Module 4

Using Systems Concepts in Ecohealth

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Overview

Systems thinking is one of the six core principles of Ecohealth, and this module explores what it means in practice. Module 2: Introduction to Ecohealth introduced the idea that health, however it is defined, is the result of a complex set of social and ecological interactions. In that module we suggested that in some cases, the solutions to some problems might result in new problems. For example, certain ways of responding to malaria (draining swamps, use of certain pesticides) might reduce malaria transmission, but they might also increase food insecurity and create habitats for new diseases to emerge. Certain ways of responding to food insecurity (increasing prices) might improve farmers’ incomes, but also make it more difficult for urban consumers to afford that food. Such consequences are properties of systems, components, and processes that interact in uncertain and complex ways, and they create complex, messy problems often called “wicked” problems by social planners. Strategies and options to deal with the consequences of our decisions and actions can be clarified if we have a better understanding of systems concepts, particularly those having to do with interrelationships, perspectives, and boundaries. This module will help learners translate systems concepts from theory into the context of Ecohealth research.

In the face of complexity, an Ecohealth researcher has to deal with a range of difficult decisions: how broad should the research be, whose interests should be considered, how can the different ways of understanding the world be resolved, and can we act in the face of unforeseen consequences. In brief, how does the research handle complex interrelationships, divergent perspectives, and choices of where and how to place boundaries around the research in a fair and equitable way?
Conceptual Map: Module 4

**Learning Objective:**
Explain the significance of interrelationships, perspectives, and boundaries to systemic inquiry.

**Activity 1:**
Warm up; introduce a case study

**Activity 3:**
Individual or small group reflection; discussion

**Activity 2:**
Handout glossary

**Learning Objective:**
Apply systems ideas to conceptualize an Ecohealth research problem and derive research questions.

**Activity 4:**
Small groups; case study

**Advanced Learning Objective:**
Explain why research design is part of understanding complex and uncertain systems.

**Advanced Learning Objective:**
Apply systems ideas to the design of ecohealth research and the interpretation of research outcomes.
Introduction to Topic

Systems ideas can be traced back many thousands of years, but the modern systems movement traces its lineage to the middle of the twentieth century, starting in the 1930s and accelerating during the Second World War. The task that confronted planners and strategists was how to consider the implications for action of highly complicated, fast changing situations on the basis of limited information. In the past 50 years or so the field has expanded to encompass a wide range of methodologies, methods, and techniques. The language of systems has been incorporated into everyday speech and in many ideas that inform both the social and physical sciences. Despite this, the real power of systems approaches have not in general flowed into those activities that seek to address some of humanity’s more significant challenges.

This module is about how using ideas from the systems field can help you be more effective and productive in your Ecohealth activities – that is, the systems part of the ecosystems approaches to health. Systems ideas can help reshape the way you understand and address complex problems – and provide new routes through to innovative solutions.

This module identifies and describes some key aspects of systemic inquiry and provides some easy to use but powerful tools that you can use in your work.

Note that the particular language is less important than the ideas each tool represents.

Module Aims

- Explain three core concepts in systemic inquiry: interrelationships, perspectives, and boundaries
- Identify a dozen key questions that a systemic inquiry poses and link them to the process of research design
- Explain that a systemic inquiry is more than observing how things interact with each other; it depends on the mental models that people bring to a situation.

Why is this topic important?

Systems thinking is one of the six core principles of Ecohealth (see Charron 2012) and this module explores what that means in practice. The health of humans, indeed any living being, depends on relationships with other members of a population, the bio-physical characteristics of their surroundings, and other contexts in which they live – in other words, the systems of which they are a part. And their health has consequences for that system too. These influences and consequences make for complex systems; health issues can be difficult to understand, or persistent, or even emerge spontaneously. Understanding and applying systems thinking will help provide
learners with tools to approach the complexities and uncertainties of health, and an ability to adopt a rigorous investigation: to develop research frameworks that take them into account.

**Key Concepts**

This module uses three key systems concepts (interrelationships, perspectives, and boundaries) and asks questions about how they apply to Ecohealth research design.

**Guiding Questions**

1. What is the structure of the interrelationships within the situation of interest (i.e. how are the components arranged)?
2. What are the processes between components of that structure?
3. What is the nature of the interrelationships (e.g. strong, weak, fast, slow, conflicted, collaborative, direct, indirect)?
4. What are the patterns that emerge from these interrelationships over time, with what consequences and for whom?
5. Who or what are the key stakeholders and stakes within the situation?
6. What are the different ways in which you can understand or frame the situation?
7. Which perspectives (i.e. stakeholders, stakes, framings) are privileged and which are marginalized? With what effect on whom?
8. Boundaries – given that our understanding of any situation and our ability to respond has limits, how do we decide what should be included and excluded from our inquiry and response?
9. What does it mean to conduct Ecohealth research in a way that uses systems principles and ideas?
10. How can you manage the ethical, political, and practical consequences of these decisions, especially those that cause harm or have the potential to cause harm because they exclude an interrelationship or perspective?
11. How are these different framings going to affect the way in which stakeholders act or expect and thus need to be considered?
Basic Learning Objectives

After completing this module, learners will be able to:

- Explain the significance of interrelationships, perspectives, and boundaries to systemic inquiry.
- Apply systems ideas to conceptualize an Ecohealth research problem and derive research questions.

Advanced Learning Objectives

Advanced learners will be able to:

- Explain why research design is part of understanding complex and uncertain systems.
- Apply systems ideas to the design of Ecohealth research and the interpretation of research outcomes.

Practical Notes

- This module is centred on the design of a research project. However, it is important to stress (especially towards the end) that systems ideas can be used throughout an Ecohealth initiative.
- The module uses technical “systems” language. All fields have jargon – shorthand that allows members to communicate. One of the consequences of transdisciplinary work is the necessity to respect, learn, and use the jargon of many fields. The glossary at the end of this module explains the main technical words and phrases commonly used in the systems field. Participants should be encouraged to consult this glossary.
- There are no prerequisites for participants, although the proposed dengue case study uses some technical language and may need to be explained to participants who have no background in biological sciences.
- The activities proposed can be carried out through individual study or within groups, but it is better and more consistent with the principles of Ecohealth instruction and systemic inquiry that this module be undertaken in a group setting.
- No special resources are required other than those outlined in the manual Introduction.
• The module will take approximately a half day at minimum, or a 3- or 4-hour session. It can be delivered as one entire session or divided into two separate sessions.

• The lessons from this module should be applied and integrated to other training activities as soon as possible.

Background information

Systems thinking focuses on relationships among things and how they influence each other. This kind of thinking has been used in a wide variety of fields, at various geographic and political scales, and is not unique to Ecohealth. For instance, some nutritionists look at household systems, farmers think about farming systems and ecologists talk about ecosystems. Policies and practices to manage human-ecological interactions in the Great Lakes that straddle the Canada-U.S. border are based on an ecosystem approach that draws on management systems. Unlike other fields, however, systems thinking is considered a central principle for an ecosystem approach to health.

Some of the people and organizations that have furthered the theory and practice of systems thinking include the Millennium Ecosystem Assessment, the Resilience Alliance, the International Society for Systems Sciences, and other networks of researchers and scholars primarily from Europe, Latin America, Australia and New Zealand, and North America.

Ecohealth practitioners have borrowed from all of these fields, and modified the ideas and practices to fit particular issues they wish to address. For most Ecohealth problems, in which human activities interact in complex ways with the bio-physical and social world, complex systems thinking, which draws on complexity theory, has been very useful.

All the systems that are talked about in systems thinking, even the most complex, are models, in the sense that they are not the world itself, but simplified representations of it. They are more (or less) useful in helping us to answer specific questions about the world, and to solve practical problems. While the language used to describe the various components of systems thinking vary by schools of thought, the underlying issues are generally agreed upon. The intent of this introduction is not to give a complete overview of systems thinking, but to highlight some of the many logistical and ethical issues that arise from, and influence, how systems are used in Ecohealth activities.

The world we live in is made up of an uncountable number of relationships among viruses, bacteria, animals, people, plants, minerals, water, and various other entities, across a wide variety of geographic, social, and time scales. Complex systems theories say that, although we can never understand these relationships fully, we can gain a better understanding when we simplify them
into systems models. These systems models can further be simplified by classifying them into simple systems, complicated systems, and complex systems (see Box 4.1). This is one of many ways to classify them, but can be useful in deciding which approaches to use to addressing various problems.

### BOX 4.1: ONE CLASSIFICATION OF SYSTEMS TYPES

**Simple systems:** linear, stable equilibrium, cause and effect, predictable systems. Respond with expertise: If you are in a car accident, you want experts who know what to do for your broken leg, and others who know how to fix the broken car!

- Scholarly response: modelling
- Practical response: good education and training. Hierarchy of command. Efficiency is good.

**Complicated:** big or messy simple systems – you can create quantitative models. Still expert-reliant but need more checks and balances as the math is difficult: sending a landing craft to Mars.

- Scholarly response: modelling
- Practical response: good education and training. Build redundancy into the system – lots of checks and balances. Effectiveness is better than efficiency.

**Complex systems:** complex systems are descriptions of complexity. There are many such descriptions possible – observer dependent. Raising children and managing sustainable food systems are activities for which one would invoke complex systems of practice.

**Complexity issues** (all contentious): feedback loops (uncertainty); scale (boundaries, stakeholders); multiple perspectives (whose version counts?).

- Scholarly response: scenarios principles; narratives.
- Practical response: expand the peer group. Iterate across temporal and spatial scales.

The intimate entanglement of cause and effect in complex human systems is portrayed in this example provided by Snowden:

“When a rumour of [company] reorganization surfaces: the complex human system starts to mutate and change in unknowable ways; new patterns form in anticipation of the event. If you walk up to an aircraft with a box of tools in your hand, nothing changes.”
We mostly address complex systems in this module.

If our goal is sustainable health, then we wish to manage our relationships with nature in such a way that the landscapes in which we live continue to perpetuate and organize themselves even as we take from them those things (food, water) which we require (or desire) for life. This ability of an ecological system to maintain basic functions over time is called “self-organization,” and is rooted in ideas of feedback loops and learning. At the simplest (subsistence) level, we might say chickens produce manure, which is used to fertilize crops that feed the chickens— with some crop left over, or eggs produced, for the people. The ability of farming families to do the work of managing a farm depends in part on their own nutritional status. Nutrition of people in the household depends on relationships among those people (men, women, children) and these are influenced by — and influence — the social structures and cultures in which they are embedded. Furthermore, farmers might sell their eggs, generating money for them to buy different foods for themselves and their animals, hopefully with enough left over to pay for schools and health care. The feedback loops at the household and farm level now begin to interact with relations between markets, local climate, the services that society can provide, and regional water management. We cannot look at everything! Which relationships we focus on depends on the questions we have, and the reality of the situation we are examining. A useful approach in this sense is to think of “interventions” in the system: how, where and when do we intervene in a system to better manage critical relationships?

We address health and sustainability issues at individual, household, farm, neighbourhood, regional, national, and global levels. Philosopher of science Arthur Koestler called these units, such as individuals and households, “holons” — units that are both a whole, and a part of something else — each unit having its own leaky boundaries and internal feedback loops with their own rules. These units are nested — people in households, households in neighbourhoods, neighbourhoods in larger communities, and so on. Individuals are both constrained by, and influence, the multi-layered contexts within which they live. Furthermore, because complex systems are created by the interaction between observer and observed, many such “systems” are possible and the boundaries depend on the questions being asked.

In practical terms the interactions between observer and observed world, and the notion of a nested hierarchy (holons within holons), means that:

1) Any attempt to transform systems (individuals, families, communities) relies on accommodating the multiple perspectives — that is, even as an individual organism I must somehow accommodate my biological, social and economic constraints, and desires.

2) Every boundary drawn implies a logistic choice about the issues and the kinds of influence we want to exert on them. These boundary choices can be understood in both geographic and temporal terms. Do we wish to help a household use water more efficiently and provide end-user ways of sanitizing it (the household level), or do we wish to focus on more
To deliver safe water to households, how do we design sustainable and effective policies and infrastructure? These choices are not exclusionary, that is, “either-or” choices, but for practical purposes and research these choices provide focus.

3) Every boundary is also an ethical choice, as we are deciding whose perspectives we will accommodate most directly and include as “relevant,” that is, who we will consider as participating stakeholders. Even if we choose to work at households, however, we not only need to think about local feedback loops (chicken manure is used as fertilizer to grow crops to feed chickens; chicken manure in water leads to sickness and decreased ability to care for chickens) but also about cross scale loops (price of eggs or chickens sold on market influences what people do with their poultry; the availability of water from watershed influences household possibilities).

Figure 4.1 Three core concepts for systems thinking: interrelationships, perspectives, and boundaries.
Activities

Before the exercise, participants should have read the case study on dengue fever (Module 4 – Handout 1 – Activity 1: Case Study: Dengue Fever Prevention). Ideally participants should read it before the course, but if not then make sure they read it before the start of the session. It will take five or ten minutes to read.

Activity 1

Warm up.

Learning Objective:

- Explain the significance of interrelationships, perspectives, and boundaries to systemic inquiry.

INSTRUCTIONS

This module uses a case study on dengue fever. However at this stage, do not circulate the case yet, just introduce the idea of a dengue issue. This warm up activity allows you to gently introduce the ideas in the case study.

INSTRUCTIONS FOR LEARNERS

You have been asked to participate in some applied research on controlling outbreaks of dengue fever in urban areas of Thailand. Dengue fever is a virus-caused disease that is spread by mosquitoes. What kinds of issues would you need to consider and negotiate when designing, carrying out and analyzing this research?

This task can be structured in various ways, depending on the group and its size.

Here are two possibilities:

OPTION ONE:

Ask participants to consider for a moment what might be involved, and to form a “buzz group” with the person sitting next to them to discuss for 2 minutes. Then, one at a time, ask each participant or pair to suggest one thing. Write the responses on a flip chart or whiteboard. If a participant’s idea is already displayed ask them for another. If they don’t have one, move to the next participant. Continue until all ideas are exhausted.
OPTION TWO:
Circulate sticky notes to participants. Ask them to write clearly a word or phrase or an activity that describes what is involved. Participants are then invited to post the sticky notes on a wall.
Don’t give participants too much time to think about this, and stop before the energy in the room dissipates.

Activity 2
Reading Activity
Learning Objective:
• Apply systems ideas to conceptualize an Ecohealth research problem and derive research questions.

INSTRUCTIONS
The short essay, Module 4 – Handout 2 – Activity 2: Three Core Concepts: Interrelationships, Perspectives, and Boundaries, should be circulated to participants, who are given 20 minutes to read it.
Participants may ask questions about particular words and phrases. You can print out copies of particular words and phrases from the glossary – words contained in the glossary are highlighted in bold in the handout.
Activity 3

Reflection

Learning Objective:

- Explain the significance of interrelationships, perspectives, and boundaries to systemic inquiry.

INSTRUCTIONS

Having read the document, the next task is for participants to group their previously posted ideas into the three components of thinking systemically: interrelationships, perspectives, and boundaries. How this is done will depend on which option was chosen, but it is a collective activity. Trainers should listen and note carefully any important comments or disagreements.

It is important that participants understand that they can allocate an item to more than one category.

Commonly the “interrelationships” category has more items than the other two; so participants should be encouraged, once the categorization has finished, to add any further items to the three categories.

Once this exercise is complete, there should be a reasonable period of reflection. This process is best done in small groups, but can also be done individually at first and then moving to small groups or the entire group, depending on numbers, time, and group dynamics.

INSTRUCTIONS FOR LEARNERS

Think back to the previous exercise where you were asked about particular aspects of work on dengue fever. Where would you place aspects in terms of the three systems dimensions and why? Don’t worry if you can place them in more than one, but think of the difference between each option.

- Interrelationships
- Perspectives
- Boundaries
Activity 4  
*Applying Systems Ideas to Ecohealth Research*

**Learning Objective:**
- Apply systems ideas to conceptualize an Ecohealth research problem and derive research questions.

**Advanced Learning Objective:**
- Explain why research design is part of understanding complex and uncertain systems.
- Apply systems ideas to the design of Ecohealth research and the interpretation of research outcomes.

**INSTRUCTIONS**

This is a good place to split the module if you are doing two separate classes on systems. This activity is best explored in small groups (max 6 to 8) with larger group plenaries.

At this point, introduce the case study on dengue fever and ask participants to read it. For the remainder of this module, participants will be working on this case. The case is short and may not contain all the necessary information; additional information could be provided by the instructor.

Some participants may feel frustrated that the case study does not provide sufficient detail. Explain to these participants that the case is provided for learning purposes, and that part of the research design process will always be an exploration of what is already known and what is not yet known about an issue. Participants will be expected to supply some information as part of the process, or suggest that information needs to be found. However, if you feel that participants’ learning is being hampered by a lack of some information do not hesitate to make something up.

The following process focuses on the very early stages of a research design – long before decisions are made about specific methodologies, methods, or techniques. Indeed it is this process and analysis that helps decide specific methodologies, methods, or techniques. Some participants may not be familiar with this stage of a research design process – and have only experience of selecting methods. If that is so, then some guidance may be necessary.

Although this process focuses on research design, encourage participants to think about the relevance to other aspects of Ecohealth research, such as the fieldwork, research management, data analysis, and reporting. An exercise at the end of this module promotes this further.
INSTRUCTIONS FOR LEARNERS

The process of research design has two phases. The first phase is to deliberate on the problem, situation, or issue that you are interested in. The second phase is to identify the methods and techniques necessary to undertake the research. The process that follows is focused on the first stage, because that is where the key interrelationship, perspectives, and boundary decisions are made.

However, you can use systems approaches in any part of the research – design, fieldwork, analysis, and reporting.

There are various ways to structure this process. Several examples from India, Peru, Kenya, Canada, and Nepal are described in Waltner-Toews et al 2008. Nevertheless, most processes take the ideas of interrelationships, perspectives, and boundaries, including the 12 systemic questions, and reorder them in a way that can be used to undertake this first phase of a research design.

This rearranged version is divided into four steps:

- Step 1: Construct a “rich picture” of the situation of interest
- Step 2: Frame the situation
- Step 3: Consider the ethical and pragmatic consequences of these framings
- Step 4: Assess the dynamics of the situation.

It is a generic process that needs to be and should be adapted to match particular situations. Don’t feel you have to pose exactly the questions that are listed here, or exactly the way they are worded, but do make sure that the principle underpins whatever questions you ask.

STEP 1: CONSTRUCT A “RICH PICTURE” OF THE SITUATION OF INTEREST

See Module 4 - Handout 3 – Activity 4, step 1 for instructions.

For this exercise, learners will need a large sheet of paper, some felt-tipped pens, and sticky notes. Note that drawing a rich picture is usually a group exercise, and sometimes stretches over a period of a whole workshop or course, as people think of more things to add. Although the pictures will appear messy and sometimes simplistic, they form a basis for more sophisticated and locally-rooted understanding of a situation. In some cases, rich pictures have been used as the basis for developing GIS computer simulation models (see Bunch et al. 2008).
During the exercise, have the groups reflect not just on the content, but on who drew what, and if there were gender, cultural, or occupational differences in what is depicted.

Allow some time for reflection at the end and get people to compare results. See if you can get people to reflect on whether their “rich picture” represents a limited number of perspectives. Ask i) what boundary choices have been made in drawing the picture and ii) what the consequences might be for the representation of the system.

**STEP 2: FRAME THE SITUATION**

*See Module 4 - Handout 4 – Activity 4, step 2 for instructions.*

Participants may have some difficulty working out the difference between a perspective and a framing. The easiest way to distinguish is that people have perspectives but problems and issues are “framed” by defining what they are. Framings are often a complex combination of different perspectives. So there will be lots of perspectives on dengue fever, but you could frame it as a social issue, an economic issue, a health issue, an issue of poverty or overcrowding. Each step involves value-based decisions. For instance, two people may both frame an issue economically (a decision on what they value generally); but one may favour the perspective of small farmers and the other of urban consumers.

- Ask the groups to think back to Module 2 and reflect on how perspectives and framings were, or were not, included in that module.
- Allow people to have a good break after this session, because Step 3 is a big challenge.

**STEP 3: CONSIDER THE ETHICAL AND PRAGMATIC CONSEQUENCES OF THESE FRAMINGS**

*See Module 4 - Handout 5 – Activity 4, step 3 for instructions.*

It is probably a good idea to break the group into smaller sub-groups, each one working on a different framing. This is why starting with a large group first is a good idea.

Participants may find the next set of tasks difficult. In particular, people in the “caring” professions find difficult the idea that someone or something “ought” to be harmed or marginalized – or that they have some ethical responsibility to explore harm mitigation even to those whom they really wish to be marginalized; indeed this process will likely draw on different moral judgments, not just harm mitigation.

Perhaps even more difficult for some is the realization that all their actions are driven by values, even though it might appear to them to be derived from an objective “truth.” The best advice is to keep repeating that every endeavour, including this research, has to set boundaries, and part of systems practice is to set them ethically – which involves being concerned with the consequences.
• Instruct learners to select one of the framings that emerged during the last step. Ensure that a wide variety of different framings are selected among the groups in your session.

• You need to ensure that participants consider only that framing and not take any other framing into consideration. This is much harder than it sounds, especially if participants have selected a framing that is different from their own experience and knowledge. Your task is to keep them focused.

• Ask the learners to consider a number of different perspectives:

  • What should be the purpose of the research? (For example if your “framing” is about economic development, then the purpose of your research may be to explore ways to undertake mosquito control that enhances the economy. If framing is about sustainability, then the research might look at ways of controlling mosquitoes that does the least damage to the environment.)

  • Given that purpose, who ought to be the prime beneficiaries? Are there gender or other inequity issues that need to be considered? (Try to be specific rather than general. So in the above example avoid saying the beneficiaries will be “people.” Be specific: what kind of people, where?)

• Now ask the learners to return to their rich picture. They should think and state clearly what their values and assumptions are with regards to:

  1. Who should be involved in the research, what resources (money, skills, time, people) ought to be available to the research, and who ought to control those resources? Who ought not to control those resources? What is the consequence for whom of those decisions?

  2. What sources of knowledge and expertise ought to be respected and what sources of knowledge and expertise ought to be ignored? What is the consequence for whom of those decisions?

  3. How ought they manage the ethical and practical consequences of these boundary choices and decisions, especially those that will disadvantage or advance certain points of view or have the potential to cause harm?

**STEP 4: ASSESS THE DYNAMICS**

See Module 4 - Handout 6 – Activity 4, step 4 for instructions.

This step needs to be fully debriefed. In particular, you need to ensure that the participants are using the information and issues raised in Steps 2 and 3, exploring the dilemmas and contradictions that they pose, rather than just talking about things in general.
REFLECTION ON THE BROADER USE OF SYSTEMS IDEAS TO ECOHEALTH RESEARCH

This module has focused on the early stages of designing an Ecohealth research intervention.

As a whole group, discuss how systems ideas, especially the three key dimensions of interrelationships, perspectives, and boundaries could influence how you undertake these other stages of an Ecohealth research project:

- Method selection
- Fieldwork and data collection
- Analysis
- Reporting

Sample Timetable: Module 4

<table>
<thead>
<tr>
<th>TIME</th>
<th>INTENSE SHORT COURSE (1 DAY)</th>
</tr>
</thead>
<tbody>
<tr>
<td>08:30-09:00</td>
<td>Activity 1, Introduction and warm up: Brainstorming on dengue fever issues.</td>
</tr>
<tr>
<td>09:00-9:30</td>
<td>Activity 2, Reading handout on interrelationships, perspectives, and boundaries.</td>
</tr>
<tr>
<td>09:30-10:00</td>
<td>Activity 3, Grouping ideas into interrelationships, perspectives, and boundaries. Reflection.</td>
</tr>
<tr>
<td>10:00-10:30</td>
<td>Break</td>
</tr>
<tr>
<td>10:30-11:30</td>
<td>Activity 4, Step 1, Construct a rich picture map of case study.</td>
</tr>
<tr>
<td>11:30-12:30</td>
<td>Activity 4, Step 2, Frame the situation.</td>
</tr>
<tr>
<td>12:30-13:30</td>
<td>Lunch</td>
</tr>
<tr>
<td>13:30-15:00</td>
<td>Activity 4, Step 3, Consider the ethical and pragmatic consequences of framings.</td>
</tr>
<tr>
<td>15:00-15:15</td>
<td>Break</td>
</tr>
<tr>
<td>15:15-16:30</td>
<td>Activity 4, Step 4, Assess the dynamics.</td>
</tr>
<tr>
<td>16:30-17:00</td>
<td>Wrap up and evaluation.</td>
</tr>
</tbody>
</table>
Evaluation

Refer to Modules 1 and 2 for suggestions on evaluating this topic.

Terminology

Agent
A component of a situation. It could be people or things. Often the nodes of network relationships.

Boundary
Marks an important distinction between two features of a situation. It determines what is “in” (included) or what is “out” (excluded), what’s important or relevant and what is unimportant or irrelevant, what is emphasized and what is marginalized.

Boundary decision
The choice of where to place a boundary.

Boundary critique
The means by which you consider the implications of particular boundary decisions.

Complex situations
Situations whose behaviour is knowable only after the fact; uncertain and unpredictable. (Uncertainty is also a large area of study in its own right).

Complicated situations
Situations whose behaviour is knowable but not necessarily known, and once known is relatively predictable.

Context
Something that affects how a situation behaves but over which that situation has little influence or control. History is often an important aspect of context.

Dynamic
How agents interrelate and the consequences of those interrelationships over time.

Feedback
The phenomenon where an output of a process becomes the input of the same process. In most situations, these feedbacks work over different time periods.

Framing
A collection of perspectives that help you make sense of a situation in a particular way.
**Input**
Something that is changed by a process.

**Interrelationship**
Connections between components or agents within a situation.

**Marginalization**
In boundary setting, an aspect of a situation is marginalized if it is considered unimportant.

**Network**
A set of interrelationships between objects or agents.

**Object**
A component of a situation. It could be people or things, and is often the node of network relationships.

**Output**
The result of a process.

**Pattern**
A set of repeated behaviours.

**Perspective**
Values, assumptions, and viewpoints that stakeholders bring to a situation.

**Problem**
A situation that is of some concern or that contains issues that need resolving.

**Rich picture**
A graphic means of displaying key features of a situation that is unstructured and unfettered by pre-conceived views and ideas.

**Simple situations**
Situations whose behaviour is wholly known and predictable.

**Situation**
The set of circumstances that are of interest to us and on which we intend to apply systems concepts.

**Situation or situation of interest**
In systems language, a state of affairs that is of interest to you that you wish to explore further or intervene in.

**Stake**
Motivations, world views, and other factors that could benefit or be at risk.

**Stakeholder**
Someone or something that can affect or be affected by a situation or any action to address a situation.

**System**
Within this module the word “system” is used to describe a model of a set of interrelationships, within certain boundaries, that we wish to study and/or change.
**Systems thinking**
A means of understanding the world holistically, using concepts of interrelationships, perspectives, and boundaries.

**Worldview**
A set of values and attitudes that influence how you engage with a situation.

**Key References**
Much material about systems ideas is available on the Internet. Two key sites are:
- Bob Williams’ website: [http://www.bobwilliams.co.nz](http://www.bobwilliams.co.nz)
- Open University: [http://openlearn.open.ac.uk/](http://openlearn.open.ac.uk/)

**Publications**


Williams, B. (2011). All methods are wrong, some methods are useful. How to choose between systems principles and systems methods. The Systems Thinker, 22 (4). Pegasus Communications, Inc.

**Additional References**

**Rich Picturing**


Boundaries


Case study: Dengue Fever Prevention

Note: This case study is about a multi-agency research project in urban and peri-urban Thailand. It is based on an action research Ecohealth intervention. This description outlines only the main points of the intervention and, for the purposes of this course, does not describe the intervention itself or its outcomes. Essentially you are going to design the intervention during this session.

Aspects of the case that will emerge during the exercise are not fully covered in this description. This is done deliberately to allow you to uncover these aspects as you work through the case study.

CONTROL OF DENGUE VECTORS IN URBAN AND PERIURBAN SETTING S IN THAILAND

BACKGROUND

Dengue fever is considered one of the most important vector-borne diseases in Thailand and its incidence is increasing despite routine implementation of national dengue control programs. This study aimed to demonstrate application of integrated, community-centred, eco-bio-social strategies in combination with locally produced ecofriendly vector control tools within the dengue control program, focusing on urban and peri-urban settings in eastern Thailand.

Dengue has four viral serotypes (variations of virus types) and there is still no available quadrivalent vaccine (i.e. which applies to all four virus types). Control efforts in most countries, including Thailand, therefore have focused on controlling the mosquito vectors (carriers of the virus), especially *Aedes aegypti*.

With regards to ecological factors that contribute to dengue transmission, research findings have shown that the dengue virus, human host populations, and ecosystems show features of complex systems. Other investigations related to environmental and climatic factors have revealed that nutrients and temperatures could affect the growth development and survival of *Aedes* larvae, shorten the period during which the virus replicates in the mosquito’s body (extrinsic incubation period), and increase the incidence of dengue fever, while an increase of rainfall could cause a decrease of incidence.

From the initial program in the 1960s, the Ministry of Public Health of Thailand has concentrated on vector control for dengue by spraying insecticide to control adult mosquitoes and using temephos (1% abate sand granules) to control larval stages. However, despite having established intensive vector control programs and vector surveillance strategies all over
the country, suppression of dengue transmission has not been fully achieved, as indicated by the number of reported cases in Thailand over the past 10 years (more than 30,000 per year). The lack of efficacy of ultra-low volume (ULV) and thermal fog application techniques has led to a re-evaluation of recommended strategies for prevention and control of mosquito vectors, and strategies ranging from integrated approaches to community participation have been considered. Moreover, the consequences of intensive use of insecticides have caused insecticide resistance in many insects including mosquito vectors, and insecticide residues retained in the food chain affect many life forms, including soil bacteria and plants. For these reasons, the trend in dengue vector control has shifted away from the use of chemical-based control to biological-based control and source reduction/environmental management through community participation.

Research has shown that residential mixed with commercial and densely populated urban residential areas clearly exhibited the highest risk for dengue incidence. This suggests that dengue control programs could focus on this kind of urban ecosystem, especially during an economic crisis when there are lower budgets for such programs.

Although many research attempts have provided diverse lines of evidence about the drivers of vector abundance, virus circulation, and dengue transmission, they have not taken an integrated approach to investigating all of these factors together. Such a single-focus approach is no longer considered effective for figuring out the complexity of factors underlying the three epidemiological components. Theoretically, comprehensive dengue management requires getting an insight into the holistic disciplines that can assess the driving determinants and how they significantly interact. The need for interdisciplinary integration of ecological, biological, and socio-demographic dimensions of dengue has been recently confirmed by dengue experts in different disciplines.

ECOHEALTH RESEARCH

The intervention site in Thailand was in Chachoengsao Province, located approximately 120 km east of Bangkok. This province is representative of the geographic, social, economic, and epidemiologic situation in most of Thailand. Dengue (DHF) incidence exhibited a strong seasonal pattern in the province, with high transmission during the rainy season. The peak outbreaks of dengue were in 1987 and 2001, as in other provinces. In general, households and buildings were more tightly packed and infrastructure (connecting roads, electric service, and tap water supply) was better in urban settings as compared to peri-urban areas. In all the study areas, both tap water and rainwater were used by households, and although the piped water supply was reliable, people still stored water in various types of containers. An efficient municipal waste management system was in place.

Indoor spraying and fogging was intensively used in the high endemic area, while preventive measures were markedly applied in the low endemic area. A majority of the stakeholders involved in the dengue problem and vector
control were public health service offices. Dengue control activities in this area were mainly driven by public health authorities who are directly in charge, whereas other respective stakeholders rarely participate in control programs.

The key breeding containers were found to be water storage jars, cement baths/basins, and buckets. Before intervention, 7095 containers were inspected, yielding 1231 pupae in 231 containers, and leading to the mean pupae per person index of 0.38. A considerable proportion of the respondents in low dengue transmission areas possessed sufficient overall knowledge about dengue, whereas respondents in high dengue transmission area did not.

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Three Core Concepts: Interrelationships, Perspectives, and Boundaries

Systems thinking is one of the six core principles of the Ecohealth approach (Charron 2012). But what does it mean to conduct Ecohealth research in a way that uses systems principles and ideas? What does it mean in practice? What does it mean for the design, practice, analysis, and reporting of Ecohealth research?

What does “systemic” mean to you? What enters your mind when you read the word? Perhaps something like “looking at the big picture,” or “being aware of how things link together,” or “even seeing things from lots of viewpoints.” These are all very fine ideas, but no great help when confronted with the kind of tricky problem or messy situation that confronts you when dealing with designing and carrying out some Ecohealth work. After all, the “big picture,” complicated relationships, and multiple perspectives are what made the problem or situation difficult to address in the first place.

So what does being systemic or thinking systemically mean in practice? A bit of history helps.

Systems ideas can be traced back many thousands of years, but the modern systems movement traces its lineage to the middle of the twentieth century, starting in the 1930s and accelerated during the Second World War. You can recognize three main phases since then.

From the early days until the late 1960s, the focus of the systems field was very much on interrelationships. This period represented the “wiring diagram” phase of thinking systemically and is still influential today. Indeed some of the maps in other modules (e.g. network maps, concept maps) originated during this first phase).

By the early 1970s, many people in the systems field felt that focusing entirely on interrelationships, while important, was not as useful as it appeared. For instance, the relative importance of particular interrelationships often depended on the different perspectives through which people observed a situation, usually reflecting what they have already experienced, think is most important, or value most highly. Think briefly of the first exercise today – there are probably many perspectives represented. Thus systemic thinking began to include the implications of applying different perspectives, world views, or framings to the same situation.

By the mid-1980s, some systems thinkers concluded that focusing on perspectives had its problems. Perspectives influence what we consider relevant or irrelevant; they determine what is “in” our framing of a situation (the way we understand a situation) and what lies “outside” that framing. Whoever defines the dominant perspective controls the boundary of a
systemic inquiry or intervention; this underlines the importance of addressing questions of power, gender, and equity that were raised in other modules. This reflects the understanding that a complex systems model is the result of what is being observed (the “real world” outside ourselves) and who is doing the observing. Thus, the importance of studying boundaries and critiquing boundary decisions (including those who made them) is the third core concept underpinning a systems approach, and related closely to the kinds of questions raised in the participatory and equity modules.

So let us look at each of these concepts in turn.

**INTERRELATIONSHIPS**

Many newcomers to the systems field are familiar with the idea of interrelationships. Questions of how things are connected and with what consequence stem from the earliest thinking about systems. It is also the concept most strongly embedded in the popular imagination. When we talk about the education system or the health system, we imagine a set of objects and processes that are inter-connected in some way. The popularity of system dynamics and complex adaptive systems in many parts of the world cements the notion that interrelationships are an important systems concept.

However, systemic thinking doesn’t concern itself with just any interrelationships. It focuses on particular aspects of them:

- How the interrelationships affect the behaviour of a situation over a period of time (dynamic aspects).
- How the size of the output or effect of interrelationships appears unrelated to the size of the input to the interrelationship. This is often but not always caused by “feedback” (non-linear aspects). The simplest example of non-linear relationships is exponential growth patterns familiar in ecology and your bank account (“non-linear” in the sense that it is an exponential curve, “feedback” in the sense that “the more there is, the more opportunity there is for more”).
- How the same interrelationships in different contexts have different results (Sensitivity to Context). Disease control methods which work in Thailand may not work in the Philippines.
- How to understand interrelationships that are so complicated or complex that you cannot assess them in terms of simple cause and effect.

When studying interrelationships systemically we ask the first five of the 12 questions we will be considering:

1. What is the structure of the interrelationships within the situation (i.e. how are the components arranged)?
2. What are the processes between components of that structure?
3. What is the nature of the interrelationships (e.g. strong, weak, fast, slow, conflicted, collaborative, direct, indirect)?

4. What are the patterns that emerge from these interrelationships over time, with what consequences and for whom?

5. What are ways in which these complicated and complex dynamics can be identified and managed effectively?

Note that the very idea of interrelationships assumes that we have already set boundaries around the situation we wish to study and/or change, and we have already assumed certain perspectives. One of the challenges of systemic approaches is they are themselves systemic, and the characteristics we are concerned with are interrelated. We “take them apart” in order to better understand them. Indeed, later in this module the 12 questions are put together in a sequence that addresses this issue.

**PERSPECTIVES**

A systemic approach, however, is more than describing how things fit together or networks operate. Just looking at interconnections does not make an inquiry or intervention systemic. What makes it systemic is how you look at the interrelationships. People will see and interpret those interrelationships in different ways depending on their perspectives. A local cafe owner might view issues to do with preventing the spread of dengue quite differently than someone from the health service, even though they may “see” the same thing. The Kathmandu case study described at the end of the Ecohealth Primer (and summarized in Charron’s book) includes a situation in which restaurant owners and customers both knew the water was contaminated. The owners did not boil their drinking water because customers didn’t want them to; the customers feared that if the water were boiled, they would lose immunity to local bacteria. The public health researchers “saw” the same thing, but drew different conclusions. Although it is useful to explore perspectives for getting a more comprehensive understanding of the situation, there is an even more important benefit. What a health inspector does when he or she “sees” a cafe premises will be different from what the cafe owner does when he or she “sees” the same thing. Our perceptions promote behaviours that affect the way a situation unfolds. Indeed what we see as unintended patterns within a situation often result from our unwillingness to understand or explore other people’s perceptions. We write these behaviours off as “unintended” without considering that somebody, somewhere, may indeed have intended the result that we consider a problem. Thus we cannot comprehend the dynamics of a situation without identifying and understanding the range of relevant perspectives that people bring to it.

It’s helpful to distinguish between three forms of perspective: stakeholders, stakes, and framings.

Stakeholders are groups of people or things that have a common role in a situation or intervention (e.g. teachers, consumers, writers). In contrast, stakes relate to individual values and motivations (e.g. wealth, honour, fairness, past
history, purpose, ideas of professionalism), that is, what matters to the stakeholders. People belonging to different stakeholder groups may share the same stakes; for instance, in the Kathmandu study cited above, all the stakeholders – butchers, local residents, shopkeepers – had a stake in the economic success of the local slaughterhouses. At the same time, any one stakeholder grouping will contain within it several different (perhaps conflicting) stakes. For instance, the butchers wanted to make as much money as possible, but they also wanted a clean neighbourhood – which meant increased costs for waste management.

Deliberating on the impact of different stakeholders and stakes gives us an opportunity to reframe issues; literally consider a situation from a different angle. Framing is a bit more than just listing stakeholder views, although that is often a good place to start. Framing is really trying to work out what the situation is – or could be – about. Framing is a means of identifying how people understand a situation and thus how they behave. Framing is the lens through which you (or others) view the situation or an intervention.

Some of the core principles of Ecohealth are examples of framing. In particular:

- Social equity
- Gender equity
- Transdisciplinarity
- Knowledge to action
- Sustainability.

If you designed or looked at the result of an intervention only through a sustainability framing, you might come up with a very different design or assessment than if you used a social equity framing. These are not necessarily “right” or “wrong” framing – sometimes seeing things through a different framing helps solve a tricky problem. A big manufacturing company, for instance, framed a particular situation in terms of an “industrial relations” problem (lots of disputes around ways of hiring and firing people). A consultant encouraged them instead to see the situation as a “business model” issue (controlling fluctuating demand for their products). By doing this they not only created a new set of products and solved the industrial relations problem by generating a more stable workforce that didn’t need to be fired periodically. Similarly, in the Kathmandu case study, framing the slaughterhouse situation as one of “waste management” would lead to one set of solutions, perhaps involving trucking and landfill sites; framing the situation in sustainability terms resulted in solutions based on composting and biogas production.
We will explore these issues of stakeholder, stakes, and framings later in this module, but in the meantime here are the next four questions, that allow you to be systemic in terms of perspectives.

6. Who or what are the key stakeholders within the situation?

7. What are the key stakes?

8. What are the different ways in which you can understand or frame the situation?

9. How are these different framings going to affect the way in which stakeholders act or expect and thus need to be considered?

**BOUNDARIES**

Every endeavour has to set boundaries. That’s because a boundary differentiates between what is “in” and what is “out,” what is deemed relevant and what is irrelevant, what is important and what is unimportant, what is worthwhile and what is not, who benefits and who is disadvantaged. Boundaries are the places where values are exposed and disagreements are highlighted. A lot of power issues get wrapped up in boundaries – just as the person with the magic marker controls what goes on the whiteboard, the person who decides the boundaries exercises powerful influence on any situation.

In her introduction to Ecohealth Research in Practice, Charron discusses the important systems concept of scale. Scale can be spatial (yard, creek, watershed, bioregion), temporal (seconds, hours, weeks, years), or it can be organizational (household, neighbourhood, village). An apple grower might wish to focus on the nutritional and water requirements of a tree, a whole orchard, or the “health” of the apple-growing industry. A virologist might look at the genetic structure of a virus, the micro-habitat within which the virus vector survives, or the urban landscape that creates the microhabitats where the virus vector survive. Decisions about the scale of an intervention are important boundary decisions because something that might be seen “valuable” at one scale (e.g. the use of pesticides may benefit particular crops but devastate biological diversity; seasonal migration of workers might benefit a cropping industry but disrupt community life; building dams on a river might increase power for industry but reduce water for farm use).

Setting boundaries is not optional. You cannot do everything, consider everything, see everything, record everything. Treating boundaries systemically means that you set boundaries consciously and consider the implications.

But why bother?

From an ethical point of view, you hold certain values and those values reflect your ethical stance on things. If you believe that women should have an equal voice on preventing dengue fever, then you will want your intervention to ensure that their voices are enabled and acknowledged. From a pragmatic point of view, those who are marginalized (or those who represent marginalized interests) are not likely to take things lying down. Some people
may not like the efforts to include women’s ideas and may oppose your intervention and hinder its execution. You need to work out a way of managing that situation. So there is a pragmatic reason to explore who or what is marginalized and see how those marginalized interests can be accommodated in your intervention.

We have found the following questions good places to start when addressing boundary decisions:

10. Which interrelationships are privileged and which are marginalized? With what effect on whom?

11. Which perspectives (i.e. stakeholders, stakes, framings) are privileged and which are marginalized? With what effect on whom?

12. How can you manage the ethical, political, and practical consequences of these decisions, especially those that cause harm or have the potential to cause harm because they exclude an interrelationship or perspective?

The last question of course raises the further question of what kind of harm to whom. Hence the iterative nature of boundary questions; they raise the possibility that you may need to reassess your initial judgments on interrelationships and boundaries.

To summarize: systems approaches can be understood as addressing three important factors within a situation:

- The interrelationships between aspects of a situation.
- The perspectives through which that situation can be understood.
- The boundaries that are necessary to allow us to address a situation.

This module will help provide ideas, drawn from the systems field, on how you can do this.
Construct a “Rich Picture” of the Situation of Interest

This is a mapping process where you display all the key aspects of the situation you want to research.

It is very important to free your mind as much as possible from any pre-conceived ideas you may have about the situation. Too many mapping processes try to place too much order too quickly into a situation. In contrast a “rich picture” displays as much of the situation as possible, but without trying to fit it to any pre-conceived ideas.

For many, the value of rich pictures is only revealed once they start using them in a group. One of the difficulties in thinking and learning about a messy situation is that different people in the situation have different perceptions of and assumptions about what is going on. Looking at what different people in the same group contribute, and then comparing pictures between groups, is an effective way of revealing these differences because they express things you wouldn’t think of saying. And sometimes they allow you to say, in a simple and unthreatening way, things it might have seemed rude or frivolous to articulate.

Here are three examples of rich pictures: notice i) how they convey a lot of information in a variety of ways; ii) one is messy and complicated while the other is tidy and relatively simple. It doesn’t matter a great deal as long as the picture conveys all the important aspects of the situation.

This is a rich picture of the Working for Water Programme (WWP) in South Africa, United Nations (Martin Reynolds, Open University, UK).
Rich picture: Wendy Fisher’s perspective on WWP


(The original draft of the rich picture was drawn by OU academic staff, Wendy Fisher with Martin Reynolds.)
This is another rich picture about the Waimea Basin:

Here is another diagram that concerns river pollution issues in Vietnam:

(Unidentified source)

Return to the case study on urban dengue fever. You are going to develop a rich picture of this situation. Since it’s often difficult to know where to start, here are some of the 12 questions:

Write on separate sticky notes:

- Who or what are the key stakeholders?
- What are the key stakes (e.g. purposes, motivations, values, norms, aspirations, goals)?

A key stakeholder or stake is one that has or might have a significant impact on the dengue situation in urban Thailand.

Now place them on the paper and annotate them in a way that allows you to address the following questions. Use words, pictures, graphics, or whatever works to illustrate and enable this picture to be really “rich.”

- What is the structure of the interrelationships of stakes and stakeholders within the situation?
- What are the processes between elements of that structure?
- What is the nature of the interrelationships (e.g. strong, weak, fast, slow, conflicted, collaborative, direct, indirect)?

Now stand back and look at what you’ve done.
Ask yourself the following questions.

Is everything that’s important to the situation represented? Are all these things represented?

- Structures
- Processes
- Culture
- People
- Issues expressed by people
- Conflicts between people or ideas.

Can any of the words be replaced with pictures or drawings to give the picture more depth than words can ever bring?

Has it fallen into the trap of too much structure? For example, did you decide that the dengue had a biological reproduction process, an infection process, a contagion process, a prevention process, and put them together?

Can you see feedbacks in your picture, where a pattern is reinforced or perpetuated?

If other groups are working in parallel with yours, ask them if you can look at their rich picture and see what they’ve included.

Finally and importantly, are you in the picture? You are planning research in a community context, therefore you are part of the situation and you (and even the research programme) need to be represented.

Go back and alter the picture.
Frame the Situation

The rich picture probably looks a mess. Indeed the term “systems mess” is often applied to rich pictures. This second step helps you to make sense of the emerging picture and to identify how to focus your research.

Your task now is to determine possible ways of framing the situation and exploring the consequences of each framing for your intervention.

- What are the different ways in which you can understand or frame this situation?

The following process will help you to identify some key framings.

Look at your rich picture:

1. List those stakeholders who have the largest (in terms of magnitude of effect) impact on the situation. The impact can be positive or negative. Write this on a sheet of paper.

2. List the stakes that are the most powerful influences (in terms of decision-making) in the situation. The influence could be positive or negative. Write this on the same paper.

3. Compare the list of stakeholders and stakes and consider their effects on the situation. From these comparisons, what do you think are the most important considerations for your research so far? Write them on the paper.

4. Looking at these considerations, what are the different ways of understanding what the situation is about or how people understand what it is all about. Write them on the paper also.

5. Now as a group decide which of these framings are going to give you the best insights into how to design your research? These will be your key framings.

Hint: Think about the possible “framings” of Ecohealth projects mentioned in the introductory reading – they may give you some clues about important framings for this case study.

Typically you will have three to five key framings.

- Once your group has done this, compare your assessment with other participants. What are the similarities and differences? What might that mean for any proposed research?
Ecohealth Trainer Manual (FBLI)
Module 4: Using Systems Concepts in Ecohealth

MODULE 4 – HANDOUT 5 – ACTIVITY 4, STEP 3

Ethical and Pragmatic Consequences of These Framings

Framings imply value judgments about what is relevant and what is to be ignored. In systems language these are called boundary decisions. Boundary decisions have ethical and pragmatic dimensions that practitioners need to make explicit and deliberate on. Different framings imply different boundary decisions.

Select one of the framings that emerged during the last session. Try to ensure that a wide variety of different framings are selected among the groups in your session.

Consider only your framing and no other way of understanding the situation. Within that, you may consider a few differing perspectives:

- **What purpose ought your research to serve?**

  For instance, if your “framing” is about economic development, then the purpose of your research may be to explore ways to undertake mosquito control that enhances the economy. If framing is about sustainability, then the research might look at ways of controlling mosquitoes that do the least damage to the environment.

- **Who ought to be the prime beneficiaries of that purpose?** This is a function of both the framing (e.g. economic development) and the perspective (e.g. income of small farmers, which may benefit the rural economy, versus agro-industrial development, which may benefit the urban economy).

  Try to be specific rather than general. So, in the above example, avoid saying the beneficiaries will be “people.” Be specific, what kind of people, where?

Return to your rich picture. From the orientation of your key framing, write down:

- **To achieve this purpose in ways that benefit the beneficiaries, who should be involved in the research, what resources (money, skills, time, people) ought to be available to the research, and who ought to control those resources? Who ought not to control those resources? What is the consequence for whom of those decisions?**

- **To achieve this purpose in ways that benefit the beneficiaries and within the available resources, what sources of knowledge and expertise ought to be respected and what sources of knowledge and expertise ought to be ignored? What is the consequence for whom of those decisions?**
• How ought you to manage the ethical and practical consequences of these boundary choices and decisions, especially those that will disadvantage or advance certain points of view or have the potential to cause harm?

You may notice that some of the questions are phrased in a way that forces you to be explicit about the values you use in determining boundaries.

You will find similar ideas expressed in the following modules: Module 3: Participation; Module 5: Collaboration and Transdisciplinarity; and Module 7: Sustainability.

At this point, you:

1. Have observed the enriched picture of the dengue situation
2. Have selected an important way of understanding that situation
3. Have identified some of the implications for your research of that framing.

What next?
Assess the Dynamics

Ecohealth research is action research; it does not study just people, it involves them, intervenes in their lives, and affects the situations they find themselves in.

The first three steps have given you plenty of information about the current situation and the implications for the dengue prevention research project.

The final set of questions will help you explore the implications of this for your research scope, focus, methodology, methods, and techniques.

First, take some time to look at other people’s framings and their analysis.

Next, in your groups explore, discuss and conclude:

- How are these different framings and boundary choices going to affect the way in which people are likely to act in response to your research?
- How will these individual behaviours affect the overall behaviour of the situation? What patterns are likely to emerge? Will they help the research achieve its purpose, or hinder it?
- What are ways in which these complicated and complex dynamics can be identified and managed effectively?

After this systemic exploration of the situation, you would now be in a position to continue to the next stage of a research design – the identification of research methodologies, methods, and techniques that are capable of working within and exploring the issues raised in your systemic inquiry.