environment require a revision of energy policy in Ukraine [1]. In addition, the burning of fossil fuels is the main cause of air pollution. The main natural agents to reduce the impact are coniferous forests, which absorb and accumulate carbon dioxide. But unfortunately, more than 100 years of forest management due to consumer approach has lead to decrease by 40% the total forest area of the Ukraine. Ministry of Forestry of Ukraine was established only in 1966, it main task was to restore the forests. The forest cover increased by 1.5 times for 50 years and to date is 16% of Ukraine [2].

To achieve ecological balance should be increase the absorption of CO_2 through reforestation pine forests. Also, to achieve a balance between

emission and absorption should involve instruments, including financial that would make unprofitable and unpopular high energy and carbon capacity of the economy. These tools are taxes calculated on the basis of fairness, objectivity and scientific.

For example, can be improved environmental tax [3]. It should include a higher carbon tax, tax for crop rotation, manure tax (on livestock), forest enterprises tax (tax on cutting of trees).

The choice of the tax base is a responsible task because insufficiently substantiated tax base may cause doubts about the fairness of the tax and its economic feasibility. Moreover, the decision as to what should be the tax base is uncertain, particularly when there is uncertainty about the properties and the environmental impact of industrial use of various natural resources and consumption of products with externality [4].

Introduction of a tax on crop rotation, which makes the allocation instead of carbon absorption, promote change priorities in the selection of crops and reducing carbon emissions. The tax rate should be based on exceeding the permissible area of high-carbon crops.

We have studied the relation between the yield of various crops and absorption or excretion of CO_2. We hypothesized: there is some connection between the yield of various crops and the balance of absorption / excretion of CO_2. We explored this relationship. According to our research was developed an econometric model of the dependence of absorption / excretion of CO_2 harvest different crops.

To investigate the factors that most affect the excretion and absorption of carbon by plants we resorted to the correlation analysis. Analysis of the correlation matrix of indicators showed that the ability to release carbon plants are remains different and have both direct and indirect relationship with the studied factors (harvest various agricultural cultures for years). We used multiple regression analysis to examine the impact of all factors to determine which ones have the most impact.

We have created a regression model:

$$Y_x=0.57x_1-1.04x_2-33.93x_3+38.71x_4+32.88x_5+3.05x_6+12.77x_7+6.59x_8-1.11x_9-143485$$

Land Use, Land-Use Change and Forestry, Cropland	Y	-143485
Grain and leguminous crops	x_1	0,5728949
Sugar beet (factory)	x_2	-1,03598
Oil crops	x_3	-33,92927
Sunflower	x_4	38,710469
Rape	X_5	32,884556
Potatoes	X_6	3,0536347
Vegetables	X_7	12,769011
Feed root crops	X_8	6,5923682
Maize for silage, green feed	X_9	-1,112174

Over the period since 1990 was not observed stability in carbon dioxide sequestration in cropland. Was noted the prevalence over the excretion of CO_2 above absorption of CO_2. According to the results of the correlation analysis, we found that the greatest positive impact on the change in the allocation of CO_2 have sunflower, rape and vegetables. The strongest feedback (ie, increase absorption and reduce selection) have oil crops, sugar beet and maize for silage.

Over the period sharply declined growing the fodder and silage crops and sugar beets. Obviously this is due to the fall of livestock cattle. Livestock farms are a source of methane emissions. Therefore it is necessary to encourage farmers and farm to use biogas settings. Due to the tax manure can activate the innovative activity of farmers to use biogas plants. The tax base should be livestock. If using biogas settings the tax will not be charged and will be available preferential credit for the innovative development of clean energy technologies.

Another reason for the decline in absorption is a decrease in forest areas that have been destroyed in the last century. So far, the state of the forest industry does not meet the needs for reforestation.

As fore deforestation and reforestation in Ukraine are forestry - they have to feel the depth of responsibility for the preservation and restoration of forests. In order to fix the current state forestry have to pay tax for cut forest area. Tax cuts can be made in the case that forestry will plant forest that will not cut. The areas of this forest have to compensate the cutting down forest or destroyed forest due to other causes. This tax rate should be

progressive, depending on the area of cutting and high enough to motivate forestry in its decrease.

Another factor that must be considered is the complexity of measuring the tax base. To formation of an economically and environmentally efficient and fair tax system can be used adjustment factors to the tax rate. Carbon Footprint could be use as an adjustment factors and as measure of environmental damages. We propose to consider the carbon footprint in terms of environmental damage by O. Balatsky (O. Balatsky, 1979) [5]. We propose to calculate the damage as the ratio of the carbon emission and uptake capacity of forest per year. We believe it is enough to know carbon dioxide emissions, forest area and volume absorption for calculate the environmental damage from carbon dioxide.

We offer to increase the carbon tax by reducing Value Added Tax. We also propose to use differential tax rate in the regions. The difference will be in the degree of damage to the environment and the possibility of its compensation.

Thus, the problem of environmental management can be solved by balanced and scientifically-based approach to the development and implementation of environmental taxes to ensure energy and environmental safety.

References:

1. Energy Strategy of Ukraine till 2030. Retrieved from http://mpe.kmu.gov.ua/minugol/control/uk/doccatalog/list?currDir=50358
2. State Agency of Forest Resources of Ukraine http://dklg.kmu.gov.ua/forest/control/uk/publish/article;jsessionid=211A226A109C8D500D33B75EFF8E7AFC?art_id=36143&cat_id=32867
3. Tax Code of Ukraine (2011). Retrieved from http://zakon.rada.gov.ua/go/2755-17
4. Don Fullerton, Gilbert E. Metcalf (1997). Environmental Taxes and the Double-Dividend Hypothesis: Did You Really Expect Something for Nothing? (Working Paper No 6199). Cambridge, MA 02138: National Bureau of Economic Research. Retrieved from http://www.nber.org/papers/w6199.pdf
5. Balatsky O. Economics of clean air. Naukova Dumka, 1979. - 296.

CAUSES OF LAND DEGRADATION IN TANZANIA

Nyanda Nchungi E David, Olha Lukash
Sumy State University,Sumy, Ukraine

Land degradation is a process in which the value of the biophysical environment is affected by a combination of human-induced processes acting upon the land.

It has been a top ranked environmental problem before and after Independence of Tanzania. Despite the government's commitment to solving land degradation problems; still it affects the majority of people especially in dry land areas.

Land degradation (see figure 1) is directly related to the following aspects; population and poverty in the sense that population increases yearly forcing people to expand their farming and economical activities hence this refers to increasing pressure of population on land, resulting in small farms, low production per person and increasing landlessness. A consequence of land shortage is the next element, poverty.

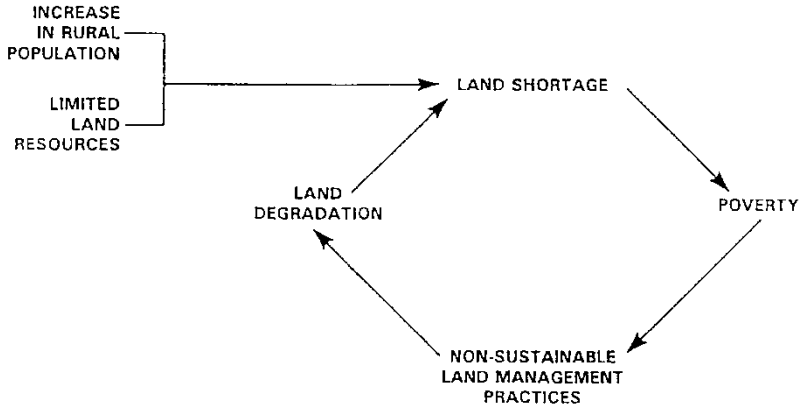


Figure 1 - Consequences of non-sustainable land-management

The main causes of land degradation are mainly natural disasters and human made or manmade disasters. Some of the main causes of land degradation in Tanzania include:

- **Deforestation.** Tanzania is a developing country and

depends on agriculture as one of the main economic activities hence in a way or another there have been an increase in cutting down of trees due to the increasing demand of timber, fuel and forest products in order to support the economy of the country. The main problem facing Tanzanian forests is the charcoal burning.

- **Overgrazing.** In most Tanzanian villages, villagers see livestock as a sign of wealth, and would like to maximize their herd size for their own social, cultural, and economic reasons. This perception tends to encourage overgrazing and land degradation.
- **Mining and quarrying.** Using of some explosives and the deep digging of the earth in order to extract sand, ore and other valuable minerals leaves the land bare and without cover hence encouraging degradation and Tanzania being a country rich in minerals suffers a great deal, affected areas include Geita, Nyamongolo and Kahama among other areas where mining takes place.
- **Population.** We can say this is the major cause of land degradation as the population increases there is need for more land for agricultural activities and also land for settlement of the extra population, and in turn it leads to clearing of forests hence land degradation.

Apart from the above we can also say that other causes of land degradation include; agricultural depletion of soil nutrients through poor farming practices, inappropriate irrigation, soil, vehicle off-road driving, quarrying of stone, sand, ore and minerals, increase in field size due to economies of scale, reducing shelter for wildlife, as hedgerows and copses disappear, exposure of naked soil after harvesting by heavy equipment, monoculture, destabilizing the local ecosystem and dumping of non-biodegradable trash, such as plastics

In order to counter the ever growing effects of land degradation we need to put in place some measures which will help support a sustainable development of the nation and the world at large. And also educate the people on sustainability of environment which will help eradicate land degradation at large.

FUTURE BUSINESS ENERGY MODELING AND SYSTEM DEVELOPMENT FOCUS ON EAST AFRICA REGION

Anthony Nyangarika
Beijing Institute of Technology, Centre for Energy and Environmental Policy Research, Beijing, China

Africa has a landmass of just over 30.3 million km2, an area equivalent to the United States of America, Europe, Australia, Brazil, and Japan combined. As of 2004, Africa housed 885 million people (World Bank, 2005) in 53 countries of varied and diverse sizes, socio-cultural entities, and resource endowments, including fossil and renewable energy resources.

Most of these energy resources are yet to be exploited, which is a contributing factor in making the continent the lowest consumer of energy. Africa uses only one eleventh, one sixth, and one half of the energy used by a North American, a European, and a Latin American, respectively. There is an urgent need for substantial increases in energy consumption in Africa as a whole if Africa is to be competitive with other developing regions of the world.

Tanzania is gifted with diverse energy sources most of which are untapped, these include biomass, hydro, uranium, natural gas, coal, geothermal, solar and wind. The primary energy supply includes biomass (90%); petroleum products (8%); electricity (1.5%), and there maining (0.5%) is contributed by coal and other renewable energy sources. More than 80% of energy delivered from biomass is consumed in rural areas; heavy dependence on biomass as the main energy source contributes to deforestation, while the importation of oil costs about 25% to 35% of the nation's foreign currency earnings. To-date only about 18.4% of the country's population has gained access to electricity. Extending the National Grid too many parts of the country including rural areas is not financially and economically feasible.

Project Objectives

General: To develop energy models and setups with related activities for planning, managing effectively and optimizing energy production.

Specific:

- To identify and assess the capacity needs for effective development of models and setups for the region.

- To reinforce human and institutional capacity in scenarios building and modelling for energy and energy related sectors within the region.
- To advance knowledge networks and others collaborative links among specialist in energy modelling and setups building inside and outside the region.
- To categorize capacity needs for effective development of models and setups for the region.
- To harmonize national, sub-regional and regional plans, models and setups in the region.
- To develop and harmonize energy database useful for setups building and modelling
- To preserve track for development in scientific and technological advance in the energy.

East African countries must reform the market for energy services and establishment's institutions framework which facilitates investment expansion of service, efficient pricing mechanism and other financial incentives to enhance the development and utilization of indigenous and renewable energy source develop the energy development plans and management model system.

For the last decade, indicators that reflect changes in energy models have been used to monitor efficiency progress and identify market trends and efficiency improvement opportunities. Governments routinely produce documents displaying trends in these indicators, and cross-country comparisons of energy intensity abound in energy policy literature. Trends in energy intensity indicators increasingly serve not just as a monitoring tool, but as a basis for energy efficiency policies and regulations aimed at achieving greater energy conservation.

Before the mid-eighties, however, policy-makers were primarily concerned with the effect of shifting energy consumption on economic growth. As a result, energy policies were often coupled with economic policies that were typically implemented to boost a nation's economic performance. Although the maintenance of economic growth is still a priority for governments, the policy focus has shifted to capitalizing on the environmental benefits associated with more efficient energy use rather than just the economic benefits of conservation.

In other words, policy-makers are growing increasingly concerned with the physical rather than economic repercussions of energy use.

Accordingly, many believe that measuring changes in energy intensity can provide both international and national policy-makers with the information needed to design appropriate greenhouse gas mitigation strategies. Through the use of energy intensity indicators, governments may be able to identify which industries need to be targeted for mitigation strategies. Many also believe that such indicators can suggest the appropriateness of a particular strategy. As a result, energy intensity indicators (particularly cross-country comparisons of them) are increasingly being touted as a very useful and necessary instrument for climate change negotiations and policy-making (Eichhammer and Mannsbart 1997). CO_2 intensity indicators, which depict trends in the intensity of carbon use, are also gaining prominence as a potential policy-making tool. Indeed, a recent special issue of the journal *Energy Policy* (Special Issue, vol.25, nos. 7-9, June-July 1997) was devoted entirely to studies which examined the use of energy intensity (and their implications for energy efficiency) and carbon dioxide intensity indicators in the context of global climate change.

Perhaps, then, a deeper understanding of the trends shown by both types of model indicators might be gained by considering how economic energy model and system development strength has historically reacted to changes in physical energy intensity, and by accounting for all the major variables that could potentially affect the relationship between them.

References:

1. Phylipsen, G. J. M., K. Blok and E. Worrell. 1998. Handbook on International
2. Comparisons of Energy Efficiency in the Manufacturing Industry. Utrecht: Department of Science, Technology and Society, Utrecht University.
3. Phylipsen, G.J.M., K. Blok and E. Worrell. 1997. International comparisons of energy efficiency - methodologies for the manufacturing industry. *Energy Policy,* 25(7-9): 715-725.
4. Schipper, Lee, Michael Ting, Marta Khrushch and William Golove. 1997. The evolution of emissions from energy use in industrialized countries: an end-use analysis. *Energy Policy,* 25(7-9): 651-672.
5. Park, Se-He. 1992. Decomposition of industrial energy consumption: an alternative method. *Energy Economics,* 14(4): 265-269.
6. Freeman, Scott L., Mark J. Neifer and Joseph M. Roop. 1997. Measuring industrial energy intensity: practical issues and problems. *Energy Policy,* 25(7-9): 703714.
7. Jenne, C.A. and R.K. Cattell. 1983. Structural change and energy efficiency in industry. *Energy Economics,* 5(2): 114-123.

8. Eichhammer, Wolfgang. 1998. Methodological issues and relevance in a policy context of energy efficiency indicators. Conference Paper presented at the Workshop on Energy Efficiency Indicators for Industry in Tokyo, Japan, September 21-22.
9. Eichhammer, Wolfgang and Wilhelm Mannsbart. 1997. Industrial energy efficiency: indicators for a European cross-country comparison of energy efficiency in the manufacturing industry. *Energy Policy*, 25(7-9): 759-772.

APPLICATION OF FUZZY SETS FOR DETERMINING THE LEVEL OF SUSTAINABLE DEVELOPMENT OF UKRAINE

Olena Pidberezna
National Technical University of Ukraine "KPI", Kiev, Ukraine

The problem of achieving the sustainable development conditions requires appropriate coordinated actions of many subjects' of the economic-productive activity. Herewith, an important component of this complex action is to provide the acceptable level of the State's economic security (ECS) and its individual areas because achieving the sustainable development conditions requires, above all, rational organization of economic activity.

Public Policy for National ECS should include [1]:

– description and classification of internal and external threats;

– identifying and monitoring the factors that characterize the stability of sustainable development of the State;

– determination of criteria and parameters that characterize the national economic interests and meet the requirements of national ECS;

– national ECS policy which is aimed to coordinate the activities of public authorities and government to secure the ECS at the national, regional and global levels.

The threats are considered as a set of conditions and factors, as well as conjunctures that significantly increase the risks of a subject's life.

For Ukraine's areas' assessment according to the ECS terms the following three methods are mainly used: the scalarization method, the cutting-plane method and the method of discriminant analysis. All the given above approaches have one significant drawback - they require a

clear classification of the situation to a particular security class (depending on the security indicators values and their boundary levels).

In the crisis it is quite important to develop integrated methodological approach accounting the properties of uncertainty and multicriteriality in problems of ECS.

Herewith, multicriteriality can be considered as one of the form of displaying the uncertainty of the development conditions and complex systems functioning (purposes' uncertainty). Another feature is the diversity of ratings by the criteria. To solve the problem of ECS it is necessary to the most properly recognize a situation of management decision making. Herewith, information describing the knowledge about the system and the situation is formulated the most adequately by using fuzzy concepts, fuzzy definitions and fuzzy logic.

Thus, the given above led us to a necessity of considering the methodological basis of the fuzzy sets theory (FS) for Ukrainian's ECS level assessment.

This method involves creation of expert systems for pattern recognition. The decision about referring the security indicators to a particular class the experts make on the basis of their understanding of the required security level and the consequences of deviation from this level. In fact, while making a responsible decision the expert usually operates not only with formal concepts, expressed by a number or numerical formula, but also with some logical conclusions that can be expressed as: "If there are certain conditions ..., then the situation can be assigned to the following class". To process this kind of expressions a special system, which is based on the methods of the fuzzy sets theory and fuzzy expressions, is developed[1, 2]. This is achieved by introducing a membership function (MF) of fuzzy parameters, which takes values from 0 to 1. Its approximation to 1 means more confidence in expressions and more significant level of its implementation. It is appropriate to use exponential functions, as follows:

$$f(x) = \exp[b(x-c)2],$$

where b and c - parameters of the function that determine its form.

The proposed mathematical description corresponds to the information nature and reflects its fuzziness. On the basis of experts' or expert groups' statements a database, that describes the situation classes, is

formed for all ECS indicators. Thus, any current or predicted situation can be assigned to a particular class by comparing it with already known data, which was entered into the database.

In general fuzzy set characteristic is the membership function (MF). Fuzzy set is called the set of ordered pairs or corteges of form , where - element of the universe ,- (MF) which assigns to each element a real number in the interval , that characterizes the element grade of membership to fuzzy set . The larger the MF value , the more universal set element corresponds to the fuzzy setproperties .

There are many types of curves to determine the MF. The most common MF is triangular, trapezoid and Gaussian function[1].

This function is preferable due to its three following properties:

1) its similarity to the accumulation;

2) limitation of values that are necessary to comply with the MF properties;

3) infinite definition domain, which greatly simplifies the algorithmic solutions while programming operations on fuzzy subsets.

Using the ranking of indicators the priority directions of emerging the economy from the crisis can be determined. Thus, the created system accurately and properly formalizes knowledge about the object of research, which, in turn, facilitates communication with experts; provides an opportunity with a minimum scope of knowledge to solve problems on the analyzed object properties.

References:

1. Караєва Н.В. Застосування методу нечітких множин для визначення рівня економічної безпеки України / Н.В. Караєва, Л.О. Левченко, О.Д. Верченов // Держава та регіони. – 2011. – N2. – С.101-106.

2. Ризик-менеджмент суб'єктів енергетичного ринку як складова механізму забезпечення енергетичної безпеки : монографія / Н.В. Караєва, І.І. Гусєва, В.О. Бараннік, А.О. Савицька; за заг. ред. Н.В. Караєвої. – К.: Софія-А, 2012. – 256 с.

SCENARIO ANALYSIS MODEL OF ECONOMIC SECURITY COMPONENTS

D.O. Pidhrushnyi
National University of Ukraine "Kiev Polytechnic Institute", Ukraine

Tendencies of recent years have shown that economic security is the most important part of the sustainable development of nations and the world in general. That is why the forefront every state puts improves their economic situation, their international resource dependencies and explores new methods of management economic situation.

Components of economic security.

The term "economic security" can be interpreted in different ways:

– A set of measures taken by subjects to ensure the sustainability of facilities (economy of the state). In this case, economic security - the state created conditions that ensure preventing irreparable damage from internal and external economic threats;

– In the second case, security - a condition of the object protection which differs dynamic stability and timely Possibility of influence on course of events in order to maintain this facility.

The economic security of the country is divided into a number of areas. Let us consider the most important of them:

– Demographic security;

– Military security;

– Energy security;

– Financial and monetary security;

– Scientific and intellectual security.

For today the current issues is to analyze the components of economic security with the use of information analytical systems (IAS), including advanced analytics [1].

In IAS apply model-driven approach. For IAS with advanced analytics model contains its model scenario looks:

$$Sc = \bigcup_i \left\{ El_i, Ex_i, F^{El}\left(null \mid Ob_1, \ldots Ob_n\right) \mid i = \overline{1,N};\ j = \overline{1,N};\ i \neq j \right\}$$

where El_i - element of scenario analysis information that can be action, event or link;

Ex_i - performer of scenario element that can be a business analyst, data analyst, expert, worker of organization and process;

$F^{El}(null \mid Ob_1,...Ob_n)$ - function of k task of information analysis, which can take input the meaning of the subject area or empty value.

To construct scenario tools that have the following features was developed:

- Construction and saving of scenario models;
- Execution of the scenario and getting the result of the constructed model;

Using of these tools a scenario model of GDP calculation (fig. 1) was build, as this index is one of the most important indicators of economic security.

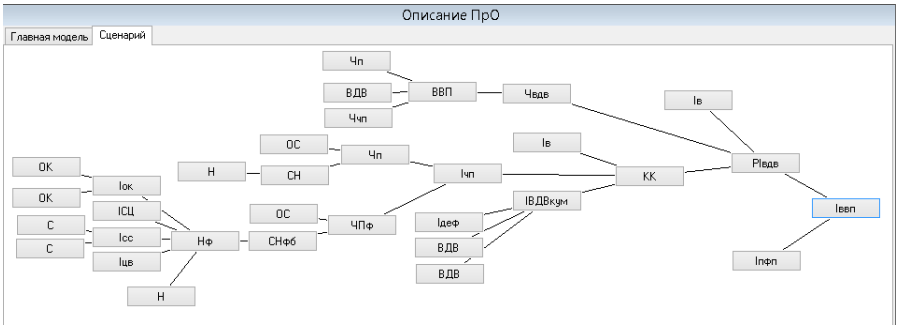


Figure 1 – Scenario model of GDP calculation

References:

1. Magic Quadrant for Business Intelligence and Analytics Platforms. — 2013, © Gartner Analytic.

PROBLEMS OF TRANSBOUNDARY WATER RESOURCES IN CENTRAL ASIA

Sardor Sadykov
Sumy State University, Sumy, Ukraine

Descriptions of Central Asia.

Central Asia is located in the center of the Eurasian continent - at the crossroads of Europe and Asia and covers an area of about 4 million. km^2. The region covers an area of five countries: Kazakhstan, Kyrgyz Republic, Tajikistan, Turkmenistan and Uzbekistan.

For more than 20 years, which took place after the collapse of the Soviet Union, the countries of the region have not been able to overcome the contradictions in the field of water allocation. Although at first countries in the region supported the principle of sharing of transboundary water resources, which was supported by a number of agreements. The most important political step was the initiative of the first persons of national water departments of Central Asia, adopted in October 1991 Tashkent statement. It was the starting point of the negotiation process between the Central Asian states in the use of transboundary water resources. It was about the sharing of water resources, taking into account the interests of all republics. Soon, however, it turned out that each of them pursues national interests, caring little about how they relate to the interests of the neighbors and the impact on the situation in the region as a whole. In 1993, Uzbekistan for the debts of Kyrgyzstan left without gas. In response to the actions of Tashkent Bishkek to reset from the Toktogul reservoir, citing the need to produce electricity in winter and its accumulation in the summer.

In addressing water energy problems countries in the region are trying to build a joint "front" in the promotion of new hydropower projects seeking support outside the country. In September 2014 the World Bank experts presented a report which actually took the side of one of the parties. In particular, the document was expressed a positive attitude towards the project of construction of Rogun and noted that the project is the most cost-effective solution to meet the demand for electricity in Tajikistan, than any alternative.

Solving Problems sharing water and energy resources in Central Asia is not only crucial economic, but also a huge environmental, political and

international importance. Despite the agreement, which the countries of the region periodically reach, increasing the number of international agreements, effective mechanisms for joint management of water resources is still there. National egoism generates the desire for unilateral action regarding the use of transboundary water resources in Central Asia. Given that water resources in these countries is one of the main factors determining the state of most sectors of the economy, and especially agriculture, are constantly growing water scarcity and declining quality of river flow increase contradictions between the countries of the region.

Formation and use of water resources in Central Asia.

Hydrographic the main territory of Central Asia occupies the Aral Sea basin, which covers apart from the above countries, as the northern part of Afghanistan, a minor part of China and Iran. The nature of the Aral Sea basin form the highest mountain ranges of the Pamir and Tien Shan mountains, vast deserts and steppes, large Asian rivers AmuDarya, SyrDarya, which flow into the Aral Sea. Basin area within Central Asia is more than 1.5 million. Km2. The overwhelming majority of the basin is located in the arid zone, the main distinguishing feature of which - shortage of fresh water.

Table 1 - Formation of surface runoff in the Aral Sea Basin

Countries	AmuDarya		SyrDarya	Total	
	km^3	%	km^3	%	km^3
Kazakhstan	-	-	4,50	12,12	4,50
Kyrgyzstan	1,90	2,42	27,40	73,77	29,30
Tajikistan	62,90	80,17	1,10	2,96	64,00
Turkmenistan (with Iran)	2,78	3,54	-	-	2,78
Uzbekistan	4,70	5,99	4,14	11,15	8,84
Afghanistan	6,18	7,88	0,00	0,00	6,18
Total	**78,46**	**100,00**	**37,14**	**100,00**	**115,60**

The most full-flowing river in the region is the Amu Darya, the average annual flow of which is 78,46km^3. More than 80% (62,90km^3) flow of this river is formed on the territory of the Republic of Tajikistan. On the territory of Uzbekistan formed 4,70km^3 (6%), Kyrgyzstan - 1,90km^3 (2.42%), Turkmenistan (Iran) - 2,79km3 (3.5%) and Afghanistan - 6,18km^3 (7.9%) Amu Darya.

Average annual flow of the Syrdarya River is 37,14km^3, of which 73.8% (27,40km^3) is formed on the territory of the Kyrgyz Republic. On the territory of the Republic of Tajikistan is formed only 1,1km^3 (2.96%) of water resources of the Syr Darya river basin.

The current situation in the region, along with the Aral Sea tragedy is compounded by global climate change, which is due to intensive melting of glaciers and snowfields in the region, and increasing water demand associated with population growth and economic development of countries.

To address the issue actively joined the World Bank, which examines the economic feasibility of the project Rogun and evaluating its impact on the environment. At the same time retained a large proportion of doubt that, in the intransigence of the Presidents of Tajikistan and Uzbekistan, they agree with the arguments and recommendations of the World Bank. They made it clear that will remain at their positions regardless of its conclusions.

In February 2012, the EU expressed its disapproval of the Russian loan of 1.7 billion. Dollars. To Kyrgyzstan for construction of Kambarata that could be interpreted as an attempt to prevent the strengthening of Russian influence in the region. The fact that the lower basin of the country looking for an ally in Russia, said at least the fact that Emomalii Rahmon appealed to Vladimir Putin to take close to a conflict between Tajikistan and Uzbekistan, and help in his resolution, and Kyrgyzstan expects mainly Russian investment in the creation of its modern hydroelectric complex. Until recently, Russia was on the side of water issues in Central Asia. However, due to historical and geopolitical reasons Russia can not be out of the problem field in Central Asia. Of course, she is interested in resolving water conflicts that threaten its interests and national security. In addition, the need to participate in solving the problems of energy and water use in Central Asia is caused by increased activity of other international players (USA, EU, China, Iran), offering its mediation services and seeking to consolidate its position in the region, pushing Russia.

Today, Russia's interest in water resources in Central Asia is connected primarily with the use of their hydropower potential. However, this highly profitable activity fraught with considerable risks ─ Russia is in the center of the escalating rivalry between the countries of the region for the control of transboundary water resources. It would be naive to believe that the Russian leadership is not aware of the political risk of involvement in water conflicts. Back in 2009, when he first emerged theme of Russian

large loan to Kyrgyzstan in exchange for a 50% stake in the project, the Uzbek leadership did not hide his displeasure, but to go to an open confrontation with Russia is not stalo.Chto As for Russia, it initially avoided a collision with Uzbekistan. It is worth remembering that in the face of Russian private company Rosa supports the revision of the Rogun HPP in Tajikistan, given the possible consequences for those located in the lower basin countries. And during a visit to Tajikistan in October 2012 Vladimir Putin announced Russia's intention to invest in smaller hydropower projects, without threatening economic and environmental interests of neighboring countries.

Kazakhstan and Uzbekistan see a way to ensure the water itself through the use of water potential in Russia and the resuscitation of the water transfer project from Western Siberia. However, this kind of water supply will be just another manifestation of the already excessive dependence on raw materials in Russia and deprive it of the stimulus to the development of promising large profits markets modern resource-saving technologies. Russia is able to assist the Central Asian countries in overcoming their water crisis through the provision of financial and technical assistance in the transition to resource conservation. This will favor its further advance their market investments and equipment. At the political level, Russia's participation in the settlement of inter-state differences in character of transboundary waters should be directed to the conclusion of multilateral agreements on mutually acceptable mode of water, which is consistent with its position of investors and business partners in Central Asia. According to UNDP, the economic benefits of cooperation in the region in the field of water use is estimated at 5% of the regional GDP. However, since the prospect of an agreement between the two countries on the water is not expected, in a situation where major policy decisions in the Central Asian countries are taken at the highest level, much will depend on the performance of its mediation Russian diplomatic mission, including the talks between the heads of state. The problem of transboundary water resources goes beyond mere resource problems, and to a great extent politicized determined by the complex nature of relations between the countries of Central Asia and, above all, between their political elites and their unwillingness to make concessions, their national egoism, which, in turn, fueled by political rivalries in the conditions of instability of their political and economic systems. Nevertheless, a certain optimism about the water situation in Central Asia is

preserved - the fact that, as history shows, water conflicts are resolved sooner or later. And the way to it is through cooperation and economic integration.

References:

1. http://ru.journal-neo.org/2014/02/24/rus-vodny-e-konflikty-v-tsentral-noj-azii-i-pozitsiya-rossii/
2. http://cyberleninka.ru/article/n/gosudarstva-tsentralnoy-azii-problemy-sovmestnogo-ispolzovaniya-transgranichnyh-vodnyh-resursov
3. UN report 2014.

THE ASSESSMENT OF GREEN POTENTIAL OF THE REGION DEVELOPMENT[1]

Olena Shkarupa, Anton Tolbatov, Ivan Burych
Sumy State University, Sumy, Ukraine

In the informational society and transformational changes in the economy there is a need in the personalities and ways of making decisions that have the ability to self-development, have an unusual approach and can make a new quality in social and economic life of society. The term "creative" denotes creativity, which "not only put forward the idea, but also brings them to the practical results." In English literature, as a rule, the term «creativity» represent all that is directly related to the creation of something new, the actual process of the creation; product of this process, its subject; the circumstances in which the creative process runs; factors that cause it.

In our opinion, in a revitalization of global processes and the corresponding transformation of economic systems, innovative concept of social development requires an understanding of creativity as the driving force of the post-industrial economy. That is why it is vital to ensure the creative business potential in the regions and cities, which are the main centers of economic life that will enhance their investment attractiveness, efficiency of operation, attracting highly qualified professionals and improve the quality of life in general.

[1]This material was prepared while performing scientific research #0111U003564

We evaluated the performance of green potential in the period of 2011-2014 in Sumy region. As a whole the trend is positive, especially in terms of green tourist attraction (it increased by almost 2 times), indicating that the strategic opportunities for enhancing the competitiveness of the region and gives reason to believe Sumy region promising region in terms of its ecological oriented creative potential.

In order to develop innovative directions in ecological oriented transformation of socio-economic system in Sumy region we have made analytical studies. With the help of SWOT-analysis we identified strengths of the region, such as the relative environmental friendliness, the potential for economic development, a high level of education, the creative potential of the staff of enterprises. Among the weaknesses - the outflow of labor resources, significant deterioration of infrastructure, the lack of a coherent program of advertising the city and the region, the corruption of power, lack of a clear program of regional strategic development, etc. In order to improve the capacity of green creativity is determined by the position of the territorial formation of a bright brand in order to attract both domestic and foreign investment to improve the economic well-being of the region.

It should be noted that emissions of air pollutants and wastewater discharges into waters area is less than 1% of total emissions in Ukraine. Sumy is also rich in natural resources. A real gem of a nature reserve Mikhaylovskaya tselina. Overall, 6.6% of the territory is reserve fund, 19% - forest. In addition, Sumy has a great historical socio-economic experience. In the beginning of the last century, there existed a real, by today's standards, eco polis, where the organic farming was predominant - Neplyuy brotherhood on the territory of the Yampol district. Thus, Sumy can become an incubator of goods and services for environmental purposes, the priority areas of production which should be the agrarian sphere, green energy and construction, eco-tourism.

As the result of evaluation and theoretical justification of features of the green potential in the regional strategic development, it was found that the backbone factor of the region is the creative potential, which is based on the creative industries and the creative class - workers of enterprises that create intangible assets, bringing tangible benefits - new ideas and technologies, i. e. maintain the current level of production and services, including environmental ones.

SWOT- analysis of green potential of Sumy region

Strengths	Weaknesses
• The existing potential of innovative development • The high level of education of the population • The creative potential of enterprise personnel • The relative environmental cleanliness • Beautiful nature and landscapes • Availability of vacant of market niches, scope for business development • Development of high enough quality masmedia and ensure freedom of speech	• Instability and unpredictability in politics • The lack of a unified strategy of regional development • Insufficient business information • Lack of development of the third sector (unions, business associations, non-governmental organizations) • Lack of structures that would be engaged in the creation and promotion of green image • Substantial deterioration of infrastructure • Lack of motivation to promote the brand of Sumy region
Opportunities	**Threats**
• Major the agrarian possibilities • Development of industrial parks • Using the oil and gas in the region, which produces more than 40% of the Ukrainian oil • Creation of the green regional structure • Creation the potential of the brand – "green oasis"	• The slow change of mentality of residents of territorial communities • The imperfection of the executive of the sphere of authority • Unsuccessful examples of foreign investments in Sumy region • High mortality rates • Difficult customs procedures • High migration • The aggressive competition • Depreciation of infrastructure and communications

ECONOMIC AND ECOLOGICAL ADVANTAGES OF COGENERATION USE IN POWER INDUSTRY

Irina Sotnyk, Vladislav Mandryka
Sumy State University, Sumy, Ukraine

In the developed countries, the main source of the environmental contamination is industry. There is a set of plants, factories and other industrial facilities, which pollute environment in various ways. One of the key industrial sources of environmental pollution is the energy sector. At extraction, processing and combustion of fuel, pollutants and redundant heat are released into the air and contaminate water and land resources. According to the expert estimations, Ukrainian energy sector provides about 30% of all environmental pollution volumes in the country. The world average for this figure is 20% [1].

Partially it is possible to solve the problem of environmental pollution by applying technologies of the combined production of heat and electricity named as cogeneration. These technologies have been existed for a long time, but till today all their advantages are not widely used. However, the use of cogeneration is justified from both an economic (significant reduction in fuel use, reducing the need for new generating capacities, saving operating and capital costs in energy production) and environmental point of view (reducing the energy facilities burden on the environment).

Conventional thermal power stations generate additional heat pollution because they throw out in atmosphere the heat generated in the production of electricity. The result of overheating of the atmosphere is aggravating the greenhouse effect. Technical efficiency of traditional power generation technology for thermal power plants is about 35%. A similar situation is observed in the production of the thermal energy, where the losses reach 20% or more. If we compare separate production of electricity and heat with the cogeneration technology, then the generation of the same amount of energy by cogeneration power plant can provide fuel savings of about 40% and, respectively, reduce emissions of harmful substances into the atmosphere [2]. Important advantages of cogeneration technology are the high fault tolerance that allows not to interrupt the process of power generation and almost complete automation that considerably reduces costs of operation and maintenance. In addition, cogeneration plants can run on

alternative energy sources, such as peat, wood wastes and biogas obtained by recycling or from water treatment plants. This allows the use of cogeneration technologies not only in the central heating systems and electrical grids, but also as an independent source for individual households.

By the end of 2014Y in Ukraine about 20% of all thermal energy was produced at combined heat and power plants – usually large thermal facilities citywide that use cogeneration cycle. The average power of 23 domestic cogeneration plants was about 200 MW which compared with an average power of conventional thermal power plant of 2000 MW is relatively small [3]. In Europe, utilization rate of cogeneration plants is also close to 20% of total energy production. Such a low percentage of application of cogeneration technologies is explained by the relatively low power of these installations that can not always fully meet the needs of the consumer. It is caused by the design features of cogeneration systems, which generally use gas and steam turbines with capacity of 30 MW and above. At low powers there are used gas-piston engines. They have larger term of operation compared with turbines and several times wider load range, in which high efficiency is not lost. Apart from this, the system with gas-piston engine has a smaller size and can be installed in close proximity to the consumer [4].

Thus, the strong growth in use of cogeneration plants in the world is now tempered by their relatively small power and high price. For today, with all their technical efficiency and environmental friendliness, these facilities are too expensive to operate and repair. Because of these problems, the cogeneration is not widely used in the world and in Ukraine in particular.

Nevertheless, today the cogeneration is one of the most environmentally and technically efficient technologies of heat and electricity production. Despite the significant capital costs and relatively low power, the cogeneration facilities have a number of indisputable advantages over conventional thermal energy production, such as:

- average payback period of the installation within 3 years [5];
- high efficiency;
- eco-efficiency;
- reducing the fuel consumption in comparison with conventional technology;
- increased reliability and safety of the installations;

- cost savings in energy transportation.

All these advantages give reason to believe that solving the problem of low power of cogeneration installations by increasing the number of turbines or by increasing the overall plant efficiency and reducing capital and operating costs make possible to apply cogeneration as the primary method of energy production in Ukraine and in a whole world.

References:

1. Sources of environmental pollution, 2011 [Electronic resource]. – Mode of excess: http://environments.land-ecology.com.ua/uchrezdenija-kieva/1709-istochniki-zagryazneniya-okruzhayushhej-sredy.html.
2. Combined heat and power, 2008 [Electronic resource]. – Mode of excess: http://www.2g-cenergy.com/pdfs/more-chp/CHP%20Report%20-%20International%20Energy%20Agency.pdf.
3. List of the companies - Thermal power plants – Ukraine, 2014 [Electronic resource]. – Mode of excess: http://ua.kompass.com/a/электростанции-тепловые-теплоэлектростанции/0731001/.
4. Cogeneration gas-piston combined heat and power plants (MWM), 2014 [Electronic resource]. – Mode of excess: http://www.ges-ukraine.com/maininfo_20.html.
5. Vorontsov S. What is cogeneration? / S. Vorontsov // Business and safety. – 2002. – No. 6. – P. 25–27.

CRITICAL CHANGING GROUNDWATER LEVEL IN UKRAINIAN INDUSTRIAL CITIES

Elena Strelnikova, Elena Serikova
A.N. Podgorny Institute for Mechanical Engineering Problems of the National Academy of Sciences of Ukraine

Abstract: Paper treats the issue concerned with drastic increasing of groundwater level through the influence of technogenic factors of urban environment. The aim is to present possibilities of proposed mathematical model of prediction of groundwater level increasing for different areas of urban territory.

Keywords: mathematical modeling, flooding, groundwater level.

INTRODUCTION

Most objects of the Ukraine water supply system are in a poor technical condition. Leakages from water supply systems, sewerage

systems and from thermal networks in some regions have already reached 40-50 percent of water supply volume. Leakages from water communications lead to flooding and change qualitative composition of groundwater. In the industrial cities of Ukraine additional groundwater replenishment is many times greater than the natural infiltration of precipitation [4]. For example, for Kharkiv city the additional groundwater replenishment was 210 000 thousand m^3/year (575 300 m^3/day) in the period 2005-2014 years [1, 4]. Compensation of additional groundwater replenishment volume due to water abstraction for drinking and technical needs does not usually occur because of poor water quality of shallow horizons. Total water abstraction from the first of surface aquifer in the period 2005-2014 years is averaging 19700 m^3/day for Kharkiv. This difference in credit and debit water balance technogenic components is compensated by transpiration only when the ground water level closed to surface, i.e. in concrete flooded conditions [5].

Flooding processes currently do not have adequate expression by mathematical modeling. The issue of forecast has been solved by Averyanov, Muftahov, Sologaev, Polubarinova-Kochina, Verigin, Telima, Kremez etc. in incomplete statements, in different cases excluding additional groundwater replenishment, dependency of time, transpiration and evaporation [2, 3, 6].

MATERIALS AND METHODS

On the example of typical industrial city of Ukraine, Kharkiv for the groundwater regime prediction included changing water management conditions the mathematical model has been developed. Developed model considers all important water balance components. Such as, natural infiltration of precipitation, additional groundwater replenishment, transpiration, evaporation and water abstraction. The mathematical model describes by a boundary value issue for a non-stationary differential equation of filtration pressure. The solution of the boundary value problem is obtained in the form [5]:

$$h(x,y) = \sum_{n=1}^{\infty} D_n \sin\left(\mu_n x\right)\cos\left(\frac{\pi n \gamma}{2(l+a)} y\right)$$

h – groundwater level; l, l considered plot of territory, where from l to $l+a$, transpiration and evaporation are took place; γ – coefficient of anisotropy; D_n – coefficients which are determined by the technogenic impacts.

Calculations and visualization of the model were implemented by the software package Maple.

CONCLUSIONS AND DISCUSSION

The forecast based on calculations of groundwater level changing of Kharkiv for the next 50 years has been provided in the paper. The groundwater level will be increased to average 0,03 m on the 1st year and 1,5 m on the 50th year.

Developed model presented 2 ways of water balancing of debit and credit water balance components for the period 2005-2014 years. They are decreasing additional groundwater replenishment in 2,4 times, i.e. additional groundwater replenishment must be reduced by an average of 240,000 m^3/day and increasing of water intake from the first of surface aquifer in 15 times, i.e. increase the average water intake of 300 000 m^3/day. The sum of these amounts of water is 540 000 m^3/day. Because of bad conditions of groundwater at Kharkiv, waters to intake could be used for technical purposes. For example washing roads, pavements, automobiles, making skating rinks, watering plants, in construction, in industrial water-cooling and water-thermal systems, for firefighting have been proposed.

References:

1. Howard, K.W.F., 2007. Urban Groundwater – Meeting the Challenge IAH-SP Series, Volume 8. Taylor & Francis. Howard, K.W.F. (Ed.), 307pp.
2. Kremez V. S., Buts Y. V., Tsymbal V. A., 2003. Actual issues of modeling flooding territories and other dangerous processes concerned with groundwater regime changes. In: Mitropolsky O. (Ed.): Environmental Ecology and Life Safety №6, Kiev, pp.56-64.
3. Pshinko A.N., Belyaev N.N., Pokutneva L.V., 2008. Numerical modeling of flooding process. In: Myamlin S. V. (Ed.): Bulletin of Dnepropetrovsk National University of Railway Transport named after Academician V. Lazaryan №25, Dnepropetrovsk, pp.84-87.
4. Serikova E.N., Yakovlev V.V., 2011. Additional infiltration to underground waters of big cities territory (on example Kharkiv region). In: Babaev V.N. (Ed.): Proc.: Municipal Economy of Cities №97, Kharkiv, KNAME. pp. 344-348.
5. Serikova E.N., Strelnikova E.A., Yakovlev V.V., 2014. Mathematical modeling of groundwater level changing in cities taking lead factors of the water balance. In: Bardachov Y.M. (Ed.): Bulletin of Kherson National Technical University №4 (51), Kherson, pp. 182-191.
6. Telima S.V., Revyakina N.Y., 2011. Model research processes of flooding by groundwater of urban areas in modern conditions. In: Voloshkina O.S.,

Trofimchuk O.M. (Eds.): Proc.: Environmental Safety and Nature Resources №7, Kiev, pp. 45-63.

EVALUATION OF THE COEFFICIENT ACCOUNTING OF ASSIMILATIVE PROPERTIES OF NATURAL ZONES OF UKRAINE FOR THE DIFFERENTIATION OF RATES OF ECOLOGICAL RENT TAX

Olena Suhina
State Institution "Institute of environmental economics and sustainable development of the National academy of sciences of Ukraine", Kyiv, Ukraine

For evaluate of the fair size of a payment for use by economic entities of the assimilative potential of the nature (or services of ecosystems) it is expedient to evaluate it through an estimation of the ecological rent [1] which is appropriated now by users of natural resources. The author has named this payment – the ecological rent tax (payment). For its differentiation it is expedient to evaluate coefficient of the account of assimilative properties of natural zones of Ukraine, and also for an establishment of rates of the ecological tax when the base of the taxation will be changed. This theme is also actual as in a control system of an environmental safety more and more than attention it is paid to its regionalization.

The purpose of this scientific research is to contribute to improvement of a condition of an environment by an establishment of the valid payment for used by users of natural resources the assimilative potential of an environment, differentiating it by means of an establishment of the coefficient of the account of assimilative properties of natural zones of Ukraine.

The ecological capital of different natural zones forms and the differentiated ecological rent. For differentiation of rates of the ecological tax on a rent basis expedient there is an evaluation of the coefficient of the account of assimilative properties of natural zones of Ukraine. One of criteria of an evaluation of cost of the assimilative potential of an environment will be a belong of the enterprises to natural zones (the account of assimilative properties of natural zones of Ukraine), including depending on development of an organic life in soil and water bodies. In

calculations it is expedient to evaluate the corresponding coefficient. In Ukraine there are the following natural zones: mixed (coniferous and deciduous) woods, forest-steppe, steppe, the Ukrainian Carpathians, Crimean mountains, and also water areas of the Black and Azov seas. The UNESCO in 2014 has confirmed a belong of Crimea to Ukraine.

By scientists it is certain, that woods (among them – tropical) have the greatest assimilative potential. The high assimilative potential forests of temperate latitudes have, wetlands, ecological systems of deltas. Low assimilative potential characteristic for tundra, deserts, semideserts. Thus, if to take for coefficient of the lowest level of the assimilative potential desert or tundra (0,1), and the highest – a tropical forest (1,0) in Ukraine the corresponding coefficient of natural zones will change within the limits of: from 0,4 up to 0,8 (table 1). In Ukraine it is expedient to consider natural zones of all natural zones of the Earth as industrial activity can lead to desertification of territories even with high assimilative potential of an environment, and about this a number of scientific articles (for the decision of these problems and the prevention of desertification of territories it is expedient to implement to corresponding legal documents of position of "The United Nations Convention to Combat Desertification in Those Countries Experiencing Serious Drought and/or Desertification, Particularly in Africa (UNCCD)") is already written. Possible also more detailed division of natural zones: for example, woods – on coniferous, deciduous, mixed, etc. (table 2).

Thus, for northern administrative regions of Ukraine coefficients will make from 0,6 up to 0,8; for central – 0,4-0,6. It means, that northern and central administrative regions of Ukraine are in natural zones with mainly high and an average level of the assimilative potential of an environment.

Northern and central regions of Ukraine are located in a southwest of the East European Plain and are in a mixed-wood coniferous-deciduous damp, moderate-warm zone (a significant part of Zhytomyr, Kyiv, Chernihiv, Sumy regions); forest-steppe damp (in the West) and to the insufficiently humidified warm zone (a part of Zhytomyr, Kyiv, Chernihiv, Poltava, Sumy, Khmelnytsky, Vinnytsia, Cherkasy regions and an insignificant part of the Kirovograd region) and steppe droughty very warm zone (a prevailing part of the Kirovograd region and a part of the Poltava region). That is these administrative regions are in three natural zones of Ukraine, except for the Ukrainian Carpathians and Crimean mountains. The

corresponding parameters can be used and for other administrative regions of Ukraine which are in these natural zones.

Table 1 - The coefficient of the account of assimilative properties of natural areas of Ukraine for evaluate of rates of the ecological rent tax and differentiation of the ecological rent

Natural area	The coefficient of the account of assimilative properties of natural areas (ecosystem services)
Mixed (coniferous and deciduous) forests	0,8
Forest-Steppe	0,6
Steppe	0,4
Ukrainian Carpathian Mountains	0,6
Crimean Mountains [1]	0,4
The water area of the Black Sea	0,7
Aquatoria of the Azov Sea	0,7

Source: It is made by author Suhinoyu O.M. by own calculations and according to geographical maps "Physico-geographical regionalization of the world" and "Physico-geographical division into districts of Ukraine" [2].

Table 2 - The coefficient of the account of assimilative properties of natural areas in the rate of the ecological rental tax for administrative regions of Ukraine (on an example of the Sumy region)

Geographical regions
1. *[5]* Novgorod-Seversky Polesie (Polesie Province of mixed coniferous-forest-wide-moist, warm moderately zone (0,8));
2. *[20]* North Poltava region high (Left-Bank Dnepr forest-steppe steppe province wet (in the west) and not humidified warm zone (0,6));
3. *[23]* Sums slope-highland region (Middle wet forest-steppe steppe province (in the west) and not humidified warm zone (0,6));
4. *[22]* East Poltava region high (Left-Bank Dnepr forest-steppe steppe province wet (in the west) and not humidified warm zone (0,6)).

Source: Compiled by author Suhinoyu O.M. by own calculations and according to a geographical map "Physico-geographical zoning Ukraine" [2].

[1]The UNESCO in 2014 has confirmed a belong of Crimea to Ukraine.

Notes: * Physico-geographical areas are put down in that order, they occupy what area of the region (from the greater area to smaller) (in square brackets there is number of natural area on a geographical map).

Thus, proceeding from calculations and the established sizes of coefficient of the account of assimilative properties of natural zones of Ukraine for differentiation of rates of the ecological rent tax (payment), in Ukraine meanwhile there are natural resources with assimilative properties, but for their recovery it is expedient to enter such payment (in particular, the ecological rent tax) which would allow to improve a state of an environment, and it would be a principle: economy – for environmental protection.

References:

1. Сухіна О.М. Розвиток теорії екологічної ренти та справедливого її розподілу / О.М.Сухіна // Економіка України. – 2014. – № 7. – С. 49–68.
2. Фізико-географічне районування України : географічна карта [Електронний ресурс]. – Режим доступу: https://www.google.com.ua/search?q=

ECOLOGICAL AND ECONOMIC ASPECTS OF RESOURCE PROVISION OF MINING ENTERPRISE

Olexandra Tymoshenko
National Mining University, Dnipropetrovs'k, Ukraine

Mining companies use ore reserves incompletely, that is due to, on the one hand, unfavorable geological conditions of ore deposits occurrence, on the other – the low and slow-performing solution for complete and integrated use of existing reserves.

The problem of resource provision on mining enterprises may be partially solved through using production and consuming wastes. The biggest volumes of wastes are formed on enterprises of mining and enrichment industry. These wastes may be used on theirs mining and processing companies (MPC), which increased the level of commercial elements extraction.

While very low effectiveness and slowly solving of problems belonging to absolute and complex using of mineral products deposit, our country lose a significant amount of natural recourses for producing products. Even in process of stripping and system of deposit projecting are

provided mining looses of iron ore reserves on some mining horizons at 0,8…8,2%, although actual looses are much bigger, because low-metal content ore in final pit boundary often extract as stripping soils.

Imperfection of deposit stripping schemes, transport schemes and systems of mining, technologies of ore processing and significant level of depreciation in active part of fixed assets in deepening open pits and mines complicate providing of production processes with iron ore. This causes an implementation of measures for providing an operation reliability of mining equipment, necessary fund-time of its working, its size and composition of production areas. That is why the planned production program of MPC must be resource-reasonable, i.e. definition of its production capacity providing, labor providing, material and investment resource providing. For capacity maintenance should be viewed such measures for providing necessary volumes and quality of iron ore:

– measures for liquidation of “bottle necks” during planned year;

– necessary quantity of equipment or its changing for more productive;

– redistribution of operations between some groups of technological equipment and between production processes;

– possibility of increasing quantity of shifts for equipment or bay that limits production.

One part of measures mentioned above is in the strategy plan of enterprise development on the level of current problems, the other part is assumed in the current plans, based on both changed conditions of functioning and production organization. For example, a “bottle neck” of Tsentral'nyy MPC still stays stripping operations and also high production costs. For improvement this situation it is planned modernization and restoration mining and transportation techniques and crushing-and-dressing equipment. Processes that are related with rising operational efficiency and, namely, program “lean production” are implemented in the enterprise.

Within this program, teams of continuously improving are created, which develops measures of detections and removal of “bottle necks”, seeking for economical reserves.

During work of mining enterprise with high productivity, iron ore reserves in out of project open-pit boundary mined in a short-term. This leads to shortage enough time to recoup technological equipment by itself, physically or moral depreciation, and caused rising of production costs. It means that too high level of productivity have the same negative effects.

Resource providing of production – is an important factor of product competitiveness for enterprises of mining industry. Companies try to stimulate creation and realization of investment projects of equipment modernization and technologies with the aim to reduce power consumption of operations in mining and processing production. In 2010 – 2014 years the basic way of modernization was: reconstruction mining and transportation equipment for increasing of commercial product quality (iron-ore concentrate, agglomerate, iron-ore pellets); construction of blocking for tailing dams and dumps, recycling water supplying and complex ecological measures.

The problem of the greatest satisfaction of consumer demand on iron-ore products (IOP), leads to the problem of excessive accumulation of different wastes of metallurgical industry in Ukraine, especially of mining industry. In general, near 18% of waste from coal mining and iron ore production, 10% of smelter slags are created each year in the country, but are utilized only 20 – 43% of its annual volume. By order [1], it is necessary to implement till 2020 year an ecological and safe technologies of mining operation, and also obligatory recultivation and ecological rehabilitation of territories, that was violated as a result of production activity, in particular, to adjust size of the recultivated areas by 2020 year to 4,3 ths. hectares.

It means that for exploitation and revision of deposit it is needed to justify and implement technological complexes of mining operations, which will be turned, primarily, on fullness extraction iron ore materials from the subsurface resources, and high level of its usage in the process of production IOP. Such approach will contribute for improving of environmental conditions of mining enterprises and nature in mining region.

Mining companies and agglomerating plants have a significant influence on the environment (emissions of pollutants into the air, sullage, large-scale blasts in open pits, seismic load, mine drainage waters). Annual volumes of storage stripping soils are 70 millions m^3, including processing wastes and draw rocks – about 52 million tones, disturbed soils more than 33 ths. hectares, 100 hectares from which are recultivated each year. Examples of main ecological measures, which are predicted by enterprises of mining industry on short-term perspective, are presented in work [2]. Any of measures, that increase the fullness of usage of ore reserves in

deposit, will decrease the mentioned above volumes of violation of the environment.

References:
1. Постанова Кабінет міністрів України від 8 грудня 2009 року «Про схвалення Концепції Державної програми покращення екологічного стану населених пунктів розташованих поряд з підприємствами гірничо-металургійного комплексу до 2020 року». [Електронний ресурс]. – Режим доступу: http://zakon4.rada.gov.ua/laws/show/1029-2009-р – загол. з екрану.
2. Варава Л. М. Концептуальні положення модернізаційної політики у гірничорудній підгалузі України / Л.М. Варава, Арутюнян А.Р., Варава А.А. // [Електронний ресурс]. – Режим доступу: http://www.economy.nayka.com.ua/?op=1&z=2695 – загол. з екрану.

EDUCATION AND AWARENESS CAN SAVE OUR ENVIRONMENT

Martins Uwayo
U&I FOR AFRICA, Rwanda

Environment and education are both vital elements of human existence that can be used to enhance the quality of the human condition. The environment provides the space and essential ingredients for life where humans are able to interact with each other, with the infrastructure and with the environment itself. On the other hand, education is the process and result through which teaching and learning operate. Through this process, knowledge, values, attitudes and skills are imparted to the learner. With the growing awareness of these environmental problems, consideration should be given to the types of educational programmes that can meet the requirements for creating a sustainable world.

There is no doubt that education is an essential component of development and one of its preconditions. In Rwanda, environmental education has been given a high importance and place in educational reform and innovation due to the pre-eminence of the natural environment in everyday life and culture.

Thus, it is time to give careful thought to what type of integrated environment-based education will be most appropriate and how education

can best address the current problems in each country. Do people need an understanding of ecological concepts or information about what is causing the problem? Are there specific critical thinking skills such as problem-solving or decision-making that can help them understand and tackle the problems?

What are the Causes and Consequences of Environmental Problems?

The pressures on the world's environment and ecosystems are numerous and come from myriad and diverse sources. Natural resources, land, water, forests and various animal species are being degraded or lost at an alarming rate in many places throughout the world. The reasons for the magnitude and rate of this destruction are many and complex. They include poverty, greed, untenable economic models, mismanagement of resources, lack of adequate education and trained personnel, under-development, deforestation, illegal dumping of hazardous wastes, global warming, the depletion of the ozone layer, pollution and many more. Crop yields are affected, as well as forests and jungles. We lose natural habitats, and the plants and animals that were once there. Also, newer infectious diseases are formed, and older ones spread. Air quality is also negatively affected. Solutions to these problems are ongoing, however slow.

Essentially, an over-emphasis on economic development without environmental system considerations lies at the heart of why our planet's environment is in such peril.

How Can Education Help Solve the Problems, Both Now and in the Future?

In thinking about local environmental problems, we should make sure to consider the role students play in causing a problem and the role they could play in helping to solve the problem. For example, are they part of the problems now? How are their families connected to the problems? How well do they understand the problems and from what perspective? Are they motivated to help find solutions? Have any students taken part in efforts to find solutions?

It's also important to think about the future role our students will play in the community.

Will they be farmers or fishers, industrial workers or white-collar workers, religious leaders or politicians? Will they live in the capital city, in villages, or on small farms? Or will they be nomads? Will they hunt, gather firewood, vote in local and national elections, and so on? How will they

relate to the environmental problems confronting the country and community, and how will they be able to help solve the problems?

We should also consider how students can help solve environmental problems now. Can they plant trees, design educational exhibits for the community, write to their government representatives, or help others learn how to plough on the contours?

Guidelines: Steps for Incorporating Environmental Protection into Science and Social Studies

All these questions assume a different form of “literacy” than has been defined in the traditional sense. We need an “ecologically focused literacy” if we are to conserve and maintain an environment that sustains the human species. We must teach youth what or who is causing the problems, what the consequences (ecological, health, social and economic) are, how the problems can be solved, and what is preventing these solutions from being implemented.

It can be conclude that everyone should take responsibility for environment protection. Thus, I am firmly convinced that us students could play an important role in this now and in the future.

CHARGING OF THE NICKEL CATALYST WITH THE "JET" METHOD AS A COMPONENT OF THE SUSTAINABLE DEVELOPMENT OF UKRAINIAN CHEMICAL INDUSTRY

Valerii Vladimirov, Kateryna Ivanova
LLC “Catalyst charge”, Ukraine

The sustainable development of the chemical industry of Ukraine is appreciably complicated with the forced orientation of the domestic economy to the needs of the military field. The search of the methods of the industry's transition to the principles of green chemistry becomes especially relevant in such circumstances. Green chemistry aims to minimal using of hazardous substances in the industry. Today one of the most important chemical products in Ukraine is the group of mineral fertilizers which are 1.9% of the total volume of the country’s exports (based on the data of January-February 2015), which corresponds to the second place in the list of chemical and related industries exports. On the other hand, the Ukrainian part in the world market of nitrogen fertilizers is about 8%.

Keeping this part needs continuous improvement of the ammonia synthesis process as the basis for the nitrogen fertilizers production.

Devoted to this problem analysis of publications, allows to detect the preferential orientation of production innovations to reduce the consumption of natural gas, the main raw material for the production of ammonia. In addition, some companies introduce the development aiming at the consumption of recycled water reducing, the process steam recycling, the output of electrical energy on its basis and other fields of energy intensity production reducing.

The problems of the primary reforming of natural gas catalyst consumption reducing stand aside. In this catalyst nickel is the main active substance, which is prevalent in the environment at low concentrations. The prevalence of nickel causes its harmless substances erroneous labelling. At the same time, the World Health Organization (WHO) names Nickel one of the most dangerous environmental pollutants, i. e., ecotoxicants. Excess of nickel in an organism can provoke skin dermatitis, asthma, the increase of some central nervous system excitability, blood pressure drops, nose bleeding, eye diseases, brain and lung swelling or even cancer, nasal mucosa or sinuses cancer.

The present level of the chemical technology development cannot completely eliminate nickel catalysts for ammonia synthesis using. The way out of this situation is proposed by us the nickel catalyst longer lifetime (about 40%, according to our experience) at the expense of its patented "jet" method's charging with the reforming pipes layers ordering. It will also make possible a number of technological advantages, such as:

- preventing of localized pipes overheating owing to resulting structure of the catalyst homogeneity;
- the increase of the catalyst structure stability, excluding the shrinkage during the furnace operation;
- the temperature of pipes lowering due to their walls higher heat transfer by radial heat transfer improving;
- elimination of the catalyst crumbs and dust sifting needing due to perfoming of these operations during catalyst charging;
- the catalyst charge time reduction up to 4 days by the process in a single stage carrying out and the preparatory steps exception.

The described technological advantages of the "jet" method provide an supplementary increase of the resulting ammonia competitiveness, and as a result, nitrogen fertilizers which are produced on its basis. On one's

part, it will not only keep our country's part in the nitrogen fertilizers world market, but it also will avoid a number of internal social problems resulting from the possible decline in employment and some reduction in payments to the national budget (as well as from foreign trade enterprises). Simultaneous the implementation of environmental, economic and social vectors of the industry growth on the basis of this development is a real component of the sustainable development transition.

ORIGIN AND REASONS OF SYNERGY ESTABLISHMENT

Yakimtsov V.V.
Ukrainian National Forestry University, Lviv, Ukraine

In modern science there are several definitions of synergy as a science of self-organization. Well-known scientist I. Pryhozhyn, one of the founders of synergistic research, believes that this science should be defined as "theory of dissipative structures", while in the US the same science is called a "theory of dynamic chaos" (M. Feigenbaum), in Latin America - theory autopoeza (self-construction, self-reproduction of living beings) (U.R. Maturana). In our literature it becomes increasingly oftener found and more applied.

The ambiguity of terms and definitions is not coincidental. Synergy is a young science, characterized by deep learning of phenomena and comprehensiveness. It requires both philosophic understanding and knowledge of modern mathematics, physics, biology, computer science, human and society sciences, knowledge of modern technology of production of consumer goods and so on.

In the 80-ties of the last century synergy gained considerable impetus helped by opening opportunities and ways to transition from order to chaos and vice versa. Eminent scientist D. Ryuel noted the fact that the study of chaos as a phenomenon has become necessary in all fields of science.

Today, scientists in all fields of science point out, that modern ideas for solving problems of modern science have had their philosophical and sometimes practical implementation in the works of scientists, who lived many centuries ago. Ancient philosophical movements of Eastern world, Asia, Tibet, have an extensive theory of chaos, self-organization and so on. There is a fair question about the validity and necessity of comprehensive

development of such theories with the help of modern mathematical and physical, computer-oriented methods. This situation makes it possible to conclude on common ideas of mankind for solving many problems and phenomena. Thus, the idea of common origins and ideas of synergy, that formed both thousands years ago and now, today, become obvious.

The first reason why the synergy, which is built on the achievements of modern science, uses and draws conclusions basing on centuries-old knowledge is a common subject of analysis. Complex systems of self-organization are studied. Internal characteristics of the system acquire special meaning as a source of self-development.

The second reason is a new look at a problem of the whole and partial. Philosophers of ancient Greece believed that part of a whole is much simpler and if you learn its properties you can understand the properties of the whole.

However, in their further researches, scientists have concluded that, generally, object (process, phenomenon, etc.) acquires new qualities and properties, other than those that its part has. Therefore there is a need for new scientific approaches based on a study of the impact to the whole of every its part.

The third reason of synergy establishment is the need to develop such strategy of study of complex systems (which usually describe phenomena, processes), which would coordinate methods for studying of simple systems in accordance with the laws of nature with the methods of studying of complex systems and the ability and need to anticipate and predict the development of phenomena, events, and their results.

In synergy there are equations in partial derivatives widely used. These equations are a tool to study processes, where parameters vary not only in time but also in space. Therefore, any field of study can be the area of research of synergy. A common feature of phenomena and processes, that synergy studies, is examination of irreversible processes dynamics and fundamental innovations emergence.

However, status of synergy as a science still gives rise to a variety of opinions and attitudes of scientists. According to Yu.L. Klimontovych, author of the theory of statistical self-organization: “Synergy is not a new science, but it is a new direction in science that brings together diverse fields of expertise. The purpose of synergy is to identify common ideas, common methods and common patterns in the various fields of natural science and sociology.” In 1982, associate of USSR Academy of Sciences

M.V. Valkenstein, on the first USSR Conference on synergy, identified synergy as a new world view that is different from the Newtonian classicism.

Ability to design and calculate mathematically complex system is closely related to the computing processes and computer technologies. Thanks to these latest achievements, prediction horizons have expanded greatly and provide opportunities for the researcher to ask and get the desired results in the required horizons, logs, and sometimes in quite distant future.

GREEN TECHNOLOGIES AS AN OBJECTIVE NEED OF UKRAINIAN REGIONS' SUSTAINABLE ENERGY

Anastasiya Yudina
National Technical University of Ukraine "KPI", Kiev, Ukraine

Today, one of the major global issues the humanity is facing is an issue to provide a sustainable economic World and national development with the needed fuel and energy resources and, respectively, to provide global and national energy safety. For Ukraine today the very topical is GDP radical energy and resource intensity decrease and, as a consequence, strengthening of independence and increase of economy's competitiveness. Energy and environmental problems faced by Ukraine today are the result of long-term neglecting of the laws of development of relationship between a human being and nature, these are lessons of inefficient, irrational, wasteful use of natural energy resources by humans, as well as unwillingness and inability to use Green technologies [1]. Green technologies do not only help to reduce greenhouse gas emissions but are developed for a more efficient use of available energy resources, water and various kinds of raw materials. Green technologies can be a part of solving the problems of traditional energy carriers crisis (when significant fluctuations affect the availability of thesis resources), the crisis of food availability; they help to reduce greenhouse gas emissions and gain increasing importance in the coming decades. Analyzing green technologies as phenomena, one should note that at this stage in most countries only certain projects can be observed, while in the USA, EU and

certain Asian countries trends and even industry reviews can be already singled out [2]. Only several projects and local initiatives could be seen in Ukraine. These initiatives will undoubtfully become a part of the World's transition to a green economy paradigm, as well as the fact that in Ukraine the share of these technologies will be dominated and used. Ukraine has one of the highest green house gases (GHG) emissions per unit of GDP in the World and is a country where certain environmental initiatives are very slow to introduce, considering not only the need for funds for their implementation, but also on the inertia of consumers. In Ukraine the main types of green technologies must be: renewable energy sources (solar and wind energy, biomass, hydropower, etc.); green construction and green design, changes in the infrastructure; water purification, green information technologies (IT); clean and improved transportation. This list can also include different types of waste disposal (paper, industrial, solid, etc.), energy saving technologies, energy storage technologies (batteries), the concept of green offices and buildings and so on.

Wind power potential is estimated at 20-30 mln tons of c.e. a year. Network wind power plants are projected to be built with total capacity of 2000 MW, which will provide energy savings of 1.8 mln tons a year. Ukraine has substantial wind power resources: annual technical wind energy potential is 30 billion kwh. However, according to the level of wind energy deployment Ukraine is ranked as only 21 number among the European countries and 30^{th} among the World countries. For the development of wind power inventory sites suitable for efficient wind farm construction needs to be made. Map of the level of natural wind power potential of Ukraine in view of industrial and autonomous wind power throughout Ukraine requires additional research and refinement.

Ukraine has favorable natural and climatic conditions for solar energy. For example, solar energy reaching us annually is estimated at 400 mln tons of c.e. Average annual total solar radiation arriving at 1 m^2 of surface in Ukraine is in the range from 1070 kWh/m^2 in northern Ukraine to 1400 kWh/m^2 and more in AR Crimea. These energy parameters of solar radiation access are fundamental in the implementation of solar energy equipment and are recommended for use, primarily, by solar energy facilities designers to select the type of equipment (solar thermal, photovoltaic systems) and to establish their optimal power and time of efficient operation of equipment in a particular area.

Energy potential of small rivers is estimated at 50 billion kWh of electricity per year, which is four times more than the average annual production of entire HPP cascade on the Dnieper river. The capacity of small, mini and micro-HPP can reach 600 MW, which will provide savings of 17 mln t. of c.e. At the end of 2008, 78 small HPP with capacity of about 110 MW were in operation, annually producing 300-390 mln kWh of electricity. They have fairly guaranteed renewable energy resource, meeting the complex of ecological requirements to preserve biological, geomorphological and hydro-chemical processes in the canal and river valleys. Besides, small hydropower contributes to the solution of other important economic problems: water supply, fisheries management, managed protection of the neighbor areas from flooding, transfer of these lands from the category of non-guaranteed agricultural into the category of guaranteed agriculture due to the irrigation.

Potential of geothermal energy are primarily thermal waters and the heat of heated dry rocks. Besides, promising for use in the industrial scale include the heated underground waters resources that are brought off with oil and gas with the existing oil and gas wells. The most promising for mining of high-grade energy resources is the Carpathian geothermic region, having high geothermal gradient and, respectively, high-temperature rocks. Heat recovery is also an energy-saving technology of the diversified application with energy-saving potential at the level of 7-8% of the volume of energy resources consumed, or 16-17% of total energy-saving potential. Distribution of this potential at implementation objects is appraised in the following way: 50% - industrial and heating boilers, 25% - industrial furnaces and 25% - other equipment. Recovered heat can be used for heating and hot-water supply of satellite towns of industrial enterprises.

In Ukraine impediments to the implementation of green technologies are certain political and economic risks that are inherent in transforming society, business, thinking of consumers, including [1]: lack of favorable economic and regulatory conditions for investments in low carbon and resource saving technologies; subsidies to traditional technologies, which using traditional energy sources and making a negative impact on the environment, proved to be relatively reliable, but with the significant negative externalities; limited willingness of society to adopt new technologies; especially inertia and limitations of the current educational system, excellent economic opportunities for the introduction of new technologies in the context of the needs of different technologies by

different countries (depending on which country provided the resources, and what resources are missing); high riskiness of investing in new technologies, as well as the adverse economic and regulatory situation in many countries, which make the venture capital investments even more risky.

References:

1. Karaieva N. V. Global energy conflicts and sustainable development risks caused by the climate changes [Internet source] / N. V. Karaieva // Economic Processes Management: International Scientific E-Journal. – 2014. – № 3. – Access mode: http://epm.fem.sumdu.edu.ua/download/2014_3/2014_3_3.pdf.

2. Karayeva N. V. Formuvannya strategichny`x napryamiv perexodu do ny`z`kovuglecevogo rozvy`tku Ukrayiny` na osnovi ekspertnoyi ocinky` / N. V. Karayeva, M. V. Berezny`cz`ka // Ekonomichny`j visny`k Nacional`nogo texnichnogo universy`tetu Ukrayiny` "Ky`yivs`ky`j politexnichny`j insty`tut", 2014. t.# 11.-S.39-46.

Наукове видання

Економіка для екології

Матеріали
XXI Міжнародної наукової конференції
(Україна, Суми, 6–7 травня 2015 року)

Дизайн та комп'ютерне верстання
Андрія Іскакова

Economics for Ecology

Materials
of 21st International Scientific Conference
(Ukraine, Sumy, May 6–7, 2015)

Design and desktop publishing by
Andrii Iskakov

Стиль та орфографія авторів збережені.

Формат 60x84/16. Ум. друк. арк. 6,28. Обл.-вид.арк. 7,24. Тираж 300 пр. Зам. № .

Видавець і виготовлювач
Сумський державний університет,
вул. Римського-Корсакова, 2, м. Суми, 40007
Свідоцтво суб'єкта видавничої справи ДК № 3062 від 17.12.2007.


Economics for Ecology
ee
21st
ISCS 2015
May 6-7