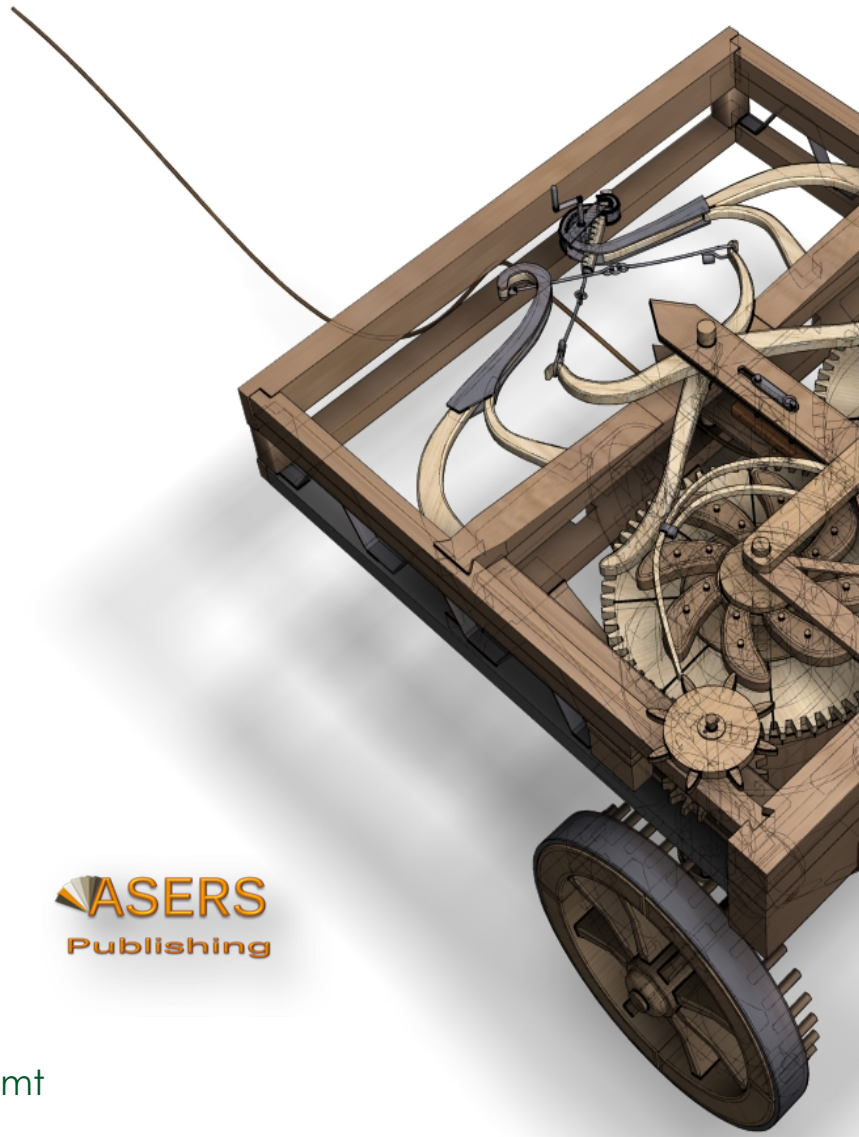
ASERS

Journal of Environmental Management and Tourism



Biannually
Volume VIII
Issue 1(17)
SPRING 2017

ASERS Publishing

ISSN 2068 – 7729
Journal DOI
http://dx.doi.org/10.14505/jemt

SPRING 2017
Volume VIII
Issue 1(17)

Editor in Chief
Ramona PÎRVU
University of Craiova, Romania

Editorial Advisory Board

Omran Abdelnaser
University Sains Malaysia, Malaysia

Huong Ha
University of Newcastle, Singapore, Australia

Harjeet Kaur
HELP University College, Malaysia

Janusz Grabara
Czestochowa University of Technology, Poland

Vicky Katsoni
Techonological Educational Institute of Athens, Greece

Sebastian Kot
Czestochowa University of Technology, Institute of Logistics and International Management, Poland

Nodar Lekishvili
Tibilisi State University, Georgia

Andreea Marin-Pantelescu
Academy of Economic Studies Bucharest, Romania

Piotr Misztal
Jan Kochanowski University in Kielce, Faculty of Management and Administration, Poland

Agnieszka Mrozik
Faculty of Biology and Environmental protection, University of Silesia, Katowice, Poland

Chuen-Chee Pek
Nottingham University Business School, Malaysia

Roberta De Santis
LUISS University, Italy

Fabio Gaetano Santeramo
University of Foggia, Italy

Dan Selişteanu
University of Craiova, Romania

Laura Ungureanu
Spiru Haret University, Romania

ASERS Publishing
http://www.asers.eu/asers-publishing
ISSN 2068 – 7729
Journal DOI: http://dx.doi.org/10.14505/jemt

Contents:

1 **Price Co-movement between Biodiesel and Natural Gas**
Karel JANDA, Jakub KOURILEK, Sarah TRABELSI ...7

2 **Specifics of Agricultural Risks Insurance System in the Republic of Kazakhstan**
Yury KHAN, Galina NIKITINA, Vladimir GRIGORUK, Galya AKIMBEKOVA ...17

3 **Diversified Approach to Quantification of Risks that Arise in Projects Associated with Extraction of Hydrocarbon**
Mikhail Nikolayevich DUDIN, Nikolay Vasilievich LYASNIKOV, Evgeniy Danilovich KATUL'SKIY, Dorina Grigor'evna SHHIPANOVA, Andrey Evgen'evich CHEKANOV ...31

4 **Foreign Direct Investment and Environmental Degradation: Further Evidence from Brazil and Singapore**
Ioannis KOSTAKIS, Sarantis LOLOS, Eleni SARDIANOU ...45

5 **Methodology for Identifying the Differentiated Mineral Extraction Tax Rates Relating to the Recovery of Solid Minerals**
Tatiana Alekseevna BLOSHENKO, Vadim Vitalievich PONKRATOV Andrey Sergeevich POZDNYAEV ...60

6 **The Impact of Mineral Resources on Development in Sub-Saharan Africa**
Natália HLAVOVÁ ...67

7 **Development of a Land Resources Protection Model**
Evgeny Vladimirovich KUZNETSOV, Tatyana Ivanovna SAFRONOVA, Irina Vladimirovna SOKOLOVA, Anna Evgen'evna KHADZHIDI, Anatoliy Dmitrievich GUMBAROV ...78

8 **Synergetic Modeling the Republic of Bashkortostan Energy System Parameters**
Damir GAYNANOV, Olga KANTOR, Ekaterina KASHIRINA ...84

9 **The Impact of Management Skills of Agricultural Entities in Relation to Economic Efficiency and Natural-Climatic Conditions in Slovakia**
Rastislav KOTULIČ, Peter ADAMIŠIN, Ivana Kravčáková VOZÁROVÁ, Roman VAVREK ...92

10 **Features of Optimal Modeling of Tax Mechanisms in the Leveling System of Environmental and Food Security Taking Into Account Inter-Industry Externalities**
Anna V. SHOKHNEKH, Natalya N. SKITER, Alexey F. ROGACHEV, Tatyana V. PLESCHENKO ...100

11 **Methodological Basis of Statistical Research on Russia's Food Security**
Svetlana Valentinovna PANKOVA, Alexandr Pavlovich TSYPIN, Valery Vladimirovich POPOV ...105

12 **Actual Aspects of Cadaster Relations in the Monitoring System of Land and Rural Areas**
Aksana A. TSARENKO, Irina V. SCHMIDT, Vladimir A. TARBAEV ...116

13 **Development of the Russian Economy's Agricultural Sector under the Conditions of Food Sanctions (2015-2016)**
Natalia P. KOPTSEVA, Vladimir I. KIRKO ...123

14 **How Consumers Price Fresh Whole Milk Label?**
Kanokwan CHANCHAROENCHAI ...132

15 **The Territorial Frames of a Small Town in the Landuse System Ensuring its Sustainable Development**
Yury Mikhailovich ROGATNEV, Marina Nikolaevna VESELOVA, Irina Vladimirovna KHORECHKO, Tatyana Anatolievna FILIPPOVA, Valentina Nikolaevna SHCHERBA ...143

16 **State and Challenges of Environmental Accounting in the Republic of Kazakhstan**
Gulnara Dusenbaevna AMANOVA, Aigul Ualievna ABDRAKHMANOVA, Anargul Sarsenbaevna BELGIBAYEVA, Gaukhar Zh. ZHUMABEKOVA, Kunsulu Zhilkaydarovna SADUAKASSOVA, Utegen Kuttugujinovich SARTOV, Saule Gabitovna SERIKBAEVA ...155

17 **Determinants of Cooking Fuel Choices in Urban Nigeria**
John Kehinde AKOMOLAFE, E.O. Esthere OGUNLEYE ...168

18 **Inclusive Growth, Agriculture and Employment in Nigeria**
Elizabeth OLONI, Abiola ASALEYE, Fadeke ABIODUN, Opeolu ADEYEMI ...183

19 **Estimation of Spring Runoff Characteristics of Lowland Rivers in Kazakhstan**
Dinara ARYSTAMBEKOVA, Saken DAVLETGALIEV, Aleksandr CHIGRINETS, Ainur MUSSINA, Daulet JUSSUPBEKOV ...195

20 **Improvement of Methods for Evaluating the Cost-effectiveness of Energy Systems Projects**
Irina Valereyvna BURENINA, Evgenii Viktorovich EVTUSHENKO, Dmitry Valeryevich KOTOV, Alena Aleksandrovna BATTALOVA, Dilyara Agelamovna GAMILOVA ...210

SPRING 2017
Volume VIII,
Issue 1(17)

Editor in Chief
Ramona PÎRVU
University of Craiova, **Romania**

Editorial Advisory Board

Omran Abdelnaser
University Sains Malaysia, Malaysia

Huong Ha
University of Newcastle, Singapore, Australia

Harjeet Kaur
HELP University College, Malaysia

Janusz Grabara
Czestochowa University of Technology, Poland

Vicky Katsoni
Techonological Educational Institute of Athens, Greece

Sebastian Kot
Czestochowa University of Technology, Institute of Logistics and International Management, Poland

Nodar Lekishvili
Tibilisi State University, Georgia

Andreea Marin-Pantelescu
Academy of Economic Studies Bucharest, Romania

Piotr Misztal
Jan Kochanowski University in Kielce, Faculty of Management and Administration, Poland

Agnieszka Mrozik
Faculty of Biology and Environmental protection, University of Silesia, Katowice, Poland

Chuen-Chee Pek
Nottingham University Business School, Malaysia

Roberta De Santis
LUISS University, Italy

Fabio Gaetano Santeramo
University of Foggia, Italy

Dan Selişteanu
University of Craiova, Romania

Laura Ungureanu
Spiru Haret University, Romania

ASERS Publishing
http://www.asers.eu/asers-publishing
ISSN 2068 – 7729
Journal DOI: http://dx.doi.org/10.14505/jemt

21 **Mediation Effect of Marketing Mix Strategy on Supply and Demand Towards Marketing Performance**
Otto Randa PAYANGAN, Adrianus S. GIRIKALLO, Romansyah SAHABUDDIN ...223

22 **Waste Portable Batteries and Accumulators Management in Compliance with European Union Requirements in Ukraine: Present State and High Priority Activities**
Tetiana SHEVCHENKO, Inna KOBLIANSKA, Olena MARKOVA ...232

23 **Eco-Management and Eco-Standardization in Russia: The Perspectives and Barriers for Development**
Svetlana RATNER, Valery IOSIFOV ...247

24 **Strategies for Environmental, Economic, and Social Sustainability of Potato Agriculture in Dieng Plateau Central Java Indonesia**
Tri WIDAYATI, WARIDIN, Edy YUSUF ...259

25 **Organizational and Economic Basis of Natural and Man-Made Disasters Consequences Management**
Olexandr TELIZHENKO ,Yuliia MASHYNA, Yuliia OPANASYUK ...270

Call for Papers
Summer Issues 2017

Journal of Environmental Management and Tourism

Journal of Environmental Management and Tourism is an interdisciplinary research journal, aimed to publish articles and original research papers that should contribute to the development of both experimental and theoretical nature in the field of Environmental Management and Tourism Sciences.

Journal will publish original research and seeks to cover a wide range of topics regarding environmental management and engineering, environmental management and health, environmental chemistry, environmental protection technologies (water, air, soil), pollution reduction at source and waste minimization, energy and environment, modeling, simulation and optimization for environmental protection; environmental biotechnology, environmental education and sustainable development, environmental strategies and policies, etc. This topic may include the fields indicated above, but are not limited to these.

Authors are encouraged to submit high quality, original works that discuss the latest developments in environmental management research and application with the certain scope to share experiences and research findings and to stimulate more ideas and useful insights regarding current best-practices and future directions in environmental management.

Journal of Environmental Management and Tourism is indexed in SCOPUS, RePEC, CEEOL, ProQuest, EBSCO and Cabell Directory databases.

All the papers will be first considered by the Editors for general relevance, originality and significance. If accepted for review, papers will then be subject to double blind peer review.

Deadline for submission:	25th May 2017
Expected publication date:	June - July 2017
Website:	http://www.asers.eu/publishing/index.php/jemt
E-mail:	jemt@aserspublishing.eu

To prepare your paper for submission, please see full author guidelines in the following file: JEMT_Full_Paper_Template.doc, then send it via email at jemt@aserspublishing.eu.

DOI : http://dx.doi.org/10.14505/jemt.v8.1(17).25

Organizational and Economic Basis of Natural and Man-Made Disasters Consequences Management

Olexandr TELIZHENKO
Sumy State University, Sumy, Ukraine
altel@ukr.net

Yuliia MASHYNA
Sumy State University, Sumy, Ukraine
Yuliyamashyna@gmail.com

Yuliia OPANASYUK
Sumy State University, Sumy, Ukraine
juliaop1982@gmail.com

Suggested Citation:

Telizhenko, O., Mashyna, Y., Opanasyuk, Y. 2017. Organizational and economic basis of natural and man-made disasters consequences management. *Journal of Environmental Management and Tourism*, Volume VIII, Spring, 1(17): 270 - 278. DOI:10.14505/jemt.v8.1(17).25

Article's History:

Received November, 2016; *Revised* December, 2016; *Accepted* January, 2016.
2017. ASERS Publishing©. All rights reserved.

Abstract

The article considers economic essence and factors of natural and man-made disasters economic consequences. Theoretical and methodological principles of organizational and economic mechanism of disasters consequences management are developed. Scientific and methodological approach to the assessment of ecological and economic damages from natural and man-made disasters by rapid method is presented. Reserve fund means distribution mechanism of State budget of Ukraine for prevention and compensation of natural disasters consequences on the basis of region economic potential decrease is developed. The mechanism of branch compensation funds formation is offered, taking into account the probabilistic nature of disasters occurrence on the basis of specific damages indices system, which permits to minimize budgetary expenditures for disasters prevention and elimination.

Key words: economic consequences, territory potential, natural disaster, risk, system of budgetary and financial, instruments, inter-budgetary transfers, man-made disaster, ecological and economic damage

JEL Classification: Q510, Q520, P28

Introduction

According to *International Convention on Major Industrial Accidents Prevention* (1993), *Convention on Transboundary Effects of Industrial Accidents* (1992), *Tampere Convention on Provision of Telecommunication Resources for Disasters Mitigation and Relief Operations* (1998) and *Framework Convention on Civil Defense Assistance* (2000), the most important direction of serious disasters consequences reduction is development and improvement of the security level assessment methods for enterprises and territories with the aim of the risk and expenses prediction for natural and man-made disasters consequences prevention and elimination. These documents form the world countries policy in order to prevent accidents and disasters and witness the fact, that

they influence human life and environment. Therefore, recently a significant attention has been paid to the development of different methodological approaches to the analysis of natural and man-made disasters consequences and their prevention measures.

Natural disasters consequences are considered to be a serious threat for the safety of humanity and environment, as well as for sustainable development of country's economy. Natural and man-made disasters consequences elimination require considerable funds of the state and population. At that, man-made disasters can be caused by natural cataclysms, such as: earthquakes, hurricanes, storms. Whereas, industrial activity of the population can cause natural disasters with serious consequences. Formation of sufficient amount of financial resources for these aims and their rational use foresee development of the appropriate organizational and economic mechanism, the aim of which is to provide their consequences management. The basis of this mechanism is a system of budgetary and financial instruments, determining financing sources, financing conditions, and necessary means accumulation. One of the most important issues is determination of economic damages, resulting from natural and man-made disasters.

1. Literature review

The issues on the economic damages assessment and financial provision of measures on these consequences prevention and elimination are in the field of view of governmental and non-governmental structures, insurance companies, auditing and consulting firms, and leading native and foreign scientists.

Substantial contribution to the research of disasters theories was made by Poston and Stewart (1978), Arnold (1990), Steuart (1980). Disasters elimination methods were investigated by Altunin (1976), Kochetkov (1995), Povyleyko (1990). The issues of disasters economics are the object of scientific works of Koff (1996), Kozmenko (1997), Gardoni and Murphi (2008), *etc*. Scientific fundamentals of the assessment of ecological and economic damage were formed in the works of Balatskiy (1987), Gofman (1991), Melnyk (2004). The works of Marshall (1989), Schipper and Pelling (2006), Wisner and Blaikie (2004) are devoted to scientific research of quantitative assessment of man-made and natural disasters risks. In the economic literature the issues of compensation of ecological and economic damages from disasters are considered by Brydun (2002), Smolka (2006).

2. Objecive statement

In spite of the significance of the conducted native and foreign research, scientific and methodological approaches to the assessment of ecological and economic damages from natural and man-made disasters and formation of the efficient budgetary and financial instruments system of organizational and economic mechanism of natural and man-made disasters consequences management are developed not enough for today.

Thus, the objective of the article is a necessity of further improvement of organizational and economic mechanism of natural disasters consequences management, including its main constituent – budgetary and financial instruments system on the basis of complex economic assessment of their influence on the territory economic potential. At the same time, it is necessary to continue the research of the theoretical-scientific and methodological approaches to the determination of ecological and economic damages from man-made disasters, such as formation of reserve funds, insurance payments, and damages payments compensation of the third persons.

3. System analysis of the main statements of disasters economics

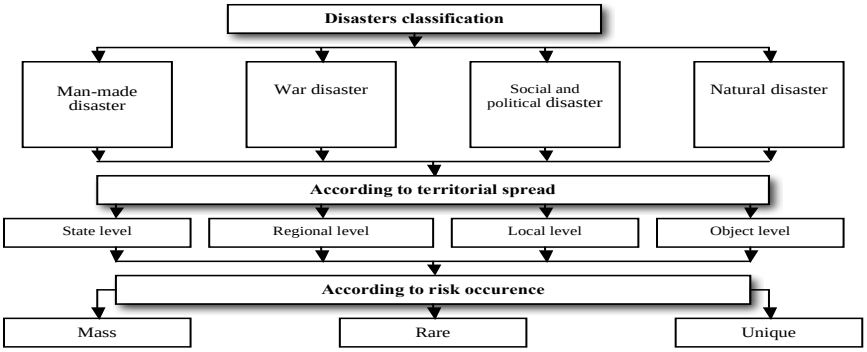
A characteristic feature of the modern stage of scientific and technological progress development is a problem of population and environment safety. Modern ecological state is determined largely by overloads on the environment, causing man-made and natural disasters.

In our civilized, technologically developed time, humanity stays to be dependent on the natural phenomena, which are disastrous rather often. Volcanic eruptions, earthquakes, droughts, mudflows, snow avalanches, and floods cause death of many thousands of people and bring enormous material damages.

An increase of natural disasters amount in the world is conditioned by global processes in social, natural, and man-made fields, which stimulate the development of dangerous natural phenomena. Higher growth of critical situations, caused by natural phenomena, is explained by growth of not only human population, but also man-made influence on environment (Akimov *et al.* 2006).

Experts often associate the risk of man-made disasters occurrence with chemical enterprises, nuclear and thermal electric power stations, sewage constructions, and storages and burials of chemical pesticides and toxic wastes. In the result of issues research, concerning disasters economics, some dependence between categories, forming conceptual apparatus of this branch of knowledge, was revealed. Any disaster results from emergency situation or accident. We generalized and systematized classification of disasters (Figure 1).

Figure 1. Disasters classification



To our mind, it is reasonable to classify disasters according to the risk of their origin. High integral damage from disasters for some period of time is achieved due to combination of the frequency of their occurrence and damage from each disaster. It is suggested to distinguish mass disasters, which are characterized by high probability of their occurrence and not considerable damages; rare, which are characterized by low probability of occurrence, but damages from them can be considerable; unique, which are characterized by exclusively low probability of occurrence.

The assessment of economic damage from natural and man-made disasters is of wide practical use. In spite of the constant improvement of methodological principles of economic damages quantitative assessment, existing today methodologies pay not enough attention to the factors, influencing amount and quality of these damages. Basing on the general theory of economic damages, we carried out a system analysis of cause-effect relation in the system "disaster – economic consequences". We suggest to consider the notion "economic consequences of natural disasters" as combination of damages and (or) qualities of socially useful results of work degradation, lost advantages, territory economic potential decrease, additional expenses for natural and man-made disasters consequences elimination.

The performed analysis permitted to reveal problem points in the existing system of natural and man-made disasters consequences management. Thus, this system is presented by institutional subdivisions, belonging to different management levels: state, regional, and local. At the same time, as the practice has shown, interaction in frames of these levels is not coordinated enough.

Considerable scope of natural disaster influence on social and economic conditions became the reason of accurate analysis of the risk conception in modern society. The number of works on the issues of risk assessment is constantly growing. In spite of such variety and great amount of information in the mentioned field, this problem stays to be investigated not enough. We determined that from analytical point of view, the risk expresses the dangers realization frequency, concerning their possible number. The risk is realized via damage, acquiring particular and measurable forms. The greatest social and economic damages are revealed through disastrous risks.

The work is focused on the analysis of scientific approaches to the calculation of ecological and economic damages, which existed at the moment of research objective statement. Their main disadvantages are:

- almost all methodologies are not adapted to calculation of ecological and economic damage from disastrous phenomena;
- some methodologies take into account both recipient and factor damages, which can cause double counting effect;
- almost all methodologies don't take into account all constituents of ecological and economic damage and elimination expenses, which in some accidents constitute the greatest part of the whole sum of ecological and economic damage (Opanasiuk 2007).

4. Peculiarities of the assessment of ecological and economic damages from natural and man-made disasters consequences

One of the most substantial issues of disasters economics stays to be an issue of economic assessment of natural and man-made disasters consequences. The main territory economic potential constituents, undergoing damages in the result of disasters, are determined. Traditional indicator, reflecting the rate of natural environment worsening, resulting in territory potential change, is considered to be economic damage. In order to create calculation methodology for economic potential changes in the result of natural disasters, we determined the connection between economic damage and territory economic potential, which is given in (Skydanenko 2007).

The analysis of the theoretical approaches to the essence of the territory economic potential category gives us an opportunity to make a conclusion about its complex multifold nature. Natural disasters and their consequences can influence territory economic potential negatively. Some territory economic potential constituents, such as natural environment, population, industry, agriculture, *etc*., undergo economic damage in the result of natural disasters. The action results negatively in the territory material and technical base decrease, disturbance of the main funds, material stocks, which are considered as constituents of production potential; violation of population vital activity, demographic situation, population health, which are labour potential constituents; damage of renewable (forest, water, animal and vegetal life, air) and non-renewable (land, fuel-energy, mineral) natural resources, which are nature and resource potential constituents; deficiency of scientific knowledge, practical experience, informational resources, which are innovative potential constituents; decrease of the efficiency of territorial management system functioning, which is institutional potential constituent.

Skydanenko (2007) proved, that territory economic potential is based on the labour potential, which is considered as social and economic category, containing combination of qualities, determining working capacity of people, their physical, psychological, and intellectual levels, which are expressed by the ability to create new intellectual and material values. Using the assessment of labour potential in Sumy region, which has been performed earlier, its value is adjusted with the use of regional human development integral coefficients and consumer prices indices.

Grounding on the structural correlation of the labour potential in the system of economic potential, the work suggests scientific and methodological approach to the integral estimation of economic potential value, including human development index, which is adjusted to the consumer prices index. Economic potential value is calculated by the formula:

$$P_i = \frac{LP_{bas}}{Pop_{ec.act.bas}{}^{\gamma}} Pop_{ec.act.i}\, HDI_i I_{cons.pr}, \quad (1)$$

where P_i – economic potential of *i* region, thous. UAH; LP_{bas} – labour potential of base region, for which Sumy region is taken, thous. UAH; $Pop_{ec.act.bas}$ – economically active population of Sumy region, pers.; $^{\gamma}$ – labour potential part for general territory economic potential amount is taken at the level 0.385 (Zhulavskiy 2004); $Pop_{ec.act.i}$ – economically active population of *i* region, pers.; HDI_i – human development index of *i* region; $I_{cons.pr}$ – consumer prices index.

In the general form the value of territory economic potential change is determined by the formula

$$\Delta P = RP, \quad (2)$$

where ΔP – value, for which economic potential changes in the result of natural disasters, thous. UAH; P – territory economic potential, which is in the area of natural disaster action, thous. UAH.

At that, territory economic potential, which is in the area of natural disaster action, is calculated by the formula:

$$P = Pop_{ar} \frac{P_i}{Pop_i}, \quad (3)$$

where Pop_{ar} – population, which is in the area of natural disaster action, pers.; Pop_i – population of *i* region, pers.

We improved methodological elaborations for determination of ecological and economic damage from man-made disasters and suggested a complex method of their calculation on the basis of 8 main constituents. Generalized author's approach to the calculation of ecological and economic damage from man-made disasters is illustrated in the work (Opanasiuk and Melnyk 2013).

During calculation of natural indices, such as number of workers and population, who got to the area of active damage, the probable location of these people at this territory at the moment of the accidents is taken into account. Also it was taken into account the disaster occurrence probability, prevalent wind direction at the time of the accident and recipients' specific weight, who got into the area of active damage. For the basis of ecological and economic damage calculation, it was taken "Methodology of the assessment of damages from man-made and natural disasters consequences", it was supplemented by such recipients, as damages of housing and communal services and elimination expenses. We took classical constituents of ecological and economic damage, at that, a hypothesis on the existence of possible manifestations of such kinds of damages, as damage from population lives loss and health of future generations was set up. It is connected with the fact that serious man-made disasters cause long-run disturbance of natural environment, which in its turn can cause pathological aberration in gestation course in women and considerable health deterioration of their children. From economic point of view, it can cause GDP deficiency, as children can become disabled from their birth, and will not be able to generate national product, besides, the country gets damages from pension payments to such people (Opanasiuk 2008).

For managerial decision making at minimal amount of source information, the work suggests improved scientific and methodological approaches to the assessment of ecological and economic damages from man-made disasters by rapid method, considering such issues:

- man-made disasters are characterized by large emissions and short time for poisonous cloud spreading, therefore, for ecological and economic damages calculation, it is necessary to use specific damages, which are obtained exactly for characteristics of man-made disasters, which are developed in this work;
- the methodology is supplemented by additional adjustment coefficient, reflecting the deviation rate of regional damage-creating factors, for which specific ecological and economic damages were calculated, and mean factors in Ukraine. The value of adjustment regional coefficients should take into account recipients structure and density.

Ecological and economic damage by rapid method is calculated by the formula:

$$Y = \sum_{i=1}^{n} y_i \cdot Q_{rec.i} M_{cond.em.i} C_{reg.i}, \quad (4)$$

where y_i – specific damage, brought to *i* recipient, UAH/conv.t·un.rec.; $Q_{rec.i}$ – amount of *i* recipient, which gets into the active damage areas; $M_{cond.em.i}$ – amount of conditional emissions, into the influence area of which *i* recipient gets, tons; $C_{reg.i}$ – regional adjusting coefficient for *i* recipient, characterizing deviation of the territorial damage-creating factors from their mean values in Ukraine.

It is determined by the formula:

$$C_{reg.i} = \frac{\rho_{iz}}{\rho_{iU}}, \quad (5)$$

where ρ_{iz} – density of *i* recipient in *z* region; ρ_{iU} – density of *i* recipient in Ukraine; *n* – number of recipients kinds in the area of active damage; *m* – number of kinds of harmful substances, formed in the result of the disaster.

Table 1. Average specific damages per 1 *t* of conditional emissions (for disasters with hazardous chemicals emission)

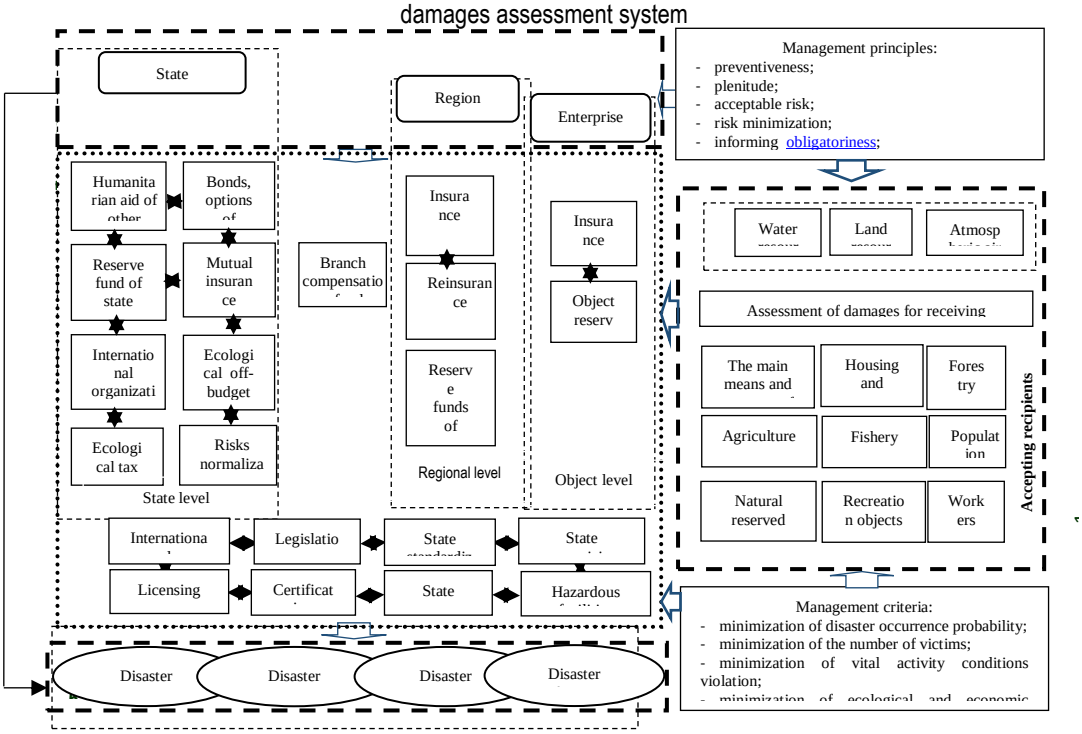
Ecological and economic damage constituent	Unit of measurement	Value
1. Damage from the population health loss	USD per 1 thousand people of the region	3,306
2. Damage from the capital funds collapse and revolving funds loss	USD per 1 milliard UAH of the region's capital funds	44
3. Damage from the agricultural lands seizure or violation	USD per 1 million ha of agricultural lands	39
4. Damage from the loss of wood and other forest resources	USD per 1 million ha of forests	31
5. Damage to fisheries	USD per 1 million ha of the region's water level	2,325
6. Damage from housing and communal economy objects destruction	USD per 1 milliard UAH of the housing and communal economy value	1,000
7. Accident elimination expenses	USD per 1 km^2	11,408

Determination procedure formalization of ecological and economic damage from man-made disasters is represented in Telizhenko and Opanasiuk (2014). Rapid method provides acceptable level of variable calculations accuracy while predicting ecological and economic damages from potentially probable man-made disasters. It is recommended to use the suggested methodological approach for rapid assessment of the necessary means for disaster elimination, for determination of the compensation funds volumes, taking into account peculiarities of the structure, density and kinds of recipients, which are in the area of the potentially dangerous enterprises, as well as for determination of insurance indemnities to the enterprises and third persons, who suffered from man-made disasters. Work (Opanasiuk 2015) considers the formation of specific ecological and economic damages matrix for each recipient. This matrix can be formed on the basis of combined method by several dangerous objects, which are situated in separate economic regions of Ukraine.

5. General principles of damages compensation mechnism formation

One of the main reasons of complicated situation with occurrence and development of natural and man-made disasters is an absence of the efficient mechanism of damages compensation and state and regional budgets load reduction. Existing today in Ukraine regional organizational system of measures, which are used for natural and man-made disasters consequences prevention and elimination, is not perfect. Compensation mechanism of natural and man-made disasters consequences via assessment system of ecological and economic damage (Figure 2).

Figure 2. Compensation mechanism of natural and man-made disasters consequences via ecological and economic damages assessment system



The main elements of this mechanism are organizational-administrative and economic instruments, distributed into four levels: state, branch, regional, and economic entities level. While forming organizational and economic mechanism, which provides natural disasters consequences elimination, it is proved in work (Lapin and Skydanenko 2010), that the most efficient mechanism is a formation and use of reserve fund of Ukraine and local budgets means. The offered mechanism permits to formalize the connection between the participants of the subject and object relations of the territory and state in general. It is proved, that efficient distribution and use of financial resources for territory natural disasters consequences elimination are based on the assessment of economic potential of the region and its gross regional product.

Inter-budgetary relations are carried out according to the Resolution of the Cabinet of Ministers of Ukraine on the basis of "Formula of inter-budgetary transfers amount allocation (levelling subventions and means, passed to state budget) between state budget and local budgets".

At the same time, the mechanism does not take into account the value and structure of damages from natural disasters, therefore, scientific and methodological approach to the financial resources allocation on the basis of the use of adjusting coefficients, taking into account these factors, is offered. Integral adjusting coefficient is calculated by the formula

$$c = \frac{\Delta P_m}{\Delta P_i}, \quad (6)$$

where c – integral adjusting coefficient; ΔP_m – mean value of economic potential change by the regions of Ukraine in the result of natural disasters, thous. UAH; ΔP_i – value of economic potential change of *i* region in the result of natural disasters, thous. UAH.

Hence, distribution formula of inter-budgetary transfers for natural disasters consequences elimination has the form:

$$T_i = c\left(\Delta P_i - \left(\frac{1}{25} RF + GRP_i \beta\right)\right) \quad (7)$$

where T_i – amount of transfers for natural disasters consequences elimination, thous. UAH; RF – reserve fund; GRP_i – gross regional product of *i* region, thous. UAH; β - part of gross regional product, which can be allocated to natural disasters consequences elimination.

Another economic instrument of this mechanism is a system of compensation funds at different management levels. The main aim of these funds is accumulation of cash means for compensation of ecological and economic damages from natural and man-made disasters and their prevention. It is reasonable to stress the role of branch compensation funds, which are formed in order to provide economic liability of the fund participants for commitments, emerging in the result of the caused ecological and economic damage from man-made disasters. Branch compensation fund is formed at the expense of branch enterprises contributions, which are capable of man-made disasters. The amount of contributions depends on the amount of possible ecological and economic damage, disaster occurrence probability, and financial capacities of the enterprises for induced damages compensation. Accumulated means of the branch compensation fund can be considered also as depositary resources, increasing its amount in time. Annual contribution of the particular enterprise to compensation fund is determined by the formula:

$$V = Y \cdot P \cdot C_{comp}, \quad (8)$$

where Y – value of probable ecological and economic damage from man-made disasters at the enterprise; P – possibility of disaster occurrence for current period; C_{comp} – compensation coefficient of ecological and economic damage, which depends on the financial state of the enterprise.

The developed methodology of the transfers amounts adjusting for natural disasters consequences elimination permits to offer an algorithm for their financing source grounding. If economic damages from natural disasters in the region are considerable, i.e. integral adjusting coefficient *k* is less than one, gross regional product

of the region is more than average in Ukraine, it is reasonable to fulfil financing from the local budgets and (or) reserve fund of Ukraine. If damages from natural disasters in the region are not considerable, *i.e. k* is more than one or equals one, and gross regional product of the region is less or equals mean value of gross regional product in Ukraine, it is reasonable to fulfil financing at the expense of transfers from the reserve fund of Ukraine. If economic damages are considerable, i.e. *k* is less than one, and gross regional product of the region is less than mean value of the gross regional product in Ukraine, it is reasonable to fulfil financing from reserve fund of Ukraine.

Conclusion

Grounding on the system analysis of the known approaches to the assessment of ecological and economic damages from natural and man-made disasters, the necessity of operative calculations of the damage value at minimal amount of source information is proved in the work. On the basis of such requirements, the work suggests rapid method of assessment of ecological and economic damages from disasters of different types.

The article gives generalization of the theoretical and methodological approaches to the development of organizational and economic bases of natural disasters consequences management on the basis of territory economic potential change and system improvement of budgetary and financial instruments of inter-budgetary transfers allocation for prevention and compensation of natural disasters consequences. The results of the research prove an existence of interrelation between economic potential and natural disasters consequences.

In the course of research, on the basis of assessment of the ecological and economic damage, organizational and economic mechanism of natural and man-made disasters consequences compensation to the third persons, which, unlike existing, is based on the creation of compensation funds system, was developed. This mechanism includes a complex of organizational-administrative and economic instruments, grouped by the management levels: state, branch, region, and dangerous enterprise.

References

[1] Akimov, V. A., Vladimirov, V. A., Izmalkov, V. I. 2006. *Disasters and Safety*. MChS Rossii. Delovoy Ekspress. Moskow. Russia.

[2] Arnold, V.I. 1990. *Catastrophe Theory*, Moscow: Science, p. 128.

[3] Brydun, E.V. (2002) Modeling compensation system of ecological and economic damage. National Technical University "KPI", Kiev. p. 277.

[5] Gardoni, P., Murphi, C. 2008. Recovery from natural and man-made disasters as capabilities restoration and enhancement. *International Journal of Sustainable Development and Planning*, 3(4): 317-333. DOI: 10.2495/SDP-V3-N4-317-333

[6] Helmer, M. 2006. Natural disasters and climate change. *Disasters*, 30: 1-4. DOI: 10.1111/j.1467-9523.2006.00302.x

[7] Koz'menko, S. N. 1997. Economy Disasters (investment aspects). Naukova dumka, Kiev, 204 p.

[8] Lapin, Ie. V., Skydanenko Iu. P. 2010. Methodological approaches to the redistribution of financial resources to compensate for losses from natural disasters. *Bulletin of Sumy State University. Series Ekonomika*, 1: 28-34.

[9] Opanasiuk, Iu. A. 2008. Determining the economic damage from the loss of health of future generations as a result of man-made disasters. *Bulletin of Sumy State University. Economy Series,* 1: 96-100.

[10] Opanasiuk, Iu. A. 2007. Development of scientific and methodological approaches to the calculation of the ecological and economic damage from man-made disasters. *Bulletin of Sumy State University, Economy Series*, 1: 40–45.

[11] Opanasiuk, Iu. A. 2015. Ecological and economic evaluation of man-made disaster. *Bulletin of Sumy State University, Economy Series,* 2: 31-39.

[12] Opanasiuk, Iu. A., Melnyk, Iu. M. 2013. Methodical principles governing the assessment of ecological and economic damage from emergencies. *Economy and Management*, 5: 63-69.

[13] Poston, T., Stewart, I. 1978. *Catastrophe Theory and Its Applications*. Dover Publications, p. 491.

[16] Sawada, Ya. 2007. The impact of natural and manmade disasters on household welfare. *Agricultural Economics,* 37: 59-73. DOI: 10.1111/j.1574-0862.2007.00235.x

[17] Smolka, A. 2006. Natural disasters and the challenge of extreme events: Risk management from an insurance perspective. *Philosophical Transaction of the Royal Society A*, 364: 2147–2165. DOI:10.1098/rsta.2006.1818

[18] Schipper, L, Pelling, M. 2006. Disaster risk, climate change and international development: Scope for and challenges to integration. *Disasters*, 30: 19–38.

[19] Skydanenko, Iu. P. 2009. Methodological approaches to calculating the economic damage as a result of emergency situations of natural character. *Economic Bulletin of National Mining University,* 3: 84-92.

[20] Telizhenko, O. M., Opanasiuk, Yu. A. 2014. Express - estimate environmental damage from man-made disasters. *Journal of Khmelnytsky National University, Economics,* 4 (4): 164-170.

[21] Wisner, B. Blaikie, P. Cannon, T., Davis, I. 2004. At Risk – Natural Hazards, People's Vulnerability and Disasters. London: Routledge; p. 471.

[22] Zhulavskiy, A. Yu. 2004. *Sustainable development of the economic potential of the territory*. Paper presented at the Scientific Conference "Problems of Assessing the Economic Potential of the Company and the Mechanism of its Performance Materials, June, Sumy, Ukraine, pp. 7-10.

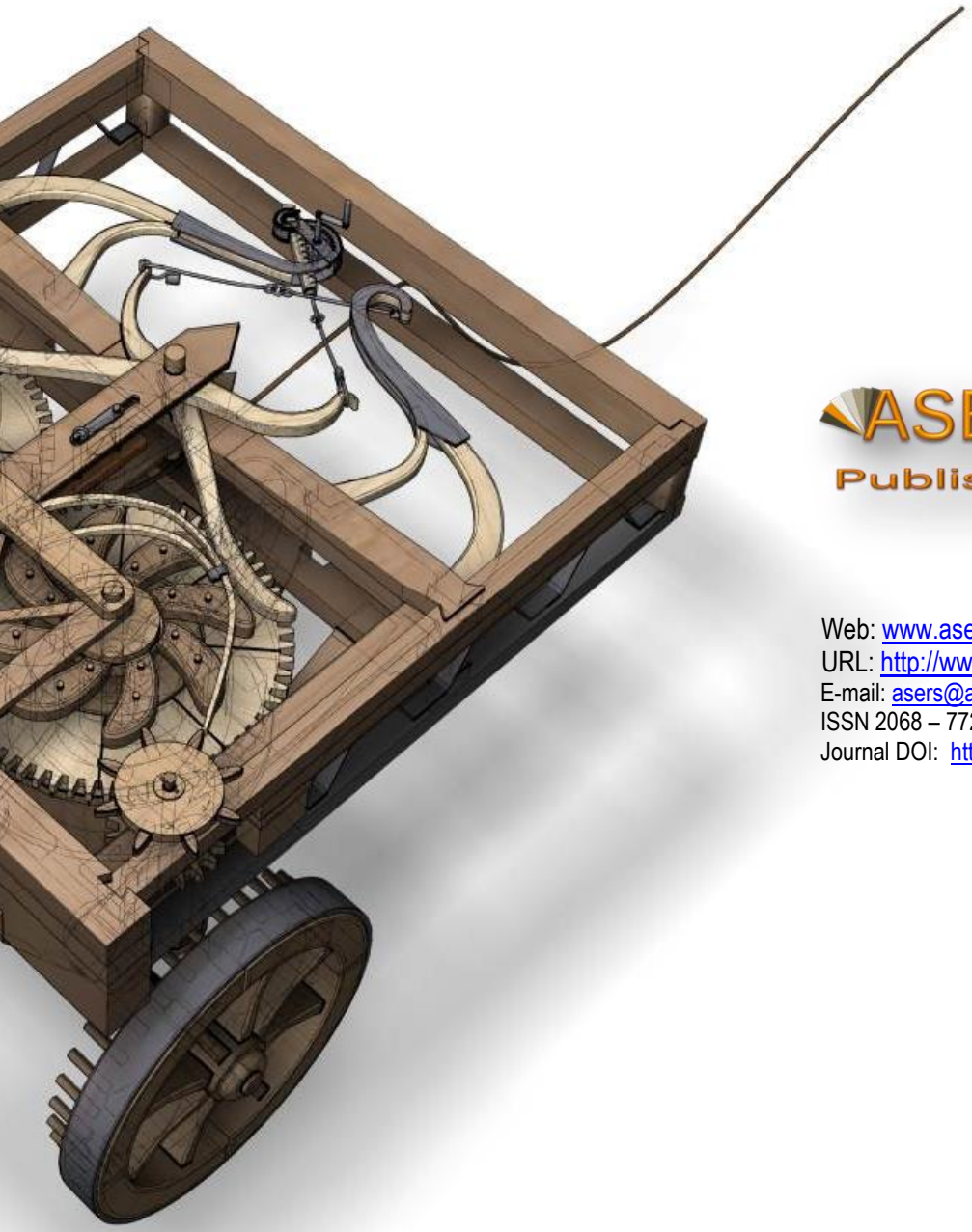
*** Convention on the Transboundary Effects of industrial accidents [Retrieved 2016-01-19] Available at: http://www.jus.uio.no/english/services/library/treaties/06/6-01/transboundary-effects-accidents.xml

*** Framework Convention on Civil Defense Assistance [Retrieved 2016-01-19] Available at: http://www.ifrc.org/Docs/idrl/I319EN.pdf

*** Prevention of Major Industrial Accidents Convention, no 174 [Retrieved 2013-05-01]. Available at: http://www.ilo.org/dyn/normlex/en/f?p=NORMLEXPUB:12100:0::NO::P12100_INSTRUMENT_ID:312319

*** Tampere Convention on the provision of telecommunication resources for disasters mitigation and relief operations [Retrieved 2015-01-19]. Available at: http://www. Ifrc.org/docs/idrl/1271EN.pdf

ASERS



ASERS Publishing

Web: www.asers.eu
URL: http://www.asers.eu/asers-publishing
E-mail: asers@asers.eu
ISSN 2068 – 7729
Journal DOI: http://dx.doi.org/10.14505/jemt