CHAPTER 7 COMPREHENSIVE MODELING APPROACH TO ADDRESS WATER POLLUTION IN THE ENTIRE BASIN

7.1 General Evaluations on the entire Black Sea Basin

In the international waters focal area, countries often face very complex, water related environmental problems. In order to develop the shared political commitment to be successful in addressing these transboundary water problems, it is first necessary to

(a) Build the capacity of countries to work together,

(b) Jointly understand and set priorities based on the environmental status of their water body,

(c) Identify actions and develop the political commitment to address the top priority transboundary problems, and then

(d) Implement the agreed policy, legal, and institutional reforms and investments needed to address them GEF (2000)

11 of the 17 countries of the Black Sea Basin are non-coastal countries share mainly Danube basin and other international rivers like Dniipro, Dniester, Don, and the other 6 Black Sea countries face a variety of shared environmental problems. The countries have already identified the excessive release of nutrient pollution from agriculture, municipal, and industrial sources as the top priority of water problem and releases of toxic substances from hotspots as an additional priority. The countries agreed on what involvement are needed to address the top priorities through their programs and plans of action as known “Strategic Action Plans” (SAP). However, after signing of Bucharest Convention in 1992 by six Black Sea countries “Guidelines for the protection of the Black Sea against pollution” have not been fully implemented so far because of financial
problems and other priorities Parr et al. (2000). Moreover, water pollution is still one of the critical issues in the region.

In order to accelerate on the implementation of SAP by countries; the action should be clearly identified and policy/legal/institutional reforms are performed for each country basin to find out sources of pollution and their contribution then basin-wide comprehensive action is implemented for reversing the degradation of the damaged sea ecosystem and its contributing freshwater basins.

7.1.1 Principles and Mechanism

Bearing in mind, the support by international organizations to overcome the water pollution problems in the Black Sea will not be continued forever. The countries in the basin should be cooperated as a strategic partnership considering their socio-economic, politic, and environmental properties. Modeling of ecosystem integrated with environment is one of the key points to draw the whole picture of the system in a country or its basin that we have considered as a first step of comprehensive action. In order to integrate the systems, water pollution indicators originated by domestic, industrial and land use activities should be classified, analyzed, and collected as database. Second, main socio economic indicators classified and determined in countries basin to be able to formulate and integrate the systems. With the modeling, briefly it can be figure out:

(i) The sources of pollutants and their contributions in each country including international rivers and future changes,

(ii) Impact of socio-economic development on the environment,

(iii) Introduce Cost-efficient production and treatment systems

(iv) Contribution development of future plan considering environmental state
7.1.2 Model Adoption

After each country gathers the necessary data, the model that we introduced in Turkish Black Sea Basin may adopt in the Black Sea Entire Basin in the following:

The way of modeling is the same as previous model described in Chapter 3; Total pollution is sum of the total pollution emitted by each country in the Black Sea Entire Basin at certain time. Pollutants from each country may also classify as sources of pollutants such as agriculture, industry etc that depending on the country's situation. Next, pollution integrates to macroeconomic indicators and other factors introduced into market flow system then the model can be run dynamically in a period of time.

It is concluded that basin-wide modeling in the entire basin might also be appropriate taking into consideration socioeconomic-environmental structure and priorities that it may also provide valuable information to implement policy instruments to improve water quality in the Black Sea and in the rivers as a comprehensive action. Moreover, a uniform policy for pollution reduction targets is neither economically nor environmentally practical for the entire basin, since the basin is very wide and has different natural, environmental, socioeconomic and political systems. Therefore, it is necessary first to determine clearly socioeconomic system and ecosystem interactions in each country to be able to formulate an optimal policy to achieve the targets in a certain period. Second, after each country has a profile of policies it is necessary to combine the policy from the viewpoint of the whole basin of the Black Sea. In order to do those not only economic contracts but also political ones between the countries must be discussed. Such negotiation may need review of policy that possible in each country, which of course a revised policy simulation should be done, based on specific simulation model to reach the targets clarified by the countries.