Unit 0.0 Overview: What is this course all about?

Objectives of the course

This course explores how the peoples of an increasingly stressed planet earth can achieve better lives for themselves, their neighbors, and their posterity. Our focus is on the long-term, large-scale pathways of human development that emerge from the intertwined systems of nature and society that characterize our planet today in what some have called its "Anthropocene" epoch. In particular, we address two pernicious attributes of current development pathways: 1) they are achieving their many gains in ways that degrade the resources (natural and social) on which future prosperity depends; 2) they are fundamentally inequitable, with a privileged minority achieving better lives for themselves but only by limiting the ability of everyone else – especially of poor and otherwise vulnerable communities alive today and all future generations – to better their own lives. The course seeks to understand how these ills can be remedied through collaborative actions and capacity building efforts that support the transition to more just and sustainable pathways of development.

The course will equip you to serve as a "general practitioner" supporting the pursuit of sustainability. In particular, you will learn concepts and skills that have proven useful for helping citizens, corporations, governments, and other social actors to:

- Articulate shared goals for sustainable development of the nature-society system in which they live;
- Assess progress (or lack thereof) toward achieving those sustainability goals;
- Diagnose obstacles to further progress and design opportunities for overcoming those obstacles;
- Build capacity for turning those diagnoses into programs of action in pursuit of sustainability.

Why we developed this course:

The idea of sustainability has a long history, accelerated but not initiated by the Brundtland Commission's publication of "Our Common Future" in 1987 and its follow up at the UN's Rio summit of 1992.[*] Early courses on the subject (including our own), tended to be either a smorgasbord of theories pulled from relevant disciplines and applied to selected problems, or single cases fleshed out with ad-hoc theories, or method-heavy hammers applied in search of sustainability nails. Over the intervening years, however, sustainability scholars across a wide range of research programs and disciplinary backgrounds have collaborated to develop approaches to teaching about sustainable development that more effectively integrate theory, cases, methods and practical experience.

This course emerged from our collaboration over many years in designing, teaching, and re-designing several courses in sustainability science and sustainable development for college students, graduate students, researchers, and practitioners.[†] Our approach begins with the fundamental recognition that any effort to foster sustainability necessarily takes place within a complex and co-evolving nature-society system in which shocks and surprise are the name of the game. It reflects our conviction that successful efforts to meet sustainability challenges must always be fit to place, sensitive to natural and social contexts, adaptive in the face of the unexpected, and humble in recognition of the complexity of the nature-society system. The course is shaped by our belief that efforts aiming to help students think analytically about the goals of sustainability and how better to pursue them in practice must complement thinking with doing – moving from simply asserting the problem, the complexity and the need to take local context seriously toward also devising actions and the means for implementing and learning from them.

To do this, this course focuses not just on immediate crises but on long-term development pathways of different peoples, sectors, and places around the world. Exploring long-term, large-scale patterns in

[*] World Commission on Environment and Development. (1987). *Our Common Future*. United Nations. http://www.un-documents.net/wced-ocf.htmCaradonna, J. L. (2014). *Sustainability: A History*. Oxford University Press.

[†] The approach we sketch here has been highly informed by our collaborations with colleagues including Arun Agrawal, Krister Andersson, Jeannine Cavender-Bares, Danny Bicknell, Ruth Defries, Christian Binz, Partha Dasgupta, Sam Elghanayan, Melissa Fiffer, Wyatt Hurt, Ann Kinzig, Lennart Kuntze, Michele Lamont, Eloi Laurent, Pamala Matson, Kira Matus, Julia Mason, Suerie Moon, Charles Perrings, Steve Polasky, Kevin Rowe, Oswaldo Sala, Afreen Siddiqi, Michaela Thompson, Bill Turner and generations of students. We are extremely grateful to all of these collaborators and many more not listed here for improving the way we have learned to teach this complex and important material.

development in the midst of today's multiple interacting crises may seem insensitive or irrelevant. It's not. History shows that transforming unsustainable development pathways onto more sustainable ones is the work of decades and must reach across countries and continents. Over such spans, surprises, shocks and crises are inevitable. These often cause horrific suffering and death. But they also disrupt the technologies, institutions and power alignments that stabilize the status quo. Crises thus provide rare opportunities for would-be change-makers to actually make a difference. Our explorations in this course seek to help individuals, communities, firms, or governments learn how to seize the opportunities of our present crises to bend the curve of development toward sustainability.

How this course is structured:

As we taught sustainable development courses over many years, we learned that combining generalizable theory with specific, placed-based studies of sustainability in action was more effective than relying on either approach alone. We therefore found ourselves developing both conceptual frameworks for analyzing sustainability and a set of concrete case studies to which we and our students apply the frameworks in explorations of how specific contexts shape sustainability challenges and solutions. Below we outline the current design of the course, providing an overview of how we utilize the frameworks and cases to help students integrate generalizable theory with sensitivity to specific contexts.

Part I: Sustainable Development as a Conceptual Challenge

The first step in our course is to develop a common understanding of the goals of sustainable development. Many different formulations of those goals have been set forth, ranging from the articulation in 1987 by the World Commission on Environment and Development (the "Brundtland Commission") of sustainability as "development that meets the needs of the present without compromising the ability of future generations to meet their own needs," to the three-pronged approach of balancing economy, society, and environment used by many textbooks, to the UN's more recent articulation of its "Sustainable Development Goals" (SDGs). We find it most useful to follow those leading scholars and international organizations that have begun with the globally negotiated conceptualization of the Brundtland Commission but have expanded the Commission's narrow concept of "needs" to a more expansive one encompassing "well-being." The most general goal of sustainability thus becomes development for which, at a minimum, human well-being both within and across generations does not decline.‡ Consistent with international development goals more generally, the course puts special priority on improving the well-being of the poorest and most vulnerable communities alive today, while conserving the ability of future generations to define and pursue their own well-being. Scholars have come to call this sustainability goal the promotion of "inclusive human well-being." While this general conception of sustainable development is helpful, is leaves unanswered what aspects of "inclusive well-being" will be most important to people in different places and times. This, we believe, should be seen as a feature rather than a bug, stressing as it does the importance of emphasizing that communities around the world as well as in future generations must be able to define for themselves what constitutes the specific elements of the good life are most important to them and how exactly they want to go about pursuing them in their own places and times. The 'longue durée' of the case studies we explore in the course provides a vehicle for exploring this "feature" of our approach.

Our next step in the course is to consider the resources—both natural and anthropogenic (or human-made) —that make up the productive base on which both current and future generations must draw to achieve their goals of enhanced and inclusive well-being. Well-being ultimately requires access to flows of goods and services such as food, energy, housing and education. Both theory and experience suggest, however, that for measuring sustainable development over long times and large spaces it is generally easier to measure the stocks of resources that function as its determinants (i.e. the means of

‡ An early, concise and accessible treatment of this conceptualization of sustainability is provided by Solow, R. (1993). An almost practical step toward sustainability. *Resources Policy, 19*(3), 162–172. https://doi.org/10.1016/0301-4207(93)90001-4; A more expansive version is Dasgupta, P. (2004). *Human Well-Being and the Natural Environment* (1st paperback, with revised Appendix). Oxford University Press.; Among international organizations, examples include the UN Sustainable Development Goals focus on "well-being" in SDG #3 (United Nations. (2021). *THE 17 GOALS | Sustainable Development*. https://sdgs.un.org/goals), and the OECD's focus on measures of "well-being" in its efforts to move "Beyond GDP" in assessments of social progress (OECD. (n.d.). *Well-being and beyond GDP*. OECD. https://www.oecd.org/en/topics/well-being-and-beyond-gdp.html).

achieving it) than to measure the flows of goods and services that are consumed as constituents of its ultimate end. The course reviews what those resources are and how they have been changing in different places around the world. Part I concludes by arguing that a particularly useful working definition of sustainability is pathways of development in which the *"inclusive wealth" represented by accessible resource stocks does not decline*. Again, the case studies we have integrated into the course provide an opportunity for students to explore how this definition might be applied in a variety of different local contexts.

Part II: The Anthropocene as a Complex Adaptive System:

With the ends and means of sustainable development in hand, our course then moves on to explore what science can say about future pathways for the promotion of inclusive wealth in the Anthropocene. To aid in these explorations, we introduce frameworks that help students take seriously the complexity of the nature-society systems that link resources to well-being without getting lost in their details. These frameworks are not explanatory theories – indeed they don't predict anything at all! Rather, they offer checklists of elements (variables) and relationships (processes) that research has shown to be worth considering in understanding and intervening in nature-society systems in particular contexts.

Part II starts with the simple framework that views nature-society interactions as dynamical systems whose development pathways are shaped – often in counter-intuitive ways -- by multiple stocks, flows and feedbacks. We then expand this initial framework to encompass two additional features of those systems: their persistent heterogeneity (one place is not like another) and their continuing generation of novelty (via biological mutations, technological inventions, or new policies). Together, these result in what is technically a "complex adaptive system" (CAS), with dynamics that exhibit far from equilibrium behavior replete with nonlinearity, tipping points, hierarchical self-organization and path-dependence. We next extend the framework to include explicit consideration of the processes connecting heterogeneous elements of the system, including "horizontal" ones such as trans-boundary pollution or migration, and "vertical" ones through which micro- and macro-level processes interact with one another to reshape phenomena as different as impacts of climate change and the spread of innovations. Finally, we introduce actors into our framework, emphasizing their diversity (individuals, firms, states, etc.), their agency (ability to set goals and take action), the institutional settings in which they interact, and their power over one another. Our summary of Part II includes an elaborated version of our initial framework, its application in the exploration of several of our case studies, and an assessment of its strengths and limitations for harnessing science in the pursuit of sustainability.

Part III: Capacities Needed for Sustainable Development

In the 3rd part of the course, we turn our attention to the capacities necessary for the pursuit of sustainability. We argue that advocates for sustainable development should pay greater attention to building a set of strategic capacities that empower and enable individuals, communities and organizations to make strategic decisions, and to take deliberate and collective action in the pursuit of sustainability. By "capacity" we mean both the intention and the ability to accomplish a task or achieve an outcome or, more bluntly, "the ability to get stuff done". Why? Because failure to build, exercise, and improve capacity for the pursuit of sustainability has too often resulted in a "missing middle"—an inability to connect widespread agreement on the goals of sustainable development with the scientific understanding of the dynamics of intertwined nature-society systems that set the stage on which those goals must be pursued.

We focus on six strategic capacities that recent research and practice have shown to be essential for "getting stuff done" in the pursuit of sustainability: i) the capacity to promote equity; ii) the capacity to measure progress; iii) the capacity to adapt to shocks and surprises; iv) the capacity to govern cooperatively; v) the capacity to link knowledge with action for sustainable development; and vi) the capacity to transform unsustainable development pathways to sustainable ones. We explore what research in sustainability science can tell us about each of these capacities.

Part IV: Next Steps: How do leaders catalyze progress in the pursuit of sustainability

The final part of the course consists of a single unit that explores how leaders have built, maintained and utilized the capacities discussed in Part III to promote sustainable development at scale.

How we have taught the course

From the earliest iterations of this course we have integrated some provision for having students continually apply the theory they are learning to messy sustainability challenges of the real world. This initially involved having us assign the most interesting case examples we knew to illustrate each of the ideas introduced in the course, and having students write individual term papers analyzing a sustainability problem of their own choosing. But we found that this approach fell short in three ways.

First, it encouraged students to engage sustainability problems as individuals with necessarily bounded expertise, whereas most real-world engagements involve team work to encompass the multidisciplinary complexity of those problems. This was pretty straight forward to resolve: we (re)built more of the course discussions and assignments around work carried out in student teams.

The second shortfall was harder. Our initial approach failed to generate an understanding of particular sustainability challenges shared by all students that would facilitate rich classroom discussion over how the theory applied in particular contexts. This led us to the realization that -- unlike many other fields -- the young science of sustainability still lacks common "problems" or model case examples that all are familiar with and can thus be used without explicit elaboration as common platform for exploring frameworks, theories, and hypotheses. (That is, we lack the "perfect markets" that provide a common reference point for economists, the "fruit flies" that do the same for geneticists, the "prey-predator cycles" of ecologists, the "Vostok ice cores" for climatologists, the "French Revolution" for historians, "Paris" for urban planners, "Java" for anthropologists etc.). We ended up addressing this shortfall by following a long tradition at Harvard's (and other universities') professional schools: creating our own set of rich case studies for use by us and others teaching sustainable development.

To build those shared cases for the study of sustainable development we needed to decide what the canonical case would look like. Though trial and error, we found that good candidates would generally cover multi-generational time scales. They would also avoid the sorts of disciplinary blinders that imposed when messy sustainability problems are treated as essentially environmental problems or essentially economic problems. Instead, they we determined that good cases would foreground the co-evolutionary dynamics of nature and society in today's Anthropocene world, exploring both how changes in society impact nature and how changes in nature impact society. Finally, good cases would be framed in ways that encourage not just thinking by scholars but also actions that decision makers might take in pursuit of sustainability. In practice, this meant building most cases around particular places (e.g. a region, a firm) or sectors (e.g. energy or food).

Our current set of "teaching" cases builds on an initial collaborative effort of one of us (BC) with Pamela Matson and Krister Andersson to provide common reference points for the book *Pursuing Sustainability: A guide to the science and practice* (Princeton Univ. Press 2016).[§] For that book the authors wrote short cases focused on irrigation in Nepal, agriculture in Mexico's Yaqui Valley, the interplay of nature and society in the history of London, and depletion of the global ozone layer. We used those cases in our evolving course, but eventually found that we also needed some even richer and more elaborated ones. We and our collaborators therefore wrote an expanded version of the London case together with additional cases on the Alaska salmon fishery and on natural resource use in Appalachia.[**] Together these six "teaching" cases constitute our current stock of common contexts and problems that we help all of our students to learn about, and against which we ask them to evaluate the theory, methods and

[§] Matson, P., Clark, W. C., & Andersson, K. (2016). *Pursuing Sustainability: A Guide to the Science and Practice*. Princeton University Press.

[**] Thompson, M. (2021). *The Alaskan Salmon Fishery: Managing Resources in a Globalizing World*. Harvard University.Harley, A., & Wexner, H. (2022). The Struggle for Sustainable Development in Appalachia's Mineral Rich Mountains. *Sustainability Science Program Working Paper*, *2022*(1), 65.

frameworks that constitute our core analytical approaches to sustainability science. The cases are thus a pedagogical tool used to help students think about sustainable development within the context of messy, complex, dynamical systems. We generally assign these cases within the first few weeks of the semester. We then return to them throughout the course to allow our students, individually and in groups, to explore the theoretical ideas and concepts of our syllabus as they play out in the pragmatic setting of our cases.

A third shortfall of our initial approach was that it deprived our students of precisely the agency we were trying to help them develop as active participants in the pursuit of sustainability. That is, our initial cases were essentially vehicles for us to teach the students about sustainability rather than opportunities for them to craft their own strategies for promoting sustainable development. To remedy this, we explored several means of helping students to pick "your case" to which they would apply lessons they were learning from the course to create practical guidance on how sustainability could be better pursued in that particular open-ended case setting. In the most formal version of this approach, we as instructors picked promising open-ended cases in which people were actively trying to pursue sustainability, provided a guide on basic facts of the case to help anchor students' work, but then turned them loose in teams to explore the challenges and opportunities to promote sustainable development in those "your case" settings. (The application cases that we have developed for the course include China's Pearl River Delta, the Brazilian state of Acre, and the East African nation of Uganda). But others teaching a version of this or similar courses in the future can also prepare their own "your case" studies, guided by the instructors' and students' current interests.[††] Even more flexibly, student teams are encouraged to pick any "your case" that interests them and (at least in our course after some negotiation with the instructor) then return to that case to apply what they are learning throughout the course. In all of these variants of the "your case" stream, students work in teams, and frequently adopt special areas of expertise and responsibility within those teams. Throughout the course, teams have opportunities to use the general ideas that have been presented in class to shape their research into the specifics of their case, and to report the results to other members of the full course. This work on the "your cases" has been in our most recent installment of this course the foundation both for a final symposium presentation by each team and for a final course paper by each individual student, centered on the case but with the focus within it a matter of choice by the individual student in consultation with the instructors.

There are clearly other ways to engage students in the complementary perspectives of theory and practice, of learning and of doing. But we have found the approach presented here to be the richest and most rewarding way we have yet come up with to help students learn about understanding and promoting sustainable development. The cases not only help students understand the sustainability challenges faced by different societies around the world, but also provide a foundation on which to develop both the analytical perspectives and the humility needed to begin fostering sustainability in the settings where the students themselves live and work.

[††] We provide in the Course Library a copy of our Uganda case to suggest how instructors might fashion background materials for their own "your case" selections: Harley, A. G. (2021). *Uganda Reading Guide for a course in sustainable development* (p. 17). Harvard University.