

TC-330L

Groundwater Resources Planning and Development in Eastern Economic Corridor (EEC)

with an Integrated Spatial Plan and Public Participation

Arnon Phongkula¹, Vijitsri Sanguanwongse², Mana Luksamee-Arunothai², Non Vorlapanit²,
Kanokon Seemanon², Krit Won-in³, and Wandee Thaisiam⁴

The Thai government places importance on Eastern Economic Corridor (EEC) Project in Chachoengsao, Chonburi, and Rayong provinces, where manufacturing industry has been rapidly expanding, resulting in the shortage of surface water and sometimes the water quality is non-consumable. Therefore, the Department of Groundwater Resources, the Ministry of Natural Resources and Environment, in cooperation with Kasetsart University, has launched the Study on Exploration and Economic Evaluation of Large-scale Groundwater Development in the EEC. The objectives of this study are to 1) explore groundwater resources and get information on groundwater potential in the EEC, in both quantity and quality 2) conduct an economic viability and analyse the real cost analysis of groundwater utilisation and 3) construct an area integrated groundwater resources planning and development in the EEC.

The methodology consists of surface-geophysical survey in 4,517 points where soil and rock data are not available using resistivity survey method, Vertical Electrical Sounding (VES), selection of at least 150 existing groundwater wells for jetting, following by constant-rate pumping test of 250 groundwater wells to determine groundwater yield and hydraulic properties of aquifers. The data gathered from the tests were analysed, interpreted, and processed in order to update the hydrologic map at 1:50,000 scale and generate maps of suitable areas for groundwater development of each purpose (consumption, agriculture, industry, and tourism).

Moreover, the research team analysed water uses and water demands in the EEC, and evaluated water scarcity (current and estimated) of 3 EEC Provinces during 2019-2039. Willingness to pay for groundwater were collected from 382 sampling persons. In addition, discussion meetings with 35 relevant organizations, public hearings with 1,217 participants, 3 focus group meetings, and the project launch seminar and the findings dissemination seminar were organized to collect comments and suggestions from all stakeholders.

¹ Department of Ground Water Resources, Ministry of Natural Resources and Environment, No. 26/83 Soi Than Satit Tula (Soi Ngamwongwan 54) Ngamwongwan Road Ladyao, Chatuchak, Bangkok 10900 Thailand.

² Faculty of Economics, Kasetsart University (Bangkhen Campus), 50 Ngamwongwan Rd, Chatuchak Bangkok 10900 Thailand.

³ Department of Earth Sciences, Faculty of Science, Kasetsart University (Bangkhen Campus).

⁴ Department of Water Resources Engineering, Faculty of Engineering, Kasetsart University (Bangkhen Campus).

The results of the study indicate that the groundwater resources planning and development in the EEC should achieve the Sustainable Development Goals (SDGs) by creating water resource security and effectively utilizing groundwater with maximum benefits, under control of economic measures. The short term (5-year) groundwater resources planning and development in EEC should comprise of 1) Amendment of related laws and regulations by indicating the EEC area in 3 Provinces as groundwater critical area and imposition of groundwater use fees and groundwater conservation fees for effective groundwater utilisation; 2) Large-scale groundwater development in the EEC area in 2.1) Ban Khai District District, Rayong Province with NPV of 10.44 million baht/well and IRR of 26.69%, 2.2) Sattahip District, Chonburi Province with NPV of 21.42 million baht/well and IRR of 40.59%, and 2.3) Bang Nam Prio and Phanom Sarakham Districts, Chachoengsao Province with NPV of 15.14 and 9.31 million baht/well, and IRR of 32.68% and 25.23%, respectively; and 3) Supporting public participation of citizen and relevant sectors and organizations, and public relation through various types of media.

The medium term (10-year) and long term (20-year) groundwater resources planning and development in EEC should comprise of 1) Effective and sustainable allocation and utilisation (for agriculture, consumption, tourism, and industries) of large-scale groundwater development in 3 EEC Provinces (from year 6 onwards); 2) Groundwater conservation for sustainable and effective groundwater utilisation, which includes increasing effectiveness of management, conserving upstream areas or groundwater recharge areas, controlling amount of groundwater usage, and identifying EEC area in 3 Provinces as groundwater critical area and imposition of groundwater use fees and groundwater conservation fees (operate throughout 20 years); and 3) Monitoring quantity and quality of groundwater, consisting of level and quantity of groundwater data, and dispersion and concentration of contaminants in groundwater data (operate throughout 20 years).

In conclusions, groundwater resources planning and development in the EEC should consist of public participation of citizen and relevant sectors and organizations; large-scale groundwater development, and effective and sustainable allocation and utilisation of large-scale groundwater development; groundwater conservation for sustainable and effective groundwater utilisation; legislative amendments related to collection of groundwater use fees and groundwater conservation fees; and groundwater monitoring (in both quantity and quality).

Keywords: Groundwater Resources Planning and Development; Eastern Economic Corridor (EEC); Public Participation