THE WATER CRISIS IN TOKYO

Madison Francis

Abstract

Tokyo, Japan, is approaching a water crisis. Several causes have attributed to this, and several studies analyze the causes of the water shortages to suggest possible solutions.

Causes

Radioactive Contaminants
Tokyo Bay has significant amounts of radioactive contaminants which then are brought to the greater Tokyo region (Yamazaki). The sources of these contaminants include the 2011 Fukushima nuclear power plant accident and contamination from the atomic bombs of Hiroshima and Nagasaki (Yamazaki).

Climate Change
Researchers used models to represent climate change patterns and have found that the water availability between April and May might be crucial (Islam).

Socio-Economic Factors
Researchers have concluded that supply/demand situations influence water shortages significantly more than climate change does (Shen). In fact, in the journal article "Projection of Future World Water Resources under SRES Scenarios: An Integrated Assessment," Shen concluded, "Thus, population growth and economic development are the major drivers causing more severe water scarcity in the future" (Shen).

Methodology

Shen and other researchers studied Global Climate Models to analyze possible changes in rainfall and water availability with regards to climate and radioactive contaminants. They used many scenarios in order to interpret the dependent and independent variables (Shen).

Yamazaki and other authors used sediment core tools and measured particle sizes to find the amount of radiocesium deposited in the Tokyo bay (Yamazaki et al.). Figure 1 shows "Geographical distribution of the radiocesium precipitation is indicated by the values for eight months after the accident, adapted from "Extension Site of Distribution Map of Radiation Dose, etc." [3]. (a) Study area. (b) Sampling points in the Edogawariver system. (c) Sampling points in the Tokyo Bay area. V: Tamagawa estuary, W: Sumidagawa estuary, X: Old-Edogawa estuary, Y: Off the Old-Edogawa estuary, Z: Center of Tokyo Bay, Aqua Line: Cross road of Tokyo Bay" (Yamazaki).

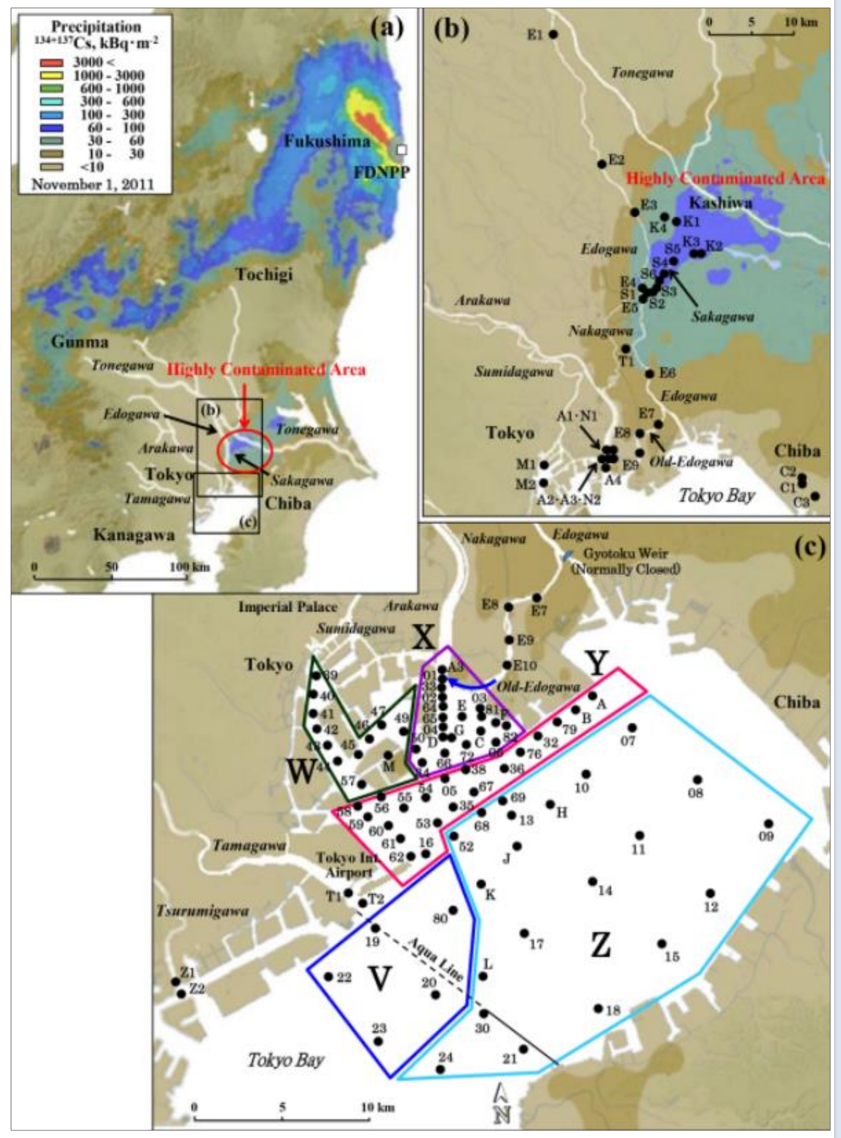

Figure 1: Distribution of Radiocesium

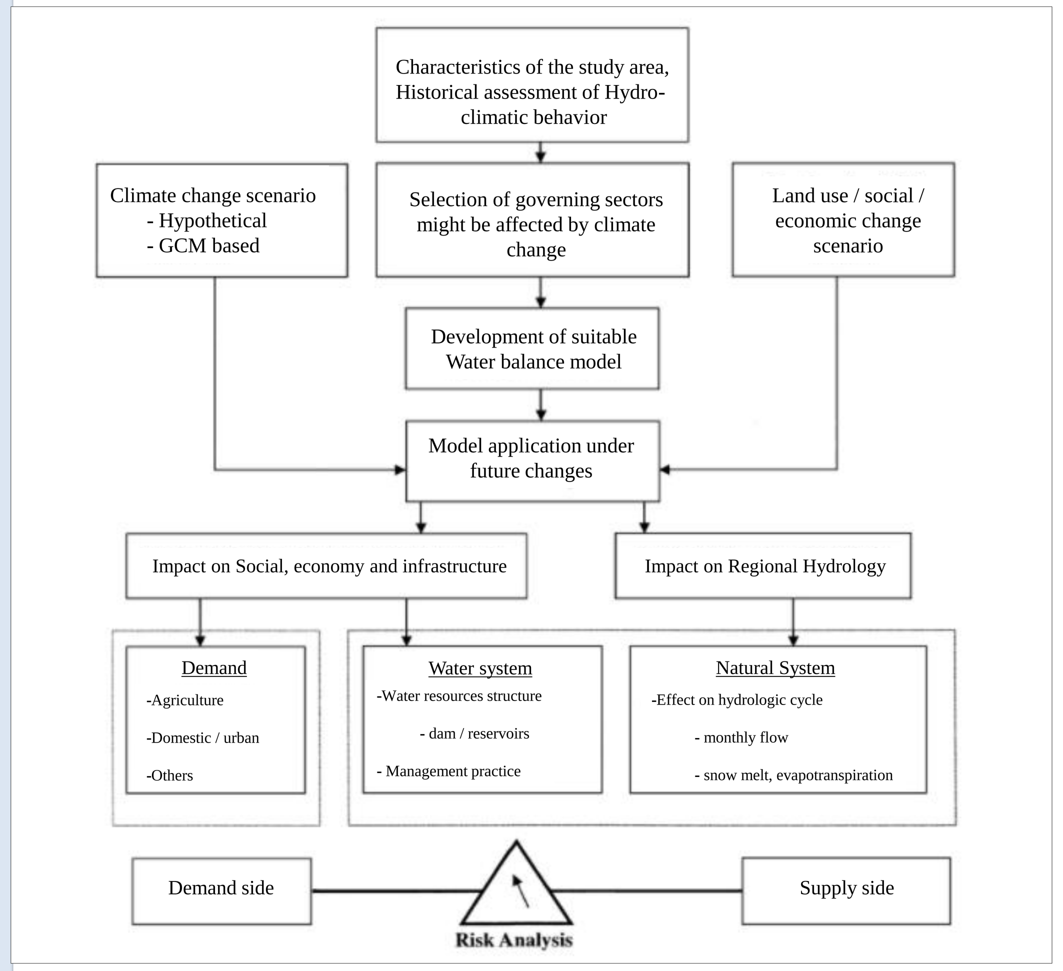

Figure 2: Climate Change Impact Assessment

Islam and others conducted a study to "develop a suitable research methodology to address the climate change impact in a complicated river basin" (Islam et al.). They created charts and concluded that these models can be used to assess climate change in the future (Islam et al.). An example is shown in Figure 2, assessing climate change.

In a separate study, Islam and other authors also studied climate change and the Tone River with similar methodology to their other study mentioned above.

Kurihara and Takeuchi assessed several models for water desalination efficiency, costs, and effectiveness. (Kurihara and Takeuchi).

Possible Solutions

Desalination Technologies
Kurihara and Takeuchi suggested desalination technologies. Different models can conserve energy and create drinkable water. These tools can help adapt to climate change and conserve water.

Water Legislation and Management
Shen and other authors stated that the major drivers for water scarcity are population and socio-economic factors, and they suggest using water management and legislation in addition to technology (Shen et. Al).

Figure 3 shows a model for water desalination called the SWO-PRO system (Kurihara and Takeuchi).

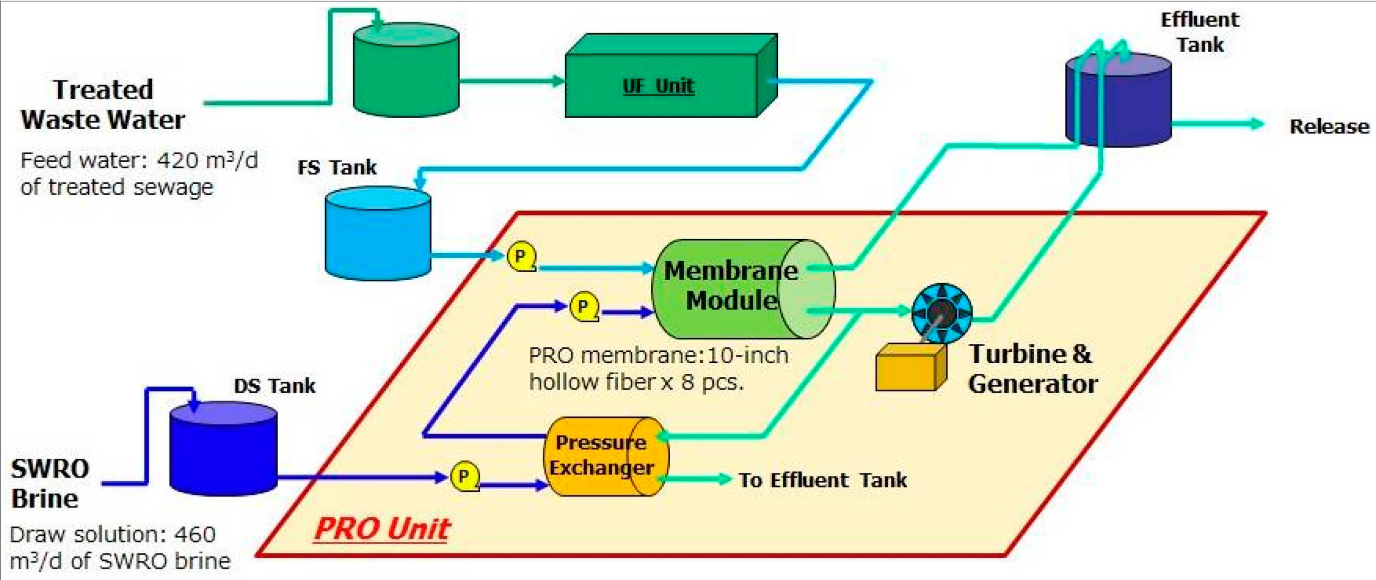

Figure 3: The SWO-PRO system

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