Society Structure and Flux of Phosphorus: The Adriatic Case

Vukadin, Ilija.
Institute for Oceanography and Fisheries, Split, Croatia

The large-scale flux of nutrients in modern society is coupled to the exponentially growing world population. During the last three decades, there has been a several-fold growth in use of nitrogen (N) and phosphorus (P), particularly in the agricultural and chemical production, such as in detergents and as in food additives. Many factors are important in controlling levels of plant biomass in aquatic ecosystems, but phosphorus is generally considered the key element that controls or limits productivity. The enrichment by nutrients and suspended matter causes accelerated growth of algae and higher forms of plant life to produce an undesirable disturbance to the balance of organisms present in the waters. Excess phosphorus inputs into surface waters are a major determining factor in eutrophication phenomena associated with impairment of commercial and recreational fishing, local water quality problems and aesthetic damage. The aim of this paper is to briefly discuss the main feature of the present flux of nutrients through agro-urban and aquatic ecosystem, and the measures to reduce or stop the great losses of nitrogen and phosphorus. Special attention will be paid to phosphorus, because this element is looked upon as a limited natural resource. Continuos monitoring of seawater along the eastern Adriatic coast for the past decade. The goal of this research is to observe the influence of urban and industrial effluents on the quality of the receiving seawater. The nutrient balance has been calculated, for the whole Adriatic Sea.

Table 1. Annual pollution load of the all Adriatic Sea (**x 10^3 t $year^{-1}$**)

Pollutants	Rivers	Domestic effluents	Industrial effluents	Agricultural	Total
Phosphorus (P)	79	2.5	0.5	3	85
Anionic Detergents (AD)	14000	2200	-	-	16200

Since the amount of phosphates from municipal sewage contributes about 40 % of total P-loading in the European countries, of which about 40-50 % is due to detergent phosphates, the reduction of detergent phosphates could have a beneficial effect in reducing the total load. As conclusive remark, it must be pointed out that effective and long-term control of eutrophication can only be achieved by reducing nutrient loads by adequate preventive measures, supported by appropriate administrative and legal powers. Basic options are:

- chemical phosphorus removal in treatment plant and development and improvement of enhanced biological phosphorus removal;
- ban or reduction of phosphates in detergent;
- pollution control measures of agricultural practices;
- regional planning including the control of land usage.