



Field Investigation and Analysis on the Environment of Farm Ponds in the Slopelands of Southern Taiwan

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Due to global climate changes, the frequency of flood and drought increases around the world in recent years. Water resources development and utilization especially in dry season becomes more significant in southern Taiwan. There is a great number of farm ponds in the slopeland area (with amount of 4,601 and 740.9 ha) of Southern Taiwan during 2006 to 2015. Farm ponds can provide the functions of ecological conservation, habitat environment, water retention and detention, ground water recharge, water purification, and land subsidence mitigation. Therefore, it is important to manage farm ponds effectively and activate the use of farm-pond resources. In order to achieve these goals, this study applies the satellite images of FORMOSAT-2, QuickBird and Google Earth to interpret the number of farm ponds and to find out the cover area. The field investigation is mainly focus on the farming active area for 102 and investigate farm ponds by using unmanned aerial vehicle (UAV) and echo sounder to realize the distribution, storage area, water depth and deposition of the farm ponds.

In this study, we found that there are 5,498 farm ponds, covering an area of 656.0 hectares. The amount of farm ponds sharply increase of 897 and storage area decrease of 84.9 ha. Among these farm ponds, fourth of them are under the area of 0.02 ha and half of them are under the area of 0.04 ha. For more details, the farm ponds are mainly distributed in Erren River basin (1,645 ponds and 186.4 ha), and the most amount of farm ponds locate in varying types of mudstone areas (2,184 ponds and 286.5 ha). By doing the field investigation for 102 farm ponds, we found that there are 27 ponds with water depth less than 1.0 meter. Among these farm ponds, there are 12 ponds under serious deposition problem (effective water depth under 1.0 meter). Based on our analysis, we find some tendencies: the deposition in farm pond might be more serious with increasing perimeters and areas as well as the more slender of the shape. In short, the implementation of the study will enhance the management of the farm ponds, the resources utilization and the environment situation. This study will also conduce to the promotion of conservation measures and programs that related to farm ponds.