

Resilience Theory & Applications to Environmental Planning

Instructor: Liao Kuei-Hsien, Ph.D., Professor

Meeting time: Wednesday 15:30-18:00

Meeting room: 630, College of Public Affairs

INTRODUCTION

Originated in ecology, resilience theory has received great attention in recent years in environmental planning. As an increasingly popular term, resilience is prone to misuse and abuse. The application of resilience theory to environmental planning could bring a new perspective to advance the discipline, but it requires a solid understanding of resilience theory itself in the first place. In this course, we will first explore the notion of resilience originated in ecology and natural resource management, and subsequently examine its development and application to other fields relevant to environmental planning. While resilience has been discussed with regards to various facets, this course focuses on the resilience to environmental—rather than socio-economic—changes, and more specifically to natural hazards. We will explore how the concept of resilience provides an alternative paradigm for managing natural hazards. In this new paradigm, human communities are viewed as complex adaptive, social-ecological systems, where humans and inherent environmental dynamics are tightly coupled. This course takes a seminar format, where students are required to read and synthesize academic journal papers and book chapters, and are expected to actively engage in class discussion.

OBJECTIVES

After taking this course, students are expected to be able to:

1. gain an in-depth understanding of resilience theory and articulate what it involves
2. identify the different conceptualizations and interpretations of resilience
3. articulate how resilience can be applied to the management of a specific type of natural hazard
4. develop a framework to analyze the resilience of a certain system

GENERAL COURSE POLICY

1. Students are expected to attend all classes. Be punctual to respect the instructor and your classmates. **Do not come to class if you are late for more than 5 minutes** unless a justifiable reason can be provided in advance.
2. The success of this seminar course depends on the active participation of each student, and hence full engagement in class is required.
3. The cell phone and/or laptop can only be used in class as a dictionary.
4. Check Line messages or emails at least once a day to avoid missing important announcements about this course.

LANGUAGE-RELATED POLICY

1. This course is conducted fully in English, but occasionally the instructor might translate difficult vocabularies and concepts into Mandarin for Mandarin-speaking students in order to facilitate learning.
2. If you don't understand the instructor, never hesitate to ask her to slow down or explain.
3. There is no such thing as "shame". Don't be afraid of speaking "broken English".
4. No one should laugh at anyone's English, including the accent, grammar, and pronunciation.
5. The instructor might correct your grammar, pronunciation, and/or vocabulary; or help finish a sentence that you are struggling with to help you learn English. Try not to feel embarrassed or offended. You learn when your mistakes are pointed out.
6. Understandable English does not necessarily require a great amount of vocabularies. If you don't know the exact vocabulary for a certain thing or concept, try your best to use other vocabularies to describe it.
7. If you've tried hard but still can't precisely express what's in your mind in English, it is fine to ask the instructor for help in Mandarin.

TENTATIVE SCHEDULE

Feb 19		Course introduction
Feb 26	Subject Literature	[Theory] What is resilience? Rockstrom et al. 2023. Shaping a resilient future in response to COVID-19. <i>Nature Sustainability</i> 6: 897-907
Mar 05	Subject Literature	[Theory] New paradigm in ecology & Complexity Theory - Pickett STA, Parker VT, Fiedler P. 1992. The new paradigm in ecology: Implications for conservation biology above the species level. Page 65-88 in Fiedler PL, Jain SK, editors. <i>Conservation Biology: The Theory and Practice of Nature Conservation, Preservation and Management</i>. Chapman & Hall, Inc., New York - Complexity systems: https://www.youtube.com/watch?v=vp8v2Udd_PM - Complexity Theory: https://www.youtube.com/watch?v=i-ladQjo1QA
Mar 12	Subject Literature	[Theory] Holling's original notion of resilience Holling CS. 1973. Resilience and stability of ecological systems. <i>Annual Reviews of Ecology and Systematics</i> 4: 1-23
Mar 19	Subject Literature	[Theory] Two interpretations of resilience & paradigm shift in management - Holling CS. 1996. Engineering resilience versus ecological resilience. Page 31-42 in Schulze PC, editor. <i>Engineering within Ecological Constraints</i>. National Academy Press, Washington, DC - Holling CS, Meffe GK. 1996. Command and control and the pathology of natural resource management. <i>Conservation Biology</i> 10(2): 328-337
Mar 26	Subject Literature	[Theory] Social-ecological resilience & resilience thinking - Walker B, Holling CS, Carpenter SR, Kinzig A. 2004. Resilience, adaptability and transformability in social-ecological systems. <i>Ecology and Society</i> 9(2): 5 - Berkes F. 2023. Origin and development of the field. Page 1-21 in <i>Advanced Introduction to Resilience</i>. Edward Elgar, Cheltenham, UK.
Apr 02		Holiday Reading for resilience assessment: - Required: Walker B, Carpenter S, Anderies J, Abel N, Cumming G, Janssen M, Lebel L, Norberg J, Peterson G, Pritchard R. 2022. Resilience management in social-ecological systems: a working hypothesis for a participatory approach. <i>Conservation Ecology</i> 6(1): 14 - Optional: Chapter 2, 3 & 4 in Walker B, Salt D. 2012. <i>Resilience Practice: Building Capacity to Absorb Disturbance and Maintain Function</i>. Island Press, Washington, DC
Apr 09	Subject Literature	[Theory] Resilience thinking + Resilience assessment proposal Berkes F. 2023. Basics of resilience. Page 22-44 in <i>Advanced Introduction to Resilience</i>. Edward Elgar, Cheltenham, UK
Apr 16	Subject Literature	[Application] Social resilience Keck M, Sakdapolrak P. 2013. What is social resilience? Lessons learned and ways forward. <i>Erdkunde</i> 67(1): 5-19
Apr 23	Subject Literature	[Application] Urban resilience Meerow S, Newell JP, Stults M. 2016. Defining urban resilience: A review. <i>Landscape and urban Planning</i> 147: 38-49
Apr 30	Subject Literature	[Application] Resilience assessment - Quinlan A, Sellberg M, Perrotton A. 2021. Resilience assessment. Chapter 14 in Biggs R, De Vos A, Preiser R, Clements H, Maciejewski Km Schluter M, eds. <i>The Routledge Handbook of Research Methods for Social-Ecological Systems</i>. Routledge, London - UNU-IAS, Alliance of Biodiversity International and CIAT, UNDP GEF-SGP and IGES. 2024. <i>Indicators of Resilience in Socio-ecological Production Landscapes and Seascapes (SEPLS)</i>, 2024 Edition. https://unu.edu/sites/default/files/2024-07/Indicators%20of%20Resilience%20in%20SEPLS%202024%20Edition_V2_0.pdf

May 07		Resilience assessment progress report
May 14	Subject Literature	[Application] Resilience in urban planning Sharifi A, Yamagata Y. 2018. Resilience-oriented urban planning. Chapter 1 in Yamagata Y, Sharifi A, eds. <i>Resilience-Oriented Urban Planning: Theoretical and Empirical Insights</i>. Springer, Cham.
Mar 21	Subject Literature	[Application] Hazard/disaster resilience - Graveline H-M, Germain D. 2022. Disaster risk resilience: conceptual evolution, key issues, and opportunities. <i>International Journal of Disaster Risk Science</i> 13: 330-341 - Optional: Berkes F. 2023. Disaster risk reduction. Page 135-157 in <i>Advanced Introduction to Resilience</i>. Edward Elgar, Cheltenham, UK.
Mar 28	Subject Literature	[Application] Flood resilience - Liao K-H. 2012. A theory on urban resilience to floods—a basis for alternative planning practices. <i>Ecology and Society</i> 17(4): 48. - Liao K-H, Le TA, Nguyen KV. 2016. Urban design principles for flood resilience: Learning from the ecological wisdom of living with floods in the Vietnamese Mekong Delta. <i>Landscape and Urban Planning</i> 155: 69-78. - Optional: McClymont K, Morrison D, Beevers L, Carmen E. 2019. Flood resilience: a systematic review. <i>Journal of Environmental Planning and Management</i>.
June 04		Resilience assessment presentation & concluding discussion

ASSESSMENT SCHEME

40% In-class discussion & weekly short reports

To facilitate class discussion, each week you are required to present a short report on one of the required readings for the week.

- The report should include—but not limited to:
 - (1) the aim/objective/purpose of the paper
 - (2) key messages or concepts
 - (3) keywords and definitions
 - (4) your reflection on the paper
 - (5) questions—any content in the paper that you don't understand.
- The purpose of this report is to help you and your classmates to better comprehend the paper, so it needs to be structured. It should NOT be written as an essay. Utilize bullet points and have clearly and appropriately titled sections and/or sub-sections to facilitate reading.
- You are encourage to take advantage of AI tools (e.g., NotebookLM) to better understand the required reading. You are also encourage to use AI tools to edit your English. However, do not entirely reply on AI. You still should read the text yourself and try to write the report by yourself.
- The exact requirement of the weekly report is subject to change latter in the semester.
- The report should be printed out on A4 papers to disseminate to the class.

60% Resilience assessment

Choose a particular system and assess its resilience to a particular type of environmental change.

- Plan for this assignment as early as possible in the semester.
- Proposal presentation: April 09
The proposal should include the analytical framework, with which the resilience of the system in question is analyzed.
- Progress report: May 07
- Final presentation: June 04
The final deliverable of the resilience assessment is a 20-minute presentation. No written paper is required. The grade of your resilience assessment would be based on the final submission of the presentation document, which should be self-explanatory without oral presentation.

SUPPLEMENTARY LITERATURE

Other classic (highly-cited) articles of resilience theory

(based on the bibliometric analysis by Van Meerbeek et al. 2021)

- Folke C. 2006. Resilience: The emergence of a perspective for social-ecological systems analyses. *Global Environmental Change* 16(3): 253-267
- Folke C, Hahn T, Olsson P, Norberg J. 2005. Adaptive governance of social-ecological systems. *Annual Review of Environment and Resources* 30: 441-473
- Folke C, Carpenter SR, Walker B, Scheffer M, Chapin T, Rockstrom J. 2010. Resilience thinking: Integrating resilience, adaptability and transformability. *Ecology and Society* 15(4): 20
- Gunderson LH. 2000. Ecological resilience—In theory and application. *Annual Review of Ecology and Systematics* 31(1): 425-439
- Gunderson LH, Holling CS. 2002. *Panarchy: Understanding transformations in human and natural systems*. Island Press.

Measuring resilience

- Carpenter S, Walker B, Anderies JM, Abel N. 2001. From metaphor to measurement: Resilience of what to what? *Ecosystems* 4: 765-781