ABSTRACT

The political border between the Palestinian and the Israelis makes the water issue more sensitive and critical. The Palestinian shared the Israelis in the Western and Northeastern Basins. The Jordan River Basin is also shared between Palestine, Israel, Syria, Lebanon, and Jordan. One of the convenient and comprehensive procedures to solve the shared water resources conflicts is the application of the international water law.

The main objective of this thesis is to define a multi-criteria decision model to quantify the shared water resources and apply the model to the Palestinian case to divide the shared Jordan River and groundwater basins between riparian.

In this study a multi-criteria decision model was developed to quantify the Palestinian and other riparian water rights in the shared water resources according to the international water law. The International Water Law was translated to ten measurable standards. The ten equity standards were operationalized and a multi criteria model was developed for the calculation of the water proportion for any country. The model can be applied for any dispute in shared water resources regardless the number of countries and the number of standards, the model is as follows:

$$\text{Riparian Proportion} = S_j = \sum_{i=1}^{k} W_i * S_{ij}$$

Where:

- S_j is the final share of the j^{th} country
- W_i is the weight percentage of the i^{th} factor
- S_{ij} is the percentage share of the i^{th} factor for the j^{th} country
- $i = 1,2,\ldots..,\ k$ where k = number of factors
- $j = 1,2,\ldots\ldots..,n$ where n = numbers of countries

The above-mentioned model which based on the international water law principles was applied to the Palestinian-Israeli water conflict. The study concluded that the Palestinian water right in the Jordan River Basin is 238.7 million cubic meters per year. The Palestinian water proportion in the Western Basin and the Northeastern Basin are 151.2 and 71.2 million cubic meters per year respectively. The total annual available water quantity in the West Bank including the Eastern Basin is 561 million cubic meters. The Palestinian future water demand in the year 2030 will be 632.2

million cubic meters. The Palestinian water budget shows a water deficit in the year 2030 by the amount of 71.2 million cubic meters, which means that other water options should be ready to cover the water deficit before it starts.

The study used the results of the CDM/Morganti, 1997 report to put in order all the possible water options to cover the water deficit in the West Bank. The short term five water options were ordered as follows: 1- Groundwater, 2- Supply System importance 3- Water conservation, 4- Surface water, 5- Watershed groundwater management. These options can be implemented immediately. The long term water options were ordered as follows: 1- Waste water reuse, 2- Desalination, 3- Water purchase from Israel, 4- Medusa Bags, 5- Water exchange between Syria, Jordan, Israel, and Palestine.