

I am Sayak Karmakar, an ex-student of the ME program at the School of Water Resources Engineering at Jadavpur University. I have completed my master's thesis under the supervision of Prof. (Dr.) Pankaj Kumar Roy with the title "Assessment of groundwater potential zone with integrated MCDM model and WQI in Silabati-Joypanda river basin of West Bengal". In most of the previous studies, GIS and RS parameters have been used as thematic layers. However, some field-based parameters were also introduced in my work. I conducted a Vertical Electrical Sounding survey, measured soil index properties and groundwater quality parameters in the laboratory. As part of my thesis work, I am in the process of writing up two research papers. In our ongoing research work, we are using four different MCDM models to check the accuracy of groundwater potential maps. Also, I was a prominent team member of the DGPS and current meter surveys in the Mayurakshi River. As of now, I am working on two separate research projects on Mayurakshi basin that focus on IDF curve generation and discharge calculation.

As my thesis work aimed to calculate the groundwater potential and water quality for a river basin, an overall groundwater scenario could be derived from it. The study would provide multiple benefits, and managed aquifer recharge zones could be identified as an extension of that study. A combined groundwater index can be built so that people can easily understand the groundwater scenario of an area both qualitatively and quantitatively. Additionally, I am interested in computational hydrodynamics and computational hydrology. There are some research works I've done on surface water hydrology. I am interested in studying the chemical and flow interactions between surface water and groundwater in the future. The results of this study may be useful for maintaining water quality, conserving biodiversity, and enhancing the ecological functions of watersheds. The following scientific issues related to SW-GW interactions interest me: First, riparian zones are the most direct link between the atmosphere and groundwater, providing sites for enhanced direct recharge and discharge to the environment through baseflow and phreatophyte evaporation, and serving as an effective source of aquifer salinization and mineralization. Consequently, understanding the dynamics of riparian zones is crucial to integrated river basin management. Additionally, rainfall anomalies propagate to shallow aquifers, affecting basin-wide hydrology. There is a need for better understanding of the "teleconnections" between groundwater recharge and riparian discharge near valley floors. Furthermore, native vegetation and introduced crops have water use requirements that must be met through precipitation or irrigation (groundwater withdrawal). Different types of plants also respond differently to rainfall, affecting evapotranspiration, soil moisture, recharge, carbon sequestration rates, and phyto-remediation. Lastly (most pertinent to regional water balances), whether SWGW interaction influences subsurface storage, evapotranspiration, base flow, and surface runoff is still under debate.