



***People, Pigs, and Tigers in Shangri-La
Teaching Notes¹
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ABSTRACT

A trans-disciplinary, socio-environmental systems approach (Balint *et al.*, 2011; Brown *et al.* 2010), which accounts for far more complexity than represented in a simple Venn diagram model of interdisciplinarity, is necessary if today's super wicked environmental problems (Lazarus, 2009) are to be successfully addressed. This case examines 'real-world' human-wildlife conflicts in Bhutan (Thinley and Lassoie, 2013) to explore the multifaceted interactions characterizing tightly linked socio-environmental systems and determinants of sustainability (Palmer, 2012). It can be used to introduce a wide spectrum of conservation issues from different stakeholder perspectives allowing students to grasp the difficulties of protecting both biodiversity and rural livelihoods over long periods of time. Bhutan offers an ideal opportunity to examine these issues and perspectives owing to its unique socio-cultural setting, recent transition to democracy, national commitment to conservation and sustainable development, and ecological standing worldwide as a biodiversity hotspot for charismatic wildlife. It is also typically unfamiliar to most students, and the nation's distinctive and exotic characteristics quickly capture their curiosity and interest. Despite Bhutan's uniqueness, this case addresses socio-environmental issues that are relevant elsewhere, including the United States. In analyzing this case, students examine qualitative and quantitative data based on research by the author, his graduate students, and others over the past decade. The case is applicable to a variety of courses, scalable for students at various educational levels, and appropriate for various Teaching Methods. It has been used extensively at Cornell University since 2007, and is supported by an Internet-based, multi-media learning system, www.conservationbridge.org (Lassoie *et al.*, 2012; see **Appendix I**).

TOPICAL AREAS

International Agriculture, International Conservation, Environmental Science/Natural Resources, Wildlife Ecology and Management, Human-Wildlife Conflicts, Sustainable Development, Socio-Environmental Synthesis

EDUCATIONAL LEVELS

Introductory and upper-level undergraduate courses; adaptable to graduate level courses and seminars

¹ This work was supported by the National Socio-Environmental Synthesis Center (SESYNC) under funding received from the National Science Foundation DBI-1052875. The author acknowledges and thanks Dr. Cynthia A. Wei, Assistant Director of Education and Outreach, SESYNC for her technical and editorial assistance in the development of these Teaching Notes.

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TYPE/METHODS

This case study can be used at varying degrees of intensity represented by increasing levels of details and time commitments: *Directed Discussion*, *Decision-Dilemma*, or *Problem-Based Learning* (see: <http://sciencecases.lib.buffalo.edu/cs/collection/method.asp>).

OBJECTIVES

This case will help students appreciate, understand, and articulate the socio-environmental complexities surrounding conflicts between humans and wildlife in agrarian societies in developing countries. By analyzing this case students will gain an ability to use Socio-Environmental Synthesis³ in the investigation of super wicked environmental problems.

BASIC CASE STUDY QUESTION

What should the Bhutan Wildlife Conservation Division do to protect wildlife biodiversity and farmer livelihoods in rural communities across the country? This is a ‘real-world’ question that forms the policy context for program development and implementation by the Bhutan Ministry of Agriculture (NCD, 2008).

LEARNING OUTCOMES

Human-Wildlife Conflicts

Upon completing this case, students will be able to:

1. identify key stakeholders and articulate their different positions concerning conservation measures to protect biodiversity;
2. understand the crucial interplay between wildlife and rural livelihoods in agriculturally-based communities;
3. discuss a tangible example of a cultural dilemma involving conservation;
4. understand the importance of changing national policies on rural livelihoods;
5. recommend specific actions to reduce human-wildlife conflicts in Bhutan; and
6. apply knowledge gained to human-wildlife conflicts occurring in the United States.

Socio-Environmental Synthesis

Upon completing this case, students will be able to:

1. describe a socio-environmental system, including the environmental and social components and their interactions;
2. co-develop research questions and conceptual models in inter- or trans-disciplinary teams;
3. find, analyze, and synthesize existing data; and

³ Although beyond the scope of this particular Lesson Plan, Socio-Environmental Synthesis is focused on understanding and managing Coupled Human and Natural Systems (Force and Machlis, 1997; Liu, J., *et al.*, 2007 a, b, c; Machlis, et al., 1997; McPeak *et al.*, 2006; Walsh and McGinnis, 2008). In order for ecologist to better inform society’s search for sustainable development, Socio-Environmental Synthesis promotes the development of trans-disciplinary science to “...enhance research project development, facilitate large-scale experiments and data collection, and link science to solutions; (2) [provide] procedures that will improve interactions among researchers, managers, and decision makers; and ... build public understanding of the links between ecosystem services and humans” (Palmer *et al.*, 2005). “This type of science can be called *actionable* because it has the potential to inform decisions (in government, business, and the household), to improve the design or implementation of public policies, or to influence public- or private-sector strategies, planning and behaviors that affect the environment” (Palmer, 2012). The National Socio-Environmental Synthesis Center was established in 2001 to promote actionable science (see: <http://www.SESYNC.org>). For earlier examples of studies using Socio-Environmental Synthesis see Engelen *et al.* (1995) and Lopez-Ridaura *et al.* (2002).

4. consider the importance of scale and context in addressing socio-environmental problems.

CLASSROOM MANAGEMENT

General

This case uses Socio-Environmental Synthesis (SES) to examine stakeholder perspectives concerning human-wildlife conflicts (HWC) in rural Bhutan. These Teaching Notes provide suggestions for using the case with first-year undergraduate students to focus a small-group discussion session (i.e., *Directed Discussion*) and with third- and fourth-year students to provide the basis for group-work leading to a stakeholder debate (i.e., *Decision-Dilemma*) or a research report (i.e., *Problem-Based Learning*). Use of this case study can fit into a ‘traditional’ lecture/discussion format (e.g., 50 minutes per session), but longer discussion/work session periods are recommended (e.g., 90-120 minutes). Assessment (i.e., grading) is based around a combination of written assignments and participation and relative emphasis can be adjusted to fit overall course pedagogy. The case was designed according to pedagogies and recommendations set forth by the Center for Socio-Environmental Synthesis (SESYNC; <http://www.sesync.org>) and the National Center for Case Study Teaching in Science (<http://sciencecases.lib.buffalo.edu/cs/>).

Background Preparation

It is expected that students will have at least a basic understanding of today’s super wicked environmental problems (Lazarus, 2009) and SES (Palmer, 2012) through lectures, readings, and/or discussions prior to engaging in this case study.⁴ In addition, students may need a general understanding of HWC.⁵

Specific Teaching Methods

This case study is scalable with respect to the details it provides using different Teaching Methods making it adaptable to a variety of courses. The exact approach depends on the depth of coverage relative to how the case fits into the orientation of the course subject matter and its pedagogy. For example, at Cornell University it has been used successfully as the focus of (1) 90-minute discussion sessions in an introductory environmental science course (*Directed Discussion*), (2) a two-week teaching module (four class periods; 5 ½ hours of total class time) leading to a stakeholder debate in a sustainable development course (*Decision-Dilemma*), and (3) semester-long team research projects in both an international conservation course and a capstone international agriculture synthesis course (*Problem-Based Learning*). Based on these experiences, suggestions for the use of this case study are provided below.

1. Directed Discussion

This approach is structured around two class periods and three assignments, which includes researching and writing short pre- and post-discussion essays. It is best suited for first-year college students, but could be modified and used in upper-division courses and seminars. Use of this case study can be sequenced into any appropriate block of time in the course syllabus. The length of class periods and nature of written assignments can be modified depending on how this case study exercise fits into a specific course.

⁴ Note: Dr. Cynthia Wei (see Footnote 1) is currently (December 2013) developing a video introducing SES.

⁵ For example, see Earthwatch Lecture: Living in Harmony with the Wild. Retrieved September 15, 2013 at URL: http://www.earthwatch.org/europe/newsroom/news_events/news-5-rgs-march-2013.html.

Assignment #1: This assignment prepares students to discuss the HWC case study in class by building empathy for the protagonist, Karma Wang, and providing students with a general understanding of the situation (i.e., dilemma). Before the first class period all students will view *Human-Wildlife Conflicts in Bhutan* (see: <http://www.conservationbridge.org/casestudy/human-wildlife-conflicts-in-bhutan/>) and read: (1) *People, Pigs, and Tigers in Shangri-La: A Story* (see: **Appendix II**) and (2) *Promoting Biodiversity Conservation and Rural Livelihoods in Bhutan* (see: **Appendix III**). Students will briefly outline a written response to the six General Overview questions provided in **Box 1** to assure that all are properly prepared for Class Period #1. This assignment should take about 60-90 minutes to complete.

Class Period #1 (50-90 minutes): This is an open discussion facilitated by the instructor⁶, best suited for use with 12-15 students, but workable in groups up to 50 or 60. It includes three discussion topics that build in details relative to deconstructing the case. The first step is to discuss the general aspects of the case study (**Box 1**), which will get students talking about issues they have already consider while completing Assignment 1 (~10 minutes). Next, the class will identify and justify key stakeholders in this case (~10 minutes), which should include at least (1) farmers, (2) government agencies, and (3) international conservation organizations. They should recognize that ‘nature’ (e.g., in this case, wildlife in general and pigs in particular) is also a stakeholder...they should be pushed to articulate why (e.g., maintenance of ecological functioning and ecosystem services; ethical considerations; animal rights; etc.). Additional stakeholders, e.g., non-farming Bhutanese, scientists, tourists, students, and everyone worldwide (because of Bhutan’s biodiversity legacy) might also be identified. Lastly, a 30-minute discussion of these stakeholder groups will give students insights into the multiple perspectives relative to HWC in Bhutan. **Box 1** provides questions to help focus this discussion. Among other key points, it is important to bring out Bhutan’s unique national commitment to *Gross National Happiness* and the country’s recent (2008) transition to a democratic form of government. Students will find both of these topics to be very interesting. A modification to this open discussion approach would be to divide the class into stakeholder groups and have them address questions in **Box 1** specific to their group. Then, 20 minutes can be used for this small group work allowing 10-minutes for each to report out to the entire class. Although this approach limits full class discussion, small-group discussions focused on fewer questions promote the development of more in-depth responses. All three discussion topics can be expanded if more class time is available.

⁶ Instructors desiring additional background information beyond the student assignment should refer to Appendices IV, VII, and VIII, as well as Brown and Bird (2011), NCD (2008), Wang (2008), and (with caution) <http://en.wikipedia.org/wiki/Bhutan>

Box 1

Possible Discussion Questions

General Overview (Writing Assignment #1 – see Lesson Plan, Directed Discussion)

1. What do we know about Bhutan?
2. What's the name of the protagonist in the case?
3. Who is he? What do we know about him?
4. What's his problem?
5. Is this a 'real' problem? Why? Describe it.
6. Is it just Karma's problem?

Farmers' Perspectives

1. What do we know about the people of Chumey?
2. How widespread is the problem in Chumey?
3. How and why are people affected differently?
4. What are some of the economic issues faced by the people in Chumey?
5. What are some of the social/cultural issues being faced by the people in Chumey?
6. Do farmers eat meat? Why don't farmers just kill and eat the pigs?
7. How long has this been a problem? Is it more of a problem now? Why?
8. Might there be other problems regarding wildlife? Why are pigs a priority?
9. What do the farmers want?

Pigs' Perspectives

1. What do we know about them?
2. Where do they live? What do they eat? Why do they eat crops? How many babies? What eats pigs?
3. Why are they a big problem now?
4. What is the prey-predator-livestock relationship?

Bhutan Nature Conservation Division's Perspectives

1. What do we know about them?
2. How might we find out more?
3. What are their primary concerns/responsibilities?
4. Why are they concerned about farmers and agriculture?
5. How much do they know about agriculture and rural livelihoods?
6. How might they prepare (plan) to address this problem? Short-term/long-term?
7. What short-term solutions might the division put in place? Pros and cons?
8. What short-term solutions might the division put in place? Pros and cons?

National Government's Perspectives

1. Why is the government concerned about this problem?
2. What might be the impact of moving from a monarchy to a democratic form of government? Before/after?
3. How might this change the management practices of governmental organizations?

International Perspectives

1. Are you concerned about this problem? Why?
2. Why would international conservation organization like the World Wildlife Fund be concerned about this problem? How might they be involved in its solution?
3. Could this problem affect Bhutan's tourism industry? Why? How?

Assignment #2: This assignment allows students to inventory their knowledge about this case in preparation for the second class period. Based on Assignment #1 and Class Period #1 students will write an essay of 300-400 words (length can be varied as appropriate to the course) that: (1) discusses the ecological, social, or economic aspects (PICK ONE) of prey-predator relationships in complex agricultural landscape mosaics that include parks and protected areas. OR (2) addresses the question: What actions should government agencies take to reduce HWC in and around the Bhutan's parks and protected areas? Comments and suggestions should relate to the government's commitment to maintaining and enhancing the nation's *Gross National Happiness* Index. Guidelines for this essay should be clearly identified

and specific to the course's pedagogy (e.g., see **Appendix IV**). However, it is recommended that this assignment focus on building critical thinking skills (versus merely reporting facts in a term paper style) and require additional library research beyond references provided in the case study. This assignment should take 60-120 minutes and it needs to be completed before Class Period #2.

Class Period #2 (50-90 minutes): This session will provide students with the opportunity to work in small teams (3-5 students each) to synthesize and apply knowledge they have acquired about social-environmental interactions associated with HWC in Bhutan. Before doing so, the instructor (or teaching assistant) will lead a discussion of Assignment #2, which provides an opportunity for students to share their ideas and establish an open, interactive learning environment. If the case is used early in the term, or in relatively large classes, introductions (e.g., name, home town, academic interests and major, etc.) and nametags or placards further reinforce the open discussion format and help build class unity. Student teams are then formed and presented with the following scenario:

You work for a large international conservation non-governmental organization⁷ that has just received a multi-million dollar grant to help strengthen Bhutan's protected area network, in collaboration with the government and people of Bhutan. You are directly involved with a team charged with designing a comprehensive program to accomplish this goal. However, before moving forward you need to engage in a "brainstorming" session with colleagues to identify and discuss key questions that must be addressed during the project. These questions include: What measures will you take to expand or improve the current system of compensation and protection against human-wildlife conflict? How will these efforts complement other initiatives to strengthen Bhutan's park system? How will your approach take into account the deep cultural ties between religion, conservation, and the livelihoods of the Bhutanese? What effect will it have on Gross National Happiness⁸? What are the implications for your work of Bhutan's recent transition to democracy?

Teams should be allowed at least half of the class period to discuss these questions and formulate responses, which are then shared with the entire class at end the session. The instructor should facilitate this final discussion and maintain an accumulative summary of key ideas on flip charts or a white-board. This approach can be modified as needed by having different groups consider different questions, which helps if shorter time periods are involved

⁷ Depending on prior student knowledge, it may be necessary to discuss the structure and functioning of non-governmental organizations before engaging in this discussion. For example, the United Nations defines them as follows (<http://www.ngo.org/ngoinfo/define.html>): "A non-governmental organization (NGO) is any non-profit, voluntary citizens' group which is organized on a local, national or international level. Task-oriented and driven by people with a common interest, NGOs perform a variety of service and humanitarian functions, bring citizen concerns to Governments, advocate and monitor policies and encourage political participation through provision of information. Some are organized around specific issues, such as human rights, environment or health. They provide analysis and expertise, serve as early warning mechanisms and help monitor and implement international agreements. Their relationship with offices and agencies of the United Nations system differs depending on their goals, their venue and the mandate of a particular institution."

⁸ Principles of Bhutan's Gross National Happiness Index: 1. Promotion of equitable and sustainable socio-economic development, 2. Preservation and promotion of cultural values, 3. Conservation of the natural environment, and 4. Establishment of good governance (Fishman, 2010).

(i.e., 50 minutes) or deeper analyses of each question are desired (e.g., employing in-class Internet research).

Assignment #3: This writing assignment provides students with the opportunity to reflect on the universality of HWC by applying what they have learned to the United States, specifically Ithaca, New York. Based on a review of *Cornell University Integrated Deer Research and Management Program* (see: <http://wildlifecontrol.info/deer/pages/default.aspx>), they will write a 300-400 word reflective, critical essay (length can be varied as appropriate to the course) that juxtaposes HWC in the Ithaca area with those in Bhutan. They should reflect on issues related to predator-prey interactions, how Cornell is responding to the problem, and how the Ithaca-based program might be evaluated using Bhutan's indices for *Gross National Happiness*. If available, a local example of how organizations/institutions are addressing HWC can be used.

Grading and Assessment: Three writing assignments form the primary basis for student assessment (~90%): the outline response to General Overview questions (Assignment #1) and two short essays (Assignments # 2 & 3). The outline response should be graded based on the instructor's general assessment of how well a student reviewed the assigned video and the two readings and should represent a modest contribution to a student's final grade for this exercise (e.g., ~10%). The two essays are more important (e.g., ~40% each) and assessments should follow established guidelines distributed with each assignment (e.g., **Appendix IV**). With first-year students unfamiliar with this type of writing it may be helpful to differentially weight these two essays (e.g., 30% and 50%, respectively) to reward improvement. The importance of student participation in class and team discussions needs to be emphasized at the beginning of this case exercise and then qualitatively assessed by the instructor at its conclusion (~10%). In courses using midterm and/or final exams to also determine final course grades, test questions can be developed from those provided in

Box 1.

2. Decision-Dilemma (Public Hearing)

This approach is structured around a teaching module of four class periods (~5-6 hours total time) that culminates in a simulated, government-sponsored public hearing where relevant stakeholder groups debate the following general question: *What should the Wildlife Conservation Division do to protect wildlife biodiversity and farmer livelihoods in rural communities in Bhutan?* Four out-of-class assignments support this case. This approach is most appropriate for upper-division courses/seminars involving a diversity of students from social and environmental science disciplines. This case study can be sequenced into any appropriate block of time in a course syllabus. As with the Directed Discussion approach just discussed, class time periods and written assignments can be modified depending on how this case study exercise fits into a specific course's pedagogy.

Assignment #1: This assignment provides students with an understanding of the complexity of HWC problems in Bhutan within the national policy framework promoting *Gross National Happiness*. Before the first class period all students will view *Human-Wildlife Conflicts in Bhutan* (<http://www.conservationbridge.org/casestudy/human-wildlife-conflicts-in-bhutan/>) and read: (1) *Promoting Biodiversity Conservation and Rural Livelihoods in Bhutan* (**Appendix III**) and (2) Brown and Bird (2011)⁹. This writing assignment will assure that students are properly

⁹ Brown, J. and Bird, N. 2011. *Bhutan's Success in Conservation: Valuing the Opportunities of the Environment to Gross National Happiness*. Development Progress, Overseas Development Institute, London: UK. 16 p. Retrieved

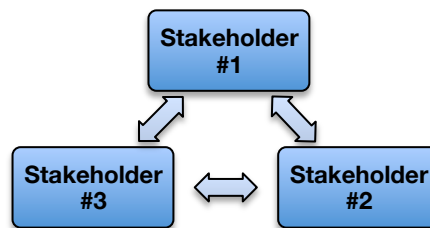
prepared for Class Period #1 (i.e., have read and thought about the readings assigned). Students will develop an outline summary of key points in this case organized around the four principles of *Gross National Happiness* (e.g., see footnote #4). This assignment should take about 90-120 minutes to complete.

Class Period #1 (50 minutes): Based around lecture (~30 minutes) and discussion (~20 minutes), this session should assure that all students have a comprehensive understanding of the case study and be able to articulate many of the key issues outlined in **Box 1** (note that students have not yet read *People, Pigs, and Tigers in Shangri-La: A Story* [**Appendix II**]). A PowerPoint presentation has been provided to assist instructors in covering this material (**Appendix IV**), which can be modified as needed.

Assignment #2: This assignment focuses on helping students to identify key stakeholder groups and gain a comprehensive understanding of why a SES approach is necessary for successfully addressing HWC in Bhutan (**Box 2**). It can be completed individually, or in small groups (2-4 students each) and should take about 60 minutes to complete.

Box 2
Possible Writing Assignment #2

Human-wildlife conflicts in Bhutan illustrate a complex Social-Environmental System (SES) characterized by bio/physical and socio/economic/cultural linkages and dynamic inter-dependences. Based on what you now know about this situation identify and justify the key stakeholders in this case. Identify the various social-environmental linkages and interactions between these stakeholders. Your response may be in outline or graphic form (see below).



A couple hints:

1. <http://www.sesync.org>
2. <http://www.uiweb.uidaho.edu/hesg/downloads/HESG.08-01.pdf>

Class Period #2 (90 minutes): This is a facilitated class discussion in two parts that includes small group work. At the beginning of the class period distribute and have students read *People, Pigs, and Tigers in Shangri-La: A Story* (**Appendix II**). The first full-class discussion (~30 minutes) focuses on identifying and justifying key stakeholders in this case, which should include at least the ‘primary’ stakeholders: (1) farmers (specifically, those in Chumey), 2) government agencies (specifically, the Wildlife Conservation Division¹⁰ and the Tourism Council of Bhutan¹¹), and (3) international conservation organizations (specifically, the World Wildlife Fund, WWF-Bhutan¹²). They should recognize that ‘nature’ (e.g., in this case, wildlife in general and pigs in particular) is also a stakeholder...they should be pushed to articulate why (e.g., maintenance of ecological functioning and ecosystem services; ethical considerations; animal rights; etc.). Additional ‘secondary’ stakeholders, e.g., non-farming Bhutanese, scientists, tourists, students, and everyone worldwide (because of Bhutan’s biodiversity legacy) might also be identified during this discussion. At the end of this part, assign, or have students select, a stakeholder group for further work (3-5 students per team). At least the four ‘primary’ stakeholder groups should be represented, and ‘secondary’ groups can be added depending on class size and/or student interest. During a short break, have students regroup by teams.

The second part of this class period focuses on developing a SES Conceptual Model for HWCs in Bhutan. The class should have a basic understanding how to construct such models (e.g., **Box 3**) before beginning this exercise. Student Stakeholder Teams should first work together to develop a model from their respective perspectives (~30 minutes). The final ~30 minutes should be a facilitated, full class discussion to design a comprehensive model on flip-charts or a white-board that should involve linkages beyond those directly relevant to this particular case study. The nature and details of this model will vary depending on the prior knowledge of the students concerning SES; a possible iteration is provided in **Appendix VI**.

Assignment #3: Out-of-class, Student Stakeholder Teams prepare initial arguments and recommendations for presentation at the *Chumey Public Hearing on Human-Wildlife Conflicts* during Class Period #4. They should address the basic question central to this exercise (i.e., *What should the Wildlife Conservation Division do to protect wildlife biodiversity and farmer livelihoods in rural communities in Bhutan and why?*) from their respective stakeholder perspectives. Teams will have the opportunity to ‘practice’ their presentations and gain input from classmates during the next class period.

Class Period #3 (50 minutes): This is an in-class work session for Student Stakeholder Teams to outline (~10 minutes each) their key arguments and recommendations. The instructor and other students will question the teams and identify additional areas for their consideration (5-10 minutes per team). This practice session is intended to help strengthen final presentations and identify counter arguments for Class Period #4.

Class Period #4 (90 minutes): Chumey Public Hearing on Human-Wildlife Conflicts

Specific Background: This class period simulates a public hearing where various stakeholders provide suggestions and recommendations to officials from the Bhutan Ministry of Agriculture and Forests¹³ (MoAF) concerning HWCs in Chumey. It is one of numerous meetings being held with Bhutanese farmers across the country. In accordance with the recent adoption of a democratic form of government, the Ministry is seeking broad input before

¹⁰ See: <http://dofps.gov.bt/ncd/>

¹¹ See: <http://www.tourism.gov.bt/about-tcb/about-tcb>

¹² See: http://www.wwf.panda.org/who_we_are/wwf_offices/bhutan/

¹³ See: <http://www.moaf.gov.bt/moaf/>

Box 3
Key Components to Consider in Developing a SES Conceptual Model
 (from <http://www.uiweb.uidaho.edu/hesg/model.html>)

I. Critical Resources:

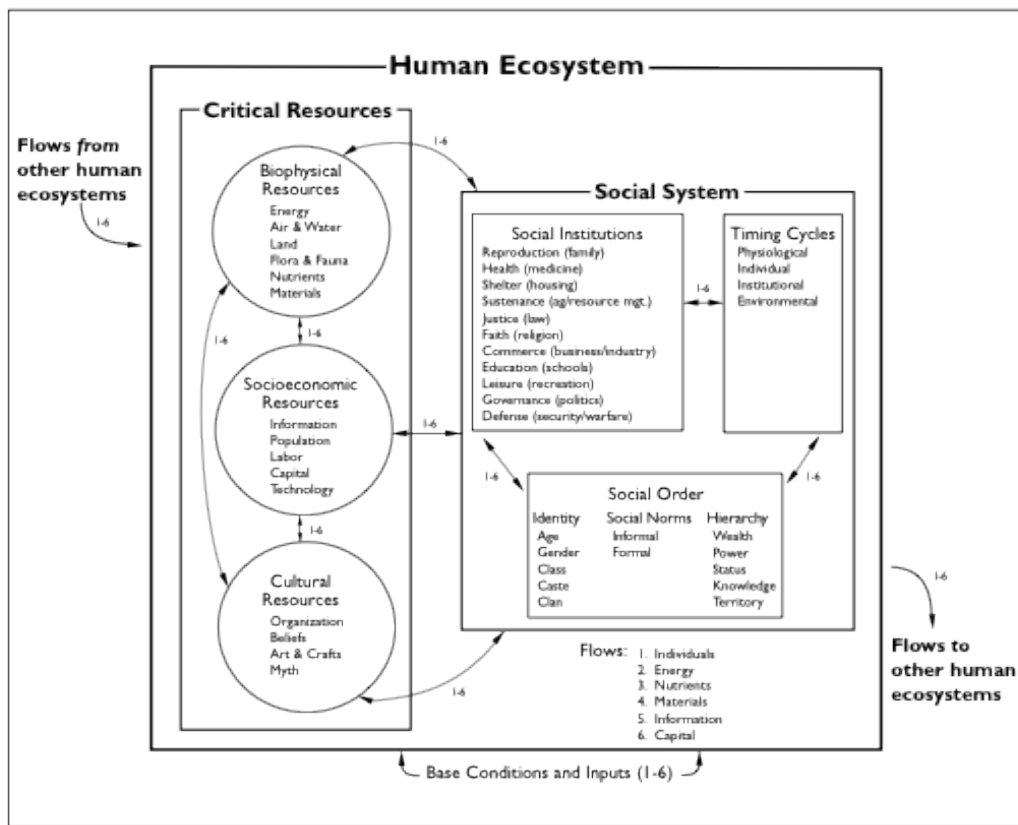
- Biophysical
- Socioeconomic
- Cultural

II. Social Systems

- Social Institutions
- Social Order
- Timing Cycles

III. Linkages

- Individuals
- Nutrients
- Capital
- Energy
- Materials
- Infrastructure



directing the Bhutan Wildlife Conservation Division to develop new policies and procedures that better protect wildlife biodiversity and farmer livelihoods in rural communities like Chumey.

Lesson Objectives: In addition to the Learning Objectives identified earlier for this case study, this class period will help students develop argumentative skills. In addition, they will better understand the difficulties of addressing stakeholder ‘trade-offs’ involved in SES issues under complex ‘real-world’ conditions.

Format: The course instructor will serve as the MoAF official responsible for (1) chairing the hearing, (2) challenging and questioning comments made by Student Stakeholder Teams, and (3) summarizing key findings at the end of the hearing. If desirable, one or two additional MoAF representatives can be used (e.g., colleagues and/or teaching assistants). In student-lead courses/seminars, students can serve as the MoAF hearing team, but they will need to prepare accordingly beginning with Assignment #3 in order to adequately question and probe comments from Student Stakeholder Teams.

Each Student Stakeholder Team will have 10 minutes to present their perspectives on HWCs. This will be followed by questions, challenges, and counter-arguments from the MoAF Official(s) (5 min). Students from other teams should be encouraged to engage in this questioning as it might strengthen the validity of their own arguments. This will be followed by a time (5 min) when teams make their final comments.

The instructor will then facilitate a class discussion summarizing the results of the hearing. This should be an open discussion with all students participating ‘out-of-character’ (i.e., free to provide comments from any stakeholder perspective including those not represented at the hearing). This class period concludes with a discussion of Assignment #4.

Hearing Agenda:

Time (minutes)	Activity
00 -05	Introduction by MoAF Official(s)
05 -65	Stakeholder Teams present their arguments (10 min each) followed by questions from MoAF Official(s) and other students (5 min each)
05 -20	People of Chumey
20-35	Bhutan Wildlife Conservation Division Representatives
35 -50	Tourism Council of Bhutan Representatives
50-65	WWF-Bhutan Representatives
65-70	Final Statements by Stakeholder Teams
70 -85	Summary, discussion, and wrap up by MoAF Official(s)
85-90	Discussion of Assignment #4

Assignment 4: Following a yearlong, international planning process, the Royal Government of Bhutan published the *Bhutan National Human-Wildlife Conflicts Management Strategy*¹⁴, which became part of Bhutan’s 10th Five Year Plan (2008-2013). Since then, Bhutan has moved from a Monarchy to a democracy and new conservation strategies have been developed and implemented worldwide (e.g., payment for ecosystem services, adaptive management, and landscape labeling). Students will write a reflective essay that summarizes the lessons learned during the analysis of case study (all assignments, class discussions, and the public hearing) specific to what modifications should be incorporated into the 11th Five Year Plan to reflect changes and contemporary conservation strategies.¹⁵

¹⁴ Retrieved September 15, 2013 at URL: <http://www.globaltigerinitiative.org/download/ELF/session-papers-and-presentations/Bhutan-National-Human-Wildlife-Conflicts-Management-Strategy-2008.pdf>

¹⁵ Note: Instructors should review Callahan *et al.* 2012 (**Appendix VII-A**) to see one comprehensive, team approach to addressing this question.

Grading and Assessment: A student's overall assessment should be based on individual performance on the two writing assignments and class and team participation (~60%), and team performance during the practice session and the Public Hearing (~40%). Differential weighting to individual performance is advised to help minimize difficulties arising from varying team strengths. Many students dislike short, team assignments where the majority of their final grade depends on group performance.

The first writing assignment (Outline Summary) should represent ~10% of the final grade for this exercise and be graded based on completeness relative to key questions provided in Box 1. There should be greater expectations for Assignment #4, the Reflective Essay (~40%), as it represents a summative evaluation of what a student has gained from the case exercise. Owing to its importance, guidelines need to be developed and distributed with the assignment. These can be tailored to the course's pedagogy, but should be clear and specific with respect to grading criteria (e.g., **Appendix IV**). The final individual assessment, participation (~10%) most likely will be determined qualitatively by the instructor (and teaching assistant if available), as more time-consuming approaches (see Problem-Based Learning: Grading and Assessment below) likely are not warranted with this relatively short exercise.

A group grade needs to be determined for team presentations with emphasis being placed on performance during the Public Hearing (~30%) compared to the practice presentation (~10%). **Box 4** provides an example of a Team Presentation Feedback Form, which could be adapted for justifying team assessments. It would also be necessary to note the weighted importance of different categories depending on the course's pedagogy (e.g., Content: 70%, Clarity and Presentation [i.e., style]: 20%, and Overall Usefulness to Practitioners: 10%) and to provide a final team score. In courses using midterm and/or final exams to also determine final course grades, test questions can be developed from those provided in **Box 1**.

Box 4

CASE STUDY PRESENTATION: EXAMPLE TEAM FEEDBACK FORM

CASE TEAM: _____ **YOUR NAME (optional):** _____

PART A. CONTENT

1 = poor, 3 = acceptable, 5 = outstanding

Situation/problem statement:	1	2	3	4	5
Information need:	1	2	3	4	5
Research question(s):	1	2	3	4	5
Research findings:	1	2	3	4	5
Commentary:	1	2	3	4	5
Conclusions:	1	2	3	4	5

With regard to the research findings:

1. To what extent did the team incorporate appropriate sources (journal articles, grey literature, case studies, etc.) representing a range of helpful perspectives on the topic? Did the literature review include cases or experiences from other geographic areas that were facing similar or analogous challenges?
2. Are the research findings clearly explained? To the extent that the review revealed conflicting experiences or viewpoints, are these presented and discussed?

With regard to the conclusion/recommendations:

3. In light of the research findings, do we agree with the team’s suggestions for future action or additional research? Why or why not?

PART B. CLARITY & PRESENTATION

1 = minimally, 3 = somewhat, 5 = extremely

Was structure of the project accessible and logical?	1	2	3	4	5
Was the presentation engaging?	1	2	3	4	5
Was the language clear, concise, and free from jargon?	1	2	3	4	5
Was the presentation free of errors?	1	2	3	4	5
Was the presentation visually appealing?	1	2	3	4	5

PART C. OVERALL POTENTIAL USEFULNESS TO PRACTITIONERS

1 = poor, 3 = average, 5 = outstanding

1 2 3 4 5

Comments:

4. To what extent did the team’s research focus and findings shed light on a key challenge facing practitioners in the case?
5. Leaving aside language barriers, how accessible do you think this report would be to practitioners in the field in this case?

PART D. Additional Comments

3. Problem-Based Learning

This case study can be used to contextualize a ‘real-world’ SES problem that requires extended student research and analysis. It provides a Problem-Based Learning (PBL) environment where students work collaboratively to solve well defined, and often difficult (i.e., “wicked), problems.¹⁶ This is the most detailed and demanding use of this case study requiring extended time commitments (at least 3-4 weeks and up to an entire term) and an advanced knowledge of the case by the instructor. This approach is best used with upper-division undergraduate and graduate students in a ‘capstone’ course or seminar where student teams (3-5 students each) pursue specific SES questions. In courses/seminars with more than ~5 students, multiple teams can examine different questions related to HWCs in Bhutan or additional case studies can be used (e.g., see Lassoie *et al.* 2012; **Appendix I**). The Lesson Plan that follows assumes that this case is being used in a term-long PBL course where the final team report (i.e., ‘deliverables’) is the primary grade determinant.

Specific Lesson Objectives: In addition to the Learning Objectives identified earlier for this case study, this PBL exercise also will provide team-building experiences simulating how SES issues are typically addressed outside academic settings where individual accomplishments are typically awarded. This will illustrate the advantages of working with a team (e.g., multiple disciplines and different skill sets) as well as the potential downsides (e.g., ‘free-riders’ and organizational challenges).

Format: Regardless of the time allocated to this PBL exercise, the syllabus is divided into three primary sections: (1) Introduction (~15%), (2) Case Research and Report Development (~75%), and (3) Class Presentation (~10%). The Course Introduction needs to discuss all the details outlined for the past two approaches and assignments and class periods can be designed as appropriate to meeting this need. It is not necessary to have students read *People, Pigs, and Tigers in Shangri-La: A Story* as this narrative, being representative but factitious, is not directly relevant to the use of the case as a PBL exercise. If multiple cases are employed, this review can be used to help students select a case of specific interest – a much better option than assigning a case. However, it is important that the instructor modify student teams as necessary in order to assure an interdisciplinary balance.

Once student teams are formed they receive a specific assignment that includes questions to address and deliverables expected (i.e., final products). At this point, it is critical to emphasize that this is a team exercise that must yield comprehensive, cohesive, integrated, and style consistent final products much like those expected from professional consulting firms. Furthermore, the results must be relevant to solving real-world problems (i.e., applicable to ‘practitioners’) as well as being well researched and scholarly. These key aspects of PBL may need to be reemphasized throughout the exercise. Teams then self-organize and commence Case Research and Report Development. Class periods can be used for the team to coordinate work activities (i.e., as ‘laboratories’) and/or for supplemental lectures and discussions relevant to the course’s pedagogy. However, it is critical that project benchmarks with feedbacks are established to assure sustained progress and avoid confusion and major misunderstandings. These can include (1) clarification of the assignment and deliverables expected, (2) review of an expanded outline for the final deliverables, and (3) a class presentation of preliminary results (discussed next).

A Class Presentation should be used near the end of the term (or exercise) to allow the team to present their findings to student peers and the instructor. Although this presentation

¹⁶ See: http://en.wikipedia.org/wiki/Problem-based_learning

could be a ‘final’ summary, it might better serve as a ‘rough draft’, which encourages class input into shaping the final deliverables. An example of a Team Feedback Form is provided above in **Box 4**. The due-date should give the team enough time to incorporate input into the final products. These most likely will be in the form of a written report, but additional options are possible (e.g., news articles, PowerPoint presentations, policy briefs, research and development proposals, etc.).

Example Assignments: This case study has been used to structure various PBL exercises at Cornell University since 2007. Most recently it was used in a capstone synthesis course required for undergraduates majoring in International Agriculture and Rural Development. Assignments were developed by professionals very knowledgeable of HWC in Bhutan and are provided in **Appendix VII** for 2012 and 2013. These individuals served as ‘practitioners’ working with the team throughout the project and providing an evaluation of the final products.

Example Deliverables: Cornell student team deliverables for 2012 and 2013 are provided in **Appendices VIII and IX**, respectively. In addition to illustrating two examples of PBL deliverables, these reports provide additional references, analyses, and information that will aid instructors in using this case study regardless of the Teaching Method employed.

Grading and Assessment: Of the three Teaching Methods proposed for this case study the PBL approach is potentially the most difficult to grade because of its heavy reliance on the results of teamwork. Of course, the development of sub-products could be delegated to individual students and graded accordingly, but this approach would fail to meet an important Specific Learning Outcome identified earlier. Hence, assessment guidelines must be developed that recognize and award contributions without penalizing those challenged with an unproductive team member. Therefore, in addition to an assessment of the quality of the final deliverables yielding a team grade, individual assessments of student contributions to the course and its final products also must be determined.

Individual Assessments: ‘Participation’ is always identified as an important criterion in discussion-oriented courses and seminars and especially in PBL courses. Often, however, this becomes a general qualitative assessment made by the instructor at the end of the course. It is important in this PBL approach to develop a more ‘qualitative’ measure and to assure that participation, especially in the team project, is significantly weighted (e.g., 25-30%) in determining a student’s final grade. One approach would be for a teaching assistant to tally comments made by students during the semester; in relatively small classes the instructor also can gain a qualitative sense of student engagement. During the development of the deliverables, which likely includes considerable out-of-class work, it is critical that the instructor monitor team member participation and confront those who are failing to meet their team’s expectations. This can be easily accomplished by simply asking students for anonymous comments about their teammates periodically during the term. Once the final deliverables are submitted all students should complete a Team and Self Evaluation (**Box 5**). It is important that students all know that this evaluation will be required at the end of the course.

Of course, depending on the course’s pedagogy, more traditional forms of individual assessment can be adopted including class presentations, short writing assignments (e.g., those used with other Teaching Methods), and even a mid-term and/or final exam. Another possibility is to have students develop ‘appendices’ to the final product that allow them to research a related topic of their particular interest. This would transcend the typical term paper assignment in that it would support and inform the primary product(s) while also allowing them to pursue particular interests developed during the examination of the case study. This is often

important for graduate students who may have topics related to their specific research work that they would like to investigate.

Team Assessments: A grading rubric for the final deliverables needs to be developed and distributed to student teams with the assignment. This can match key points in the Team Feedback Form (**Box 4**), but should include weighted importance (e.g., Content: 70%, Clarity and Presentation [i.e., style]: 20%, and Overall Usefulness to Practitioners: 10%); as well as a final team score. It is critical to also provide detailed comments justifying the instructor's assessment. Students should understand that their final grade will reflect this team score modified according to their individual assessments. In most cases this is reflected in either a 'plus' (+) for outstanding/exceptional participation or minus (-) for marginal participation.

CASE STUDY EVALUATION

In developing a course evaluation for participating students it may be important to assess the effectiveness of this particular case, the overall effectiveness of case-based learning, or both. Sample questions for assessing the usefulness of using this case compared to providing information via lectures and readings are provided in **Box 6**. Although experience indicates a strong preference for a case study approach, instructors should expect a few students to be uncomfortable with an engaged, learning environment.

Some instructors may wish to evaluate the use of this case study specific to learning outcomes. **Box 7** provides sample questions focused on assessing impacts on student understanding, motivation, and self-efficacy, as well as improving the use of the case study. In-person interviews with students can often provide greater insights into the benefits of the case study (**Box 8**). Since these are obviously not anonymous, they should be conducted by a person not directly involved in the course or in assessing student performance.

Box 5

Case Study Exercise: Team & Self Evaluation

Your Name:

Case Study:

Please use the following five-point scale to rate the participation of your team members in terms of their contribution to project ideas and workload:

- 1: Contributed significantly less than his/her share
- 2: Contributed somewhat less than his/her share
- 3: Contributed a fair share
- 4: Contributed somewhat more than his/her share
- 5: Contributed significantly more than his/her share

Justify your response with a comment for EACH core team member.

Note: Ambiguous or perfunctory comments will not be helpful.

TEAM MEMBERS' EVALUATION

Team Member:

Score for:

Project Ideas: 1 2 3 4 5
Workload: 1 2 3 4 5

Comments:

Team Member: ect. for each

SELF EVALUATION

Please rate yourself on the same 1-5 scale.

Score for:

Project Ideas: 1 2 3 4 5
Workload: 1 2 3 4 5

Please justify your responses:

Please complete the following statements below:

1. One way in which I helped strengthen or enhance our team's work product was:
2. One area where I could have done more to strengthen or enhance our team's work was:
3. If I had the chance to do this exercise again, one thing I would do differently to improve the dynamics or effectiveness our team is:
4. I think this was / was not (circle one) a valuable learning experience because:

Box 6
A CONSERVATION CASE STUDY
People, Pigs, and Tigers in the Last Shangri-La
Case Evaluation

Please rate this case discussion compared to receiving this informational in a 'traditional' lecture supported by a required reading or two. Please provide written comments on the back.

1 = completely **disagree** with statement 5 = completely **agree** with the statement

1. This case identified key stakeholders and articulated their different positions concerning conservation measures to protect biodiversity much better.

1 2 3 4 5

Comments:

2. This case helped me understand the crucial interplay between wildlife conservation and rural livelihoods in agriculturally-based societies much better.

1 2 3 4 5

Comments:

3. This case yielded greater understanding of a tangible example of a cultural dilemma involving conservation.

1 2 3 4 5

Comments:

4. This case helped me to understand the importance of changing national policies on rural livelihoods much better.

1 2 3 4 5

Comments:

5. This case helped me to prepare to research and write about the pros and cons of specific actions by the government to reduce human-wildlife conflicts in Bhutan much better.

1 2 3 4 5

Comments:

Box 7

Sample Student Evaluation Questions*

I. Using of Case Study to Support Directed Discussion and Decision-Dilemma

Supplemental Questions to Standardized Evaluation:

Use Likert Scale: 1 = “completely disagree”; 5 = “completely agree”

1. *Relative Metric:* Reviewing and discussing this case study was a good use of time.
2. *Motivation Metric:* I am more motivated to learn about socio-environmental synthesis (SES) after participating in this case study than from reading textbooks and journal articles.
3. *Understanding Metric:* This case study increased my understanding of SES.

Written Comments:

1. *Understanding Metric:* In what ways did this case study provide opportunities for more in-depth considerations of SES?
2. *Self-Efficacy Metric:* Describe ways that this case study increased your ability to consider other environmental topics.
3. *Suggestions Metric:* Please offer suggestions to improve the use of this case study.

II. Using of Case Study to Support Problem-Based Learning (Note: assumes use of multiple case studies in the course)

Supplemental Questions to Standardized Evaluation:

Use Likert Scale: 1 = “completely disagree”; 5 = “completely agree”

1. *Relative Metric:* Reviewing and discussing all of the case studies at the beginning of the semester was a good use of time.
2. *Understanding Metric:* I gained a lot from listening to the presentation of the other team reports at the end of the semester.
3. *Understanding Metric:* The ability to interact with a practitioner in the field improved the educational experience.
4. *Motivation Metric:* I am more motivated to learn about SES issues by completing the case study assignment than from reading textbooks and journal articles.
5. *Understanding Metric:* The case study assignment increased my understanding of SES.

Written Comments

1. *Understanding Metric:* In what ways did the case study assignment provide opportunities for more in-depth considerations of SES topics?
2. *Self-Efficacy Metric:* Describe ways that the case study assignment increased your ability to consider similar complex SES topics in the future?
3. *Suggestions Metric:* Please offer any suggestions to improve the case study assignment.
4. *Self-Efficacy Metric:* Describe the benefits of the real world connections provided by working with the practitioner supporting your case study.
5. *Suggestions Metric:* Describe any problems you encountered while working with the practitioner supporting your case study.
6. *Suggestions Metric:* Provide suggestions to improve working with practitioners. _____

* Developed and tested in 2011-12 at Cornell University in collaboration with EDU, Inc. (www.eduinc.org).

Box 8

Sample Student Interview Questions*

I. Understanding of Key Concepts

1. In what ways did the case study help you understand the need to integrate the three tenets of sustainability: Environment, Economic, Social?

Helper question: Think of a case you discussed. How did an environmental issue intersect with an economic issue? Give an example.

What was a social aspect of the case?

2. Give an example of how a multidisciplinary approach was applied to the case study.

Pause: Wait for misconceptions.

Just scientific disciplines – “Social chemists worked with geologists.”

Social or political or economic disciplines are presented in isolation.

Helper question: What do you think “multidisciplinary approach” means?

How did politicians interact with scientists in a case study you discussed?

II. Motivation

3. Were you more motivated to learn about socio-environmental synthesis issues from the case study than from reading similar information in textbooks and journal articles? Yes/No

YES: What made the cases more motivating?

NO: Why were the cases less motivating?

III. Self-Efficacy

4. Do you feel more confident in your ability to consider socio-environmental synthesis issues because of your participation in the case study? Yes/No

YES: Describe ways that the case studies increased your ability to consider environmental topics. Then go to questions 5 & 6

NO: Go to questions 5 & 6.

5. How did the use of this case impact the courses you will select in the future?

6. How have the use of this case helped you prepare for your career?

* Developed and tested in 2011-12 at Cornell University in collaboration with EDU, Inc. (www.eduinc.org).

REFERENCES CITED

Balint, P.J., Stewart, R.E., Anand, A., and Walters, L.C. 2011. *Wicked Environmental Problems: Managing Uncertainty and Conflict* [Paperback]. Washington, DC: Island Press. 272 p.

Brown, J. and Bird, N. 2011. Bhutan's Success in Conservation: Valuing the Contribution of the Environment to Gross National happiness. Overseas Development Institute: London, UK. 16 p. Retrieved November 24, 2013 at URL: http://www.developmentprogress.org/sites/developmentprogress.org/files/bhutan_report_-_master.pdf

Brown, V.A., Harris, J.A., and Russell, J.Y. 2010. *Tackling Wicked Problems: Through the Transdisciplinary Imagination*. New York: Routledge. 336 p.

Engelen, G., White, R., Uljee, I., and Drazan, P. 1995. Using cellular automata for Integrated modelling of socio-environmental systems. *Environmental Monitoring and Assessment*, 34: 203-214. Retrieved November 24, 2013 at URL: <http://link.springer.com/article/10.1007%2FBF00546036#page-1>

Fishman, R. M. 2010. Gross National Happiness: A real alternative or a romantic wish? Impressions from the Fourth International Conference on Gross National Happiness in Bhutan. *Consilience: The Journal of Sustainable Development*, 3(1): 179-186.

Force, J.E. and Machlis, G.E. 1997. The human ecosystem part II: Social indicators in ecosystem management. *Society and Natural Resources* 10(4): 369-382.

Lazarus, R. 2009. Super wicked problems and climate change: Restraining the present to liberate the future. *Cornell Law Review* 94(5): 1153–1233. Retrieved September 15, 2013 at URL: <http://cornelllawreview.org/articles/super-wicked-problems-and-climate-change-restraining-the-present-to-liberate-the-future/>

Lassoie, J.P., R.J. Herring, and K.-A. S. Kassam. 2012. Conservation Bridge: Enhancing the management of national parks and protected areas through collaborative, real-world learning, research, and practice. pp. 56-81. IN: Proceedings – *Education for Sustainable Development through National Park Experiences, Session 3: Enhancing the Management of National Parks and Protected Areas through Partnerships*. 11 September 2012, 2012 IUCN World Conservation Congress, Conservation Campus No. 0130, Jeju, Korea. 205 p. (see **Appendix I**).

Liu, J., Dietz, T., Carpenter, S.R. *et al.* 2007a. Complexity of coupled human and natural systems. *Science*, 317(5844): 1513-1516

Liu, J., Dietz, T., Carpenter, S.R. *et al.* 2007b. Supporting materials for: Complexity of coupled human and natural systems. *Science*, 317(5844): 1513-1516. Retrieved June 15, 2013 from <http://www.sciencemag.org/cgi/content/full/317/5844/1513/DC1>

Liu, J., Dietz, T., Carpenter, S.R. *et al.* 2007c. Coupled human and natural systems. *AMBIO: A Journal of the Human Environment* 36(8): 639-649. Retrieved June 15, 2013 from [http://www.bioone.org/doi/abs/10.1579/0044-7447\(2007\)36%5B639%3ACHANS%5D2.0.CO%3B2](http://www.bioone.org/doi/abs/10.1579/0044-7447(2007)36%5B639%3ACHANS%5D2.0.CO%3B2)

Lopez-Ridaura, S., Masera, O. and Astier, M. 2002. Evaluating the sustainability of complex socio-environmental systems: The MESMIS framework. *Ecological Indicators*, 35:1-14. Retrieved November 24, 2013 at URL: <http://doctoradoagroecoudea.files.wordpress.com/2013/03/mesmisecolind.pdf>

Machlis, G.E., Force, J.E., and Burch, W.R., Jr. 1997. The human ecosystem part I: The human ecosystem as an organizing concept in ecosystem management. *Society and Natural Resources* 10(4): 347-367.

McPeak, J.G., Lee, D.R., and Barrett, C.B. 2006. Introduction: The dynamics of coupled human and natural systems. *Environment and Development Economics* 11(1): 9-13.

NCD (Nature Conservation Division). 2008. *Bhutan National Human-Wildlife Conflicts Management Strategy*. Department of Forests, Ministry of Agriculture, Royal Government of Bhutan, Thimphu, Bhutan. 88 p. Retrieved September 15, 2013 at URL: <http://www.moa.gov.bt/moa/downloads/downloadFiles/MoADownload5lv1595os.pdf>

Palmer, M.A. 2012. Socioenvironmental sustainability and actionable science. *BioScience* 62(1): 5-6. Retrieved September 15, 2013 at URL: http://palmerlab.umd.edu/palmer_2012_bioscience.pdf

Palmer, M.A., Bernhardt, E.S., Chornesky, E.A., *et al.* 2005. Biological science and sustainability for the 21st century. *Frontiers in Ecology and the Environment*, 3(1): 4-11. Retrieved November 24, 2013 at URL: <http://biology.unm.edu/jhbrown/Miami/Palmer%20et%20al%202005.pdf>

Thinley, P. and J.P. Lassoie. 2013. Human-Wildlife Conflicts in Bhutan. Conservation Bridge Case Study No. 02. Cornell University, Ithaca, NY. 11 p., with documentary video. Retrieved November 24, 2013 at URL: <http://www.conservationbridge.org/casestudy/human-wildlife-conflicts-in-bhutan/>

Walsh, S.J. and McGinnis, D. (eds.). 2008. *Biocomplexity in Coupled Human-Natural Systems: The Study of Population-Environment Interactions*. *Geoforum* (Theme Issue) 39(2): 773-911.

Wang, S.W. 2008. Understanding Ecological Interactions among Carnivores, Ungulates, and Farmers in Bhutan; s Jime Singye Wangchuck National Park. PhD Dissertation, Cornell University, Ithaca, NY. 137 p. Retrieved November 24, 2013 at URL: <http://www.moa.gov.bt/moa/downloads/downloadFiles/MoADownload0yy9906pt.pdf>

APPENDICES (see attached files)

- I. Lassoie, J.P., R.J. Herring, and K.-A. S. Kassam (2012)
- II. Pigs, People, and Tigers in Shangri-Li: A Story
- III. Promoting Biodiversity Conservation and Rural Livelihoods in Bhutan
- IV. Critical Thinking Essays: Grading Criteria
- V. PPT Lecture: Human-Wildlife Conflicts in Bhutan
- VI. Example of SES Concept Map for H-W Conflicts in Bhutan

- VII. IARD/NTRES/SNES 4850: Case Studies in International Ecoagriculture and Environmental Conservation, Cornell University: Term Assignment for Human-Wildlife Conflicts in Bhutan Case Study
- VIII. 2012 Final Team Report: Methods for Addressing Human-Wildlife Conflicts in Bhutan
- IX. 2013 Final Team Report: Conservation in Bhutan: Revising the Management Plan of Jigme Dorji National Park in Bhutan

Box 1

Possible Discussion Questions

General Overview (Writing Assignment #1 – see Lesson Plan, Directed Discussion)

7. What do we know about Bhutan?
8. What's the name of the protagonist in the case?
9. Who is he? What do we know about him?
10. What's his problem?
11. Is this a 'real' problem? Why? Describe it.
12. Is it just Karma's problem?

Farmers' Perspectives

10. What do we know about the people of Chumey?
11. How widespread is the problem in Chumey?
12. How and why are people affected differently?
13. What are some of the economic issues faced by the people in Chumey?
14. What are some of the social/cultural issues being faced by the people in Chumey?
15. Do farmers eat meat? Why don't farmers just kill and eat the pigs?
16. How long has this been a problem? Is it more of a problem now? Why?
17. Might there be other problems regarding wildlife? Why are pigs a priority?
18. What do the farmers want?

Pigs' Perspectives

5. What do we know about them?
6. Where do they live? What do they eat? Why do they eat crops? How many babies? What eats pigs?
7. Why are they a big problem now?
8. What is the prey-predator-livestock relationship?

Bhutan Nature Conservation Division's Perspectives

9. What do we know about them?
10. How might we find out more?
11. What are their primary concerns/responsibilities?
12. Why are they concerned about farmers and agriculture?
13. How much do they know about agriculture and rural livelihoods?
14. How might they prepare (plan) to address this problem? Short-term/long-term?
15. What short-term solutions might the division put in place? Pros and cons?
16. What short-term solutions might the division put in place? Pros and cons?

National Government's Perspectives

4. Why is the government concerned about this problem?
5. What might be the impact of moving from a monarchy to a democratic form of government? Before/after?
6. How might this change the management practices of governmental organizations?

International Perspectives

1. Are you concerned about this problem? Why?
2. Why would international conservation organization like the World Wildlife Fund be concerned about this problem? How might they be involved in its solution?
3. Could this problem affect Bhutan's tourism industry? Why? How?