



# DEFINING "DAMAGE"

## INTERPRETATIONS AND DRAWBACKS

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**T**here is a contradiction in the economic activities of human beings: on the one hand, living standards determine production of goods and services, i.e. industrial and technological development, which is impossible without permanent growth of the power generation, on the other hand, it determines the state of environment.

Demand in goods, growing year to year, in certain cases makes us disregard harmful effects on the environment. Of course, attempts are made to minimize such harmful effects through different economic, legislative, administrative and information methods. For instance, there are limits for enterprises on emissions, spills and waste-dumping. There are charges for use and pollution of natural resources, quality standards are widely used, expert studies of the environment are conducted and supervising authorities toughen their

requirements. Nevertheless, it is not a secret at all that even working within the established limits on emissions and spills enterprises still do harm to the environment<sup>1</sup>. Thus, we can conclude that given the existing level of technological development, in most cases humankind has to put up with the harmful effects of industrial production for the sake of economic benefit, has agreed to carry an additional burden. Power generation, like other industries, affects the environment, Fig. 1-3 (based on data of the Russian statistical Agency and Ministry of Industrial Development), show in dynamics the effect of Russian industries, (including power generation), on the environment due to discharges of pollutants in the atmosphere, water and waste dumping.

Diagrams show a considerable decrease in the harmful effect of power generation on the environment: emissions decreased from 7.5707 million tons in 1991 to 32577 million tons in 2004 – more than twice, spills decreased from 1839 million m<sup>3</sup> in 1991 to 685 million m<sup>3</sup> in 2004 – almost by three times, waste-dumping decreased from 33. The reason for that is not only the decrease in power consumption by some energy-intensive industries. Qualified personnel also make efforts to improve the trouble-free performance of the industries and to lessen their harmful effect on the environment.

However practice shows that no one can feel absolutely protected against damage made as a result

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of accidents on power-generating plants. In our country it is often aggravated by wear-and-tear of the production assets. Recently, in specialized literature and mass-media reports one could find phrases like "damage to the power system", "damage as a result of an accident in a power system", "damage from theft of power", "damage from power-generating activity", "damage to the power-generating entities and consumers", "damage as a result of the theft from power-generating facilities", "damage to the network companies" etc. Thus, damage could be made not only by the power-generating industry. There are examples when damage is made to the industry as a result of a natural phenomenon or by human actions.

Here are some synonyms to "damage": harm, loss, deficit, spoilage, deterioration, lesion, fall, reduction, disappearance, shrinkage, expenses, costs, defect, negative (change), disutility, depletion, fine, penalty, surcharge, theft, suffering, loss of profits, pollution, distortion, injury, destruction, depreciation, omission, derogation, uselessness, inefficiency etc. Of course, the meaning of these terms is not always the same but in most cases the use of these terms implies damage.

Analysis of the sources relating to the energy industry and their use of such terms as "damage", "loss" and "harm" shows at least five main shortcomings in the existing notion "damage":

- 1) There is no universal definition to the term "damage"
- 2) There is no difference being made between "dam-

age" and synonyms like "harm", "loss" etc.

3) The subject of damage is undetermined. Sources may speak of environmental damage or damage to nature, others mention damage to society, population, recipients, economy, property, separately or together. Who suffers damage?

4) No difference is being made between "damage" and "economic damage"

5) There are various interpretations of damage to the economy as a result of incidents or accidents. For example, damage caused by chemical pollution may be called environmental or economic, or economic-environmental in the other sources.

6) Now, let us study the mentioned shortcomings one by one. To make the arising contradictions more visible we will provide a part of the analysis of the term "damage" using the existing definitions of "damage", "loss", "harm", which will make it possible to clarify the meaning of these terms, identify their main descriptive characteristics and establish a connection between the meanings of "damage", "loss", "harm".

### DAMAGE, LOSS OR JUST HARM?

It seems that to establish correctness of the use of each term, i.e. to remove the first and the second shortcomings, it would be enough to consult reference materials: dictionaries or encyclopedias. Let us see what we get...

Fig 1. General structure of the term "damage"

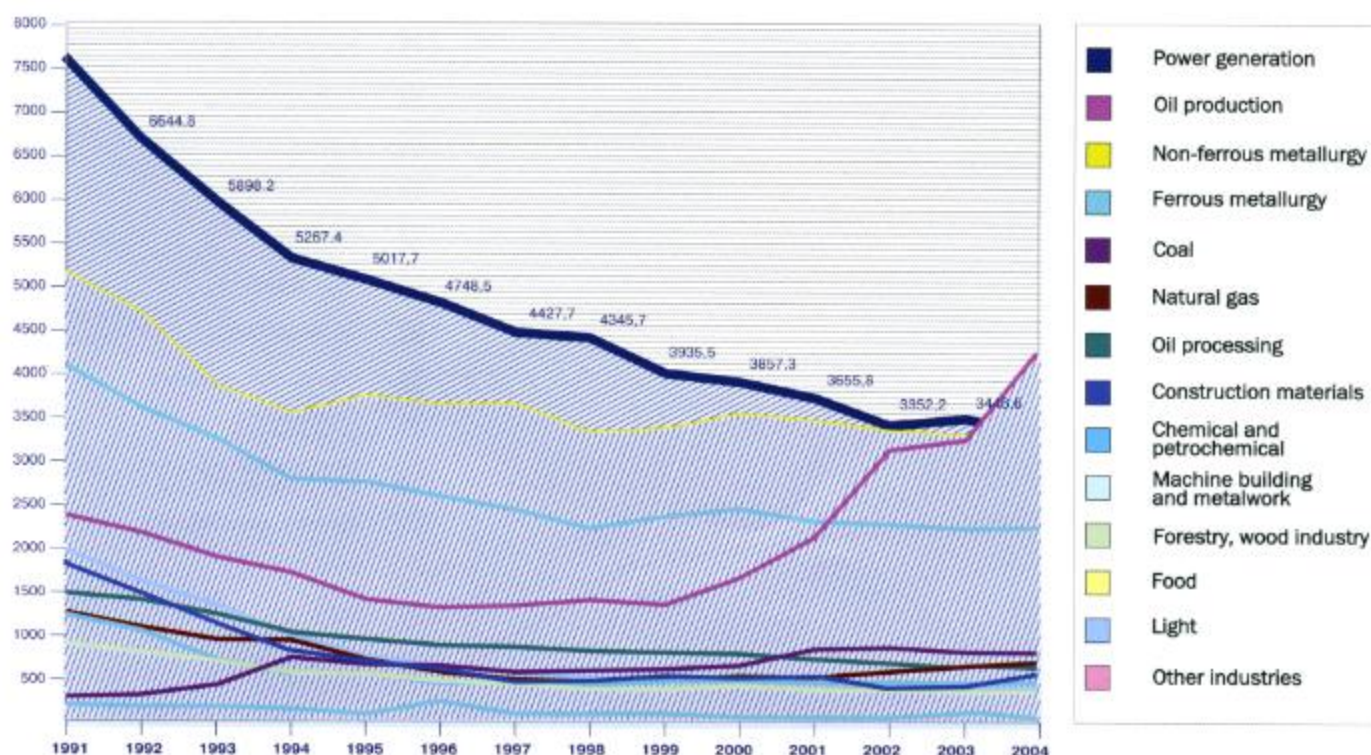




Fig. 2. General structure of the term "loss"

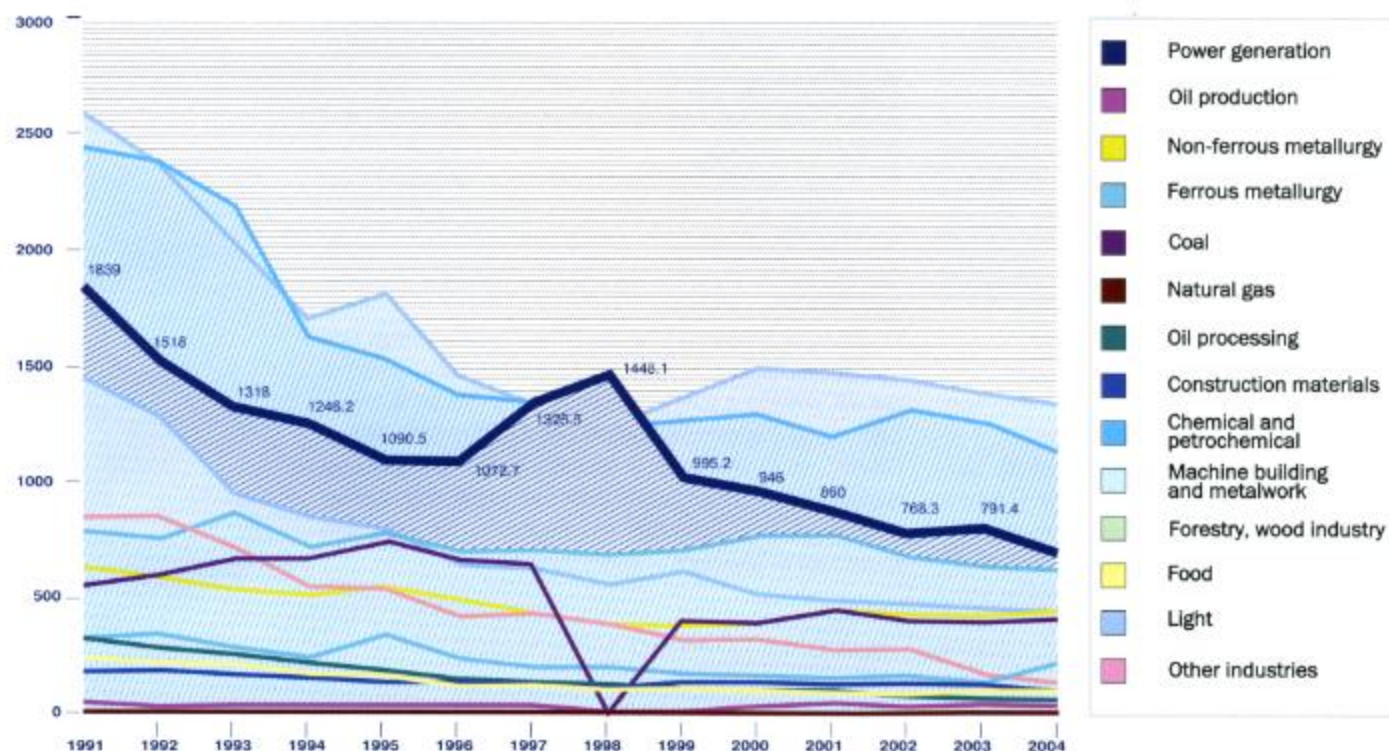
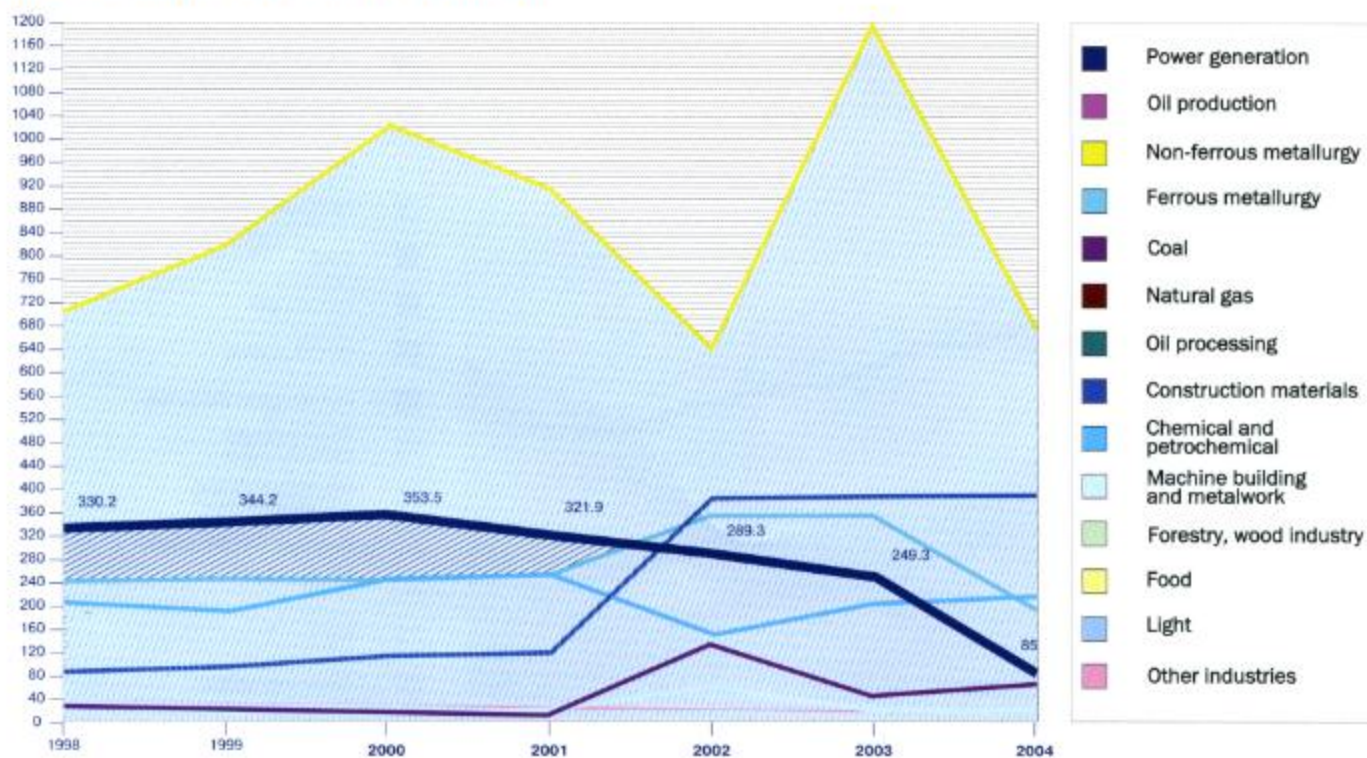


Fig.3. Connections between the meanings of the terms "damage", "loss", "harm", "deprivation"





Russian language dictionaries equate these terms as well as some other words like "spoilage", no difference is made. Most specialized dictionaries (in biology, physics, chemistry, mathematics) do not contain these terms. The Bolshaya Sovetskaya Entsiklopediya (the Great Soviet Encyclopedia), which should have it all, does not contain definitions of damage and harm, while the term "loss" is considered as a term of civil law.

The Dictionary of Economics and Mathematics contains the term "harm" with the same definition as damage. It does not provide definitions of "damage" and "loss" but these terms can be found in the definition of "harm" and in some other definitions (for example, in the definition of "economic effect", p. 428), which enables us to conclude that the author being an expert in economics and mathematics makes no difference between the terms "damage" and "loss". The Encyclopedia of Economics and Mathematics provides a detailed definition of the term "damage" (p. 558) that is divided into "environmental damage" and "economic damage". Undoubtedly, such detailed explanation of the term "damage" is a merit of the dictionary's editor, V.I. Danilov-Danilyan, known for his studies of some ecological problems. The definition also mentions that apart from the "environmental damage" there is an "economic assessment of the environmental damage"; the phrase often used in economic books, we will consider the correctness of these definitions a bit later. Unfortunately, the mentioned dictionary does not give definitions of loss and harm.

Reference books on economics provide more precise definitions of "damage" and "loss". The Dictionary of Economics divides "damage" into "damage to property" and "moral damage" without making a clear distinction between these terms: damage is equated to loss, while "harm" is absent.

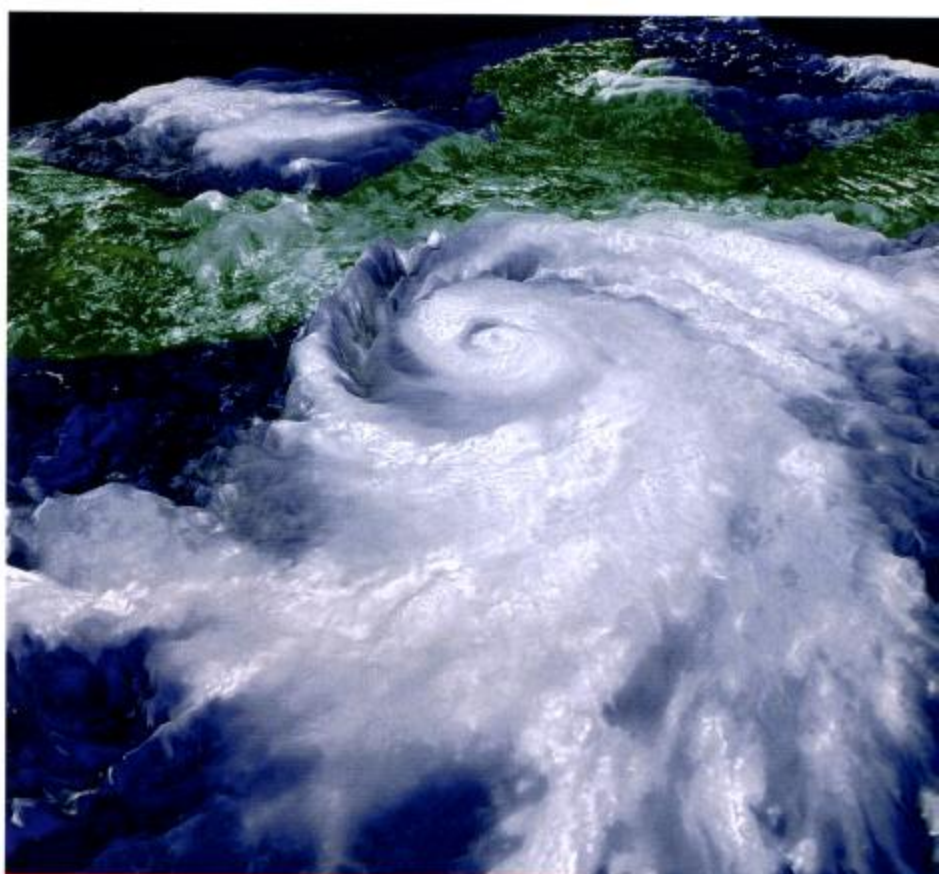
The Encyclopedia of Economics contains definitions of "damage" and "loss" though without specifying the difference between these terms.

In law these terms are mentioned in the Constitution of the Russian Federation, the Codes, some Federal Laws, Resolutions and Decrees. Partial definitions can be found here: some sources give definitions of only loss, while others give definitions of loss, damage and harm.

Analysis of more than 100 methodological and regulatory documents mentioning the term "damage" enables us to make a conclusion that there is a mixed interpretation of "damage", "harm" and "loss". Besides, contradictions of meaning can be found both in the definitions given by different sources or comparing the definitions with each other.

It is possible to identify the most common visions of the terms in question.

**1. Full equation of the terms.** In our view, it is a much generalized interpretation.



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**2.** Some sources define loss as a damage expressed in money terms. Damage can be an in-kind value or a cost-based value. The given definition implies that it can be measured as an in-kind value only. Thus, the definition is incorrect.

**3.** There is an opinion that the term "loss" is more frequently used in legal practice while the term "damage" in other domains, including economics. That would mean that "damage" in economics is a "loss" in civil law which would mean that there is no substantive difference between these two terms.

**4.** Some sources regard loss as a sum of damages made to different subjects due to an incident. We could partially agree with this point of view though the total value of the damage can differ depending on the position of a subject.

**5.** Some dictionaries, for instance the mentioned Encyclopedia<sup>2</sup>, define damage as a variety of losses. We believe that this point of view is more correct although



the substantive interpretation of these terms in the dictionary contains a lot of contradictions.

6) On the basis of this analysis a conclusion was made that in books the term "damage" is often described with such words as "deprival", "injury", "expenditure", "deprivation" and "expenses". The terms "deprival" and "injury" have a specific meaning and usually represent a particular case of "deprivation" while "expenditure" is close to "expenses".

Indeed, many researchers characterize damage as a sum of expenses necessary to restore the original qualities of a subject. For instance, the Methodology understands damage as expenses of two kinds: expenses to prevent a harmful effect and expenses caused by an action. Advocates of this approach use the so-called "cost plus method". In this case, it would be correct to say that damage means expenses. It is necessary to

note that expenses characterizing damage are, by definition, resources (material, spiritual, physical etc.) needed to restore what was lost. Consequently, deprivation is primary, it happens first, while expenses are secondary because they follow the deprivation. Thus, the term "deprivation" characterizes damage in the most generalized way. This viewpoint is confirmed by the fact that what was lost cannot be recovered even with considerable expenses. If one characterizes damage as expenses only, then there is a need to introduce the term "irreparable damage" for the cases when a recovery of what was lost is impossible. Some would argue that if recovery with expenses is impossible, then expenses may allow for an appropriate substitute. It is true but there are also cases when a substitute is impossible to find. For instance, how can we evaluate a human life?

Thus, with regard to damage the term "deprivation" is wider than the term "expenses" and is found more frequently. In terms of an assessment though the term "expenses" is usually wider than the term "deprivation" because it includes additional expenditures for recovering what is lost. It is also necessary to keep in mind that the term "expenses" can be used only to a recoverable subject, i.e. when it is possible to assess damage or deprivation even if they are big, while deprivation sometimes cannot be assessed.

The term "expenses" always implies an assessment of damage on the basis of cost, which makes it possible to express damage in economic terms. Therefore the interpretation of damage as expenses is present in the definition of the term "economic damage", methodology and economic disciplines like economics of management of natural resources.

### MAN IS THE ONLY SUBJECT OF THE EMERGENCE OF DAMAGE

Is every subject in the surrounding world capable of suffering damage, apart from harm? To answer this question it is necessary to know the main condition for the emergence of damage: the subject of emergence of damage must reach a stage of development when a cost assessment is possible. In the environment through evolution this assessment is done in the area of economic relations. Of all the subjects that can be elements of economic relations only man is their main subject acting on the environment to achieve a result. In economic relations the main result is to obtain goods that can be expressed in cost-based values. And any assessment is made from the viewpoint of a human being as the most intellectually developed subject. Thus, any kind of damage can be assessed only by man and for man as well as for people united in a corporation, a company, an enterprise, and an economy, where man is the main link. Damage cannot be made to an element of the environ-

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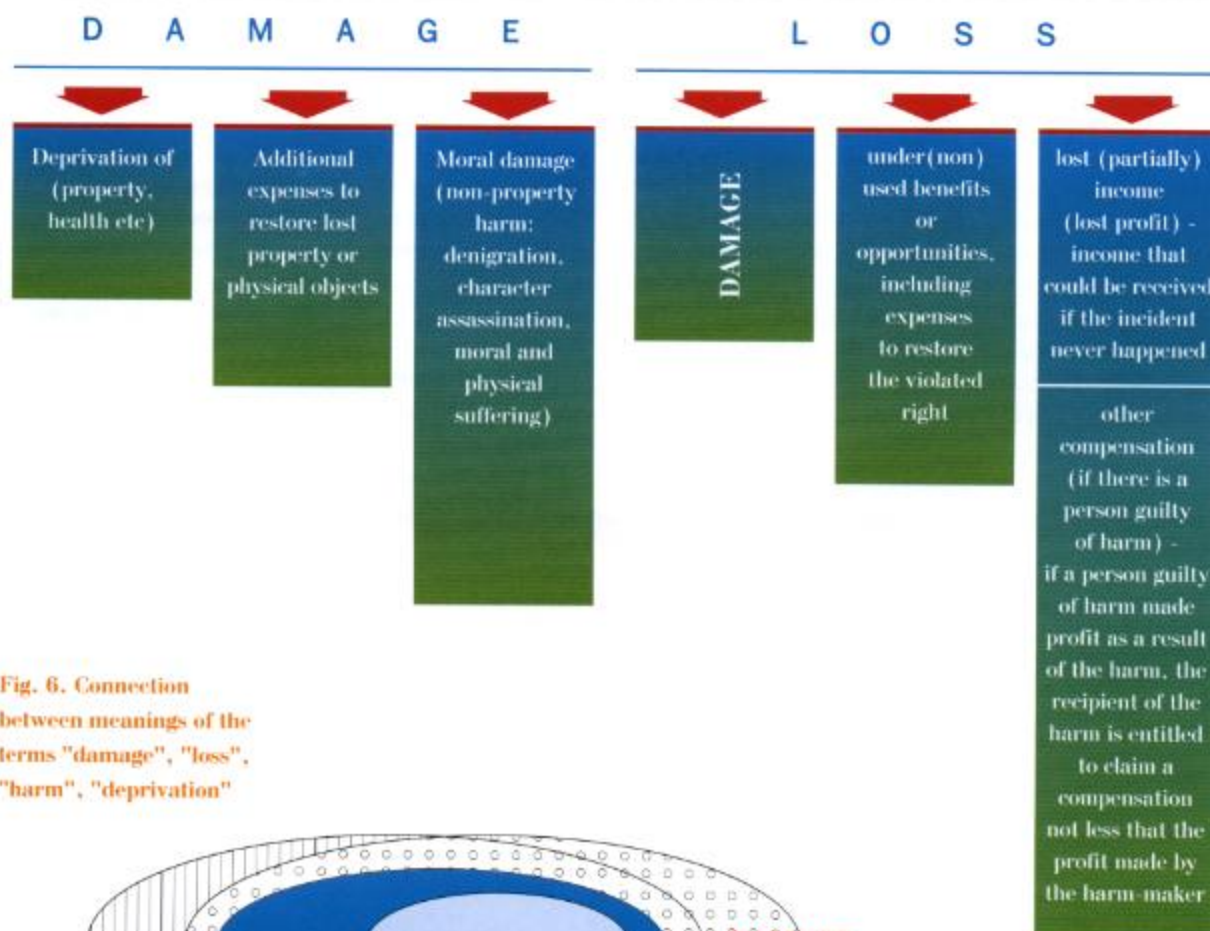
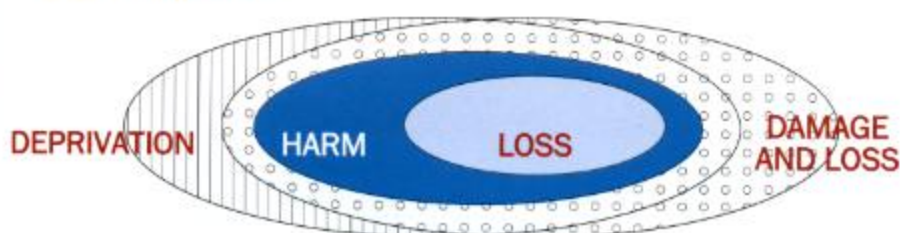


Fig 4. General structure of the term "damage"

Fig 5. General structure of the term "loss"

Fig. 6. Connection between meanings of the terms "damage", "loss", "harm", "deprivation"



ment (air, water). Non-economic terms like harm, negative changes, or deprivation should be used for such cases. Damage emerges only for man as a result of harm to water, air etc. It is more correct therefore to speak of a "damage from contamination of the environment" or "damage as a result of a negative effect on the environment" rather than "damage to the environment".

### DAMAGE TO ECONOMY AND ECONOMIC SUBJECT

The term "damage" is an economic value measured in cost-based units. Damage made to economy or to a subject is not always equal though. This fact can be illustrated with an example of a damage made as a result of a natural phenomenon: a hurricane has damaged power transmission lines. Let us see what the resulting damage would be. Damage to the power generation industry would be the cost of restoration of the power transmission line plus profit lost due to the loss of the produced power that was not delivered to consumers plus power

that was not produced during the accident. Damage to consumers or enterprises would be the cost of the goods that were not produced plus payment for the power that was not delivered. Enterprises and power generation industries are subjects of economic relations. Let us see now what the damage to the whole economy would be.

At first sight the damage to an economy would be the sum of the damages made to its elements and economic subjects. Proceeding from this premise in their calculations many experts overstate the economic damage. Real damage would consist of the lower budget revenues due to lower tax payments due to a smaller volume of the produced goods, lower payments for power consumption and, if applicable, cost of the use of state services (ambulances, rescue services etc). This example clearly demonstrates that damage to an economy is not always equal to the sum of damages to the economic subjects. That is why a clear line should be drawn between the meanings of the term "damage" and "economic damage".

1. "Economic damage" is damage to an economy as a



whole ("economic damage" and "damage to economy" have the same meaning).

2. "Damage to a subject" is a damage from the viewpoint of an economic subject as a participant in economic relations (or damage in the narrower sense – expressed in cost-based units).

Then, the phrase "economic damage to a recipient" (man, power plant, enterprise, population, victim etc.), often used in general, academic and methodological literature, is incorrect because it actually means both the damage to an economy as a whole and the damage to an individual economic subject, i.e. "damage to a subject", which leads to a contradiction.

Some sources explain these contradictions by inaccurate translation.

Let us consider now the term "environmental damage". Environment is defined as a totality of natural and social phenomena and subjects or as a totality of all relations between living and non-living elements of nature. According to Russian language rules damage is made to someone or something. If damage is made to man, then it is made to the environment, because man is a component of the environment. Thus, the term "environmental damage", i.e. damage to the environment (to man or other components of nature) have the right to exist. In our view, it is more correct though to use the term "economic damage", which removes all differing interpretations and emphasizes the damage to an



### ENVIRONMENTAL, ECONOMIC OR ECONOMIC-ENVIRONMENTAL?

As it is known, damage may be a result of different effects: physical, psychological, chemical, biological, radioactive, thermal, electromagnetic, ionizing etc. Let us see the damage resulting from contamination with chemicals.

Some sources call this damage environmental, other - economic and the other - economic-environmental. For instance, in the Methodology these terms interchange, which means that the authors either make no differentiation or have different viewpoints on the definition of damage and decide not to engage in controversy.

**If by the environment we understand not only man as its component, but man with all his economic relations, then the term "environmental damage" does make sense.**

economy as a whole. To specify the kind or cause of damage it is appropriate to say "economic damage from (as a result of) contaminated environment".

Indeed, we do not call the damage to the power generation industry from a hurricane, for instance, a power-generation-industry-related damage or damage caused by a hurricane or a natural damage. We calculate all the losses in money terms and say "damage to the economy as a result of a power transmission line broken by a hurricane".

The term "economic-environmental damage", which at first sight unites the advocates of the first and second interpretations of the term, actually makes no sense because it implies damage both to the economy and the environment simultaneously. On the one hand, as we already said, there can be no damage to the environment but there can be harm while damage can be made to man or the economy. On the other hand, if by the environment we understand not only man as its component but man with all his economic relations, then the term "environmental damage" does make sense. The use of the term "economic-environmental damage" actually implies overlapping the meaning of the two terms.

**Let us now formulate the main rules for a correct use of the term "damage".**



1. There should be a clear-cut difference between the terms "damage", "loss" and "harm".

Damage means disappearance of an object or harm (for example, to property or health) as well as additional expenses to restore what was lost (physical objects, property) as a result of an incident, including moral damage.

The term "loss" is wider, it includes, apart from the term "damage", underused benefits like income that was not (fully) received or lost profits, and, if there is a person guilty of the damage, the income received by this person as a result of this incident.

The term "harm" is a yet wider, more universal one. It may possess meanings of both "damage" and "loss".

2. Damage is an economic term. Unlike harm, for example, it can always be measured in money terms.

3. Man is the only subject of the emergence of damage. It is correct to use the term "damage" with regard to a group of people, enterprises and institutions, or to the economic activity of man. The term "harm" should be used with regard to other elements of the environment like equipment, trees, rivers, forests, air.

4. One should understand the difference between the terms "damage" and "economic damage".

Economic damage or damage to the economy is a totality of negative effects on a national economy expressed in cost-based units.

Damage to an economic subject is a totality of negative effects (consequences) from the viewpoint of the economic subject as a full-fledged participant in economic relations.

5. Speaking of damage to the economy from a negative effect it is more correct to use the term "economic damage" adding "as a result of (from) an incident (accident)". For example, speaking of damage to the economy from chemical pollution, which is a negative effect on the environment, it is more correct to say "economic damage from (as a result of) contamination of the environment (air, water, soil etc.)" rather than "environmental damage" or "economic-environmental damage".

The correct use of the term "damage" will to a great extent determine the culture of our speech and help prevent mishaps in methodology and practice of damage assessment.

**Economic damage or damage to the economy is a totality of negative effects on a national economy expressed in cost-based units.**

