

109年度臺北科技大學暨澳洲西雪梨大學研究計畫申請書

一、基本資料：

計畫類型	個別型計畫		
本計畫主持人姓名	服務機構	系所或單位	職稱
胡憲倫	臺北科技大學	環境工程與管理研究所	特聘教授
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本計畫 中文名稱	農業作物栽種方式環境衝擊與成本效益評估研究從以台灣、澳洲之裸地與溫室種植為例		
本計畫 英文名稱	Analysis of Environmental Impact and Cost-benefit for Open Field and Greenhouse Cultivation - Case studies of Taiwan and Australia		
全程執行期間	自 2020-01-01 至 2020-12-31		
本計畫是否有進行下列實驗:(勾選下列任一項,須附相關實驗之同意文件) ☐ 人體實驗 ☐ 基因重組相關實驗 ☐ 動物實驗 ☐ 同意書申請中(後補) 上傳相關實驗之同意文件:			
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計畫主持人(申請人)簽章:_____

日期:_____

簽章:_____

日期:_____

八、研究計畫中英文摘要：請就本計畫要點作一概述，並依本計畫性質自訂關鍵詞。

(一) 計畫中文摘要。(五百字以內)

氣候變遷無疑是人類現今最大的難題，各地的氣候狀況異常已經直接影響到農作物的收成，政府也有公開氣候變遷造成農作物損失的相關財務揭露，這使政府和農民開始積極策劃從裸地種植轉型為溫室栽培。與裸地種植相比，溫室可以有效控制溫度、濕度、害蟲與能資源的使用，提升農作物種植的坪效與多樣性，且集約的方式能夠達到資源利用效率最大化，避免資源的過度浪費。然而國內目前從裸地轉型成溫室所面臨的主要問題是農民須負擔極高的建置成本，因此如何設計一套整合環境衝擊與經濟效益分析之溫室建置評估架構則實屬重要。

本研究主要探討溫室建置過程中，不同溫室建材所造成的環境衝擊與成本效益，包含低階、中階及高階溫室等不同規模型態所需的建材及成本，對其進行生命週期評估分析。而本研究將採用專業生命週期評估軟體 SimaPro 及環境衝擊評估方法 ReCiPe 2016，鑑別在溫室建置過程中建材的環境衝擊熱點，並探討低環境衝擊建材之可行性方案，以降低建置溫室所造成的環境影響。同時結合生命週期成本(LCC)與成本效益分析之概念，研擬溫室建置過程之最佳成本效益模式，藉以創造出永續農業的發展，提供政府和農民溫室轉型之參考策略。

Key words: 成本效益、溫室栽培、溫室建材、生命週期評估

(二) 計畫英文摘要。(五百字以內)

There is no doubt that the climate change is the biggest challenge of the entire human history. The abnormal climate conditions have directly affected the harvest of crop everywhere. The government has a related financial disclosure about crop losses caused by climate change, which prompted the government and farmers to aggressively prepare the transition from open field to greenhouse cultivation. Greenhouse facility can effectively control the level of temperature, humidity as well as the input of energy resources. Furthermore, it also increases the efficiency and diversity of crop cultivation, and maximizes resource utilization efficiency. However, the main problem is that farmers have to pay for the extremely high construction costs when transfer from open field to greenhouse. Therefore, it is important to make a framework to estimate the environmental impact and economic benefit analysis of greenhouse facility.

This study focused on the environmental impact assessment and cost-effectiveness of different materials during the greenhouse construction process, in different scales such as low, medium and high-level greenhouses facility. This study uses SimaPro to conduct life cycle assessment and apply ReCiPe 2016 to identify the environmental impact and hotspots of building materials during the greenhouse construction process and estimate the feasibility of building materials that have the low environmental impact to reduce the greenhouse gas emission. Besides, this research also combine Life Cycle Cost (LCC) and cost-benefit analysis to make the optimal cost-effectiveness decisions. The best model of the greenhouse facility is developed to create sustainable agriculture and provide a future strategy for government and farmers about

greenhouse transformation.

Key word: Cost-effectiveness analysis, Greenhouse cultivation, Greenhouse materials and Life Cycle Assessment

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