ASSESMENT AND REGULATION OF ENVIRONMENT POLLUTION

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People have always strived at regulating their relations with the environment, trying to make its assessment more systematic. In our opinion, this assessment is to comprise two main components: essence assessment and significance assessment. Significance assessment is generally more important; but understanding should come before judgement, so essence assessment is always followed by significance assessment.

Essence assessment (or diagnosis) can be subdivided into the diagnoses of origin, activity and typical nature of general and characteristic features. Significance assessment in its turn can be subdivided into assessment of quality (of consumed properties), well-being (useful, but not directly consumed properties) and designation (role in geosystems of higher order). Such an approach to environmental assessment can be efficient in different fields, such as pollution control, responding to climate change, protection against natural hazards and etc.

This research considers the use of this approach for environment pollution control. Normally this process involves three tools: a) environment quality standards, b) standards of impact and/or load designed to observe quality standards; c) environment quality assessment as a feedback which comes back to load standards (fig. 1).

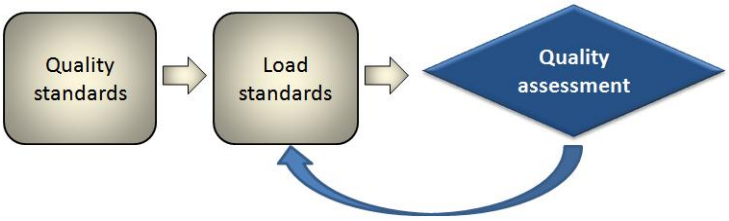

Fig. 1 Common scheme of environment pollution control.

Efficiency of environment pollution control mainly depends on environment quality standards (maximum permissible concentration of pollutants), which are subdivided into sanitary, economic and ecological standards. Their functions are listed respectively: protection of man's health and life, protection of natural resources and conservation of natural ecosystems. It is acknowledged that sustainable development is supported by ecological standards, which are developed by specifically coined research fields, such as environmental chemistry and environmental toxicology. However this problem is hardly solved, which can be explained by ecosystem diversity which forces ecological standards into regional frameworks.

This problem can be solved by the suggested order of ecological standard setting by modification of economic or sanitary standards taking into account environment pollution assessment. To carry out ecological modification of environment quality standards we can use the diagnosis of environmental pollution and the assessment of well-being and designation of natural systems affected by pollution. In this case the schemes for environment pollution control will be as follows (fig. 2).

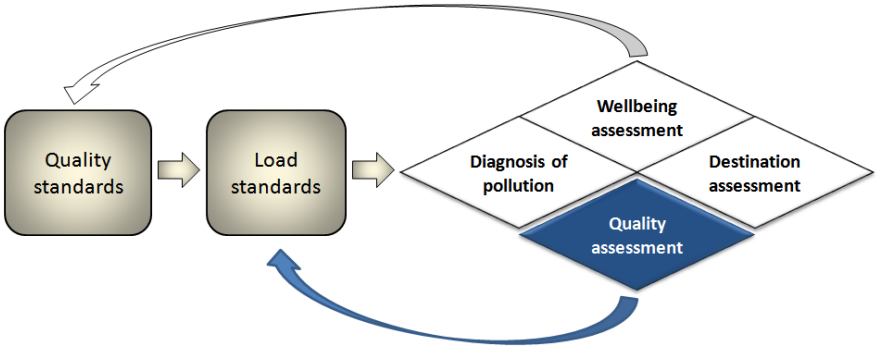

Fig. 2. Suggested scheme for environment pollution control.

One of the outcomes of this research area is the scheme of diagnosis of marine pollution in the areas of search, prospecting and production of hydrocarbons in the northern part of the Caspian Sea (table 1). This scheme is used in environmental monitoring of these areas. We hope that the collected material which is now being analysed will help elaborate the scale of reduction and multiplying factors for ecological modification of fishery standards of marine environment quality which are applied to the Caspian Sea in connection with its rich fish resources.

Table 1

Scheme of diagnosis of marine environment pollution at license areas of oil and gas producing companies in the northern part of the Caspian

Type of diagnosis	Diagnostic indicator	Diagnostic scale
Diagnosis of scale	Correlation of regional and local pollution	a) weak local pollution; b) average local pollution; c) strong local pollution
Diagnosis of gradient	Correlation of pollutant concentration at the input and output of the main flow (transfer route)	Gradient values: a) weak gradient; b) average gradient; c) strong gradient
		Gradient directions: a) not expressed; b) positive gradient; c) negative gradient
Diagnosis of secondary pollution	Inflow of pollutants into water from bottom sediments	a) absence of secondary pollution; b) presence of secondary pollution
Diagnosis of activity	Deviation of actual pollutant spatial distribution from conservative-type distribution	Activity level: a) low activity; b) average activity; c) high activity
		Activity directions: a) not expressed; b) enrichment; c) depletion
Diagnosis of sensitivity	The ratio of peak-to-peak value of pollutant concentration (C) to that of hydrological parameters (G) in case there is a connection between C and G values	a) low sensitivity; b) average sensitivity; c) high sensitivity
Diagnosis of typicality	The ratio of actual pollution to typical pollution (for the selected type of water and bottom sediments)	a) typical pollution; b) non-typical weak pollution; c) non-typical strong pollution
Diagnosis of anomalies	The ratio of actual pollution to background pollution	a) background pollution; b) abnormally low pollution; c) abnormally strong pollution