



THE-GLOW

Transdisciplinary Higher Education
for Global Wellbeing

Transdisciplinary Approaches to Zero Hunger

June 2024



Co-funded by
the European Union

Course syllabus

First semester 2024 (June)

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| 1. Faculty: Agriculture | Department: Soil Science |
| 2. Course number: 01009596 | Course name: Selected Topic in Soil Science |

(Transdisciplinary Approaches to Zero Hunger)

Number of credits: 2 credits (2-0-4)

Prerequisite: NA

Time: contact course coordinator (Associate Professor Dr. Worachart Wisawapipat)

Course type: Elective

Place: Room 302 Vajiranusorn Building, Faculty of Agriculture, Kasetsart University, Bangkok
Room 4023, Piyachart Building 2, Thammasat University, Rangsit campus
Room 206, SERD Building, Asian Institute of Technology

Date of last update: 14 June 2024

3. Instructors

1. Associate Professor Dr. Worachart Wisawapipat (Kasetsart University, Bangkhen Campus)
2. Dr. Natcha Sornhiran (Kasetsart University, Kamphaeng Saen Campus)
3. Professor Dr. Kyoko Kusakabe (Asian Institute of Technology)
4. Associate Professor Dr. Uma Langkulsen (Thammasat University)
5. Associate Professor Dr. Wannarat Rattanawarang (Thammasat University)

4. Consultation with students through email

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5. Course objectives

1. To understand the complexity of zero hunger using different fields of knowledge, transdisciplinary concepts, and peer-to-peer (P2P) learning, with special attention to gender analysis.
2. To identify linkages of factors affecting zero hunger at local, regional, and global scales.
3. To develop and demonstrate transdisciplinary mindset contributing to problem framing of zero hunger, highlighting the perspectives of gender and social inclusion.
4. To communicate with diverse groups of knowledge with differing soft skills, including critical thinking, collaboration skills, and team building.

6. Course learning outcomes (CLOs)

Students are able to

1. Explain the complexity of zero hunger using different fields of knowledge, transdisciplinary concepts, and peer-to-peer (P2P) learning with a strong gender perspective.
2. Identify and analyze the linkages of factors affecting zero hunger at local, regional, and global scales.

3. Develop and demonstrate the mindset that is needed to frame problems involving the achievement of zero hunger in terms of complexity and in a way that reflects their transdisciplinary nature, highlighting the perspectives of gender and social inclusion.

4. Communicate with groups of stakeholders with different knowledge, expertise, and experience, using soft skills, including critical thinking, collaboration skills, and team building.

7. Importance of the course

Zero hunger (Goal#2) is one of the 17 Sustainable Development Goals (SDGs) established by the United Nations (UN), with the official term of “End hunger, achieve food security and improved nutrition, and promote sustainable agriculture.” By 2022, about 735 million people (9.2% of the world’s population) will be experiencing chronic hunger, and 2.4 billion people are estimated to experience moderate to severe food insecurity. The hunger issue is concurrent with malnutrition that coexists in multiple forms: undernutrition and overnutrition. Zero hunger is an intricate concern related to various disciplines, such as food security, nutrition, rural development, gender equality, and sustainable agriculture. Therefore, the zero hunger issue should be analyzed and addressed differently in diverse countries all over the globe.

This course contributes to training a new generation of professionals with the transdisciplinary skills that allow them to lead multidisciplinary teams in which a wide range of disciplinary perspectives (e.g., agricultural science, environmental science, social science, and health science) is brought together. Overall, the course “Transdisciplinary Approaches to Zero Hunger” is crucial for its holistic and collaborative strategies in building awareness of the complexities involved in tackling food insecurity. Integrating multiple fields and stakeholders fosters a transdisciplinary mindset. A mindset that calls for approaches (reflected in policies,

, projects, and research) that define zero hunger problems as transdisciplinary problems and that advocate for collaborative action of all stakeholders and disciplines involved. The problem that such approaches aim to tackle is framed in terms of multidisciplinary action, calling for innovative solutions tailored to sustainable development goal#2, promoting resilience and equity in food systems to achieve impactful outcomes. Hunger and malnutrition are caused and exacerbated by various factors, including but not limited to food productivity, accessibility, social structures, norms, and practices. The course “Transdisciplinary Approaches to

Hunger” is crucial for its holistic and collaborative strategies in addressing the complexities of food insecurity. Integrating diverse fields and stakeholders fosters innovative solutions tailored to sustainable development goal#2, promoting resilience and equity in food systems to achieve impactful outcomes. The course would also provide a gender and social inclusion perspective to be integrated into the whole approach, addressing sustainable development goal# 5.

8. Course description

As the world is increasingly becoming aware of the need for multidisciplinary solutions for its many “wicked” problems, the aim of this course is to prepare young professionals from different disciplinary backgrounds and with different fields of expertise for a career that includes multidisciplinary work environments. Students in this course will get the opportunity to practice the skills to “connect” relevant disciplines and sectors. Skills that are crucial for functioning in multidisciplinary working environments, and to lead multidisciplinary teams. Multidisciplinary professionals bring their own professional knowledge to the table but know how to communicate with other fields and sectors and organize action across disciplinary boundaries.

To this end, they need to have a thorough understanding of what transdisciplinarity is and how and when it is practiced. The first step in this process is to learn to approach problems (such as the problems involved in achieving zero hunger) as “wicked” and complex and to redefine traditional

problems (as formulated in the traditional disciplines) into problems that reflect the complexity and the need for multidisciplinary understanding.

In this course, students will be (further?) familiarized with the concept of transdisciplinarity and the need to approach and frame problems that prevent us from realizing zero hunger –equal access to sustainable, healthy diets for all as complex problems with many dimensions and facets. Students will be made aware that zero hunger can only be realized by a collective effort of the different disciplines and various stakeholders involved. Supported by research and followed by action (policies, legislation, professional practice), in which this complexity is reflected in the way in which its core problems are framed.

To learn what transdisciplinarity entails, students will study zero hunger through the lens of the 4D food security framework. This framework forms the basis of the course and will be used to illustrate and discuss the different fields and dimensions involved in achieving equal food security for all. In consecutive sessions, the framework's different dimensions—from the problems involved in the agricultural production of enough, sustainable and healthy food for everyone, the impact of food production on the environment and vice versa, to food consumption, food preferences, securing equal access to food, and human health- will be discussed as well as the many ways in which these dimensions are entangled, co-evolve and co-develop. In addition to theoretical discussions in the classroom, students will embark on a field trip during which they will not only have the chance to study a real-life example and to see for themselves what and who is involved in sustainable food production. By interviewing the different stakeholders involved in this example, they will also have the opportunity to identify and discuss issues related to food security, equal access to food (such as (equal) distribution, impact of gender, etc.) and to have conversations with the different stakeholders involved in each of these dimensions of the 4D framework.

The different forms of active and collaborative learning applied in this course are chosen to activate leadership skills, cross-disciplinary communications and collaboration skills, analytical skills, and presentation skills. All skills are indispensable in the multidisciplinary professional's toolkit. Presentation and discussion on assigned topics. Field trip required. Data analysis, synthesis, and group discussion for the field trip data. Communication planning.



9. Teaching approach: active learning

Lesson	Topic	Teaching approach
1	<i>Transdisciplinary concept for zero hunger with gender and social inclusion perspective</i>	- Self-introduction - Brainstorm - Mind-mapping - In-class discussion - Lecture
2	<i>4Ds food security framework</i>	-In-class discussion -Reflection -Lecture
3	<i>Food security in relation to agricultural production and environment</i>	- Lecture - Problem-based learning In-class discussion
4	<i>Food security in relation to socioeconomics</i>	-Brainstorming - Lecture - Group discussion
5	<i>Food security in relation to human health</i>	Problem-based learning
6	<i>Seminar organized by students using 4Ds linkage</i>	-Seminar - In-class discussion
7	<i>Field trip preparation</i> <i>Agriculture and Environment</i> <i>Socioeconomic</i> <i>Human health</i>	- Lecture - Group discussion - <i>Group discussion</i> - <i>Group discussion</i>
8	<i>Field trip with interview</i>	- Field observation - In-depth interview
9	<i>Field trip: Data analysis, synthesis, and group discussion - Agriculture and environment</i>	- Problem-based learning - Soil testing - Group discussion
10	<i>Field trip: Data analysis, synthesis, and group discussion - Human health</i>	- Problem-based learning - Group discussion
11	<i>Field trip: Data analysis, synthesis, and group discussion - Socio economics and gender and social inclusion (GESI)</i>	- Problem-based learning - Group discussion
12	<i>Field trip: Synthesis, conclusions, and recommendations</i>	- Problem-based learning - Group discussion - Reflection
13	<i>L13: Communication planning #1</i>	- Fundamental of communication - Persuasion - Audience analysis - Presentation techniques
14	<i>L14: Communication planning #2</i>	- Presentation role-playing
15	<i>Final presentation</i>	- Presentation - Discussion



10. Teaching equipment

- 8.1 Computer, LCD projector, and Screen, Flipchart
- 8.2 Microsoft Teams or other online teaching platforms such as Google Classroom.
- 8.3 Soil nutrient assessment kits.
- 8.4 Body Composition Analyzer
- 8.5 Turnitin

11. Measures of achievement

	Details	Points)%(
1. Individual assignment		40
	- Homework/assignment	
	- Group discuss participation in each section	
	- Giving positive feedback in each section	
	- Dynamic reflection in each section	
2. Seminar		20
3. Final presentation		20
4. Final report		20
Total		100

12. Grading

Points	Grade
> 80	A
> 75-79	B+
> 70-74	B
> 65-69	C+
> 60-64	C
> 55-59	D+
> 50-54	D
< 50	F

13. Teaching materials

Course materials will be given for specific topics.



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14. Class schedule

Day	Time	Place	Lesson	Activity (Lecture, Group Discussion, Brainstorm)	Lecturer	Teaching mode (in person)&venue	Lesson-Learning outcome LLO	Assessment
17 June, 2024	09:00-10:00	KU	- Class orientation - Brief Introduction about KU and Tour at different departments (e.g., Soil Science and Faculty of Agriculture)					
(Mon)	10:00-12:00	KU	L1: Transdisciplinary concept for zero hunger with gender and social inclusion perspective (3 points)	- Self-introduction - Brainstorm & Mind mapping - In-class discussion	WW, KK WR, NS, UL, BN	in person	- To understand basic concept of Transdisciplinary - To be open minded with and familiarize with other disciplines - To set in place gender and social inclusion perspective	- Reflective form about the content the students learn. - Reflective form about what they learn from other students.
	13:00-15:00	KU	L2: 4Ds food security framework (3 points)	-In-class discussion -Reflection -Lecture	NS, UL WR, NS, KK, BN	in person	- To understand Zero hunger and 4Ds food security framework	-Quiz
18 June 2024 (Tue)	10:00-12:00	KU	L3: Food security in relation to agricultural production and environment (3 points)	-In-class discussion -Reflection -Lecture	WW, NS WR, UL, KK, BN	in person	- To understand Food security in relation to Agricultural production and environment	-Quiz -Reflection
	13:00-15:00	KU	L4: Food security in relation to socio economics (marketing, policy, poverty, gender inequality, behavioral changes, education system, governance, multi-culture) (3 points)	-In-class discussion -Reflection -Lecture - Role play	KK, WR WW, UL, NS, BN	in person	To be able to explain social economic factors that lead to food insecurity	-Individual reflection



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Day	Time	Place	Lesson	Activity (Lecture, Group Discussion, Brainstorm)	Lecturer	Teaching mode (in person)&venue	Lesson-Learning outcome LLO	Assessment
19 June 2024 (Wed)	10:00-12:00	TU	L5: Food security in relation to human health (4 points)	-In-class discussion -Reflection -Lecture	UL, WR WW, KK, NS, BN	in person	-To understand how food insecurity leads to malnutrition, micronutrient deficiencies, and diet-related diseases.	-Classroom observations
	13:00-15:00	TU	L6: Seminar organized by students using 4D Linkage (soil, environment, health, gender, social, economic) 20 points)	Seminar, Presentation, In-class discussion	NS, WW, WR, KK, UL, BN	in person	-To be able to prepare the seminar material -To be able to give a professional seminar	- Presentation
20 June 2024 (Thur)	9:00-12:00	KU	L7: Field trip preparation Agriculture and Environment - Soil survey and nutrient test kit - Information gathering techniques (how to be a good interviewer in the field) - Basic background information about the area (Provincial Agricultural Extension Office). - <i>Human health</i>	Case study and group discussion	NS, WW, WR, KK, UL, BN	in person	- To learn organizational skill	- No evaluation
	13:00-16:00	KU	L7: Field trip preparation Socioeconomics					
21 June 2024 (Fri)	Whole day		L8: Field trip with interview Rice production at (Local rice farmer at Pranakorn Sri Ayutthaya and Thai Farmer's Way of Life and Spirit Learning Cente-Suphan Buri)	Field trip	NS, WW, WR, KK, UL, BN	in person	To learn how to formulate questions. -To be able to train active listening skills. - To be able to communicate with people from different skills and background	- No evaluation



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Day	Time	Place	Lesson	Activity (Lecture, Group Discussion, Brainstorm)	Lecturer	Teaching mode (in person)&venue	Lesson-Learning outcome LLO	Assessment
24 June 2024 (Mon)	10:00-12:00	TU	L9: Field trip: Data analysis, synthesis, and group discussion - <i>Agriculture & environment</i> Soil testing using the test kit in the classroom. (4 points)	-Problem-based learning	WW, NS UL, KK, WR, BN	in person	- To be able to analyze basic statistical analysis in science	- Classroom observation
	13:00-15:00	TU	L10: Field trip: Data analysis, synthesis, and group discussion - <i>Human health</i> (4 points)	-Problem-based learning	UL, WR WW, KK, NS, BN	in person	-To synthesize and interpret field trip data, fostering collaborative problem-solving and critical analysis of health-related issues.	- Classroom observations
25 June 2024 (Tue)	10:00-12:00	AIT	-Brief Introduction about AIT and Tour L11: Field trip: Data analysis, synthesis, and group discussion - <i>Socioeconomics and gender and social inclusion (GESI)</i> (4 points)	-Problem-based learning	KK, WR WW, UL, NS, BN	in person	- To be able to analyze basic statistical analysis in social science	- Individual reflection on the analysis
	13:00-15:00	AIT	L12: Field trip: Synthesis, conclusions, and recommendations (4 points)	-Problem-based learning -In-class discussion -Reflection	WW, NS, WR, KK, UL, BN	in person	- To learn critical thinking Skill - To learn how to professionally summarize the data.	- Presentation
26 June 2024 (Wed)	10:00-12:00	AIT	L13: Communication planning #1 (2 points)	- Lecture -Role play	WR, KK WW, UL, NS, BN	in person	- To be able to communicate with different people with different backgrounds.	- Classroom observation
	13:00-15:00	AIT	L14: Communication planning #2 (2 points)	-Role play	WR, KK WW, UL, NS, BN		- To be able to communicate with different people with different backgrounds.	- In person observation



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Day	Time	Place	Lesson	Activity (Lecture, Group Discussion, Brainstorm)	Lecturer	Teaching mode (in person)&venue	Lesson-Learning outcome LLO	Assessment
27 June 2024 (Thu)	10:00- 12:00	KU	L15: Final presentation (20+20 points)	Presentation and Discussion	WW, NS, WR, KK, UL, BN, JK		To be able to give a presentation. To demonstrate the understanding in transdisciplinary.	- Presentation
	12:00- 13:00	KU	Lunch					



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Suggested Readings

- ADB (2013) Gender equality and food security: Women's empowerment as a tool against hunger, Manila.
- Akter, S., Rutsaert, P., Luis, J., Htwe, N.M., San, S.S., Raharjo, B. and Pustika, A., 2017. Women's empowerment and gender equity in agriculture: A different perspective from Southeast Asia. *Food policy*, 69, pp.270-279.
- Al, W., Orking, G., & Clima, O. (2008). *Climate change and food security: a framework document*. FAO Rome.
- Fischer, A.R., De Jong, A.E., De Jonge, R., Frewer, L.J. and Nauta, M.J., 2005. Improving food safety in the domestic environment: The need for a transdisciplinary approach. *Risk Analysis: An International Journal*, 25(3), pp.503-517.
- Food Systems Countdown Initiative. (2023). *The food systems countdown report 2023: The state of food systems worldwide*. New York: Columbia University; Ithaca: Cornell University; Rome: Food and Agriculture Organization of the United Nations (FAO); Geneva: Global Alliance for Improved Nutrition (GAIN).
<https://doi.org/10.36072/fsci2023>
- Groß, M., Stauffacher, M.J.I.s.r., 2014. *Transdisciplinary environmental science: problem-oriented projects and strategic research programs*. 39(4), 299-306.
- Lal, R., Sivakumar, M.V., Faiz, S.M.A., Rahman, A.M. and Islam, K.R. eds., 2010. *Climate change and food security in South Asia*. Springer Science & Business Media.
- Njuki, J., Parkins, J. and Kaler, A. eds., 2016. *Transforming gender and food security in the global south*. New York: Routledge.
- Pieters, H., Guariso, A. and Vandeplass, A., 2013. *Conceptual framework for the analysis of the determinants of food and nutrition security*.
- Schneider, K.R., Fanzo, J., Haddad, L., Herrero, M., Moncayo, J.R., Herforth, A., Remans, R., Guarin, A., Resnick, D., Covic, N. and Béné, C., 2023. The state of food systems worldwide in the countdown to 2030. *Nature Food*, 4(12), pp.1090-1110.
- UNICEF, 2024. *Child Food Poverty: Nutrition deprivation in early childhood*. Child Nutrition Report 2024.