出國報告（出國類別：出席國際會議）

出席 2017 年第 11 屆國際生態系統與永續發展研討會(11th International Conference on Ecosystems and Sustainable Development)發表論文

服務機關：國立嘉義大學園藝學系
姓名職稱：李亭頤 助理教授
派赴國家：西班牙
出國期間：106 年 4 月 24 日起至 106 年 5 月 2 日
報告日期：106 年 4 月 27 日

摘要

本出國計畫是運用國立嘉義大學校務基金自籌經費支應，發表兩篇論文，其中一篇為科技部補助計畫的研究成果。由筆者帶領一位大四學生謝依璇，前往西班牙參加第十屆生態系統與永續發展國際研討會，進行兩篇關於都市農業的研究論文發表和交流。該研討會是由英國 Wessex Institute 所舉辦的第十一屆生態系統與永續發展研討會，是全球少數涵蓋都市農業領域的生態永續主題之國際性研討會。論文主題分別是評估臺灣嘉義市屋頂農園達到自恃率的潛力，以及影響都市巷弄可食地景格局之空間因子。

目次

一、目的

(一)目標

本次出國的目標是由本人帶領研究室一位大學部四年級學生謝依璇，共同參與於西班牙舉辦的國際性研討會「第十一屆生態系統和永續發展國際研討會(11th International Conference on Ecosystems and Sustainable Development)」，並且發表兩篇研討會論文。

(二)主題

該研討會是由英國南漢普頓研究機構 Wessex Institute 和西班牙加的斯大學 University of Cadiz，聯合於西班牙加的斯(Cadiz, Spain)舉辦。該會議的主題著重於探討生態系統和永續發展方面的議題，研討會所涵蓋的各項次領域當中更有一項是「都市農業(urban agriculture)」，因此可以獲得在生態和永續發展領域觀點下，與會專家學者對於都市農業研究議題的建議。

(三)緣起

本人研究方向是探討都市綠色基盤設施和都市更新議題之間的關係，近年來更鑽研都市農業領域的研究，103 年曾獲得科技部補助嘉義市巷弄可食地景方面的研究，是從都市發展脈絡中，調查與分析都市巷弄可食地

景模式的基礎研究。另外，又於 105 年指導大學部學生，評估嘉義市屋頂農園類型對糧食自給率之影響的應用性研究。因此，尋找同時涵蓋都市農業與永續發展角度的研討會，作為交換本人在都市農業研究成果和心得的場域。而 106 年於西班牙的這場國際性研討會，正聚焦在生態系統和永續發展觀點，並且涵蓋都市農業議題的研討會性質。

(四)預期效益或欲達成事項

1. 預期將參與一場國際性研討會。
2. 取得兩篇研討會論文之口頭和書面發表。
3. 一篇論文獲選收錄於 International Journal of Design & Nature and Ecodynamics 期刊。
4. 與會人士的意見交流。
5. 建立未來在研究上的合作與交流管道

二、過程

本計畫參與之國際研討會舉辦時間為 106 年 4 月 26 日至 28 日，本團隊的發表時間則是在 27 日星期四，屬於都市農業場次，兩篇論文分別在 15:30~15:55、15:55~16:20 發表。報告時間大約為 15~20 分鐘，並有 5~10 分鐘討論時間。

圖 1、第一場發表者謝依璇

圖 2、第二場發表者李亭頤

第一篇是「評估臺灣嘉義市屋頂農園達到自恃率的潛力(Estimating the potential of achieving self-reliance by rooftop gardening in Chiayi City, Taiwan)」，謝依璇、徐榕德、李亭頤(Y-H. Hsieh, H. Jung-Te & T-I. Lee)合著，並由謝依璇代表進行口頭發表。本文內容是探討在全球人口朝都市地區聚集的情況下所帶來的永續糧食供應問題。從鄉村到城市

的蔬果運輸過程中必須保鮮，導致能源消耗和食物耗損。有鑑於這些成本，在都市內部和周遭生產蔬果並非新鮮事，然而，在都市屋頂上進行商業規模的生產已達到自恃率，是近年來才逐漸受到重視。以目前先進的園藝和農藝技術而言，更有可能透過在都市屋頂的栽培，確保其糧食供應。其中僅有少數商業規模的案例，在高所得且高人口密度或是冬季下雪的社會中，才能支應且合理化這項高輸入且高產值的栽培系統選項。在臺灣的冬季氣候相對溫暖，此系統的應用可能夠為可行，因為比起其他溫帶氣候區，要達到相同產量所需投入的資源可能較少。透過評估高密度城市透過在屋頂生產食物達到自恃率的潛力，使決策者獲得更多資訊推廣屋頂農園的概念。特別是嘉義市，其人口密度在 2016 年全國排名中僅次於首都台北。因此，本研究目的是評估嘉義市透過屋頂農園達到自恃率的潛力。分析了四種屋頂農園耕作系統，並且評估利用這些系統，在商業、教育和住宅三種土地使用類型上的潛在蔬菜生產量和實際的蔬菜消耗量，藉以估算個別土地使用類型的自恃率。研究結果發現達到自恃率的最佳狀況是在商業規模下運作的屋頂水耕溫室模型，儘管這對嘉義市的一般家庭而言並非最永續或務實的選項。

在討論時間中，與會人士對本研究結果甚感興趣，西班牙加的斯大學主持人首先詢問臺灣是否已有商業型水耕溫室屋頂農園的案例，以及本研究結果是屬於情境預估還是調查現況。本研究是屬於情境分析，由於國內

目前尚無商業型水耕溫室屋頂農園的案例，因此借用北美城市的實際案例之單位面積產量，運用在嘉義市的超市、校園和住家屋頂情境中進行假設性的評估。另有美國學者建議未來可進一步研究關於這類溫室水耕屋頂農園的成本效益問題，考量裝設和維護管理的成本費用，實際量測和評估溫室水耕屋頂農園的永續性，

第二篇是「影響都市巷弄可食地景格局之空間因子(Spatial factors affecting pattern of edible landscaping in urban lanes and alleys)」，李亭頤、謝依璇、黃笠箴、黃竣暉、李佳勳、許妙慈、吳品融 (T-I. Lee, Y-S. Hsieh, J-H. Huang, L-J. Huang, J-S. Li, M-C. Syu & P-R. Raymond Wu)合著，並由李亭頤代表進行口頭發表。

本文內容主要是探討可食地景呈現了一種永續文化地景的概念，在都市內部和周遭創造具有生產力的空間，能夠提供許多優點，包括環境美化、鼓勵社會互動、穩定新鮮食物的供應、支持生態系統，也就是使都市發展整體而言更具永續性。在高密度的都市環境中，帶狀的綠化可以為破碎的綠地帶來實質連結性。值得注意的是，在臺灣都市地區的巷弄在公共開放空間中扮演了重要角色，這是由於巷弄是每日生活、交通運輸和文化活動發生的地點。但是這些巷弄的綠化和可食地景常常欠缺視覺協調性，需要基礎研究做為建立相關設計準則的基礎。因此，本文目標是了解巷弄綠化形式和巷弄空間本身之間的關係，以及了解影響可食地景格局的空間因子。

本研究調查和記錄了在嘉義市都市更新地區中的所有巷弄，並且利用 SPSS 分析綠化類型與空間因子之間的關聯性。該研究結果顯示巷弄綠化的存在，主要是與巷弄本身的空間格局、有關兩側建築類型和巷弄空間上的活動有關，但是與土地使用較無關。此外，可食作物種類數量是和巷弄的空間格局和發生活動有關。可食作物出現在 77.9%的綠化巷弄中，且具有停車活動的巷弄，更有可能出現可食作物。使用可移動式盆栽種植的綠化方式，又比其他綠化類型更可能出現可食作物。因此，為了管理巷弄綠化，應根據巷弄現有的空間特徵和活動發展可食巷弄的綠化準則。

與會人士分享紐約曼哈頓島上的垂直可食綠牆案例。一位植物學專家也對於巷弄可食作物的種類感到有興趣，詢問研究團隊是否具有植物學背景，並且表達希望看到植物種類名冊，而本研究調查團隊主要是園藝系學生所組成，對於可食作物具有基本識別能力，因此可以指認出巷弄中的可食作物。另外，主持人本身則是具有造園景觀背景，除了在會後提出未來合作研究的可能性之外，也對於巷弄可食地景出現與巷弄停車現象的關聯性，進一步詢問研究是否涉及空氣汙染對作物的影響，並且建議未來可以納入空氣汙染的因子。

三、心得及建議事項

本次出國參與由英國 Wessex Institute 與西班牙 University of Cadiz 聯合舉辦的國際性研討會。本次研討會的所有論文貢獻者，共有超過一百位，並且來自多個國家，屬於不同專業領域背景的學者專家。但是，在發表當日受到午後大雨的氣象預報之影響，主辦單位對原本的會議議程進行調動，將傍晚參訪加的斯當地文史遺址的行程提前移至上午辦理，並將當日所有的發表場次時間予以順延。如此，可能導致當日最後場次留下參與研討會的人數大幅下降，減少了會後與更多人士交流論文研究的機會。但是，從另一方面來看，留下的人數雖然減少，卻是對研究確實有興趣的與會人士。因此，相較於過去參與大型國際性研討會的經驗而言，這次在相對小型的國際性研討會中，獲得了更為深度的討論機會，並能私下建立交流的聯絡管道。

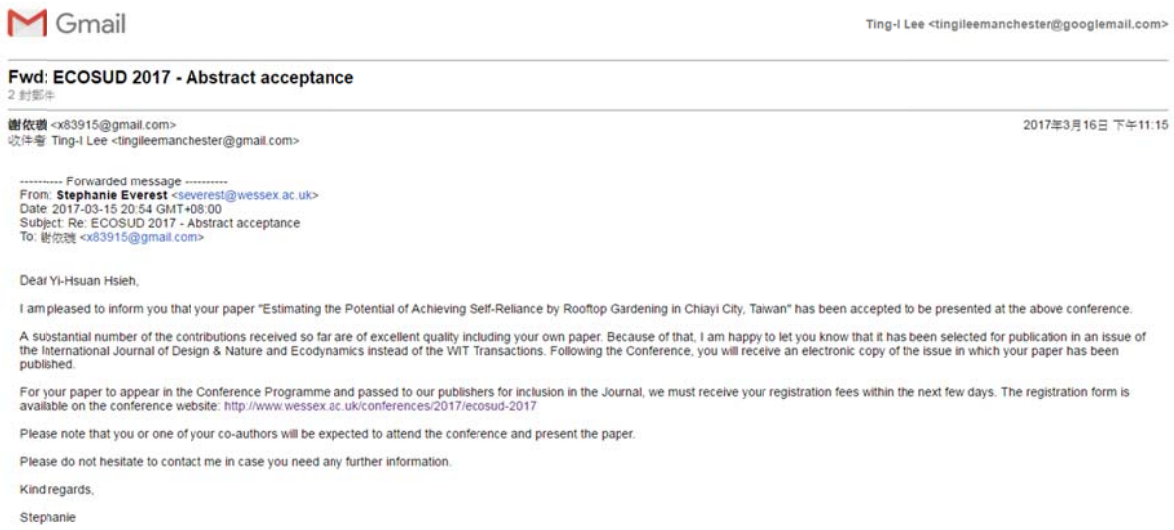
此外，Wessex Institute 是出版研究論文和辦理研討會的專職機構。該研討會的舉辦順利，與會人士能夠確實獲得研究發表和意見交流之經驗。並且，入選期刊的論文能夠獲得主辦單位委外給予的文稿校訂服務，提供論文發表上實質的幫助。但是，與過去參與國際性研討會的經驗相較，本次研討會的辦理規模較小，實際停留於會場的人數也是較少，又研討會議程在會議舉辦前一周才公布，且非學生資格的註冊費用高昂，是該機構辦理研討會有待改善之處。

過去本人參與之大型景觀或規劃領域的國際性研討會，屬於全球性景觀學會或歐洲規劃學院聯盟的年會活動，可見到在會場上同時舉辦多項主題、多重場次的超大規模會議型態。雖然有機會見聞和認識更多的研究和與會人士，但是研究主題上卻未必能夠切合自己的研究興趣。因此，在本次較為小型的國際性研討會上，由於研討會主題與發表之研究論文主題十分切合，因此能夠透過參與會議獲得較多關於研究方向上的助益。

而本次出國的行程安排，受限於補助經費未能涵蓋所有費用，必須選擇轉機多次的廉價航空機票。雖有機會停留多個城市，但是皆屬短暫停留。未能擁有充裕時間深入了解各個城市的特色，或是進一步參訪與研究專業相關的都市農業案例。這對於前往半個地球之遙的目的地國，所費不貲，又需耗費長時間的飛行旅程，整體而言是欠缺附加效益的做法。未來在整體出國行程安排上，應增加單一城市的停留時間，提供深度參訪的充裕時間，以提升出國計畫的效益。

四、附錄

附錄一、第一篇論文接受函



Gmail Ting-I Lee <tingileemanchester@googlemail.com>

Fwd: ECOSUD 2017 - Abstract acceptance

2 封郵件

謝依璇 <x83915@gmail.com> 2017年3月16日 下午11:15
收件者: Ting-I Lee <tingileemanchester@gmail.com>

---------- Forwarded message ----------
From: **Stephanie Everest** <severest@wessex.ac.uk>
Date: 2017-03-15 20:54 GMT+08:00
Subject: Re: ECOSUD 2017 - Abstract acceptance
To: 謝依璇 <x83915@gmail.com>

Dear Yi-Hsuan Hsieh,

I am pleased to inform you that your paper "Estimating the Potential of Achieving Self-Reliance by Rooftop Gardening in Chiayi City, Taiwan" has been accepted to be presented at the above conference.

A substantial number of the contributions received so far are of excellent quality including your own paper. Because of that, I am happy to let you know that it has been selected for publication in an issue of the International Journal of Design & Nature and Ecodynamics instead of the WIT Transactions. Following the Conference, you will receive an electronic copy of the issue in which your paper has been published.

For your paper to appear in the Conference Programme and passed to our publishers for inclusion in the Journal, we must receive your registration fees within the next few days. The registration form is available on the conference website: http://www.wessex.ac.uk/conferences/2017/ecosud-2017

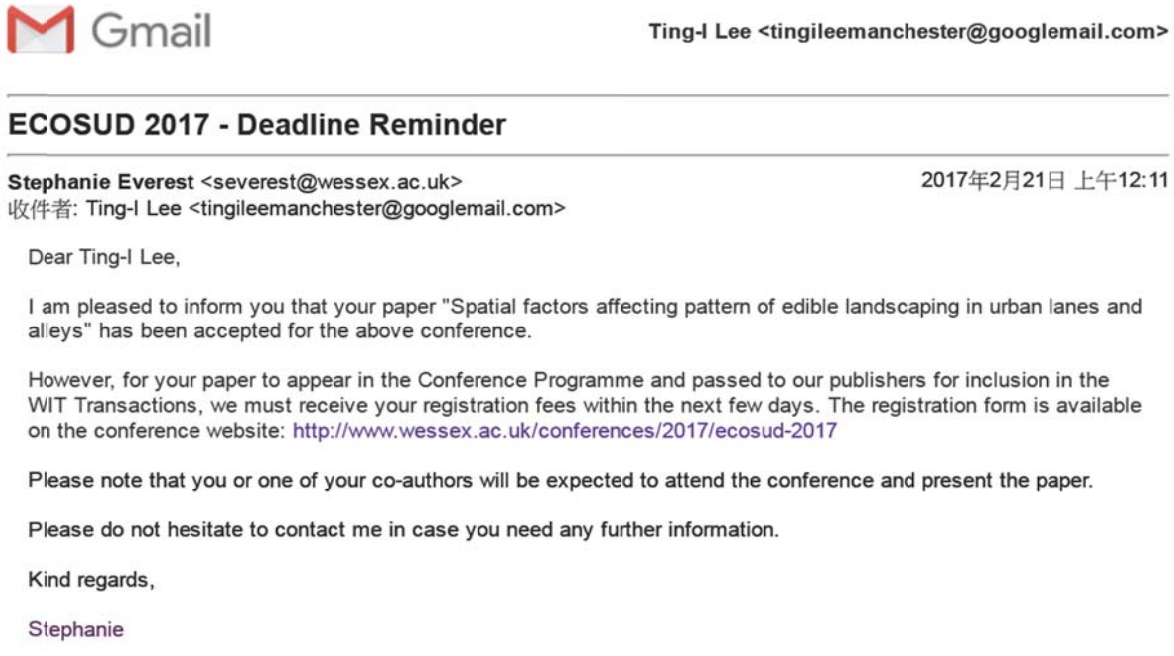
Please note that you or one of your co-authors will be expected to attend the conference and present the paper.

Please do not hesitate to contact me in case you need any further information.

Kind regards,

Stephanie

附錄二、第二篇論文接受函



Gmail **Ting-I Lee <tingileemanchester@googlemail.com>**

ECOSUD 2017 - Deadline Reminder

Stephanie Everest <severest@wessex.ac.uk> 2017年2月21日 上午12:11
收件者: Ting-I Lee <tingileemanchester@googlemail.com>

Dear Ting-I Lee,

I am pleased to inform you that your paper "Spatial factors affecting pattern of edible landscaping in urban lanes and alleys" has been accepted for the above conference.

However, for your paper to appear in the Conference Programme and passed to our publishers for inclusion in the WIT Transactions, we must receive your registration fees within the next few days. The registration form is available on the conference website: http://www.wessex.ac.uk/conferences/2017/ecosud-2017

Please note that you or one of your co-authors will be expected to attend the conference and present the paper.

Please do not hesitate to contact me in case you need any further information.

Kind regards,

Stephanie

附錄三、第一篇論文發表簡報

ESTIMATING THE POTENTIAL OF ACHIEVING SELF-RELIANCE BY ROOFTOP GARDENING IN CHIAYI CITY, TAIWAN

YI-HSUAN HSIEH, JUNG-TE HSU, TING-I LEE

ECOSUD 2017
The 11th International Conference on Ecosystems and Sustainable Development
26 – 28 April 2017, Cadiz, Spain

Outlines

- 1 INTRODUCTION
- 2 ROOFTOP FARMS
- 3 METHODS
- 4 SCENARIO ANALYSIS
- 5 VEGETABLE RELIANCE
- 6 CONCLUDING REMARKS

YI-HSUAN HSIEH, JUNG-TE HSU, TING-I LEE
Department of Horticultural Science, National Chiayi University

1 INTRODUCTION

- Feed growing urban population by urban farming
- Growing leafy vegetables on rooftops
- Commercial and non-commercial cases of rooftop farms in high-income societies
- Aim: Assessing the potential of Chiayi City to achieve self-reliance by growing food on roof

YI-HSUAN HSIEH, JUNG-TE HSU, TING-I LEE
Department of Horticultural Science, National Chiayi University

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Department of Horticultural Science, National Chiayi University

2 ROOFTOP FARMS

- 1. SAVOR...Chicago
  - 1.076032421 kg/m2 for 9 months
  - 1.434689470 kg/m2 for 12 months
- 2. Brooklyn Grange
  - 2.241733716 kg/m2 for 9 months
  - 2.988951345 kg/m2 for 12 months
- 3. Greenpoint by Gotham Greens
  - 6.575671119 kg/m2
- 4. Supermarket by Gotham Greens
  - 9.863506678 kg/m2

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Department of Horticultural Science, National Chiayi University

3 METHODS

- *Grewal & Grewal [11] evaluate the potential level of food reliance of the City of Cleveland in three distinct scenarios.*

$$\%\ Self\ Reliance$$

$$= \frac{Supply}{Needs}$$

$$= \frac{Productivity \times Area}{Comsuption} \times 100$$

YI-HSUAN HSIEH, JUNG-TE HSU, TING-I LEE
Department of Horticultural Science, National Chiayi University

3 METHODS

Case Location	Scale	Type	Area (acre)	Annual Yield (lb)	Annual Productivity per Unit Area (kg/m²)
1. SAVOR...Chicago, Chicago	Non-commercial	Open-air soil	2.50	24,000	1.076032421
				32,000	1.434689470
2. Brooklyn Grange, New York	Commercial	Open-air soil	2.50	50,000	2.241733716
				65,667	2.988951345
3. Greenpoint by Gotham Greens, New York	Commercial	Greenhouse hydroponic	3.75	220,000	6.575671119
4. Supermarket by Gotham Greens, New York	Commercial	Greenhouse hydroponic	5.00	440,000	9.863506678

YI-HSUAN HSIEH, JUNG-TE HSU, TING-I LEE
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Department of Horticultural Science, National Chiayi University

4 SCENARIO ANALYSIS

- 1. Scenario I: the Chung-Wen Elementary School, Chiayi.
- 2. Scenario II: the Taiwan-based supermarket chain, PXMART.
- 3. Scenario III: the residential land use of Chiayi City.

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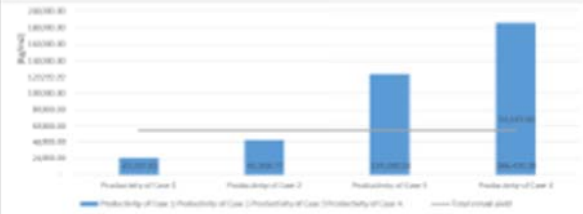
4 SCENARIO ANALYSIS

- Needs and supply in the elementary school



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4 SCENARIO ANALYSIS

- Needs and supply in the supermarket scenario

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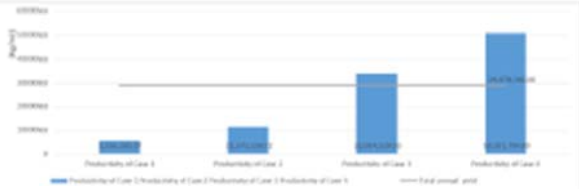
4 SCENARIO ANALYSIS

- Needs and supply of the city scenario



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Outlines

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5 VEGETABLE RELIANCE

Scenario	Case		Productivity 1 (kg/m²): 1.070692421	Productivity 2 (kg/m²): 2.241733716	Productivity 3 (kg/m²): 4.575671119	Productivity 4 (kg/m²): 9.863506678
I	Area (m²): 10,900.0	Supply (kg):	20,337.0	42,568.8	124,280.3	186,420.3
	Needs (kg): 54,557	Reliance:	37.29%	77.69%	227.88%	341.82%
II	Area (m²): 514,857.6	Supply (kg):	554,000.5	1,154,173.6	3,385,534.3	5,078,301.4
	Needs (kg): 60,385,000	Reliance:	0.91%	1.69%	4.96%	7.43%
	Organic Needs (kg): 2,590,000	Reliance:	21.39%	44.56%	130.72%	196.07%
III	Area (m²): 5,163,660.0	Supply (kg):	5,556,265.6	11,574,529.9	50,931,794.9	11,575,550.7
	Needs (kg): 29,078,382	Reliance:	19.11%	39.81%	116.77%	175.15%

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Outlines

- 1 INTRODUCTION
- 2 ROOFTOP FARMS
- 3 METHODS
- 4 SCENARIO ANALYSIS
- 5 VEGETABLE RELIANCE
- 6 CONCLUDING REMARKS

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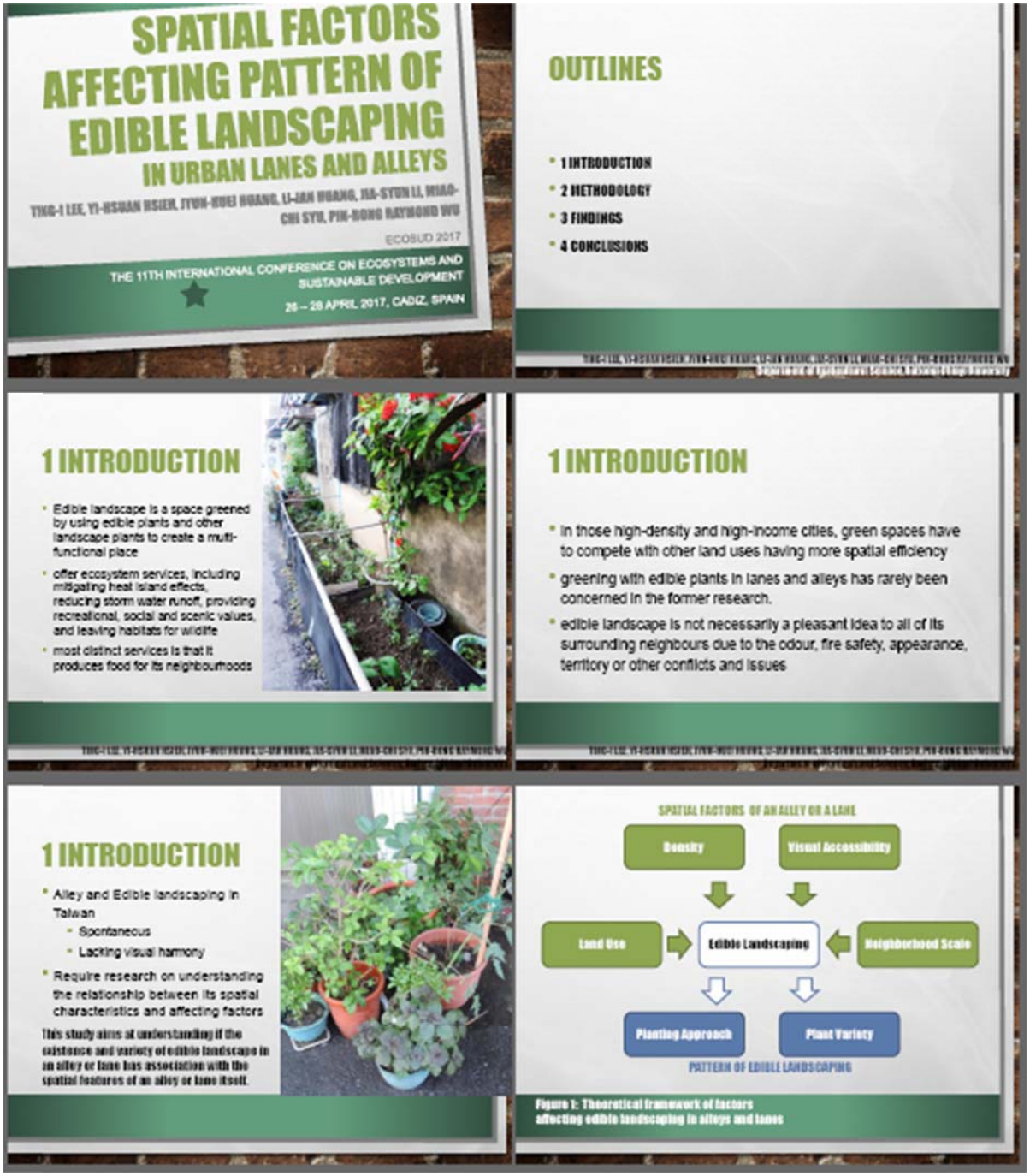
6 CONCLUDING REMARKS

- Providing food not the only thing matters in Urban Agriculture
- Soil roof farms: hardly reach 100% self-reliance
- Hydroponic greenhouses on rooftop: achieve 100% self-reliance
- Hydroponic growing model is a highly energy-consuming and technology-intense
- Open-air rooftop soil farms: most sustainable and practical type of in Chiayi City

Q & A

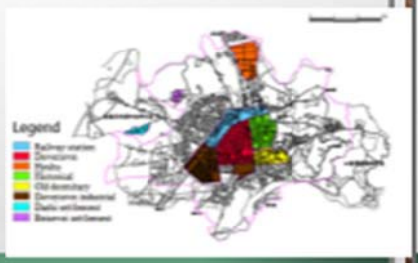
THANKS FOR YOUR ATTENTION!

附錄四、第二篇論文發表簡報



OUTLINES

- 1 INTRODUCTION
- 2 METHODOLOGY
- 3 FINDINGS
- 4 CONCLUSIONS



2 METHODOLOGY

- The research area is those designated as regeneration areas in the urban plan of the Chiayi City,

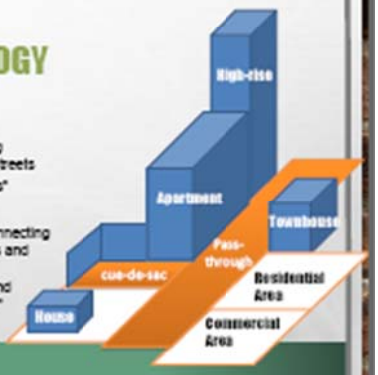
1. railway station and the surrounding area,
2. downtown area,
3. historical town area,
4. old dormitory area,
5. downtown industrial area,
6. Houhu redevelopment area,
7. Dashih settlement, and
8. Beiswei settlement

2 METHODOLOGY

- A conceptual framework of factors that affects the in alleys and lanes.
- The spatial factors affecting patterns of edible landscape include land use, density, and activities happened in the space.
- Surveyed and documented the key characteristic of the greening and edible landscaping in all alleys and lanes in the designated regeneration areas in Chiayi City
- Analysed the association between typology of their greening and spatial factors by SPSS.

2 METHODOLOGY

- Alleys:
  - "pass ways connecting boulevards, roads or streets
  - no wider than 7 meters"
- lanes:
  - "narrow pass ways connecting alleys and those roads and streets
  - wider than 7 meters and shorter than 2 meters."



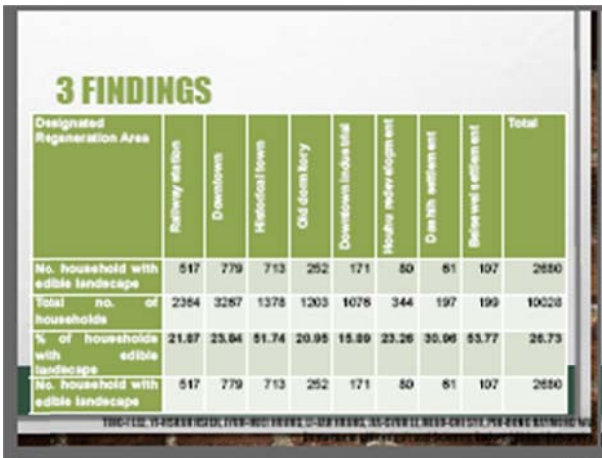
2 METHODOLOGY

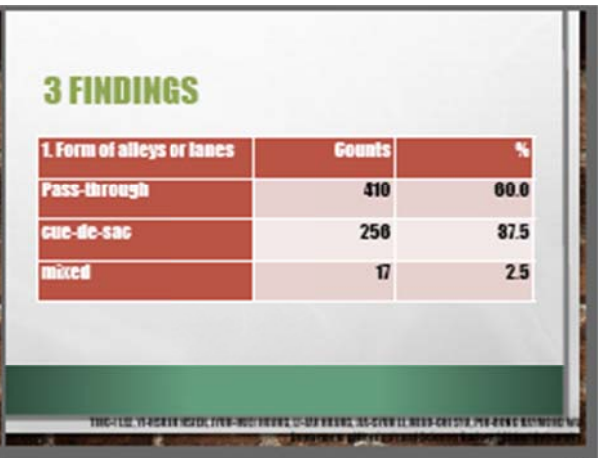
OUTLINES

- 1 INTRODUCTION
- 2 METHODOLOGY
- 3 FINDINGS
- 4 CONCLUSIONS

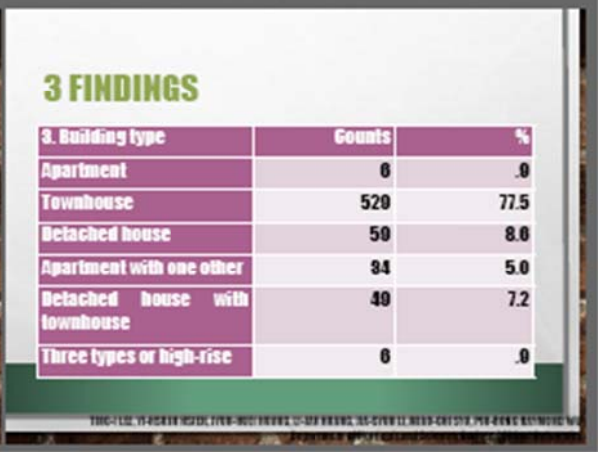

3 FINDINGS
687 data in the 8 designated regeneration areas:
235 data in the railway station and the surrounding area,
127 data in the downtown area,
169 data in the historical town area,
53 data in the old dormitory area,
99 data in downtown industrial area,
15 data in the Houhu redevelopment area,
16 data in the Dashih settlement, and
25 data in the Beiswei settlement
Levene test
p=0.000<0.05,
the null hypothesis is rejected
Means those alleys and lanes in each regeneration areas has distinctive numbers of varieties in edible plants.

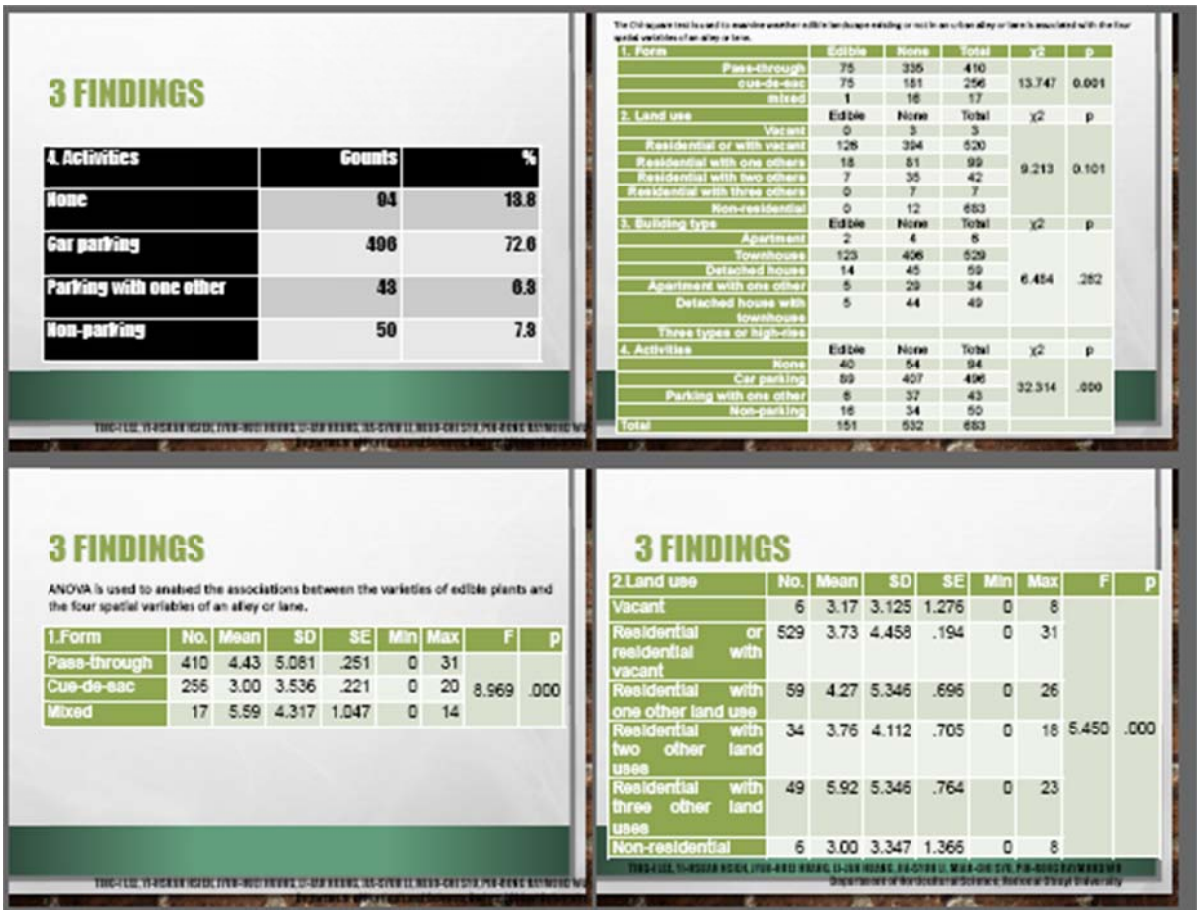
3 FINDINGS
Designated Regeneration Area
Railway station
Downtown
Historical town
Old dormitory
Downtown industrial
Houhu redevelopment
Dashih settlement
Beiswei settlement
Total
Area of the regeneration area (ha)
158 216 170 92.2 128 14.9 14.3 128 921.4
Total no. of alleys and lanes
127 235 99 53 117 25 15 15 687
No. of edible alleys and lanes
115 161 96 47 68 15 12 15 532
% of edible alleys and lanes
90.55 68.51 96.97 88.68 58.12 72.00 75.00 100 77.44


3 FINDINGS
Designated Regeneration Area
Railway station
Downtown
Historical town
Old dormitory
Downtown industrial
Houhu redevelopment
Dashih settlement
Beiswei settlement
Total
No. household with edible landscape
517 779 713 252 171 80 61 107 2680
Total no. of households
2384 3287 1378 1203 1076 344 197 199 10028
% of households with edible landscape
21.67 23.84 51.74 20.95 15.89 23.26 30.96 53.77 26.73
No. household with edible landscape
517 779 713 252 171 80 61 107 2680


3 FINDINGS
1. Form of alleys or lanes
Counts
%
Pass-through
410
60.0
cuc-de-sac
258
37.5
mixed
17
2.5


3 FINDINGS
2. Land use
Counts
%
Vacant
3
.4
Residential or with vacant
520
78.1
Residential with one others
99
14.5
Residential with two others
42
6.1
Residential with three others
7
1.0
Non-residential
12
1.8


3 FINDINGS
3. Building type
Counts
%
Apartment
6
.9
Townhouse
529
77.5
Detached house
59
8.6
Apartment with one other
34
5.0
Detached house with townhouse
49
7.2
Three types or high-rise
6
.9


3 FINDINGS
4. Activities | Counts | %
None | 94 | 13.8
Car parking | 496 | 72.6
Parking with one other | 43 | 6.3
Non-parking | 50 | 7.3
1. Form | Edible | None | Total | χ2 | p
Pass-through | 75 | 335 | 410 | 13.747 | 0.001
cue-de-sac | 75 | 181 | 256
mixed | 1 | 16 | 17
2. Land use | Edible | None | Total | χ2 | p
Vacant | 0 | 3 | 3 | 9.213 | 0.101
Residential or with vacant | 126 | 394 | 520
Residential with one others | 18 | 81 | 99
Residential with two others | 7 | 35 | 42
Residential with three others | 0 | 7 | 7
Non-residential | 0 | 12 | 683
3. Building type | Edible | None | Total | χ2 | p
Apartment | 2 | 4 | 6 | 6.454 | .262
Townhouse | 123 | 406 | 529
Detached house | 14 | 45 | 59
Apartment with one other | 5 | 29 | 34
Detached house with townhouse | 5 | 44 | 49
Three types or high-rise
4. Activities | Edible | None | Total | χ2 | p
None | 40 | 54 | 94 | 32.314 | .000
Car parking | 89 | 407 | 496
Parking with one other | 6 | 37 | 43
Non-parking | 16 | 34 | 50
Total | 151 | 532 | 683
3 FINDINGS
ANOVA is used to anabed the associations between the varieties of edible plants and the four spatial variables of an alley or lane.
1.Form | No. | Mean | SD | SE | Min | Max | F | p
Pass-through | 410 | 4.43 | 5.081 | .251 | 0 | 31 | 8.969 | .000
Cue-de-sac | 256 | 3.00 | 3.536 | .221 | 0 | 20
Mixed | 17 | 5.59 | 4.317 | 1.047 | 0 | 14
3 FINDINGS
2.Land use | No. | Mean | SD | SE | Min | Max | F | p
Vacant | 6 | 3.17 | 3.125 | 1.276 | 0 | 8 | 5.450 | .000
Residential or residential with vacant | 529 | 3.73 | 4.458 | .194 | 0 | 31
Residential with one other land use | 59 | 4.27 | 5.346 | .696 | 0 | 26
Residential with two other land uses | 34 | 3.76 | 4.112 | .705 | 0 | 18
Residential with three other land uses | 49 | 5.92 | 5.346 | .764 | 0 | 23
Non-residential | 6 | 3.00 | 3.347 | 1.366 | 0 | 8

3 FINDINGS

3.Building type	No.	Mean	SD	SE	Min	Max	F	p
Apartment	6	3.17	3.125	1.276	0	8	2.201	.053
Townhouse	529	3.73	4.458	.194	0	31		
Detached house	59	4.27	5.346	.696	0	26		
Apartment with one other	34	3.76	4.112	.705	0	18		
Detached house with townhouse	49	5.92	5.346	.764	0	23		
Three types or high-rise	6	3.00	3.347	1.366	0	8		

3 FINDINGS

4.Activities	No.	Mean	SD	SE	Min	Max	F	p
None	94	2.44	3.928	.405	0	23	14.220	.000
Car parking	495	4.01	4.142	.186	0	26		
Parking with one other	43	7.58	8.353	1.274	0	31		
Non-parking	50	2.78	3.797	.537	0	21		
Total	683	3.93	4.598	.176	0	31		

OUTLINES

- 1 INTRODUCTION
- 2 METHODOLOGY
- 3 FINDINGS
- 4 CONCLUSIONS

4 CONCLUSIONS

- The existence of alley greening is mainly associated with
  - the spatial form of an alley itself, the type of buildings alongside and
  - the activities in the alley space, but
  - less associated with the land use alongside.

4 CONCLUSIONS

- Number of species of edible crops is associated with spatial form and activities in the alley space.
- Edible plants occur in 77.9% of greened alleys and those alleys with car parking alongside are more likely to have edible plants than those without.
- Those alleys with pots placed on the ground are most likely to have edible plants than other types of greening.

In order to practically manage alley greening, an edible alley greening principle should be developed according to the current spatial features of and activities in the alley.

THANKS FOR YOUR ATTENTION!

Q & A