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"SUSTAINABLE DEVELOPMENT OF LAGOONS AND SCHOOL EDUCATION"

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It is known that lagoons constitute significant ecosystems, which are characterised by natural functions, from which, many values (e.g. biological diversity, fisheries production, etc.) derive for the man. It is also known that the presupposition for the maintenance of their functions and values, is to deal with them as a whole, as well as their sustainable management. Thus, studding lagoon ecosystem and introducing proposals for the sustainable development of lagoons become urgent necessity; for the application of these proposals, the citizen's education is recommended.

In this study, a preliminary evaluation is given, of the potentials for sustainable development of Drana and Laki lagoons of Evros Delta (North Aegean Sea), which is a significant wetland protected by Ramsar convention. Furthermore, thoughts are being expressed for the application of a programme whose main objective is to educate and sensitise the students, concerning the structure and function of a lagoon ecosystem, the values, protection, and sustainable development of lagoons.

For the preliminary evaluation of Drana and Laki sustainable development potentials, the ecological planning method *(Frisoni et al. 1984)* was used and the protection framework of Evros Delta was taken under consideration. For the acquisition of preliminary results, preliminary qualitative samplings of macrobenthic flora and fauna took place in July, August and September 1997 and the depth, salinity and temperature values were measured indicatively in both lagoons.

Drana lagoon communicated with Laki lagoon with an opening 4m. wide until 1988. Since then, this opening was closed and there is no surface communication of Drana with Laki and the sea anymore. In Drana in July 1997, the maximum depth was about 70 cm, and salinity values varied between 15‰ and 17‰. In late August and early September 1997 the water level was reduced considerably, parts of the lagoon emerged and salinity had very high values (50-54‰). The bottom of the lagoon was covered by the seagrass *Ruppia maritima*, while the composition of benthic macrofauna was characterised by the presence of lagoon species exclusively, among which *Hydrobia acuta*, *Gammarus aequicauda*, *Hediste diversicolor*, *Abra ovata* dominated. In conclusion, according to Guelorget et al. (1983) and Frisoni et al. (1984), the whole lagoon is occupied by the confinement zone IV *(fig. 1)*.

In Laki lagoon in early September 1997, the maximum depth was about 85 cm and salinity values varied from 33‰ to 35‰. The bottom was covered by macroalgae, while the composition of benthic macrofauna was characterised, in the largest part of the lagoon, from the presence strictly of lagoon species (e.g. *Corophium orientale*,

Gammarus aequicauda, Hydrobia acuta, Abra ovata, Cerastoderma glaucum, Hediste diversicolor) as well as of species occurred not only in lagoons but in the sea as well, like the polychaete *Streblospio shrubsolii*. To sum up, according to Guelorget et al. (1983) and Frisoni et al. (1984), the largest part of the lagoon is occupied by the confinement zone III *(fig. 1)*.

To take into consideration all the above, having as a presupposition the opening of the obstruction of Drana and taking under consideration that in the area, only extensive culture has to be done, according to Frisoni et al.-(1984), it is ascertained that there is the potential of extensive culture, mainly of *Anguilla anguilla and species of Mugilidae in Drana, whereas in Laki, mainly species of Mugilidae, Anguilla anguilla, Sparus auratus and Dicentrarchus labrax*. With the proper management of the aquatic recourses, it might be possible the reduction of the fluctuation of salinity values in Drana lagoon aiming at the enlargement of cultivation potentials.

Presumption, though, for the improvement of the proposals, is monthly study of some physicochemical parameters (e.g. salinity) for two years after the opening of the obstruction and after then, monthly hydrobiological study of the ecosystem of both lagoons for an annual cycle (physicochemical parameters, plankton, benthic flora and fauna, as well as reproduction, growth, diet and population dynamics of ichthyofauna's dominated species). On this study, which can be enriched with information for the avifauna and the existing human activities in Evros Delta, on the proposals for the protection of the Evros Delta ecosystem and for sustainable development of Drana and Laki lagoons, a programme of Environmental Education can be based.

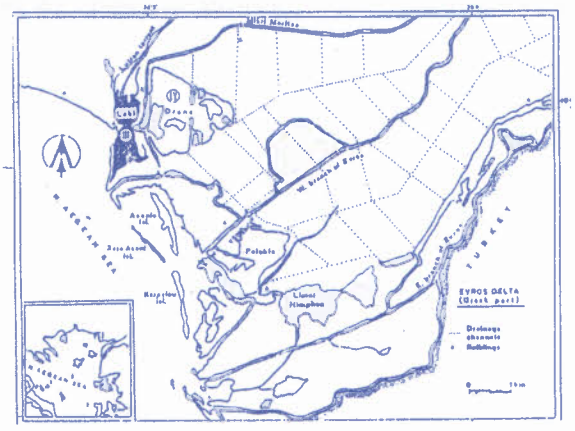

Fig. 1. Map of Evros Delta, where the distribution of Drana and Laki lagoons confinement zones is indicated.

This Environmental Education programme will be aiming at educating and sensitising students concerning:

a. the structure and function of a lagoon ecosystem, emphasising on the most important physicochemical parameters and their seasonal fluctuation, on the dominated species of macrobenthic flora and fauna, on the dominated species of

ichthyofauna and the analysis of their stomach contents for the rise of food webs and on the avifauna,

b. the natural functions of lagoons and the values which come from them for the human being (biological diversity, fisheries production, areas for recreation, research and education),

c. the lagoon ecosystem protection and finally

d. the sustainable development of lagoons.

Analogous hydrobiological research can be done in the other lagoon - estuarine ecosystems of the country, giving priority to those, which are protected by the Ramsar convention (8 ecosystems). Simultaneously in each of the above ecosystems, Environmental Education Programmes can be adjusted, with the aforementioned aims. Furthermore, we suggest the operation of a National Network, which:

a. will consist of teams (of scientists, educators and students), each one responsible for a certain wetland, for communicating, exchanging thoughts - information and co-ordinating its activities with each other and

b. will have as a purpose the monitoring of the wetlands' situation and evolution, the education and sensibility of students and the awareness of community and authorities for the protection and sustainable development of these ecosystems.

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