CHAPTER 6

CONCLUSIONS AND RECOMMENDATIONS

6.1. Conclusions

From the research outputs, many important points can be concluded in accordance with the steps of work. These results are primary used for groundwater management in the research area. These points are:

1. The best simulation model in the steady state condition is obtained with hydraulic conductivity (K) of 178 m/day, 161 m/day and 13 m/day, for Phra Padaeng, Nakhon Luang and Nonthaburi aquifers respectively. The ARM are 0.876 meter, 0.868 meter and 0.619 meter for Phra Padaeng, Nakhon Luang and Nonthaburi aquifers respectively. The best simulation model in transient simulation is obtained with K and Ss values of 89 m/day and 1×10^{-5} 1/m, 0.323 m/day and 5×10^{-5} 1/m, 0.2722 m/day and 1.29×10^{-5} 1/m for Phra Padaeng, Nakhon Luang and Nonthaburi aquifers respectively. The ARM and NRMS are 1.5 meters and 21.97%, 1.18 meters and 22.46%, 1.32 meters and 17.22% for Phra Padaeng, Nakhon Luang and Nonthaburi aquifers respectively.
2. Groundwater balance at the Phra Padaeng, Nakhon Luang and Nonthaburi aquifers is still maintained. The volumes of groundwater inflow are estimated at 7,531.72 m^3/day, 9,334.02 m^3/day, and 13,723.96 m^3/day for Phra Padaeng, Nakhon Luang and Nonthaburi aquifers respectively.
3. The quality of groundwater at Phra Padaeng aquifer is poor, only in the northeast area where the water quality meets the standard drinking water requirements. Nakhon Luang aquifer displays a poor groundwater quality in the middle of research area. While the quality of groundwater at Nonthaburi aquifer is good with no elements have higher content than that of the standard drinking water requirements present in the study area.
4. The groundwater volumes released from aquifers accumulated from1993 to 2003 are 125,351.59 m^3, 120,425.75 m^3 and 225,741.24 m^3 for Phra Padaeng, Nakhon Luang and Nonthaburi aquifers respectively.

5. Based on the quality and drawdown maps, three potential development areas are identified for Phra Padaeng aquifer, and two potential areas are identified for Nakhon Luang and Nonthaburi aquifers.

6.2. Recommendations

Some recommendations can be made from the results of the research, which are:

1. The final model of groundwater modeling can be use to simulate the effect of developing new wells in that area. Recommendations about pumping rate and screen position will be obtained from the results of simulation. It can be used to minimize the negative effect of groundwater abstraction in the research area.
2. The result of grcundwater flow modeling can be used to develop mass transport modeling in the research area. This model can help to better understand the variation of groundwater quality system in the research area.
3. Pumping rate for new wells (DR 132, DR 133 and 134) are recommended at not more than 25 m^3/day for each well, in order to maintain groundwater balance in the Nonthaburi aquifer and also to avoid the drawdown reach the village.
4. in the development of new wells for water supply system, it is recommended to avoid area with poor groundwater quality and high drawdown rate ($\geq$ 0.75 m/year), thus minimizes the cost of treatment and negative effect of groundwater pumping. However, the poor groundwater quality still can be used for agricultural or industrial purposes.
5. Groundwater modeling is neccеasry for groundwater basin development in order to understand the groundwater system, to maintain for sustainable use of groundwater and to avoid the damages caused from groundwater abstraction.
6. The availability and reliability of groundwater data are priority in groundwater analysis, therefcre, an improvement of database and monitoring system are very necessary for analizing groundwater system.