

University of Maryland
Fall 2012

PUAF 300

SUSTAINABILITY

Tuesdays & Thursdays
3:30 - 4:45
1412 Physics Building

PUAF 300 (Fall) and AGNR 300 (Spring) are alternative versions of the Sustainability Minor anchor course.

R. H. Sprinkle, M.D., Ph.D.
School of Public Policy

This course anchors the University's Sustainability Minor, a fifteen-credit-hour whole-campus interdisciplinary program hosted jointly by the School of Public Policy and the Environmental Science and Policy Program in the College of Agriculture and Natural Resources.

The Sustainability Minor is designed for students whose academic majors would be enhanced by the complementary study of a widely shared but hard-to-operationalize aspiration: that present choices should preserve or improve future options rather than foreclose or degrade them.

This aspiration – sustainability – is at once enigmatic and personal, practical and political. It is asserted to be, if not accepted as, a goal of programs and policies ranging vastly in purpose, method, and scope, from subsistence agriculture, community development, and household efficiency to habitat maintenance, biodiversity conservation, industrial ecology, and global energy transition.

How should we understand sustainability? How might we achieve it? How would we know if we had achieved it? And how could sustainability activists of a rising generation lead by example?

EXPECTATIONS

- *Participation in class.*
- *Promptness, as many meetings will feature a guest commentator.*
- *Attention in class. No student computers, smart-phones, or tablets in use except for class-work purposes.*
- *Well prepared, well reasoned, courteous, and non-adversarial engagement in class discussions. (15% of final grade.)*
- *Three experiential learning activities with written reports. (Each counting 15% of final grade.)*
- *A project-advisory memorandum. (40% of final grade.)*
- *Cooperation in non-graded learning-outcomes assessments.*

Sustainability Minor Co-Directors

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Teaching assistant

TBD

Book readings

TBD

Online readings

Papers and links will be posted by course week at ELMS-Blackboard.

www.elms.umd.edu

Academic integrity

“The University of Maryland, College Park, has a nationally recognized Code of Academic Integrity, administered by the Student Honor Council. This Code sets standards for academic integrity at Maryland for all undergraduate and graduate students. As a student you are responsible for upholding these standards for this course. It is very important for you to be aware of the consequences of cheating, fabrication, facilitation, and plagiarism. For more information on the Code of Academic Integrity or the Student Honor Council, please visit www.studenthonorcouncil.umd.edu—whatis.html.”

Americans with Disabilities Act (ADA)

If you have special needs, such as those addressed by the ADA, and need special arrangements for this class, please contact your professor or advisor, or both, as soon as possible.

Learning Assistance

If you have difficulty keeping up with the academic demands of this course, or any course, contact the **Learning Assistance Service**, 2201 Shoemaker Building, 301.314.7693. Their educational counselors can help with time management, reading, note-taking, and exam-preparation skills. Hours are Monday and Wednesday, 8:30 am to 7:00 pm, and Tuesday, Thursday, and Friday, 8:30 am to 4:30 pm.

Religious observances

You may wish to take part in religious observances that occur during course time. If so, please contact your professor or advisor, or both, ahead of time to make arrangements.

Weeks

Events & assignments

1 What does “sustainability” sustain?

1.1 Introductions to the minor, the course, and the topic • why nature alone seems sustainable • and why it isn't, really • the stromatolite, the bee, the beaver • primates like us • common-resource sustainability and the rise of stable societies • a catalogue of subsequent failures

Tues m-d-y
Comments by the teaching assistant

1.2 Sustainability as an idea • definitional problems • programmatic limitations • population sensitivities • attitudes and outcomes

Thurs m-d-y

2 Principles of ecological economics 1

2.1 The standard neoclassical environmental-economics paradigm • sustainable natural resource management • presumptions, assumptions, and uses • the sterile and the living • the exhaustible and the renewable

Tues m-d-y

2.2 The standard paradigm respectfully set aside • a human economy within a natural environment • natural inputs • entropy • throughput • sources and sinks • natural capital • ecosystem services and attendant controversies • the open-access problem • maximum sustainable yield meets the private utility function

Thurs m-d-y
The project-advisory memorandum explained

3 Principles of ecological economics 2

3.1 Carrying capacity • precaution • efficiency of allocation • its subordination to equity of distribution and sustainability of scale • population • its demographic analysis • its political calculus

Tues m-d-y
*Guest commentator:
Professor Herman Daly*

3.2 Consumption • growth • development • “uneconomic growth” • remedies

Thurs m-d-y

4 Energy from core to crust

4.1 Heat from uranium decay • Fukushima Daiichi 1, 2, 3, ± 4 • making waste continuously and storing it perpetually • scaling up sufficiently to flatten the carbon-dioxide enrichment curve • on the plausibility of an affirmative answer to “the nuclear-energy question”

Tues m-d-y
*Guest commentator:
Professor Nathan Hultman*

4.2 Extractable hydrocarbons and their combustion • mountain-top removal, the Gulf gusher, Russia's 2010 peat-fire inferno, and hydraulic fracturing • geothermal heating and cooling • sustainability claims

Thurs m-d-y

5 Energy from above the crust

5.1 Hydro • solar • wind • tidal • hydrogen • biofuels • palm oil through deforestation • corn ethanol • cellulosic ethanol • catalytic ethanol • lignin begins to yield

Tues m-d-y

5.2 Sufficiency questions • and some intriguing answers • sustainability claims • market mechanisms, science policy, and industrial policy • the Solyndra scandal • the Clean Currents story

Thurs m-d-y

6 The built environment as social centerpiece and economic catalyst	
6.1 Cooling heat islands in a warming world • by digging up and burning Carboniferous swamps • moving Wyoming to Georgia by rail • trying to do better with many factors, all at once and in a hurry • sulfur • carbon • temperature control • energy demand • water conservation • water run-off • air quality	Tues m-d-y
6.2 Siting and transportation • economic progress • form, function, fun, and beauty • insights from The National Center for Smart Growth Research and Education at the University of Maryland	Thurs m-d-y <i>Experiential learning activity 1</i>
7 Household consumption	
7.1 Clarification of goals • willingness to sustain candidate interventions • no-cost and low-cost options first	Tues m-d-y
7.2 Reuse, reduction, recycling, and other classics • newer ideas • drilling down to simplicity • scaling up to society	Thurs m-d-y
8 Industrial ecology	
8.1 The petrochemicals industry as feedstock producer • the plastics industry • its history • its scope • its scale • its typical parts • its fundamental problem • phthalates • BPA • performance in fires • biodegradation and its limits • a non-durable future • packaging	Tues m-d-y
8.2 “Litter” in advertising history	Thurs m-d-y
9 Agricultural ecology	
9.1 Origins and achievements of high-input practices • nutritional concerns • safety concerns • animal-welfare concerns • environmental concerns	Tues m-d-y
9.2 Biocides, pesticides, and food-animal “growth promotion” • antimicrobial resistance • the low-input movement	Thurs m-d-y <i>Experiential learning activity 2</i>
10 Wastes in water, land, and air	
10.1 Mining and its dependent industries • land wastage • downstream acidity • minimization of extraction through scrap recycling • toxic dumps and poisonous reprocessing in poor countries	Tues m-d-y
10.2 The management of non-human animal non-point-source waste • ruminants with endogenous phytase • monogastrics without it • uses of exogenous phytase • phosphorus, nitrogen, eutrophication, <i>Pfiesteria piscicida</i> , and other blooms • microbial waste generally • human waste specifically • liquid waste disposal • solid waste in landfills • evidence for regional effects • teratogenicity and oncogenicity claimed and disputed • at-sea dumping • overseas and other trans-boundary dumping • ballast-borne invaders • ballast exchange • the wrecks on the <i>Cougar Ace</i> • New York state and its new ballast rules for Great Lakes shipping • carbonating the warming oceans • pH and the calcification lysocline • depleting phytoplankton • disassembling food webs	Thurs m-d-y
11 Common-resource self-governance and common-inheritance protection	
11.1 Aquifers, surface waters, soils, forests, and fisheries • well beyond “the tragedy of the commons” • experiments • successes • controversies	Tues m-d-y

11.2 Species protection • species reintroduction • species perpetuation through reproductive assistance • species approximation through selective fertilization • the Tasmanian tiger • the American chestnut

Thurs m-d-y
Guest commentator:
Budhan Pukazhenti, Ph.D.
Smithsonian Institution

12 Program planning, finance, and evaluation

12.1 Specification of assumptions, goals, and methods • financing mechanisms • evaluation criteria and intervals • early planning for a final report • explicit elicitation of unexpected or adverse effects • the complementarity of objective and subjective outcomes

Tues m-d-y

12.2 Serving stakeholders *en charrette* • insights from the Environmental Finance Center at the University of Maryland

Thurs m-d-y
Guest commentator:
Dan Nees, MPP
Experiential learning activity 3

13 THANKSGIVING

14 Sustainability in village-level development

14.1 Cases far from home • why success often fades into failure • the art of the latrine • and why a nice latrine may not be used • why the simplest interventions may yield the greatest sustained benefits • FACE for trachoma • a filtered straw for guinea worm

Tues m-d-y

14.2 Why some successful interventions have been divisive • fertilizer subsidies in Malawi • the “Washington Consensus” debate

Thurs m-d-y

15 Sustainability as a local-leadership outcome

15.1 Cases close to home • small-group initiative • community action • non-profit management • looking for a few good philanthropists • insights from the Philanthropy and Nonprofit Management program at the School of Public Policy

Tues m-d-y
Guest commentator:
Professor Bob Grimm

15.2 Optimism meets discipline • lessons learned

Thurs m-d-y
Project-advisory memorandum due