■ 公開
□ 密件、不公開

執行機關(計畫)識別碼：070101e502

農業部林業及自然保育署112年度科技計畫研究報告

計畫名稱：國際生態工程學會(IEES)研討會資料蒐集研究案(國立中山大學)(第1年/全程1年)

(英文名稱) Research Proposal for Data Collection at International Ecological Engineering Society (IEES) Conference (National Sun Yat-sen University)

計畫編號：112農科-7.1.1-務-e5(2)

全程計畫期間：自 112年9月1日 至 112年11月30日
本年計畫期間：自 112年9月1日 至 112年11月30日

計畫主持人：林巧雯
研究人員：邱子潔
執行機關：國立中山大學

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一、執行成果中文摘要：

此計畫案將參與2023/10/1~2023/10/5於希臘哈尼亞舉辦國際生態工程研討會(International Ecological Engineering Society Conference)，在” Climate change, green and just transition, and carbon neutrality: the role of ecological engineers”的主題，分享臺灣欖李紅樹林溫室氣體排放與碳匯能力之最新成果。並瞭解最新的生態工程研究發展、技術，蒐集可應用於林業及自然保育署研究主題之生態工程資料。期望在未來臺灣生態工程領域與應用自然解方於淨零碳排研究有所貢獻，提升紅樹林生態系統所提供的碳匯服務功能。

二、執行成果英文摘要：

This project aims to participate in the International Ecological Engineering Society Conference scheduled from October 1st to October 5th, 2023, in Chania, Greece. Under the theme "Climate change, green and just transition, and carbon neutrality: the role of ecological engineers," we will share the latest findings on greenhouse gas emissions and the carbon sink of Taiwan's *Lumnitzera racemose* mangroves. Furthermore, we aim to gather insights into the latest developments and technologies in ecological engineering and collect data applicable to Forestry and Nature Conservation Agency. Our objective is to contribute knowledge to ecological engineering and apply natural-based solutions to achieve carbon neutrality, thereby enhancing the ecosystem services provided by mangroves in Taiwan.

三、計畫目的：

(一)　分享臺灣紅樹林碳匯經驗與成果，並探討紅樹林應用於生態工程與氣候變遷調適之議題。

(二) 學習國際生態工程的專業知識與最新趨勢。

(三) 蒐集國際生態工程的相關資料。

四、重要工作項目及實施方法：

研討會舉辦地點於歐洲希臘哈尼亞(Chania)，日期為2023/10/1-2023/10/5，研討會網址：https://www.iees.tuc.gr/key-dates/，

議程如附件，

主題包含以下八種類別：

- Use of ecological elements and ecosystems to reduce pollution
- Use of ecosystems in a circular society
- Circular design and integrated planning approaches for increased resiliency
- Resource recovery and reuse
- Climate change, green and just transition, and carbon neutrality: the role of ecological engineers
- Regenerative agriculture
- Ecological Engineering and the mining industry
- Ecological Engineering Education

本次發表的論文所屬主題為” Climate change, green and just transition, and carbon neutrality: the role of ecological engineers”，
該主題包含以下子項：

- From the Green Deal to the Real Deal
- Energy-saving technologies
- Eco-engineering for energy efficiency
- Bioenergy, biomass to fuel
- Microbial fuel cells
- Bio-sequestration, soil-carbon sequestration
- Industrial ecology
- Environmental impact assessment
- Life-cycle assessment
- Social life cycle and impact assessment
- Stakeholders’ engagement and citizen participation
- Capacity building and living labs
- Environmentally-focused social innovation

其中” Bio-sequestration, soil-carbon sequestration”這個主題更與臺灣淨零碳排最為相關，
本次研討會分享的成果為欖李紅樹林生態系統溫室氣體排放對其碳匯的影響(摘要如附件與接受函)。除了分享相關研究，視議程安排，預計將蒐集與林業及自然保育署相關的研究主題資料，如” Use of ecosystems in a circular society：Nature-based solutions: e.g., green roofs, green walls, rain gardens, green facades, vertical gardens, bioretention systems, microalgae culture, rainwater harvesting, urban forests, swales, soakways, green/blue corridors, drain ways, participatory watershed management, coastal mangrove restoration, etc.)”以及” Regenerative agriculture：Sustainable forest management”。
期望透過此次參訪，瞭解最新的生態工程研究發展、技術，並將成果應用於臺灣生態工程與氣候變遷調適。

五、結果與討論：

在IEES研討會中，計畫主持人以及研究生進行分享的主題為：Greenhouse gas emissions from *Lumnitzera racemosa* mangroves，本研究團隊順利完成海報發表，並和與會的專家學者進行相關議題的討論(如附件一)。
除了分享臺灣紅樹林碳匯經驗與成果，並探討紅樹林應用於生態工程與氣候變遷調適之議題，並蒐集了國際生態工程的專業知識與最新趨勢，會議議程如附件二。

Keynote speaker session (2023.10.2):

研討會第一天的Keynote演講是Dr. Fabio Masi，主題是”Nature-based Solutions for Wastewater Treatment and Application of Circular Economy strategies”，主講者首先提到農田過多的氮肥與磷肥排入水域環境中，造成嚴重的環境問題，加上因為戰爭的關係，磷的價錢也逐年增加，因此如何農業如何合理化施肥就變得相當重要。此外，主講者還提到氣候變遷造成的危機，包含：生物多樣性的流失、洪水與乾旱事件頻率的增加、熱島效應的情形日益嚴重、水質的惡化等，因此水資源的循環再利用也成為聯合國永續發展目標Sustainable Development Goals (SDGs)重要的議題之一。而人工濕地(Constructed Wetlands, CWs)成為

有效利用水資源(水循環)的Nature based solutions (Nbs) (以自然為基礎的解方)，人工濕地的功能除了有增加生物多樣性、洪水調節、景觀與地景、水質淨化等功能，甚至還包含熱島效應調節、二氧化碳儲存，因此對氣候變遷的調適佔有很重要的角色。講者也介紹綠屋頂的設置，除了增加城市的綠美化、減少熱島效應，更可提升都市的生物多樣性，提供昆蟲(如：蝴蝶)及鳥類棲息地，並可直接處理住宅或者商用辦公大樓的污水。最後，講者強調Nature based solutions可以成為人類與自然永續發展的重要方法。

Session A3: Resource recovery from water

“Production and recovery of orthophosphate from phosphonate-contaminated wastewater combining ozonation and ultraviolet advanced oxidation processes”這個主題是在探討，由於污水中的磷過多，易造成水域優養化，此研究運用臭氧以及紫外線氧化的方式，分解污水中的有機和無機污染物，以提高污水中磷酸鹽的回收效率。結果顯示，水中正磷酸鹽的回收率可以高達90%，且此方法可以應用於酸鹼值範圍大的污水，因此此技術也許能應用於污水處理廠。

”Exploring the potential of cyanobacteria microbiomes for sustainable bioproducts” 這個主題是在探討藍綠菌群在永續生物性產品的潛力，將二級處理放流水作為養分提供給藍綠菌生長，淨化的水再次變成可利用水源，同時產生生物質製成生物性產品(如:塑膠、顏料)，剩餘的再經厭氧消化作用製成生質能源或生物肥料。若經濟、技術許可的話，這會是一個很好的發展方向，不僅可以達到廢水處理的作用，更能利用其副產物取代石化產品，且光合作用菌(ex: 藍綠菌)有吸存二氧化碳的功能，進而減少碳排放，可達到一個雙贏的目標。

”Electrocoagulation flotation treatment technology in perspective of resource recovery and reuse of municipal wastewater in different regions of the world” 是利用電混凝浮除法對廢水進行回收及再利用，講者所在的孟加拉庫爾納市並沒有任何污水處理廠，因此排出的廢水因含有高濃度的營養鹽和重金屬，會對下游的紅樹林棲地造成影響。臺灣或許也有部分村落是沒有污水處理設備的，甚至可能有工廠私自排放廢水的隱患，因此在紅樹林保育的部分可能也要進行附近水域、河川的水質監測。

Session A4: Novel designs of Constructed Wetlands

”The Integrated constructed wetland design approach: A 35- year review”，愛爾蘭研究員Dr. Harrington分享人工濕地35年的回顧，提到Dunhill village wastewater treatment wetland (ICW) complex的案例，該區域在1988年經過”Re-wetting & Re-foresting (將土地改為濕地並植林)”，提供了許多生態系統服務，包含：生物多樣性、水資源管理、地景景觀美化，此外，該濕地吸收了許多營養鹽(氮、磷)，更具有碳吸存的功能，包含入流以及大氣碳吸存，每年約吸存3700 kg C/ha。

“Efficiency removal of specific substances in multistage treatment wetland for urban drainage water”，波蘭的講者分享的是人工濕地應用於城市排水系統，由於降雨逕流流經城市後，會污染下游的水域，污染源包含：有機污染物、重金屬、塑膠微粒、總懸浮固體(Total suspended solids, TSS)等，於城市排水系統內建造人工濕地，不僅可以降低水體的濁度、總懸浮固體、化學需氧量(Chemical oxygen demand, COD)濃度，針對塑膠微粒如聚乙烯(polyethylene)、聚丙烯(polypropylene)、醇酸樹酯(Alkyd)的移除率分別為96.8%、99.4%、99.9%，移除率相當高。

“Performance of pilot-scale constructed wetlands with different designs and substrates treating olive mill wastewater”，希臘的講者提到由於橄欖油為希臘的特產，因此有許多提煉橄欖油的工廠，然而橄欖油的製成產生的廢液有著以下特徵：腐敗的味道、酸鹼值偏低、高導電度、高化學需氧量、高濃度的酚(phenolic)，因此會污染水域環境，研究人員建造了一個人工濕地的小型模廠，於人工濕地裡種植蘆葦，結果發現COD、phenolic、Total nitrogen的移除率分別可高達57~90%、40~84%、60~70%。

Session A9: Circular water economy

Greywater treatment and reuse in a residential building in Zurich, Switzerland: Evaluation of the treatment performance and user acceptance”，一位瑞士的講者講述家庭廢水可視為是一種持續性的水源，很適合用來回收或再利用，但他的研究只有將這些廢水經過簡單的生物處理而已，無法達到自來水標準，但符合一般水源的標準。家庭廢水處理後是否可以廣泛被大眾接受這個議題在瑞士有2/3的受訪者是可以接受的，絕大部分的人可以接受這些再利用的水用來沖馬桶或是澆花。在台灣也會是一個很好的省水方法，家庭廢水很難大幅減量，若可以再利用，將能避免水資源浪費。在臺灣乾濕季明顯的地區更可以盡早引進類似的技術，減少旱季帶來的不便以及可能產生的病害。

Keynote speaker session (2023.10.3):

研討會第二天的Keynote演講是Dr. Nikolaidis，主題是” Nature-based solutions to optimize the Water-Ecosystem-Food Nexus at the basin scale”，研究地點是在希臘的Koiliaris Critical Zone的長期研究站，這個研究站蒐集了以下資料：水文氣象、土壤(生物、地質化學、組成、分解、肥料含量)。講者提到土壤的生態系統服務包含：種植農作物、生物多樣性、碳吸存、水分傳輸等，然而由於種植農作物，施灑肥料與灌溉使得農田土壤的物理、化學、生物特性產生改變，且在不瞭解土壤的物理化學特性的情形下，容易造成肥料與水資源的浪費，因此該研究人員於研究站內的酪梨農場使用土壤張力計與單環實驗分析土壤的入滲率，藉以達成合理化(最適化)的灌溉用水，結果顯示2022年，用水為5.5 m^3/tree。

Session B2: Green roofs and walls

“Proposing a holistic experimental setup for green roof flammability testing"這個主題是在測試綠屋頂的易燃性，主要考慮燃燒速度、易燃程度、消耗性、可持續性等。由結果可知火焰蔓延與水分含量與樹冠層縫隙大小有關。目前臺灣也有建物綠化的補助或是規定，有綠屋頂或牆的建築物越來越普遍，因此在種植綠屋頂植物時，除了植物種類選擇之外，仍需考慮植物種植密度及含水量等因子，避免在火災發生時，變為最好的燃燒媒介，導致火勢蔓延加快。

“Performance of three ornamental species for indoor living walls irrigated with greywater”是在探討三種室內生活牆用灰水灌溉的觀賞植物種類-波士頓腎蕨、心葉蔓綠絨、彎穗苞葉芋的性能。生活牆是為了在都市有限空間中依舊能有一些綠意而建立的，某些地區常有缺水的情形，家庭廢水可以作為澆水的水源，經過生活牆生物過濾之後水質也可以得到改善。在實驗結果中，使用廢水或自來水並不影響植物生長，廢水水質也可以有大幅的改善，且在不同物種間並沒有太大的差異。和Session “Circular water economy”提到的相同，可以發現更多家庭廢水的使用方向，實現開源節流的省水方式。

Session B5: Bioenergy, Renewable energy systems and energy efficiency

”Carbon neutrality of energy produced from woody biomass”在說明木材生質能源的碳中和性。木材生質能源在歐洲總能源中佔比不大，但可能會是許多國家重要的能源組成成分，

比如在北歐國家或奧地利等地區提供熱量、產生電能，可以減少化石燃料的使用。在臺灣並沒有太多木材可以作為生質能源，但或許可以使用廢棄木材來作為能源，燃燒銷毀之外，還能有其他可利用之處。

“Effect of environmental factors on dust accumulation and the efficiency of photovoltaic panels: A study case in an Andean City” 這個主題在探討環境及粉塵對光電板產生的影響。太陽能及風能佔全球能源的10%以上，但空氣污染及天氣會造成粉塵累積，使光電板壽命減少。由結果可知，在粉塵多時，能源效率會些微降低，也會因為降雨產生變化。臺灣由於2050淨零碳排之政策，大量興建光電板，但在光電板選址的部分除了底質之外，仍需考慮氣候、周邊環境是否會造成粉塵等因素，才可達到最大的效能。

“Forest conversion and GHG emission in screening and EIA procedures regarding PV systems in Croatia” 則是討論當克羅埃西亞的森林轉換為太陽能光電板溫室氣體排放的影響，結果顯示，該研究森林區域原有面積約為34,601公頃(ha)，將森林砍伐後，轉換為太陽能光電板發電場域後雖可發電43,116 GWh，然而卻有350 tonne/ha排放。因此建立太陽能系統時，環評中需考慮森林轉換與溫室氣體排放的關係。近年來，臺灣有許多土地轉換為光電板發電廠，然而土地轉換對溫室氣體排放的影響卻鮮少有資料，特別是濕地與森林的棲地，因是自然碳匯的重要場域，更應審慎評估。目前部分歐盟國家在進行環評時會考慮溫室氣體排放，臺灣也許可以效仿。架設光電板初期可能會進行森林砍伐、翻土等作業，這會導致大量溫室氣體釋放，任何土地利用轉變都會造成溫室氣體排放量的不同。因應減碳趨勢，未來可以將土地利用轉變所造成的溫室氣體排放(碳排放)影響納入環評的檢測項目中。

Session B8: Constructed wetlands applications

”Efficiency of pilot scale constructed wetlands with various substrates for landfill leachate treatment”探討的是人工濕地中，不同濾料介質的應用對水處理效率的影響，希臘研究團隊使用高回收的密度聚乙烯(RHDPE)、橄欖樹樹枝做成的生物炭(Biochar)、礫石的組合，探討人工濕地水質改善情形，結果顯示生物炭可以加速濕地植物生長，並且有效的移除氮，RHDPE能過有效的過濾TSS，而不同的濾料組合結果顯示，RHDPE和生物炭的濾料有較高的污染物移出率。

Session B9: Ecological restoration

”Phytocap soil density specification for optimum plant water use and root growth”主要是研究最適合植物根系生長及水分利用的土壤密度。植物覆蓋技術是在垃圾掩埋場等受污染土地上種植植物，以減少污染物滲漏並提高土地可利用性的一種技術，使用堆肥、生物碳、厭氧消化等方式進行，可以改善貧瘠土壤。在臺灣也有許多荒廢土地或是土壤不夠肥沃的狀況，若能善用植物覆蓋技術，恢復退化的土壤，將能大幅減少閒置土地的數量，也能同時提高農民產量。

Session B10: NBS for climate change adaptation

” Integrating Yami/Tao traditional ecological knowledge into ecology education - an exemplification of Nature-Based Learning”，臺灣台東大學的呂佩倫博士分享透過教育新一代蘭嶼達悟族原住民傳統文化並結合生態教育，有助於生態環境永續的發展，以及傳統活動”飛魚祭”的傳承。

六、結論：

綜合心得：

- 計畫主持人：

這次參與IEES會議，由於本人的研究與紅樹林碳匯功能、氣候變遷調適有關，與各國學者分享臺灣紅樹林碳匯與溫室氣體排放的成果，也有來自哥倫比亞的學者分享該國紅樹林作為因應氣候變遷之自然解決方案，而會議中不同面向的生態工程研究主題，讓我學習到許多除了自己領域外，寶貴的知識。此生態工程國際會議的主軸是”Nature-based solution”，因此與會的主題涵蓋甚廣，其中人工濕地被視為水質改善、提升生物多樣性、碳吸存的自然解方。人工濕地雖然都以水生植物為主，但國外的研究顯示，在人工濕地周圍種植樹木，不僅可以增加碳匯功能，也可增加生物多樣性。此外，有學者分享廢棄的木材，也可循環再利用，成為人工濕地濾料的生物炭。而人們熟知的綠屋頂，除了具有淨化民生用水的功能，也提供城市生物的棲息地，而有學者更提出綠屋頂種植樹木的可能性。歐美也有將森林轉換為光電板後，對溫室氣體排放的影響。也有研究人員分享人工濕地模場在研究過程中，實驗模場被偷竊破壞，導致實驗中斷等甘苦談。上述這些國外經驗與研究，都可以成為日後臺灣森林保育、人工濕地建置、綠屋頂發展的借鏡。

- 研究生：

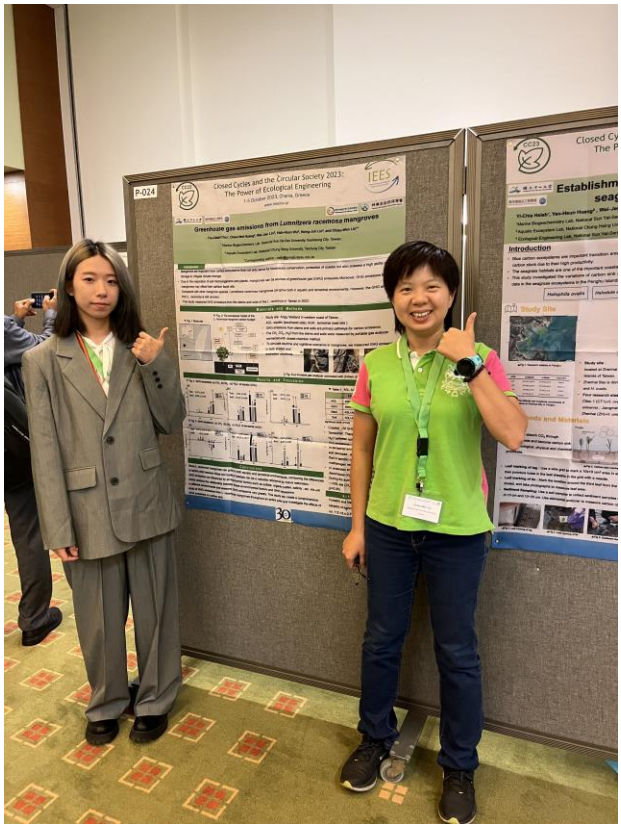
這一趟赴希臘的生態工程研討會使我獲益良多，研討會有來自世界各地的學者，研究領域也都不盡相同，有很多在臺灣從未聽聞的研究方向，讓人十分驚訝，原來還能夠有這麼多的變化方式。參與這次研討會除了瞭解各國目前研究發展之外，我認為更加有意義的是能夠將這些方式、方法適用到臺灣，特別是其中有不少臺灣可能缺失的部分，比如旱季缺水、光電板效能、土壤恢復及減碳方式等研究。當然，除了研討會內容相當豐富之外，我們還體驗了希臘當地菜餚，這對我而言是非常難得的體驗。經過這次會議，我更加瞭解自己應該增進外文能力，才能夠順利與世界接軌。從這次研討會能看出世界各國應對氣候變遷的作為，也能看出大家都積極在對減碳轉型、保護環境做貢獻，希望臺灣在接下來的幾年也能成功完成淨零轉型，達到淨零碳排的目標。

七、參考文獻：

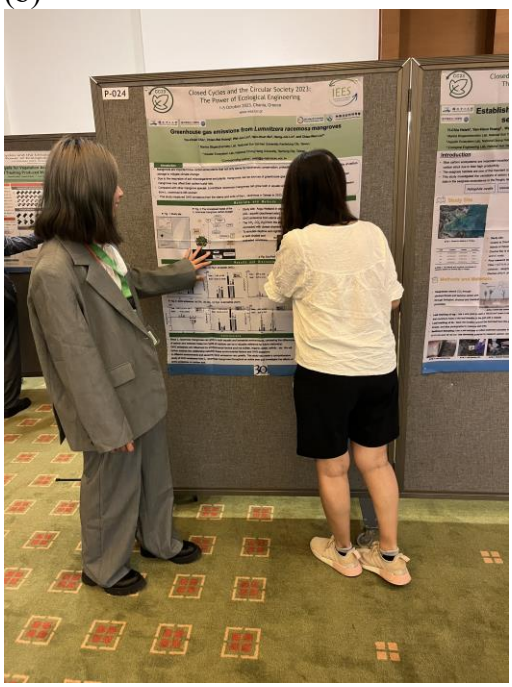
N/A

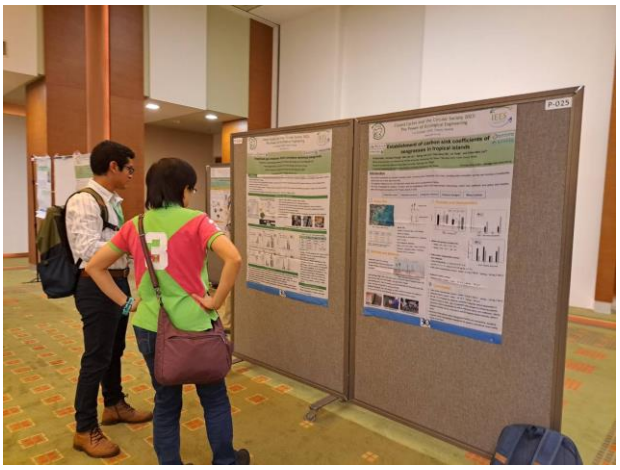
附件一

(a)



(b)





圖一、(a)海報合照；(b)與會者討論照片。

IEES 2023 PROGRAM

Closed cycles and the Circular Society 2023: The power of ecological engineering
1-5 October 2023, Chania, Greece

Sunday 1 Oct		Grand Arsenal (Chania old port)
	17:30 - 18:00	Registration
	18:00 - 20:00	Welcome reception (+registration)

O = Oral presentation: 10 min talk + 4 min Q&A + 1 min buffer (Speaker change)
F = Flash Oral presentation: 4 min talk + 1 min buffer (Speaker change)

Monday 2 Oct		MAIN HALL	ROOM 1	ROOM 2
	08:00 - 09:00	Registration (lobby area)		
		PLENARY SESSION I Chair: Alexandros Stefanakis & Andreas Schönborn		
	09:00 - 09:15	CONFERENCE OPENING AND WELCOME Alexandros Stefanakis, IEES President		
	09:15 - 09:30	WELCOME MESSAGES Professor Michalis Zervakis (TUC Rector) Ioannis Malandrakis (Mayor of Platanias) Panagiotis Simandirakis (Mayor of Chania)		
	09:30 - 10:15	KEYNOTE: Nature-based Solutions for Wastewater Treatment and Application of Circular Economy strategies Fabio Masi (Iridra Srl, Italy)		
	10:15 - 10:45	Coffe break (lobby area)		
		Session A1: Circularity in the built environment Chair: Mateus Dina & Schubert Hendrik	Session A2: Social dimension of NBS Chair: Mark Dyer & Johannes Heeb	Session A3: Resource recovery from water Chair: Francisco Erika Cristina + Gajewska Magdalena
	10:45 - 11:00	(O-099) A spatial perspective on circular economy and the construction sector within Flanders (Belgium) Pisman Ann (Belgium)	(O-030) Methodological approach for assessing the effectiveness of co-creation processes of Nature-based solutions: The case-study application of CLEVER Cities project. Mahmoud Israa (Italy)	(O-119) Framework elaboration for the development of hybrid modelling for resource recovery from municipal wastewater and impact mitigation in Gotland/SE Francisco Erika Cristina (Sweden)
	11:00 - 11:15	(O-021) Valorisation of the stabilized organic fraction of mixed municipal waste as building materials within a circular economy Santos Michael M. (Portugal)	(O-112) Why there are not more Nature-Based Solutions implemented in European cities: A Stakeholder Analysis Pineda-Martos Rocío (Spain)	(O-040) Production and recovery of orthophosphate from phosphonate-contaminated wastewater combining ozonation and ultraviolet advanced oxidation processes Ji Yuxian (Belgium)
	11:15 - 11:30	(O-014) Formalising the temporal aspect of timber component reusability in a circular construction indicator Anastasiades Kostas (Belgium)	(O-087) The use of Participatory System Dynamics Modelling to support 'Nexus doing': preliminary results from the Koiliaris (Greece) case study Pagano Alessandro (Italy)	(O-044) Exploring the potential of cyanobacterial microbiomes for sustainable bioproducts Joan Garcia (Spain)
	11:30 - 11:45	(O-135) Waste to construction: A novel Hempcrete product research Meir Isaac (Israel)	(O-152) Multi-criteria tool for Nature-based Solutions and Bioeconomy practices selection towards WEFE Nexus implementation: the case of Tinos island Tsatsou Alexandra (Greece)	(O-048) Electrocoagulation flotation treatment technology in perspective of resource recovery and reuse of municipal wastewater in different regions of the world Hassan Nazia (Belgium)
	11:45 - 12:00	(O-162) Eco-traditional buildings in Makkah: Al-Byaddiah Palace as a case study Faredah ALmurahhem (Saudi Arabia)	(O-009) Combining public participation, participatory design and AI to promote integrated planning approaches Dyer Mark (New Zealand)	(O-134) Sidestream sulphide-driven denitrification as robust solution to enable resource recovery in a large-scale industrial WWTP Polizzi Cecilia (Italy)
	12:00 - 12:05	(F-016) Plant-based biocides for the sustainable conservation of built heritage – Field experiments Mateus Dina (Portugal)	(O-163) Tiganokinisi: social innovation though the collection and recycling of domestic used cooking oil in Cyprus Petsa Demetra (Cyprus)	(O-069) Recovery of resources and generation of valuable products from municipal wastewater – assessment of products quality Krzeminski Pawel (Norway)
	12:05 - 12:10	(F-034) Advancing circular economy in the built environment: The CircularB Action Pineda-Martos Rocío (Spain)		
	12:10 - 12:15	(F-057) Biomimicry in architectural design in a holistic design process Nowak Anna (Poland)		
	12:15 - 13:45	Lunch time!		
Knowledge Transfer Event (lobby area) --- SEALIVE --- Strategies of Circular Economy and Advanced bio-based solutions to keep our Lands and seas alIVE from plastic contamination --- ISOTECH Ltd AKTI Project & Research Center		Session A4: Novel designs of Constructed Wetlands Chair: Uggetti Enrica & Jan Vymazal	Session A5: The impact of urban NBS on public health and well-being Chair: Kolokotsa Dionysia & Mahmoud Israa	Session A6: Circular design for increased resilience I Chair: Filippos K. Zisopoulos & Goonetilleke Ashantha
	13:45 - 14:00	(O-104) The Integrated constructed wetland design approach: A review Harrington Rory (Ireland)	(O-008) On the integration of nature-based solutions for health and wellbeing in two European Cities: The case studies of Dundalk and Skelleftea Kolokotsa Dionysia (Greece)	(O-083) Bioregional approach for circular design: case study in Roma via Guido Reni (Italy) Francese Dora (Italy)
	14:00 - 14:15	(O-095) Efficiency removal of specific substances in multistage treatment wetland for urban drainage water Gajewska Magdalena (Poland)	(O-110) Measuring the impact of Nature-Based Solutions on citizens' health and well-being: risks and challenges of using wearable devices Biesaga Mikołaj (Poland)	(O-096) Why edible cities? Regelsberger Martin (Austria)
	14:15 - 14:30	(O-100) Removal performance of different types of bioelectrochemical constructed wetlands for dairy wastewater treatment Kotsia Dimitra (Greece)	(O-088) Greenness visibility in urban living environments as pathway to promote health and well-being: mapping spatial differentiation in Flanders (Belgium) based on viewshed analysis Vervoort Peter (Belgium)	(O-085) El Remanso experimental center in Choachí-Colombia, A laboratory Eco-Village to learn and co-build Rojas Hector (Mexico)
	14:30 - 14:45	(O-171) Performance of pilot-scale constructed wetlands with different designs and substrates treating olive mill wastewater Dimitra Moschogianni (Greece)	(O-151) Urban greenery's effects on public health and wellbeing of citizens and how to assess it – preliminary euPOLIS findings Randelovic Anja (Serbia)	(O-061) How circular design and integrated planning approaches may increase resiliency and biodiversity? Adam Avshalom M. (Israel)
	14:45 - 14:50	(F-052) Floating constructed wetlands based on recycled polymers to restore aquatic ecosystems López Daniela (Chile)		
	14:50 - 14:55	(F-009) Selecting innovative substrates materials: characterization and potential application for enhancing CWs sustainability Ventura Delia (Italy)	(O-155) Innovative urban solutions to enhance public spaces and promote good public health and wellbeing - the case studies of euPOLIS and VARCITIES Randelovic Anja (Serbia)	Advancing Sustainability of Process Industries through Digital and Circular Water Use Innovations – Experience from AquaSPICE project Arampatzis Goerge (Greece)
	14:55 - 15:00	(F-017) Smart monitoring of waste-filled constructed wetlands for the removal of nutrients from wastewater with low carbon content Pinho Henrique (Portugal)		
	15:00 - 16:00	Coffe break (lobby area) & Poster session		
		Session A7: Sludge management using NBS Chair: Alexandros Stefanakis & López Daniela	Session A8: Sustainable Drainage Systems Chair: Frank van Dien & Tsatsou Alexandra	Session A9: Circular water economy Chair: Simos Malamis & Tjasa Griessler Bulc
	16:00 - 16:15	(O-032) A pilot study of domestic sewage sludge dewatering using Sludge Treatment Reed Beds in Oman Al-Rashdi Tahira (Oman)	(O-076) Blue-green infrastructure in highly urbanized areas - practical design examples Rous Vit (Czech Republic)	(O-159) Water companies and circular economy : Challenges and opportunities Kotsifaki Christina (Greece)
	16:15 - 16:30	(O-133) Sludge Treatment Constructed Wetland: a solution for treating sewage sludge for agricultural reuse Uggetti Enrica (Spain)	(O-150) Sustainable drainage systems (SuDS) for rainwater harvesting and stormwater management in temporary humanitarian settlements Tota-Maharaj Kiran (United Kingdom)	(O-114) Water recovery in swimming pools in accordance with the assumptions of the circular economy Kudlek Edyta (Poland)
	16:30 - 16:45	(O-173) DIALKOP project: design and operation optimization of Sludge Treatment Reed Beds in Greece Ioannis Asimakoulas (Greece)	(O-149) Experimental study and nodelling of granular filter nedia used within SuDS for stormwater purification Tota-Maharaj Kiran (United Kingdom)	(O-153) Water quality monitoring of recycled water using effect-based bioassays – a tool for the circular economy Schoenborn Andreas (Switzerland)
	16:45 - 17:00	(O-067) Fate of pit latrine sludge buried in entrenchments Bakare Babatunde Femi (South Africa)	(O-023) Assessment of the potential for microplastic retention in mature SUDS Calzadilla Cabrera Dario (Spain)	(O-136) Greywater treatment and reuse in a residential building in Zurich, Switzerland: Evaluation of the treatment performance and user acceptance Vischer Tabea (Switzerland)
	17:00 - 17:45	PLENARY SESSION II Chairs: Alexandros Stefanakis & Raffael Känzig 30 years of IEES (all participants invited!)		

Tuesday 3 Oct		MAIN HALL	ROOM 1	ROOM 2
	08:30 - 09:00	Registration (lobby area)		
		Session B1: Resource recovery and reuse from waste Chair: Antonopoulou Georgia & Ashley Hall	Session B2: Green roofs and walls Chair: Michael Ruby & Pineda-Martos Rocío	Session B3: Sustainable management of waste biomass Chair: Asli Isci Yakan & Timo Steinbrecher
	09:00 - 09:15	(O-124) Development of a beach management technology solution to monitor and mitigate plastic marine littering Tzanetou Dimitra (Greece)	(O-144) If you build it, they will come: invertebrates on green roofs Michael Ruby (Australia)	(O-027) Deep eutectic solvent pre-treatment of residual biomass streams - effects on anaerobic degradability Schultz Jana (Germany)
	09:15 - 09:30	(O-066) Turning a nuisance into a resource: options and obstacles for sustainable use of beach wrack derived from case studies Schubert Hendrik (Germany)	(O-128) Proposing a holistic experimental setup for green roof flammability testing Chell Sylvie (Australia)	(O-053) Transforming biogenic waste through anaerobic digestion in achieving the circular economy Fan Chihhao (Taiwan)
	09:30 - 09:45	(O-138) Location-based resource analysis tool for waste management and makers: a case study of Pop-Machina Conserva Andrea (Spain)	(O-168) On the influence of plant morphology in the extensive green roof cover: a case study in Mediterranean area Sara di Lonardo (Italy)	(O-089) Deep eutectic solvent pretreatment of cork dust: effects on biomass composition, phenolic extraction and anaerobic degradability Bagder Elmaci Simel (Turkey)
	09:45 - 10:00	(O-157) 3D printed Mn-based monoliths for lithium recovery from oilfield brines Knapik Ewa (Poland)	(O-158) Novel computational tool for coupling water and heat transport models – application on green roofs Stanic Filip (Serbia)	(O-093) Potential applications of hazelnut industry waste based on material properties Aguado González Laura (Spain)
	10:00 - 10:05			(F-005) Wool of mountain sheep - maximizing resources utilisation Kobiela-Mendrek Katarzyna (Poland)
	10:05 - 10:10	(O-010) Reusing depleted hydrocarbon reservoirs: An ecological alternative? Bauer Johannes Fabain (Germany)	(O-078) Performance of three ornamental species for indoor living walls irrigated with greywater Pérez-Urrestarazu Luis (Spain)	(F-029) Wheat bran proteins – raw material for production of nutritional-valued food Slavíková Zuzana (Czech Republic)
	10:10 - 10:15			(F-004) Application of sheep wool as slowly released organic fertilizer in tomato and winter wheat cultivation Broda Jan (Poland)
	10:15 - 10:20	(F-046) Energy-efficient bipolar membrane electrodeionization for integrated water and chemical recoveries from wastewater of recycled polyethylene terephthalate processes Lin Yu-I (Taiwan)		(F-008) Integrated chemicals and waste management for reduction of adverse effects to environment Aleksandryan Anahit (Republic of Armenia)
	10:20 - 10:45	Coffe break (lobby area)		
		Session B4: Urban and regenerative agriculture Chair: Ranka Junge & Broda Jan	Session B5: Bioenergy, Renewable energy systems and energy efficiency Chair: Kolokotsa Dionysia & Stergios Vakalis	Session B6: Circular design for increased resilience II Chair: Nowak Anna & Ann Pisman
	10:45 - 11:00	(O-098) Urban agriculture in Latvia – is that a choice between business, community networking and individual traditions? Dobele Madara (Latvia)	(O-130) Carbon neutrality of energy produced from woody biomass Jandl Robert (Austria)	(O-058) Circular economy – effective solution, or magical thinking? Hill Callum (United Kingdom)
	11:00 - 11:15	(O-115) Linking nature, culture, and food as an urban farming nature-based solution Argüello Jazmin (France)	(O-071) An innovative approach towards energy conservation using single RGB camera technology for obtaining occupant location in buildings Jeoung Jaewon (South Korea)	(O-011) Regenerative economics for assessing and monitoring transitions towards a circular economy Zisopoulos Filippos Konstantinos (Netherlands)
	11:15 - 11:30	(O-132) HABSIM – Unique R&D Infrastructure for closed-loop food production in space and on Earth Blomqvist Tor (Germany)	(O-072) Sustainable solutions under climate change towards water and energy independence using wind power and hydrogen storage Bertsiou Maria Margarita (Greece)	(O-052) Voluntary standards, as a way how the food industry and retailers control impact of their supply chains on ecosystem services provided by soil Frouzova Jaroslava (Czech Republic)
	11:30 - 11:45	(O-146) Fighting poverty of West African fishermen through aquaponics training centre in Kokrobite, Ghana Kaenzig Raffael (Switzerland)	(O-118) Design and implementation of a solar thermal system as a contribution to resilience and sustainable development in paramo ecosystems Kafarov Viatcheslav (Colombia)	(O-097) Measurement scale validation for inner and outer circular economy loops: a proposal based on food and beverage circular packaging and wishcycling Vayona Anastasia (United Kingdom)
	11:45 - 11:50		(F-013) Recovery of bioenergy and high added value bioproducts from confectionary industrial wastewaters Ntaikou Ioanna (Greece)	

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	11:50 - 11:55	(O-163) Urban bioeconomy: mapping organic resource streams and the bio-symbioses in cities through Geospatial and Material Flow Analysis Yang Nan-Hua Nadja (United Kingdom)	(F-018) Coupling retired electric vehicle batteries with PV systems for urban sustainability: the case study of Greece Kastanaki Eleni (Greece)	(O-183) It is a waste to waste waste. Examples of circularity in Kenya and Mali (just listen to your grandfather) Ruud Kampf (Netherlands)
	11:55 - 12:00		(F-021) Renewable resources in the conditions of the Slovak Republic Daneshjo Naqib (Slovakia)	
	12:00 - 12:05	(F-038) Analysis of the aquaponics system sustainability via system dynamics modelling – FEW nexus approach Francisco Erika Cristina (Sweden)	(F-020) Effect of environmental factors on dust accumulation and the efficiency of photovoltaic panels: A study case in an Andean City Sanchez Nazly (Colombia)	(F-003) Training a new generation of farmers and agricultural entrepreneurs to implement the concept of circular economy in agriculture – the TANGO-Circular Erasmus plus project George P. Spyrou (Greece)
	12:05 - 12:10	(F-064) Analysis of selected factors determining the possibility of introduction and effective operation of rainwater sharing systems for hydroponics in existing multi-family buildings Bąk Joanna (Poland)	(F-045) Forest conversion and GHG emission in screening and EIA procedures regarding PV sys-tems in Croatia Kalcicek Matea (Croatia)	(F-065) Towards sustainable food systems deploying Circularity Compass Strategy Papadopoulou Kyriaki Maria (Greece)
	12:10 - 12:15	(F-056) Close cycle approach in a food farm in Reggio Emilia, Italy Romagnolli Floriana (Italy)	(F-048) Implementation of DSS to optimize the selection of marine energy sites on the Mexican coastline Rivera Camacho Graciela (Mexico)	
	12:15- 12:20	(F-022) Optimization of wheat nutrition for regenerative agriculture Sadovski Alexander (Bulgaria)	(F-049) Osmotic power generation-based System for self-consumption electricity Ortiz Salcedo Monserrat Karina (Mexico)	(O-185) Advancing sustainability in industrial supply chains by embracing circular approaches and digital transformation Maria Aryblia (Greece)
	12:20- 12:25	(F-067) Development of a blockchain solution for food waste management Plakas George (Greece)	(F-071) The SunAir Fountain panel: solar-powered drinking water production from the air humidity Alexandros Stefanakis (Greece)	
	12:25 - 14:00	**Lunch time!**		
	14:00 - 14:45	**KEYNOTE:** Nature-based solutions to optimize the Water-Ecosystem-Food Nexus at the basin scale Nikolaos Nikolaidis (Technical University of Crete, Greece)		
		Session B7: Stormwater management **Chair: Polizzi Cecilia & Henrique Joaquim de Oliveira Pinho**	**Session B8: Constructed wetlands applications** **Chair: Giuseppe Cirelli & Ioannis Asimakoulas**	**Session B9: Ecological restoration** **Chair: Zhang Mingye & Schoeman Yolandi**
	14:45 - 15:00	(O-057) Nature-Based Solutions for flooding risk mitigation in an urban area: The case study of Catania (Sicily, Italy) Sciuto Liviana (Italy)	(O-013) Assessing the treatment capacity of an ecological engineered wetland receiving AMD over a period of nine years using water quality and periphyton as indicators Oberholster Paul Johan (South Africa)	(O-051) The role of natural processes in post mining land reclamation Frouz Jan (Czech Republic)
	15:00 - 15:15	(O-165) Adoption of ecohydrology approaches for urban stormwater management and advancing the circular economy concept Goonetilleke Ashantha (Australia)	(O-172) Efficiency of pilot scale constructed wetlands with various substrates for landfill leachate treatment Ioannis Asimakoulas (Greece)	(O-073) Phytocap soil density specification for optimum plant water use and root growth Ruby Michael (Australia)
	15:15 - 15:30	(O-019) Advancing Nature-Based Solutions for the management of water quality under the umbrella of the UNESCO IHP Ecohydrology Programme: case study of Pilica river catchment in Poland Jarosiewicz Paweł (Poland)	(O-074) Use of Vertical Flow Constructed Wetlands for domestic laundry wastewater treatment with ornamental plants Stefanatou Aimilia (Greece)	(O-033) Organic amendments-based technosols for the restoration of Mediterranean habitats and soil-carbon sequestration Carabassa Vicenç (Spain)
	15:30 - 15:45	(O-101) Science behind STORMEE - STORMwater Environmental Efficiency toolkit: 1) infiltration basin Vasilic Zeljko (Serbia)	(O-043) Small constructed wetland in Norwegian agricultural catchment – 18 years monitoring and perspectives for the future Krzeminska Dominika (Norway)	(O-045) Ecological engineering enhances ecological restoration in Chinese desertified lands Xinrong Li (China)
	15:45 - 15:50	(F-019) Sub-calibration of soil moisture sensor for stormwater management Perry Joseph (Finland)	(F-037) Life cycle assessment of Horizontal Subsurface Flow Constructed Wetlands: The importance of regional characteristics to enhance environmental protection Goulart Coelho Lineker Max (Denmark)	(F-023) Significance of soil type and applied fertilization on the content and uptake of macroelements with sunflower biomass Petkova Zdravka (Bulgaria)
	15:50 - 16:30	**Coffe break (lobby area) & Poster session**		
		Session B10: NBS for climate change adaptation **Chair: Nikolaos Nikolaidis & Dimitra Kotsia**	**Session B11: Water quality improvement for resource efficiency** **Chair: Darja Istenič & Pawel Krzeminski**	**Session B12: Ecological engineering for the protection of land and biodiversity** **Chair: Carabassa Vicenç & Joan Garcia**
	16:30 - 16:45	(O-169) CARDIMED - Climate Adaptation and Resilience Demonstrated In the MEDiterranean region Simos Malamis (Greece)	(O-077) Degradation of organic micropollutants in a modified OECD 308 test: implications for the use of reactive amendments in nature-based systems Perdana Mayang Christy (Czech Republic)	(O-164) Integrating the scope of ecological engineering applications: A structured framework with case studies from Australia Dale Glenn (Australia)
	16:45 - 17:00	(O-050) Development of a climate change adaptation plan for the Jordan Valley based on WEFE nexus analysis: The EcoFuture project Nikolaos Nikolaidis (Greece)	(O-020) Degradation of perfluoroalkyl and polyfluoroalkyl substances (PFAS) in secondary effluent by nonthermal plasma: role of reactive oxidative and reductive species Chen Changtao (Belgium)	(O-160) Field application of processed biosolids: Integrating municipal waste management and regenerative agriculture in Canada Grant Clark (Canada)
	17:00 - 17:15	(O-143) A glimpse into the euPOLIS multi-dimensional indicator system for site screening & NBS assessment Baki Sotiria (Greece)	(O-179) Techno-Economic Feasibility Analysis (TEFA) of the Advanced Primary Filtration (APF) process as a retrofit system at the municipal Wastewater Treatment Plant (WWTP) of Marpissa, Paros, Greece Petros Gikas (Greece)	(O-113) Innovative bioinspired intervention to control the growth of a new spit and reduce the occlusion of the mouth of the Goro lagoon (Italy) Corbau Corinne (Italy)
	17:15 - 17:30	(O-154) The water reuse potential of nature-based solutions in response to the increased water scarcity risks imposed by climate change Apostolaki Stella (Greece)	(O-080) Quantifying the effects of grazing beef cattle on microbial quality of surface water Gilboa Ben-David Yael (Israel)	(O-029) Modification of spent coffee grounds for their use as organic fertilizer Juglova Zuzana (Czech Republic)
	17:30 - 17:35	(F-031) Development of an NbS evaluation framework in the nexus of Sustainability, Circularity and Justice Mavrigiannaki Angeliki (Greece)	(F-041) Occurrence of ESKAPE pathogens in wash waters of the agri-food industry in view of the implementation of a closed loop economy Kanarek Piotr (Poland)	(F-010) Nature-based solutions using ecological engineering and dedicated to combine the mitigation of natural risks linked to water with benefits for biodiversity: considering interdisciplinary and transdisciplinary approaches Rey Freddy (France)
	17:35 - 17:40	(F-036) What do we know about the interactions between Nature-based solutions (NBS) and landscape? Sowińska-Świerkosz Barbara (Poland)	(F-053) Biological treatment of synthetic hypersaline wastewater: inoculum selection and start-up of a sequencing batch rector Polizzi Cecilia (Italy)	(F-014) Short term results of different planting technologies applied in the restoration of European habitats Carabassa Vicenç (Spain)
	17:40 - 17:45	(F-054) Integrating YamTao traditional ecological knowledge into ecology education - an exemplification of Nature-Based Learning Lu Pei-Luen (Taiwan)	(F-002) Innovative hybrid dairy wastewater system assisted by an intelligent software tool for quality prediction of the processed product water to be used for crop irrigation in a greenhouse George P. Spyrou (Greece)	(F-042) Ecosystem services value dynamics under land use alterations in the upper Ganga riverine wetland Kansal Mitthan Lal (India)
	19:30 - ...	**Conference dinner @ Diogenis Restaurant**		

Wednesday 4 Oct		**ROOM 1**	**ROOM 2**	**ROOM 3**
	08:30 - 09:00	**Registration (lobby area)**		
		Session C1: Constructed wetlands technology I **Chair: Michail Fountoulakis & Chen Zhongbing**	**Session C2: Bio-based materials I** **Chair: Shu-Yuan Pan & Johannes Fabian Bauer**	**Session C3: Ecosystem services provision and assessment** **Chair: Oberholster Paul Johan & Sowińska-Świerkosz Barbara**
	09:00 - 09:15	(O-174) Investigation of nutrient adsorption properties of selected minerals and synthetic substrates in column studies receiving constructed wetland effluent Panagiotis Regouzas (Greece)	(O-003) Plant growth under different bio-composts applications Al-Busaidi Ahmed (Oman)	(O-081) Assessing and mapping yearly ecosystem services supplies in areas affected by land degradation processes with the support of remote sensing indices: two case studies from the NewLife4Drylands Project Ungaro Fabrizio (Italy)
	09:15 - 09:30	(O-117) Diffuse pollution treatment wetlands in cold climate: the importance of flood meadows Wahlroos Outi (Finland)	(O-064) Biomass waste-based material: Electrochemical performances and CO2 uptake capability Trinh Kieu Trang (Japan)	(O-046) Planting xerophytic shrubs significantly increased the carbon sequestration capacity and potential of sandy land Haotian Yang (China)
	09:30 - 09:45	(O-016) Effects of arbuscular mycorrhizal fungi on the metabolism of ibuprofen in constructed wetland with different substrates Chen Zhongbing (Czech Republic)	(O-129) Kitchen waste from cooked food: source of contamination or a valuable source for organic composting serving circular economy perspectives? Use of waste vermicompost as a soil amendment for greenhouse vegetables (II) Kinigopoulou Vasiliki (Greece)	(O-055) Life-cycle environmental assessment of strategies for sewage treatment and reuse: a case study considering local conditions in south-central Chile Neumann Patricio (Chile)
	09:45 - 10:00	(O-102) Long term performance of nature-based solutions as decentralized wastewater treatment: a case study of a retail store in southern Italy Marzo Alessia (Italy)	(O-167) Material flow analysis of the organic fraction of municipal solid waste in EU: monitoring current uses with emphasis on bio-based applications Stamatia Skoutida (Greece)	(O-034) The Ecological Engineering Nexus Accounting Framework: a tool for impact valuation of ecological engineering projects Schoeman Yolandi (South Africa)
	10:00 - 10:15	(O-170) Performance of pilot-scale vertical flow constructed wetlands with and without aeration for municipal wastewater treatment Alexandros Stefanakis (Greece)	(O-108) Organic-mineral composite material for removal of chromium from natural water Ekonomakou Antonia (Greece)	(O-137) Nature-based and solar energy building solutions in the water-energy-food nexus across diverse climatic zones in Europe Karamanis Dimitrios (Greece)
	10:15 - 10:20			(F-070) The Application of GeoPlanner in Local Development Management Jan Kazak (Poland)
	10:20 - 10:25	(O-166) Investigating GHG emissions from vertical subsurface flow (VSSF) Constructed Wetlands treating the UASB effluent originating from domestic wastewater Seintos Taxiarchis (Greece)	(O-177) The awarded EUTeens4Green projects to TUC students: promoting nature-based solutions and circular economy Dionysis Tselentis (Greece)	(F-068) Assessment of carbon sequestration potential of targeted plants using remote sensing, GIS, and machine learning systems Aljabri Khalid (Oman)
	10:25 - 10:30			(F-007) Remote sensing-based water quality inversion in Třeboň fishponds: a comparative analysis of machine learning algorithms Ge Ying (Czech Republic)
	10:30 - 11:00	**Coffe break (lobby area) & Poster session**		
		Session C4: Constructed wetlands technology II **Chair: Fabio Masi & Seintos Taxiarchis**	**Session C5: Bio-based materials II** **Chair: Grant Clark & Panagiotis Regouzas**	**Session C6: Aquatic vegetation systems** **Chair: Vlysidis Anestis & Daniela Andrea López Leyton**
	11:00 - 11:15	(O-086) A natural coagulant for colour removal from raw and treated tequila vinasses (with constructed wetlands) Zurita Martinez Florentina (Mexico)	(O-012) Optimization of biochar filter for handwashing wastewater treatment and recycling at the point of use Bautista Quispe Jhonny Ismael (United Kingdom)	(O-026) A semi-self-sustaining microalgal-bacterial granular sludge process could reduce the cadmium-effect on wastewater treatment efficiency Li Yanyao (Belgium)
	11:15 - 11:30	(O-063) Treatment performance of constructed wetlands with subsurface horizontal flow after thirty years of operation Vymazal Jan (Czech Republic)	(O-047) Removal of Heavy Metals and Antibiotics from Water Using Biochar: From Lab to Real-World Use Ahmed Mushtaque (Oman)	(O-059) Assessing Contaminants of Emerging Concern, Heavy Metals, and Pathogens in Wastewater-Grown Microalgae for Agricultural Applications Uggetti Enrica (Spain)
	11:30 - 11:45	(O-180) Transforming polluted urban waters into liveable urban space with the help of NBS taking the Flussbad Berlin as an example Heribert Rustige (Germany)	(O-176) Production and characterization of Carbon Nanotubes and Graphene Oxide biochar nanocomposites from rice husks and sewage sludge and adsorption tests of six Emerging Contaminants from wastewater Panagiotis Regouzas (Greece)	(O-091) Algal technologies for green products – preliminary microbiological examination Istenič Darja (Slovenia)
	11:45 - 12:00	(O-175) Large-scale constructed wetlands from Brazil to the Middle East: scaling up NBS Alexandros Stefanakis (Greece)	(O-161) Coffee-oil: production of biocrude oil from spent coffee grounds via hydrothermal liquefaction Vakalis Stergios (Greece)	(O-145) Tertiary wastewater treatment of anaerobic digestion effluents using a phytoremediation bioreactor Vlysidis Anestis (Greece)
	12:00 - 12:05		(F-030) Production and characterization of biochar produced from different type of bran Pořízka Jaromír (Czech Republic)	(F-055) Nitrogen fixation rate measurement by nitrogen fixing bacteria in a Lemna minor aquatic system Vlysidis Anestis (Greece)
	12:05 - 12:10	(O-079) Septage treatment using the First Stage of French Vertical Flow Constructed Wetlands: From the commissioning to the closure of the system Arévalo Durazno María Belén (Ecuador)	(F-051) Activation of persulfate with hydrochar for catalytic degradation of bisphenol A in view of water treatment Zhang Xian (Belgium)	(F-032) Study on algae composition of a river entering Taihu Lake and effect of constructed wetland Du Yingming (China)
	12:10 - 12:15		(F-035) Acute toxicological evaluation of green biocides for outdoor cultural heritage, using Lactuca sativa seeds Rosa Manuel (Portugal)	(F-069) Assessing Heavy Metal Pollution with Common Weeds: Unveiling their Bioindicator Potential Cakaj Arlinda (Poland)
	12:15 - 14:00	**Lunch time!**		
	PLENARY SESSION III **Chair: Alexandros Stefanakis**			
	14:00 - 14:45	**Discussion panel** **The future of Ecological Engineering: integrating nature in problem-solving for a circular society**		
		Session C7: Sponsored mini keynote **Chair: Andreas Schönborn**	**Session C8: Water reuse and sustainability** **Chair: Jan Kazak & Marzo Alessia**	
	14:45 - 15:00	(O-182) Novel equipment of wetlands maintenance	(O-041) Utilizing treated wastewater for pasture irrigation: effects on productivity, plant community structure and soil properties Dovrat Guy (Israel)	

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	15:00 - 15:15	Ruud Kampf (Netherlands)	(O-092) Native vegetation for the reuse of treated municipal wastewater: Implications for greenhouse gas emissions Meister Alexandra (New Zealand)
	15:15 - 15:20		(F-047) Over 80% water recovery from urban greywater using nanofilter membranes – A Swedish case study Hall Ashley (Sweden)
	15:20 - 15:25		(F-027) Integrating academic knowledge on "Sustainability of Agricultural Water Management" Dahal Bishal (Finland)
	15:20 - 16:00	**Coffe break (lobby area)**	
	PLENARY SESSION IV **Chair: Alexandros Stefanakis & Andreas Schönborn**		
	16:00 - 16:45	**KEYNOTE:** Developing ecological engineering solutions: Low-tech should not be low-knowledge Ranka Junge (Zurich University of Applied Sciences, Switzerland)	
	16:45 - 17:15	**CLOSING SESSION & AWARDS** **IEES2023**	

Thursday 5 Oct	**Tours & Fieldtrips (separate info to be sent)**

LIST OF POSTER PRESENTATIONS

NAME	COUNTRY	POSTER TITLE
Pástor Michal	Slovakia	(P-002) Survival rate of selected newly planted urban trees in the city of Nitra (Slovakia) in the context of circular economy
Bauer Johannes Fabain	Germany	(P-005) Reclamation of land from fluid hydrocarbon extraction: State of the art and current challenges
Sirakov Ivaylo	Bulgaria	(P-006) Influence of different exposure times of treatment with a microelement in an aquaponic system on hydrochemical indicators and productivity of pepper (Capsicum annuum) cultivated integrated with common carp (Cyprinus carpio)
Zou Yuanchun	China	(P-008) Wetland-based solution for sustainable water management in a semiarid irrigation area subject to water use conflict
Aleksandryan Anahit	Republic of Armenia	(P-009) Tailings management facilities: risk reduction
Yang Mingyue	China	(P-010) Efficient removal and electrochemical detection of heavy metals by utilizing heavy-metal-tolerant bacteria from sludge
Lyu Xianguo	China	(P-011) Effect of reclamation on the vertical distribution of SOC and retention of DOC in the wetland landscapes in the Sanjiang Plain, Northeast China
Da Costa Maria	Portugal	(P-014) Physics of sound and SDGs: Raising awareness for the dangers of noise pollution
Çam Milyase Deniz	Türkiye	(P-015) Deep eutectic solvent pretreatment of olive tree biomass
Janczukowicz Wojciech	Poland	(P-016) The effect of external carbon source type and dose on nitrogen and phosphorus removal in Sequencing Biofilm Batch Reactor (SBBR)
Rodziewicz Joanna	Poland	(P-017) The influence of the method of organic substrate dosing on the efficiency of Sequencing Biofilm Batch Reactor (SBBR)
Jang Jeonghwan	Republic of Korea	(P-018) Aerobic DNRA-performing neobacillus sp. strain isolated from rice paddy field soil, Republic of Korea
Petkova Zdravka	Bulgaria	(P-019) Significance of soil type and applied fertilization on the content and uptake of macroelements with sunflower biomass in pot experiments
Barati Bahram	Belgium	(P-020) Enhancing biomass and phycocyanin productivity of spirulina sp. cultivated in anaerobically digested brewery effluent
Mielcarek Artur	Poland	(P-021) Biofilm - Supporting denitrification and dephosphatation with citric acid
Borodinecs Anatolijs	Latvia	(P-022) Dynamic electricity price: challenge for selection of cost-optimal PV Systems for households
Aljabri Khalid	Oman	(P-023) Remote sensing analysis for vegetation assessment of a large-scale constructed wetland treating produced water polluted with Oil hydrocarbons
Lin Chiao-Wen	Taiwan	(P-024) Greenhouse gas emissions from Lumnitzera racemosa mangroves
Lin Chiao-Wen	Taiwan	(P-025) Establishment of carbon sink coefficients of seagrasses in tropical islands
Isci Asli	Turkey	(P-026) Bioethanol production from microwave-assisted deep eutectic solvent pretreated wheat straw
Aslanhan Dicle Delal	Türkiye	(P-028) Deep eutectic solvent pretreatment of olive pomace
Kováts Nora	Hungary	(P-029) Can landraces better cope with environmental stress?
Schubert Hendrik	Germany	(P-030) Nature-based coastal protection measures in a circular society
Nabelek Jakub	Czech Republic	(P-031) Effect of wheat bran pre-treatment on isolation of ferulic acid
Steinbrecher Timo	Germany	(P-032) Production of biogenic aromatics from lignocellulosic agricultural residues
Sarabi Shahryar	Netherlands	(P-033) Promoting environmental justice in urban transitions: an embedded view
Lin Wei-Jen	Taiwan	(P-034) Mangrove carbon budgets suggest the estimation of net production and carbon burial by quantifying litterfall
Ghosh Sayanti	India	(P-035) Biochar supported Ag-TiO2: A green catalyst for degradation of pharmaceutically active compounds and disinfection in wastewater
Truu Jaak	Estonia	(P-036) Microbial fuel cells as a sustainable pathway to remediate oil-contaminated sediments and soils
Kimura Keiichi	Japan	(P-037) Cyanobacterial biocrust development on biomineralized sandy soil: new dryland restoration method
Tejada Manuel	Spain	(P-038) Green pepper (Capsicum annuum) fruit quality. Effects of the application of biostimulants obtained from slaughterhouse sludge
Tejada Manuel	Spain	(P-039) Application of a biostimulant obtained by enzymatic hydrolysis from slaughterhouse sludge in the bioremediation of soils polluted by the imazamox herbicide
Montero Pau	Spain	(P-041) Drone monitoring of extractive activities in Catalonia: a collaborative system for improving the sustainable management of the mining sector
Parrado Juan	Spain	(P-042) Design of a chemical/biological biphasic process for circular economy for the conversion of polyurethane into agronomic biostimulants
Kulbat Eliza	Poland	(P-043) Effect of sewage sludge mono- and co-digestion on nutrients removal from reject water
Parrado Rubio Juan	Spain	(P-044) Bioprocess of Keratin wastes conversion into agronomic biostimulants and biofertilizer
Wilinska-Lisowska Anna	Poland	(P-045) Possibilities of nutrients recovery from the liquid fraction of digestate from agricultural biogas plants in Poland
Montero Pau	Spain	(P-046) Remote sensing indicators for the study of drylands in Mediterranean climate
Ponis Stavros	Greece	(P-047) Be Well and Green When Digital - Lessons Learnt from the BeWEEN project
Truu Marika	Estonia	(P-048) Enhancing methane mitigation in landfills: insights from biocover composition and microbial parameters
Goulart Coelho Lineker Max	Denmark	(P-049) Proposal of a multicriteria decision making method to support the selection of nature-based solutions addressing rainwater management
Krzysztof Jóźwiakowski	Poland	(P-051) New generation Christmas tree shape hybrid treatment wetland for wastewater treatment in Roztocze National Park, Poland
Dong Pengyu	Belgium	(P-053) Optimized removal of silica during manure treatment by electrocoagulation-flotation (EC-F) in view of fouling prevention of reverse osmosis membranes
Gerasimova Iliyana	Bulgaria	(P-055) Fertilization and uptake of macroelements with maize biomass (a pot experiment with pelic vertisol)
Okuro Toshiya	Japan	(P-056) Effects of mixed seeding of several plants with different growth forms on mitigating sand drifting in desertified grassland in the Northeast Asia
Rusyn Iryna	Ukraine	(P-057) Green electricity: a renewable resources biotechnology and ecological engineering tool
Marijuan Raquel	Spain	(P-058) Evaluating the impact of Nature-based Solutions on the provision of water-related and water-dependant Ecosystem Services
López Leyton Daniela	Chile	(P-059) Hybrid constructed wetlands for enhance quality of urban aquatic ecosystems
Olaniran Ademola	South Africa	(P-060) Enhanced bioremediation of polycyclic aromatic hydrocarbons by laccases from two indigenous fungal isolates via the ABTS Mediator Systems
Wąs Adam	Poland	(P-061) Modelling policy options for GHG mitigation in Polish agriculture
Karamanis Dimitrios	Greece	(P-062) Climate-neutral EU Regions: Expanding the mission of 100 EU carbon-neutral cities to 30 European carbon-neutral regions through S3 platform until 2030
Perez Rubi Maria	Germany	(P-063) Scaling-up Nature-Based Solutions for decentralized greywater treatment retrofitted in urban areas of Costa Rica
Szymańska Magdalena	Poland	(P-064) A Bio-refinery concept for N and P recovery - a chance for biogas plant development
Sosulski Tomasz	Poland	(P-065) Reduced tillage, fertilizer placement, and soil afforestation as methods of CO2 soil emissions mitigation
Dafnos Ioannis	Greece	(P-067) Exploring the hydrological dynamics of Kifissos basin in Greece - an integrated analysis of water and groundwater resources
Gómez Silvia	Spain	(P-068) Agroecological solutions for resilient farming in West Africa: Identification of farmers' and communities' needs
Antonopoulou Georgia	Greece	(P-069) Biohydrogen production from household food waste through dark fermentation: the possibility of water minimization during dilution
Gómez Garrido Melisa	Spain	(P-070) Sustainable Environmental Management of pig production with an Integral Manure Management System with Constructed Wetlands
Rontogianni Anatoli	Greece	(P-071) High and low technological implementation of bio based energy sources in Europe: Comparisons and contrasts
El Bied Oumaima	Spain	(P-072) Decision Support System (DSS) for Controlled Pig Slurry Application and Sustainable Resource Management
Terrero Turbi Angélica	Spain	(P-073) Use of techniques to mitigate Greenhouse Gas emissions and ammonia from pig slurry storage
Dobele Aina	Latvia	(P-074) Aspects of urban agriculture in the sustainable development - the case of Latvia
Ho Chuan-Wen	Taiwan	(P-075) Enhancing carbon sinks through mangrove afforestation in a coastal constructed wetland park
Bauwe Andreas	Germany	(P-076) Performance of a denitrifying bioreactor for the treatment of nitrate-laden agricultural drainage water in northeastern Germany
Rubio-Clemente Ainhoa	Colombia	(P-077) Elimination of Crystal Violet in water by Pinus patula biochar: process optimization and validation
Rubio-Clemente Ainhoa	Colombia	(P-078) Life cycle assessment in the production of raw and Fe-modified biochars
Daphne Argyropoulou	Greece	(P-079) Greywater treatment with green walls for the washing of reusable cups and bottles
Fountoulakis Michail	Greece	(P-080) Integrate management of residues generated from olive cultivation and olive oil production process for soil resource recovery: the "Elaionas" project
Bąk Joanna	Poland	(P-081) Introduction of aquaponic farms partly supplied by rainwater into the urban tissue - possibilities, barriers, limitations and challenges
Galani Andriani	Greece	(P-082) Applications of circularity and the WEFE Nexus across the Mediterranean the four Demo Sites of the SureNexus project
Seintos Taxiarchis	Greece	(P-083) BIODAPH2O – Investigating a novel system for tertiary wastewater purification
Klontza Eleftheria	Greece	(P-084) Arthrospira (Spirulina) platensis growth and biofixation of CO2 using cheese whey in the context of circular economy
Zabaniotou Anastasia	Greece	(P-085) Closed loops and the circular economy of polypropylene waste: Design, engineering and feasibility of pyrolysis
Tong Shoucheng	China	(P-086) The driving mechanisms for community expansion in a restored Carex tussock wetland
Zhang Mingye	China	(P-087) Effects of melatonin priming on Suaeda corniculata seed germination, antioxidant defense, and reserve mobilization: Implications for salinized wetland restoration
Lin Wei-Jen	Taiwan	(P-088) The carbon budget in aquaculture systems with the Asian clam (Corbicula fluminea) in eastern Taiwan

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