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論文名稱：頭汴坑溪環境生態評估指數之研究

英文論文名稱: Evaluative Index of Environmental Ecology in
Tou-Bian-Keng Stream

【中文摘要】

台灣之農地重劃，將農地加以重新規劃整理，以區劃整理成標準坵塊，並重新配置農路及灌溉排水系統，使每一坵塊均能直接臨路、灌溉及排水，並透過土地交換分合，集中農戶土地，便於農機耕作及農事管理，為增進土地利用之改善措施。台灣自民國四十七年試辦農地重劃以來，至九十二年底止已完成三十八萬九千餘公頃之農地，在台灣農業發展上扮演重要角色。本研究首先對台灣地區已實施四十餘年之農地重劃作一回顧之整理分析，對於農水路工程之演變予以探討，且概略整理各國辦理農地重劃情形，並與台灣辦理差異情況簡要比較；其次針對各年農產品各產值、產量之關係及與農地重劃相關性作統計分析。

土地重劃造成坵塊形狀改變，使得交換分合後土地權屬及土地利用產生變化。以地景生態學而言，重劃區內景觀主要由農田、漁池、建築物、農舍、田間農路、縣道公路、灌溉與排水渠道、林地、河溪等要素所組成，將此景觀要素分為嵌塊體、廊道和基質三種基本類型。重劃時對地景結構之變化加以探討，以檢討農地重劃後發生的土地與資源管理問題，以期在農地

重劃過程中，除使農水路得到良好的改善外，亦使土地管理得到妥善安排。

土地利用之變遷，本研究利用地景生態指數，探討土地利用與景觀變遷情形及其代表意義。

個案研究方面，本論文主要選取台灣已實施農地重劃處為研究區，分別為民國五十八年（1969年）重劃之高雄縣大寮農地重劃區及九十年（2001年）重劃之屏東縣六巷農地重劃區。大寮區以各時期之相片基本圖量化其土地利用，六巷區則以實地測量資料與電腦繪圖，應用各相關圖層，建立重劃區土地資訊資料；在生態量化部份，並以地景生態理論為基礎，結合生態評估軟體，計算該區重劃前後之地景生態指標、景觀異質性探討及農水路廊道所產生之網絡連接度與環通度變化結果，評估重劃及農水路廊道對農田景觀生態結構變化之影響及其生態意涵在不同時期上之變異。並由馬可夫模式與半馬可夫模式，推估大寮重劃區未來農地之未來土地利用分布，預測未來之土地利用型態之最終平衡狀態情形及探討其代表意義。此可做為未來農地規劃方式之參考，並經由模擬驗證得出較佳之土地利用方式。

台灣農地之農路、灌溉與排水渠道等公共設施之配置，大部分皆強調交通運輸之便利性及輸排水效益，並考量結構體材質之耐久性與安定性。近來生態環境及自然保育意識抬頭，規劃設計者及農民亦逐漸重視農田景觀生態，除需符合一般安全之規劃設計外，更需考量生態之效益，以挽救逐漸

喪失之水生動植物正常棲息與繁衍的環境，故可經由地景生態指標將農水路工程導入生態工法之理念廣為推行，此對維持或恢復農水路生態空間將有所助益。本研究亦針對台灣地區農地農路、灌溉及排水渠道之類型、發展過程、規劃設計等分析，以探討渠道生態工法之可行性與其執行困難之處及對農業系統之影響，並以農地、坡地及農村社區等重劃區規劃施設之工法為案例，對其優劣點作探討，期能為農水路生態工法之推廣提供建言，以保育農地生態系統之自然平衡發展。

【英文摘要】

Farmland consolidation established standard blocks and installed agricultural water channels so that each block could be directly connected to road, irrigated, and draining. Exchanging tracts in order to concentrate the land the land in large blocks will facilitate agricultural management. The Farming landscape is composed of farmlands, cottages, roads, channels and ponds etc. elements. These elements can be distinguished from patch, corridor and matrix.

In ecosystem, any kind of index of ecosystem was calculated and consider its variation in different periods. This study applied landscape estimative software and landscape patch theory to discuss the ecological indices and to establish ecological model after consolidation by landscape ecology in Ping-Dong county Liu Xiang farmland consolidation area. The results revealed that connectivity and circuitry of farm road corridor increased after consolidation. These showed that farm roads to bring the connivances and to add the paths for people, but disturbed the other creatures. And that connectivity and circuitry of waterway corridor also increased after consolidation. The results show that transmission's capability of channel corridors is better for creatures after farmland consolidation. So that by consolidation could understand the changes of farmland structure and to reorganize the spatial data and digital terrain

data to analyze the problems of agricultural land use and resource management.

Markov chain and semi-Markov were used to predict the change of future, the final condition of the land utilization of farmland area, to explain its meanings. It was considered that conveyance and stability of structure were very important for systems of farm-roads, drainages, and irrigations in farmland of Taiwan. The objectives of the study are to plan, to design, and to develop the concrete ditch on farmland of Taiwan, and then evaluate its influence on farmland ecological system. The results showed that the people in Taiwan needed to pay more attention on farmland ecological conservation. The designers and farmers have paid attention to farmland ecological in recent years. Ecological protection of agricultural-water ways provide suitable surviving environment for fish, shrimp and aquatic insects. Nowadays because the consciousness of ecological environment and natural conservation rising, residents gradually place importance on the countryside ecology. This study use some planning or constructional cases about farmland, slope-land, and farmer's communities' consolidation to discuss the methods are good or bad. To popularize the ecological engineering in order to conserve farmland ecological system is an important task.