ABSTRACT

Thesis Title : The Application of GIS for Village Water Supply in Amphoe Klaeng, Changwat Rayong

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This research is aimed at analyzing the relationship between physical factors and water sources in order to evaluate their suitability for constructing a village water supply system. The study was undertaken in Klaeng District, Rayong Province using geographic information system (GIS) together with a ground truth survey and a questionnaire to identify a suitable water supply system for each village in Klaeng District.

A village water supply system is divided into 2 types: a surface water supply system and a ground water supply system. For the former, the physical factors involving availability and quality of the water source include rain quantity, a surface water source, water quality, slope and distance from the water source to the village. For the latter, depth, water yield, water quantity and types of aquifers are the major factors involved. These factors, thus, have been utilized to design a questionnaire along with each factor's weighing points set by 10 experts from governmental agencies.

In terms of size, the surface water supply system can be categorized into two types: a large system and a small system. Such categorization results from manipulating the four coverages of factors involved including rain quantity, a water storage source, slope and distance between the water source and the village using GIS overlaying methods integrated with the multi-criteria model. It is found that the areas with high suitability for the small-scale system amount to 272.894 km^2 or 39.20% of the total study area, whereas those for the large-scale system to 119.636 km^2 or 16.96% of the total study area.

In terms of the ground water supply system, it can be classified into three sizes: small-, medium-and large- scale systems. Such classification is resulted from analyzing. The ground water supply system is divided into four different coverages of factors involved including depth, water quantity, water quality and aquifers in the same way as above. It is found that the areas with high suitability for the small-, medium- and large-scale systems amount to 133.356 km^2 or 18.91%, 23.659 km^2 or 3.36% and 6.452 km^2 or 0.92% of the total study area, respectively.

The villages included in the study area are then divided into different groups according to the number of households in order to determine the appropriate scales of the water supply systems, the small- and large-scales. For the surface water supply systems, those suitable for systems are the ones with less than 300 households and more than 300 households, respectively. For the ground water supply system, the villages suitable for small-, medium-and large-scale systems are the ones with less than 50 households, between 50-120 households and more than 120 households, respectively.

Finally, when analyzing the numbers of households together with the physical factors in order to identify the number of villages are suitable for setting up the water supply systems, it was found that for the surface water supply systems, 48 villages or

97.9 % of all small villages in the study area are fitted for the small-scale and four large villages or 16% for the large-scale ones.

For the ground water supply systems, on the other hand, one small village or 16% and 2 medium-size villages or 3.8% of the total number are suitable for small- and medium-scale ground water supply systems, respectively. No large villages are found to have potential for the large-scale system development due to limitation associated with all physical factors involved and the number of households.