檔號	年度號/分類號	保存年限
	案次號/卷次號/目次號	

亞蔬-世界蔬菜中心 【函】

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受文者：依正本行文單位

發文日期：中華民國 115 年 2 月 4 日
發文字號：世蔬字第 115019 號
速別：
密等及解密條件：
附件：實習申請表、研究主題說明

主旨：本中心農業生態組自即日起至本（115）年 3 月 7 日止，徵求各大學農藝、自然資源及環境科學等相關系所之碩、博士在學生（已完成註冊且正尋求研究主題者）申請實習，詳如說明，請查照。

說明：

一、 預計實習期間自本年 3 月下旬至 12 月。實習地點為本中心臺南善化總部農業生態組。

二、 本實習以雙方同意之研究主題進行，研究主題內容如附件所示。申請人於實習期間所產出之研究成果，得保有適當之作者身分（作者排序）及發表權利。

三、 申請人須經所屬學校相關科系之教授推薦，並請指導教授於申請表中簽名。如須採計學分，請先與系辦確認是否接受。

四、 本中心提供實習津貼，並不收取實習費用；惟申請人須自行負擔餐宿、交通及保險等費用。若申請人可每週實習 5 日者，得視宿舍量能與相關規定，優先評估提供免住宿費之安排。

五、 請於本（115）年 3 月 7 日前填妥附件申請表並完成簽署，併同其他指定文件之電子檔寄至 adam.liu@worldveg.org，以憑辦理。

正本：國立台灣大學生物資源暨農學院、國立中興大學農業暨自然資源學院、國立嘉義大學農學院、國立成功大學生物科學與科技學院、國立屏東科技大學農學院

亞蔬-世界蔬菜中心

AVRDC - THE WORLD VEGETABLE CENTER 1971

To: 文書組 掛文 / 農學院

Attachment: Student MSc/PhD research topics at Agroecology, World Vegetable Center

World Vegetable Center (WorldVeg) is an international research organization with a mission to deliver science and innovation for enhanced vegetable production and consumption in a rapidly changing world. It has headquarters in Shanhua, Tainan, Taiwan. See more: https://avrdc.org/

Currently, Agroecology team at WorldVeg is looking for applications from Msc/PhD students registered at any Taiwan university to carry out research as part of their MSc/PhD program on the topics below:

Topic 1) Assessing the potential of nitrification inhibitors to enhance nitrogen use efficiency and reduce N2O emissions in leafy vegetables

Vegetables are high-value crops, yet they require high nitrogen (N) inputs, which increases the risk of N losses. Given the strong potential of nitrification inhibitors (NI) to enhance N use efficiency and reduce N_2O emissions, this research will identify which NI types deliver the greatest agronomic and climate benefits in the production of leafy vegetables in Taiwan. A selection of commercially available nitrification inhibitors (NI) will be concurrently evaluated in a pot study followed by a field trial at WorldVeg. Among the commercially available nitrification inhibitors (NI), dicyandiamide (DCD) and 3,4-dimethylpyrazole phosphate (DMPP) will be compared, with the possibility of testing additional NI (e.g. biological NI such as neem extract).

The experiments where NI will be applied together with fertilizers will be implemented by the WorldVeg field team, and the student is expected to collect and analyze various data related to soil properties, plant nutrient uptake, and N_2O emissions. This research will cover 2 seasons of a fast-growing leafy vegetable.

Key research components include:

- Assessment of effects on soil nitrogen dynamics and selected soil properties
- Evaluation of the impact on the soil microbiome, especially N-cycling microbes using qPCR of amoA gene (AOA for archaea and AOB for bacteria)
- Analyzing crop nutrient uptake and crop yield
- Assessment of N2O fluxes generated by the LICOR Smart Chamber

The key parameters will include soil properties, specifically NH_4^+ and NO_3^- (KCl extraction followed by colorimetry or ion chromatography), pH, gravimetric moisture at regular intervals and immediately after fertilization and wetting events. Plant measurements will include aboveground biomass, yield, and grain N concentrations at harvest to quantify N uptake and use efficiency. Potential nitrification rates will be determined using laboratory assays, and the abundance of nitrifiers will be quantified. N_2O fluxes will be measured in the field using the LICOR smart chamber at regular intervals.

This research is linked to a project "Agroecological Approaches for Circular and Low Emission Vegetable Production" funded by the Ministry of Agriculture of Taiwan. It will generate comprehensive evidence on the potential benefits of NI in vegetable production in Taiwan. It will be a collaborative research with experts from WorldVeg, Aarhus University, Tainan DARES, and Taiwan universities.

Topic 2) Testing of plant- and soil-based sensors for precision nitrogen management

This research topic focuses on evaluating emerging sensing technologies for precision nitrogen management in vegetable production. Through controlled pot experiments conducted at the World Vegetable Center (in Shanhua), the student will compare soil-based sensors and plant-based sensors for their ability to assess soil mineral nitrogen (NH_4^+, NO_3^-) and plant nitrogen status, and predict precise crop N requirements that will be supplied accordingly.

The experiment involves simultaneous collection of sensor data and conventional laboratory measurements, including ion chromatography and colorimetric analysis for soil nitrogen, as well as SPAD readings, spectral parameters (NDVI, HUE, greenness), and plant tissue nitrogen analysis for crop N status. By integrating sensor outputs with laboratory reference data, the study will assess the accuracy, reliability, and practical feasibility of different sensing approaches to guide the precision application of fertilizer and water.

Key research components include:

- Quantifying relationships between sensor readings and measured soil or plant nitrogen indicators
- Evaluating how environmental conditions influence sensor performance
- Assessing data stability, ease of operation, and cost-effectiveness of each sensing strategy
- Assessing the crop response to fertilizer application guided by the different sensors

This research is linked to a project "Agroecological Approaches for Circular and Low Emission Vegetable Production" funded by the Ministry of Agriculture of Taiwan. It will provide hands-on training in experimental design, sensor-based data acquisition, and nitrogen cycling analysis, while supporting the transition to sustainable and low-carbon agriculture. The outcomes will offer a technical basis for selecting appropriate sensing tools in precision fertilization and support future field-scale applications and technology adoption. In the future, data integration via AI and modelling could be used to develop new decision-support tools.

For more information, you can contact:

Lukas Pawera, Agronomist/Agroecologist at WorldVeg: lukas.pawera@worldveg.org

Adam Liu, Research Assistant at WorldVeg: adam.liu@worldveg.org

World Vegetable Center

INTERNSHIP OF MASTER'S OR PhD STUDENTS IN AGROECOLOGY

Application Form

A. PERSONAL DETAILS

A1. Name (As in your passport)

First/ Given Name

Middle Name

Family Name

A2. Date of Birth (DD/ MM/YYYY)

Date	Month	Year

A3. Sex

☐ Female

☐ Male

A4. Passport number

A5. Date of expiry

A6. Nationality (as in the passport)

A7. National ID (if available)

A8. Civil status

☐ Married

☐ Single

A9. Permanent Home Address

Street Address

Address Line 2

City

State/ Province/ Region

ZIP/ Postal Code

Country

A10. Present Address (If different from A9)

Street Address

Address Line 2

City

State/ Province/ Region

ZIP/ Postal Code

Country

A11. Email

A12. Telephone (Country code/ Regional code/ Phone No.)

A13. Mobile (Country code/ Phone number)

B. DETAILS OF THE UNIVERSITY/ COLLEGE

B1. Name of the College/ University

B2. Address of College/University

Street Address

Address Line 2

City

State/ Province/ Region

ZIP/ Postal Code

Country

B3. Telephone (Country code/ Regional code/ Phone No.)

B4. Course registered for (MSc or PhD):

B7.1 Year of Study

Field of specialization

Expected Year of graduation

C. EMPLOYMENT DETAILS (IF EMPLOYED AT PRESENT OR PREVIOUSLY)

C1. Position title and key responsibilities

Title:
Key responsibilities:

C2. Name of the organization

C3. Contact details of your organization

Street Address

Address Line 2

City

State/ Province/ Region

ZIP/ Postal Code

Country

C4. Employer's phone

D. PERSON TO CONTACT IN CASE OF EMERGENCY

D1. Name of the person

D2. Relationship

D3. Address

Street Address

Address Line 2

City

State/ Province/ Region

ZIP/ Postal Code

Country

D4. Phone

D5. Mobile phone

D6. Email

E. LANGUAGE PROFICIENCY

(Indicate the languages you speak and your language ability (**1 = Excellent; 2 = Very good; 3 = Good, 4 = Fair**)

Language	Speak	Read	Write	Remarks

F. START OF RESEARCH

F1. When can you start the internship in WorldVeg HQ, Tainan, Taiwan at the earliest?

G. ATTACHMENTS

Please attach the following:

A1. Copy of your passport and National ID (if available)
A2. Motivation letter (1 page)
A3. Your latest transcript with the official stamp from your college/university
A4. Curriculum vitae (CV)
A5. Proof of registration for a Master's or PhD program from your college/university
A6. A letter from the relevant authority at your university to permit you to join the internship at the World Vegetable Center

I certify that the information I have furnished in the application form are true to the best of my knowledge.

Signature **Date**

Name

Place