

生物策略表

類別	生物策略 (Strategy)	
生物策略 STRATEGY	自然生態系示範永續發展 (Natural Ecosystem Demonstrates Sustainability)	
生物系統 LIVING SYSTEM	草原生態系 (Prairie ecosystems)	
功能類別 FUNCTIONS	#控制沖蝕和沉積 #循環養分 #產生土壤/更新肥沃度 #Control Erosion and Sediment #Cycle Nutrients #Generate Soil/Renew Fertility	
作用機制標題	植物的多樣性及壽命幫助草原生態系有效地利用水分及養分 (Diversity and life-span of plants help prairie ecosystems use water and nutrients efficiently.)	
生物系統/作用機制 示意圖		
作用機制摘要說明 (SUMMARY OF FUNCTIONING MECHANISMS)		
<p>「根部終年生長的多年生植物 (perennial plant) 會建立一個生態系 (ecosystem)，而水分、豐富的微生物、健康的植物及土壤營養則能建立一個永續 (sustainable) 的循環。當兩者結合在一起，它們能夠防止沖蝕作用 (erosion) 及水污染，並涵養水源 (conserve water)。大草原 (prairie) 的另一個重要氣候優勢，就是多年生植物會固定 (sequester) 或封存 (lock in) 碳元素。植物從大氣中移除二氧化碳，將其長期儲存於活體植物組織中和深埋於土壤下。這是一個減緩氣候變遷 (climate change) 和建立健康農業系統的重要策略。」</p> <p>“perennial plants, with roots that stay alive all year long, build an ecosystem in which water, plentiful microbes, healthy plants, and soil nutrients build a sustainable cycle. Together, they prevent erosion and water pollution, and conserve water. Another major climate benefit of prairies is that perennials sequester, or lock in, carbon. The plants remove carbon dioxide from the atmosphere, and put it into long term storage in the living plant tissue and also buried deep in the soil. This is a major strategy for slowing down climate change and building a healthy agricultural system.”</p>		
文獻引用 (REFERENCES)		

「若我們細看地球上不同的自然、陸上生態系，找尋能夠利用在有效管理農業土壤及水資源的系統，幾乎所有的植物群落 (community) 都有這兩個關鍵的共通點：多年生特性(perennialism) 及多樣性 (diversity)。這從熱帶雨林到溫帶草原生態區都適用...雖然我們在很多情況下無法改變過去-那就是將每年收穫的土地變回多樣的多年生植被，但確實有大量證據顯示，回復成與以往自然系統相似的植被結構，能以改善土壤及水質，以及循環養分的方式提供大量的益處。」 (Glover 2003: 1)

“If we look to the planet’s many different natural, land-based ecosystems for answers on how to effectively manage soil and water resources in our agricultural systems, the plant communities in nearly all of them have two critical attributes in common: perennialism and diversity. This holds true from tropical rainforests to temperate-zone grasslands... While in many cases we cannot entirely rewind the tape by converting annually cropped land back to diverse perennial plantings, there is ample evidence that reverting back to vegetative structures more closely resembling that of the previous natural system provides substantial benefits in terms of improved soil and water quality and nutrient cycling.” (Glover 2003: 1)

參考文獻清單與連結 (REFERENCE LIST) **Harvard** 或 **APA** 格式

Glover, J. (2003). Characteristics and impacts of annual vs. perennial systems. In Proceedings of Soil Based Cropping Systems Conference (20-21 February 2003), University of Florida, Gainesville.

Glover, J. D., J. P. Reganold, L. W. Bell, J. Borevitz, E. C. Brummer., E. S. Buckler, E. S., and Y, Xu. (2010). Increased food and ecosystem security via perennial grains. *Science* 328: 1638-1639. (<http://dx.doi.org/10.1126/science.1188761>)

生物系統延伸資訊連結 (LEARN MORE ABOUT THE LIVING SYSTEM/S)

<https://landinstitute.org/wp-content/uploads/2019/12/Crews-et-al.-2018.pdf>

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<https://asknature.org/strategy/natural-ecosystem-demonstrates-sustainability/>