

UP IN THE AIR: Understanding Vulnerability when toilets fly

STUDENTS HANDOUT

Case Study in Uganda

Camp Beseri Fort Portal, Uganda

Photo by: Blair Stewart

“Toilets are flying” one Ugandan official explained when describing how funding is needed to support sanitation infrastructure. The coordinator was referring to an article published just the day before in the Ugandan national newspaper documenting the common practice of residents in the slums around Kampala to put their human waste in small polythene bags and toss them into a local wetland or leave them in an alleyway because of the lack of formal sewage systems. “The way sewage is being dealt with is unsustainable, we need funding to build new capacity, which in turn will stop the pollution of the local water sources”, he declared.

Another NGO official exclaimed that soil erosion must be controlled. The loss of soil not only reduces soil fertility but it also pollutes local water sources. Meanwhile, yet another NGO cites the burden on women who must spend hours collecting and transporting water every day. The list of priorities is long and changes based on whom you talk to. Government officials, NGO’s, local leaders, and individuals will advocate for a number of different funding needs to include: education, especially of girls, building of roads, reducing population growth rates, empowering women, increasing electricity access, and improving public health.

Deciding which projects should get funding is tricky business for funding agencies! How do they decide? Is there one specific project that will increase human well being more than another? Should funding focus on a small neighborhood project or a large country project? What demographic group should be targeted? These are all important questions that need to be considered.

AUTHORS

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Case Study Objectives

Over the the next 5 lessons your team will create a NGO with a focus on *increasing human welfare* in Uganda. The final goal is to design a pitch for funding and present it to a selection committee. Your project will compete with other projects and only one project will be funded. To be successful you need to incorporate systems thinking, identify the drivers of vulnerability, and focus on aspects your assessment indicates are most important. Your project should be focused at a local scale, by either identifying a specific region or group of people.

Evaluation:

- Concept map
- Annotated bibliography
- One page journal exercise
- Two page pitch document
- 15 minute pitch presentation

Required Sources:

Mentalmodeler (<http://www.mentalmodeler.org>)



Ft. Portal Uganda

Photo by: A.K. Richmond



Part 1: Introduction to Systems Thinking

Lesson Objectives:

- Introduce systems thinking and the properties of systems.
- Define core concepts and elements of a system.
- Consider fundamental properties of systems.
- Introduce concepts such as boundaries, nonlinear relationships, emergent properties, patterns, and drivers.

Background:

Systems can help people *conceptualize and understand* the interactions and behaviors that we observe in wicked or complex phenomenon and problems. Starting with the selection of elements, the way that you define a system determines the kinds of answers or solutions you will find or identify.

Required Reading:

- Read chapter 7 on An Earth System Perspective in the “Global Environmental Outlook” Use the following url for the entire publication <http://www.unep.org/geo/geo5.asp> or access Chapter 7 alone at http://www.unep.org/geo/pdfs/geo5/GEO5_report_C7.pdf

Homework:

For homework familiarize yourself with the UN development goals (<http://www.un.org/millenniumgoals/>).





Part 2: Defining Vulnerability

Lesson Objectives:

- Develop a definition of vulnerability.
- Identify the drivers of vulnerability.
- Develop an initial concept map.

Background:

Determining what makes people vulnerable is a question that is as simple as it is complex. Vulnerability – like happiness – is **dynamic and changes** based on temporal and geographic scales. Vulnerability is a human state that limits wellbeing. It is influenced by environmental stress. However, environmental stress, in turn, is significantly influenced by socioeconomic variables. This human-environment interaction can be exacerbated by population pressure, resource shortages, environmental change, and natural hazards.

Required Readings:

- Read: Amy Krakowka Richmond; Dylan Malcomb, and Kristine Ringler. 2015. Household Vulnerability Mapping in East Africa's Rift Valley. *Applied Geography* 63 (2015) 380-395.

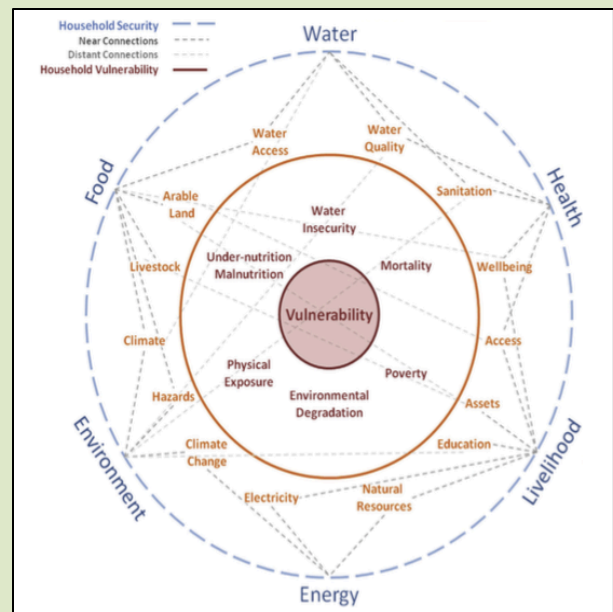
Homework:

- Search for literature or informational sources on vulnerability and Uganda specific reports. Select one source about vulnerability and one article or report on Uganda. Summarize key considerations that inform your understanding of the aspects of vulnerability. These annotated summaries should be brought to class to contribute to an in class activity where the class will create a shared list of references and provide the source for a discussion during Class.
- Scan the Mental Modeler website (www.mentalmodeler.org) make sure to watch the 4 minute tutorial video.

Example of a Conceptual Model of Vulnerability

This diagram depicts a conceptual model for the causal processes and dynamics that drive vulnerability at a household level in the East African Rift based on extensive fieldwork. The outer circle represents household wellbeing. Indicators in red around the center circle are pathways commonly attributed in research to the social-ecological environment in southern Africa and capture how households exhibit vulnerability. Indicators in orange serve as metrics used to measure along a spectrum of vulnerability (inner circle) and household security (outer circle).

*Vulnerability network diagram;
Richmond et al. 2015*





Part 3: Analyzing the literature and creating a concept map

Lesson Objectives:

- Explore the vulnerability research by completing an annotated bibliography or brief summary selected literature Sources from either peer reviewed or grey literature (e.g. governmental or NGO reports) are acceptable.
- Adjust the concept map developed in Part 2 based on your updated understanding of the topic from literature and class discussion.
- Practice iterative processes with concept models.
- Develop a model of your concept map in Mental Modeler (<http://www.mentalmodeler.org>).

Background:

The goal of this section is to have you develop skills in gathering a variety of sources and then **summarize and synthesize** them into a shared bibliographic reference list. You will discuss the sources that you select with your team and using the original concept maps from Part 2 with new information from the literature reviews, you will further refine the concept map design. Once you are confident that your concept map captures the pertinent drivers of vulnerability and the connections between the drivers, you will formalize your model in Mental Modeler.

Required Reading:

http://serc.carleton.edu/integrate/teaching_materials/mineral_resources/conceptmaps.html

Homework:

- Conduct an individual journal exercise. Write one page about how your current concept model of vulnerability has developed and how temporal and scalar resolution is addressed.
- Teams must complete their concept map in Mental Modeler with narrations and be prepared to present it next class.



Photos by: A.K. Richmond



Part 4: Creating a NGO, a mission statement, and an investment pitch

Lesson Objectives:

- Create an NGO with a name and a mission statement.
- Outline an investment pitch. What is the project that the NGO wants funding for?

Background:

Your team will design an NGO with a specific mission and focus. For example, your NGO might focus on water.

Your NGO will design a project focused on a specific geographic region or group of people. The project will address the **drivers of vulnerability** that you identified in your model that influence vulnerability the most. For example, the Iganaga district just east of Kampala is one of Uganda's most vulnerable areas. Health is the primary driver of vulnerability in this region. HIV rates in are 15 percent, which is over double Uganda's national average of 6.5 percent. The population in this region consists of 57 percent children and of those, 47 percent are orphans and vulnerable children because of impacts of HIV (Uganda Bureau of statistics 2007). Another uniquely vulnerable area in Uganda is the Hoima district in Western Uganda on Lake Albert. Oil has recently been discovered here, and some \$1.5 billion has already been invested in Uganda's oil (Groen and Jacobs 2012). Building refineries has made land disputes common in this area as has caused hundreds of residents to be evicted from their land (Voice of America 2014). Oil exploration and production have also polluted the environment.

Required Readings:

- Visit <http://www.waterforpeople.org> and find their mission statement.
- Find one other NGO and read their mission statement.

Homework:

- Write a two page project proposal for your NGO. This two page document needs to be well designed and act as an aid for your oral presentation. You will provide copies for the class.
- Prepare a 15 minute pitch for funders. This 15 minutes includes time for questions. See pitch deck (attached).



Photos by: A.K. Richmond



Part 5: Presenting the Pitch

Lesson Objectives:

- You will present a convincing pitch to compete for funding for their NGO's project.
- The class and the faculty member (and anyone else invited to attend) will vote on the best pitch.

Background:

The goal of this lesson is to present your **pitch for funding**. You will have 15 minutes to make the strongest case for your NGO. In addition you will hand out their NGO's two page document to support their pitch to the instructor and other teams. Presenting in this way mimics the real life presentations NGO's must do when competing for project funding. The class and teacher will vote on the best project and pitch. Students get one vote per team. This requires teams to negotiate the best project and reach a consensus. The faculty member gets one vote, in this way the faculty vote is worth slightly more than the individual students vote.

Required Readings:

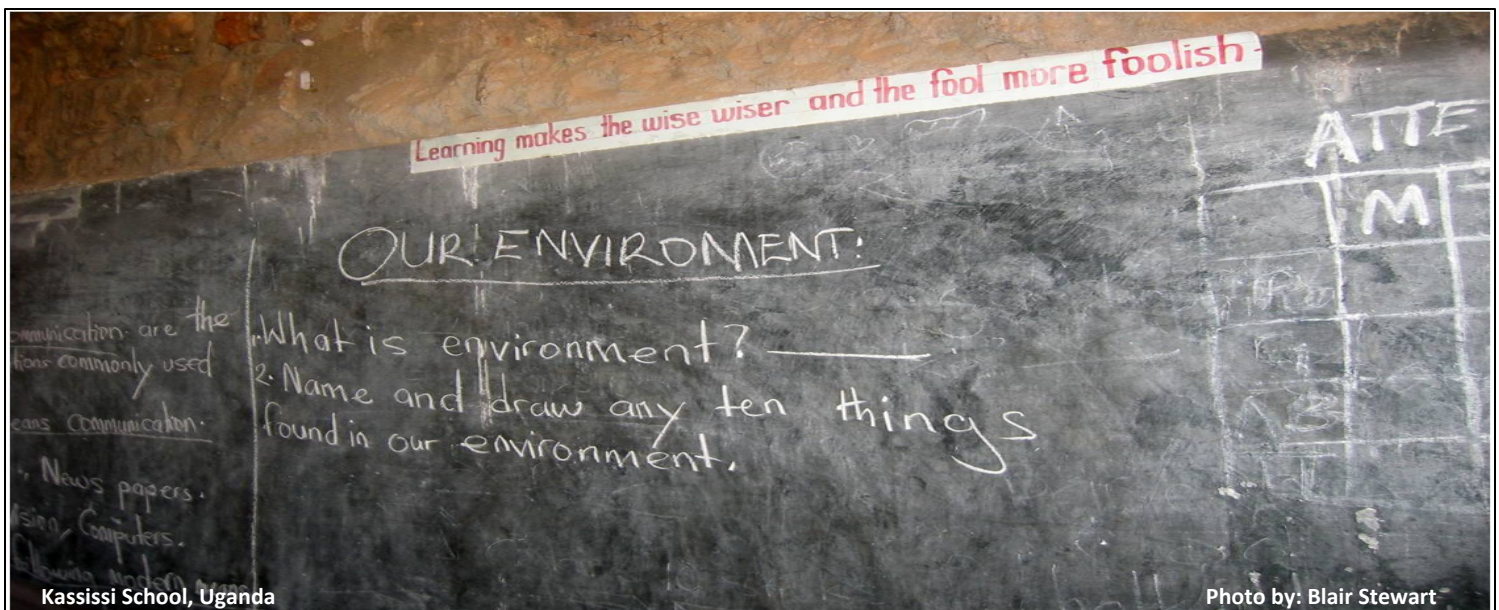
None.

Assignments:

None.

Assessment:

- Fifteen minute pitch presentation.
- Two page pitch document.
- Criteria to decide which pitch to fund.





Additional Sources

Thinking in Systems

J. W. Forrester, *Industrial Dynamics*, The MIT Press, Cambridge, Massachusetts, 1961.

D. H. Kim, "Toolbox: Guidelines for Drawing Causal Loop Diagrams," *The Systems Thinker*, Vol. 3, No. 1, pp. 5–6 (February 1992).

G. P. Richardson and A. L. Pugh III, *Introduction to System Dynamics Modeling with DYNAMO*, Productivity Press, Cambridge, Massachusetts, 1981.

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P. M. Senge, C. Roberts, R. B. Ross, B. J. Smith, and A. Kleiner, *The Fifth Discipline Fieldbook: Strategies and Tools for Building a Learning Organization*, Doubleday Currency, New York, 1994.

Concept Mapping References

Novak, Joseph D., and Cañas, Alberto J. 2008. *The Theory Underlying Concept Maps and How to Construct and Use Them*. Technical Report IHMV CmapTools 2006-01 Rev 01-2008. Florida Institute for Human and Machine Cognition. Available at <http://cmap.ihmc.us/Publications/ResearchPapers/TheoryUnderlyingConceptMaps.pdf>.

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Homer-Dixon, T.F., Levy, M.A., 1995. Environment and Security. *International Security*, 20 (3), 189-198.

Kelley, P. M., Adger, W. N., 2000. Theory and practice in assessing vulnerability to climate change and facilitating adaptation. *Climatic Change*. 47 (4), 325-352.

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Additional Sources

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Manyak, T. G., Katono, I. W., 2011. Impact of Multiparty Politics on Local Government in Uganda. *African Conflict & Peacebuilding Review*, Spring (Article) Published by Indiana University Press. 1 (1), 8-38.

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Pender, J., Jagger, P., Nkonya, E., Sserunkuuma, D., 2004. *Development Pathways and Land Management in Uganda*. International Food Policy Research Institute, Washington, DC, USA, Indiana University, Bloomington, USA, and Makerere University, Kampala, Uganda. *World Development*, 32 (5), 767-792.

Pickering, A. J., Davis, J., 2012. Freshwater Availability and Water Fetching distance Affect Child Health in Sub-Saharan Africa. *Environmental Science & Technology*, 46, 2391-2397.

Ssewanyana, S., Younger, S. D., 2007. Infant Mortality in Uganda: Determinants, Trends and the Millennium Development Goals. Economic Policy Research Centre, Makerere, Uganda, and Cornell University, Food and Nutrition Policy Program, Ithaca. *Journal of African Economies*, 17 (1), 34–61.

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DOI:10.6084/m9.figshare.2060994



Assessment Rubrics

Annotated Bibliography Rubric

| ITEM | Yes (2) | Partially (1) | No (0) |
|---|---------|---------------|--------|
| Is the article relevant | | | |
| References cited properly in the text and in the infographic. | | | |
| References are high quality, credible sources. | | | |
| Clearly state the relevance of the article | | | |
| Summary of article is clear | | | |
| Sentences are clear. Transitions between ideas are logical and smooth | | | |
| There are no grammatical or spelling errors | | | |



Assessment Rubrics

Revised Concept Map Rubric

| Systems Thinking Concepts | 1 | 2 | 3 | 4 | 5 |
|--|--|---|--|---|--|
| Identification of critical variables | | | | | |
| Linearity | | | | | |
| Interconnectivity | | | | | |
| Cause-effect relations (causal loop) | Most of the feedback loop processes and effect on the variables and the overall behavior of the system are inaccurately described or missing and the feedback loops are out of balance or do not effectively regulate the system; and most of the nature of the feedback loops are inaccurately described. | | | | |
| Dynamic Processes | View the whole system as static, and no consideration of dynamic processes, or time delay effects | | View the whole system as partially static, or no consideration of dynamic processes occurred in the system; or no consideration of time delay | | View the whole system as dynamic entity, considering dynamic processes occurred in the system; consider time delay effects |
| Contextualization | The reasoning process and conceptualization is decontextualized, taking no context-specific consideration, containing no contextual variables or effects | | The reasoning process and conceptualization is partially contextualized, taking some context-specific considerations, containing an insufficient number of contextual variables or effects | | The reasoning process and conceptualization is highly contextualized, taking full context-specific consideration, containing an appropriate number of contextual variables or effects. |
| Underlying mechanism (explanatory knowledge) | The description does not address the nature of the parts of the system and the inter-causal relationships of the parts in a way that explains how these relations serve as underlying mechanisms in the system | | The description partially addresses nature of the parts and inter-causal relationships in a way that explains underlying mechanisms and explanatory knowledge | | The description articulates the nature of the parts of the system and inter-causal relationships and how these serve as the underlying mechanism of the system and explanatory knowledge |



Assessment Rubrics

Presentation Rubric

| | ITEM | Yes (2) | Partially (1) | No (0) |
|-----------|---|------------|------------------|-----------|
| Content | Explain background information that provided the basis for pitch | | | |
| | Explain the significance of your project (why is this project worth doing?) | | | |
| | Explain your project (what is your focus, what driver are you focused on, what scale, over what time period?) | | | |
| | Explain why you choose your focus area | | | |
| | Use graphs, pictures, other visuals to explain your projects. Explain graphs, thoroughly ("walk us thru") | | | |
| | Explain why your project should be funded | | | |
| | Explain what you think should be done next. | | | |
| | Appropriate terminology was introduced/ explained & used. | | | |
| PPT Style | The slide show was clear and well organized. | | | |
| | The text was large enough to read from a distance. | | | |
| | Text was not overused. Images and diagrams were included wherever possible. | | | |
| | You delivered your presentation without rushing. | | | |
| | You spoke directly your audience, without frequently looking at the ppt. | | | |
| | Q&A: your group responded thoughtfully to questions. | | | |



Assessment Rubrics

Two Page Pitch

| | ITEM | Yes (2) | Partially (1) | No (0) |
|---|--|------------|------------------|-----------|
| Title | Catchy title captures your attention | | | |
| Mission Statement | Succinct, intuitive statement | | | |
| Written Content | Clearly state the project | | | |
| | Explain why it is important | | | |
| | Show evidence of your reasoning | | | |
| | What driver(s) do you hope to influence | | | |
| | Do you clearly state your intent | | | |
| | Is your project concise and manageable? | | | |
| | Sentences are clear. Transitions between ideas are logical and smooth | | | |
| | There are no grammatical or spelling errors | | | |
| Visual Content: create an original infographic | Does your infographic show your major position about the claim? | | | |
| | Infographic shares the most relevant information accurately. | | | |
| | Infographic is visually rich, appealing, and makes complex ideas simple | | | |
| Style | Appropriate creativity is used to engage your audience- you want to read it makes you care & want to learn more! | | | |
| References | References cited properly in the text and in the infographic. | | | |
| | References cited properly at the end. | | | |
| | References are high quality, credible sources. | | | |
| | Findings from the references are described. | | | |



Assessment Rubrics

Journal Rubric

| Criteria | ITEM | Yes (2) | Partially (1) | No (0) |
|-------------------|---|------------|------------------|-----------|
| Critical Thinking | Rich in content; insightful analysis, synthesis and evaluation, clear connections made to real life situations or to previous content | | | |
| Written Content | Ideas are clear and well organized | | | |
| | Sentences are clear. Transitions between ideas are logical and smooth | | | |
| | There are no grammatical or spelling errors | | | |
| Style | Appropriate creativity is used | | | |
| | Insider knowledge is not assumed. Terminology is explained. | | | |
| | Writing stays on topic and to the point. | | | |



Assessment Rubrics

Peer Review Rubric

Reviewer:

Team being Reviewed:

| Criteria | Worst | | | | Best |
|----------------------|-------|---|---|---|------|
| Content | 1 | 2 | 3 | 4 | 5 |
| Style | 1 | 2 | 3 | 4 | 5 |
| Professionalism | 1 | 2 | 3 | 4 | 5 |
| Argument | 1 | 2 | 3 | 4 | 5 |
| Project Design | 1 | 2 | 3 | 4 | 5 |
| Relevance of project | 1 | 2 | 3 | 4 | 5 |
| Creativity | 1 | 2 | 3 | 4 | 5 |

Do you believe that this team identified a critical point of intervention that has potential to have a real impact?

Give one constructive criticism