FIELD BUILDING LEADERSHIP INITIATIVE

Ecohealth Trainer Manual

VETERINARIANS WITHOUT BORDERS

VÉTÉRINAIRES SANS FRONTIÈRES

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ECOHEALTH TRAINER MANUAL

A Foreword: Why Ecohealth?

David Waltner-Toews, Pierre Horwitz, Sonia Fèvre

Ecohealth represents a new way of understanding and improving health as an outcome of complex relationships among changing social and ecological forces. Yet, as is apparent from this manual, Ecohealth practitioners draw on many conventional investigative techniques, skill sets, and scholarly disciplines. What, then, makes Ecohealth different from conventional research and practise? In brief, what is different is how we see the world, and therefore how we interpret and use the information we have.

Those who work in fields such as health and agriculture are already accustomed to integrating information across disciplines. Agronomists draw on biology, sociology, economics, soil science, and chemistry, as well as their many sub-disciplines. People in health sciences (including those focusing on disease ecology and medicine) draw on various disciplines such as chemistry, biology, and psychology. Manfred Max-Neef (2005) has referred to this mixing of disciplines as pragmatic interdisciplinarity. In such cases, we are trying to answer the question: What can we do? From a technical viewpoint, systems approaches have become core to our ability to achieve this kind of interdisciplinarity.

Policy-makers, politicians, and social planners must further integrate information from across these broader fields to make normative decisions about agriculture, health, and environmental management. At this level, we are seeking to answer the question: What do we (collectively) want to do? It is here that questions of equity, power, and gender emerge as important, and techniques related to participatory action research are relevant.

Ecohealth takes this process of integration to a deeper level. In Ecohealth, we draw on the disciplines and the various pragmatic forms of integration and ask the question, of ourselves, our partners and our politicians: What should we do, or, to phrase it somewhat differently, why do we want to do something in a particular way? This kind of integrated understanding, which transcends disciplines, is rooted in values, ethics, and philosophy. There are different ways to produce food or deliver medical care, but all of them reflect different underlying values and understandings of the world.

It is not simply a matter of bringing together the right team of experts and stakeholders; unless Ecohealth practitioners can articulate and commit to a particular set of values, many disputes will arise that appear to be about facts and techniques, but are really about different ways of knowing – local, traditional, intuitive, expert, and empirical – and different visions of the world. It is no accident that Valerie Brown titled her guide to collective thinking and action "Leonardo's Vision," and why she argues that we should begin the process by asking "What should be?" before we move on to the more

practical and technical questions of "What is" and "What could be?" and "What can be?"

This idea is similar to what economist Schumpeter called a "pre-analytic vision," that is, an understanding of the world that forms the basis for all subsequent study and analysis (see Daly 1993 for a discussion of this by an ecologically minded economist). If this is not clearly articulated or is based on values with which we do not agree, no amount of analysis will enable us to "fix" the problematic situations we are facing. Furthermore, no amount of analysis or study can lead us to this vision. We (and here arises the first challenge – who are "we"?) must make some decisions. In what kind of a world do we wish to live? What are we trying to achieve? Unfortunately, scholars, practitioners and the people we work with rarely articulate their vision, or brush it aside by saying "it goes without saying."

For scholars, practitioners, and trainers in Ecohealth, being able to articulate that pre-analytic vision, and to refer back to it throughout the courses and research projects, is essential. We need to be able to ask, repeatedly: How does this activity (teaching module, research) contribute to this vision? What might such a visionary statement include?

The vision of Ecohealth – since it is, after all, concerned with health – is one of sustainable health. If we "unpack" this vision, we can see that mutual respect for each person (hence "all people") now and in future generations, is inherent. Some might argue that we must explicitly extend this respect to "all life" not just people; others will argue that the health of people, if it is to be sustainable, is dependent on the ability of other species being able to achieve their genetic potential, within the complex ecological webs of the biosphere. In this view, the explicit extension is unnecessary. Nevertheless, the linking of the two words "sustainable" and "health" is important. According to the Network for Ecosystem Sustainability and Health (NESH 2012), health "offers an approach to assessing the multi-faceted well-being of organisms, populations, communities, and ecosystems. The combination of health with sustainability brings together the notion of a currently desirable state with that of longevity." Also, since the original discussions about sustainable development were rooted in concerns about ecological sustainability, the word "sustainable" provides an explicit link to ecology – the "eco" part of Ecohealth. Some would prefer "well-being" to "health"; others will argue that the WHO definitions of health already include "physical, mental, and social well-being, and not merely the absence of disease or infirmity" (WHO 1948) and that they reflect a situation in which all people can realize their aspirations, satisfy their needs, and adapt to changing circumstances (WHO 1986). Still others, recognizing the challenges of rapid and widespread global climate, economic, social, and environmental change, emphasize "resilience," as in a recent report of the United Nations Secretary-General's High Level Panel on Global Sustainability, entitled "Resilient People, Resilient Planet: a Future Worth Choosing."

The point here is not to argue about the specifics of language, but to recognize that all the activities of Ecohealth, insofar as they are Ecohealth,

must somehow relate back to broad ideas of health and sustainability, and that these are predicated on an underlying understanding of the world as a complex social-ecological system, with people embedded in it. What Dominique Charron of Canada's International Development Research Centre has called the principles of Ecohealth, and which have informed the structure and content of this manual, are rooted in this vision: systems thinking, transdisciplinarity, participation, sustainability, gender and social equity, and linking knowledge to action.

This is our "what should be," our "pre-analytic vision," the motivation for our work. As Ecohealth trainers, researchers, and practitioners, as users of this manual, together with course participants, we should be repeatedly asking ourselves: How does the work we are doing relate to this vision?

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Editors' Note

This training manual, and the Field Building Leadership Initiative (FBLI) of which it is one component, is part of a global initiative to build capacity in ecosystem approaches to health. Although several books and journals provide materials for learners about Ecohealth, the ***FBLI Ecohealth Trainer Manual*** is intended primarily for lecturers, teachers, and trainers. The focus here is on how to teach Ecohealth, providing teachers and trainers with a starting point from which to explore, improvise, adapt, and develop diverse educational Ecohealth learning experiences for and with their participants.

Ecohealth workers globally share a common set of principles and are grounded in a common pre-analytic vision (see *Preface*). However, the actual applications and techniques, growing out of local experiences, often differ from region to region, rooted as they are in different cultural and ecological contexts. Thus, complementary training materials are being created in Canada, Latin America, and West Africa, led by Communities of Practice in Ecohealth in each of those regions. As editors, we have attempted to explicitly link the initiatives in Asia with others globally, while enabling the regionally-based authors to remain true to their own experiences.

In keeping with the participatory, transdisciplinary, and systemic nature of Ecohealth, these training manuals are works in progress, open to new insights and evidence, as we work together to better understand – and more effectively promote – the health of people and the planet we share with all other life.

David Waltner-Toews and Pierre Horwitz, Executive editors

Preface: The Field Building Leadership Initiative (FLBl)

The FBLI is a 5-year initiative launched in October 2011 to build the field of Ecohealth in Southeast Asia. Its long-term vision is to build a well-established field of Ecohealth that is sustainable, rooted in local experiences, influential in global processes that drive environmental and health policy and practice, and supported by a strong community of practice. This initiative includes research, capacity building, knowledge translation, and networking in China, Indonesia, Thailand, and Vietnam. Underpinning the emergence and consolidation of the Ecohealth field in Southeast Asia is the need for capacity building for research, teaching, and policy influence. The FBLI complements other regional initiatives such as the EcoZD project of the International Livestock Research Institute, which is focused on ecosystem approaches to better management of zoonotic emerging infectious diseases.

Although the Ecohealth Trainer Manual can be used as a stand-alone resource, it is best embedded within an institutional framework where participants (teachers, trainers, participants, researchers) are encouraged to experiment and adapt Ecohealth teaching and practice to the geographical and intellectual contexts of Southeast Asia.

VWB/VSF-Canada has been privileged to work with numerous partners and contributors to help facilitate the development of this manual and we hope that it will continue to serve over time. The FBLI was originally set up because its members believed that Ecohealth research and development can contribute to more sustainable agricultural practices and livelihoods, and lead to healthier populations and environments. We hope that this spirit of endeavour and optimism will continue as Ecohealth communities emerge and develop.

Sonia Fèvre, Manual Coordinator, VWB/VSF-Canada

FIELD BUILDING LEADERSHIP INITIATIVE

Ecohealth Trainer Manual

Introduction

Sonia Fèvre MSc

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INTRODUCTION TO THE FBLI ECOHEALTH TRAINER MANUAL

By Sonia Fèvre, MSc

Background

The FBLI Trainer Manual has been developed as an iterative, collaborative process between the FBLI core members, authors and contributors, end-users, and other stakeholders. Existing Ecohealth materials were consulted and needs assessments carried out to tailor the structure, content, and approach of this manual to respond to the perceived needs of audiences in Southeast Asia. These needs will change over time and we anticipate that users will adapt and update these materials to allow them to continue to be effective.

The initiative has tried to incorporate stakeholders in the development of these materials. Significant progress was made to improve the quality and relevance of these materials at the FBLI Trainer Manual Review Writeshop convened on 29-31 March 2012, at the Ramada Riverside Hotel, Bangkok. The Pilot FBLI Trainer Manual version 1.0 distributed at the Training of Trainers workshop in Bangkok on 30 June, 2012 was used as the basis for training a cohort of future instructors of Ecohealth. Feedback was provided by these instructors both at the workshop and a few months afterwards, based on their experience of the manual up to that point. The revised and completed manual is being launched for wider dissemination in 2013.

Purpose and Scope of the Manual

This manual is intended to act as a starting point and guide for teachers and trainers to design and deliver courses in Ecohealth. It aims to bring together critical thinking from different regions and disciplines to build the field of Ecohealth.

The development of the manual has been an experimental and evolving project and has broken new ground, by attempting to bring together recent thinking in Ecohealth teaching to develop a stand-alone course in Ecohealth. It is not, however, the only resource available and other teachers, innovators, and researchers have developed a range of tools and courses related to Ecohealth and One Health in the region. It is hoped that users of this manual will refer to the range of other available resources to build their repertoire of instruction tools and approaches.

In light of its many possible applications, the manual has been structured to allow trainers different levels of engagement. At the most basic level, the courses allow participant learners to gain an awareness of Ecohealth as an emerging field; at a deeper level, trainers can encourage participants to process these ideas and apply them in their study and research; and finally, participants can be encouraged to develop Ecohealth frameworks for research using these ideas critically. More detail on using the manual is provided in the section "How to use this manual." We emphasize that teaching Ecohealth in isolation

can only have a limited impact and, ideally, learners should have opportunities to practise what they have learned, to take risks, and to build their skills.

Given the breadth of the field, we could not possibly address all relevant topics and issues in this manual. The module topics were developed based on the perceived priority needs of the primary target audience and for Ecohealth field building in Southeast Asia. The recent publications Ecohealth Research in Practice: Innovative Applications of an Ecosystem Approach to Health (Charron 2012), and Ecohealth: A Primer (Waltner-Toews 2011) serve as companion texts to this manual and the ideas and definitions around Ecohealth cross-reference these texts. Manual authors recognize that other definitions and approaches to the field exist and it will be the role of the trainers to make informed judgements about their sources and epistemological positions, and how they relate to the pre-analytic vision and principles of Ecohealth.

Manual Aims

Each manual chapter, or module, addresses different issues and themes of Ecohealth and has specific aims and learning objectives. Overall, the aim of the manual is to provide the educational foundation and depth to allow future trainers to:

- Be able to design a course on Ecohealth for their particular target audience, and
- Know how best to use further resources for teaching and learning in Ecohealth.

Trainer Competencies

It is expected that trainers who use this manual to design courses in Ecohealth will have an understanding of, and commitment to, the fundamental vision and principles of Ecohealth. They would also have experience teaching or lecturing in their own subject areas.

To successfully deliver Ecohealth courses based on the modules proposed here, trainers need to have a common set of competencies about teaching Ecohealth. Competencies refer to the applied skills and knowledge that people require to successfully perform in their role. The competencies described here can refer to the collective attributes of a group of trainers if they are delivering an Ecohealth course together, or their individual attributes if they are instructing on their own.

Trainer Competencies	To successfully teach the course outlined in this manual, a trainer (or collectively, the group of trainers) needs to be able to: 1. Explain the vision, concept, and principles of Ecohealth and why they are important for research and practice 2. Design and facilitate the delivery of the Ecohealth course as a whole while engaging experts from other fields 3. Model Ecohealth principles in their teaching in ways that reflect openness to new ideas and experiences, collegial and collaborative attitudes, and humility in the face of uncertainty 4. Deliver *Module 2: Introduction to Ecohealth* and at least one other module 5. Show a commitment to, and experience in, the application of learner-centred approaches and learning by doing.

Participant/Learner Competencies

The attributes, skills, and knowledge expected of participants who complete a course based on this manual will vary depending on the depth and breadth covered by the trainer and their intentions in delivering the course.

Learner Competencies	It is intended that at minimum all participants who complete an Ecohealth course based on these resources should achieve the following competencies: 1. Explain the concept and principles of Ecohealth and why they are important for his/her own area of work and to other areas of work 2. Formulate problem statements that can be explored using an Ecohealth approach 3. Determine where, and how, Ecohealth principles can be used to reconsider research and interventions already undertaken 4. Apply Ecohealth principles to the analysis or planning of new research and interventions, including being able to identify the skill sets and knowledge bases needed to address specific questions. More generally, participants may be able to: • Have the capacity to reflect on the values and assumptions they bring to their research, as well as the assumptions underlying other research approaches • Understand the place of Ecohealth in the broader landscape of research and policy questions, as well as the relationship of research to policy and action

- Be inspired by a shared vision of how Ecohealth can help make research more responsive and grounded to "real-world" problems
- Understand the strengths, limitations, and implications of different research methods, and when, and how, to mix those methods in the service of stronger transdisciplinarity
- Develop basic capacities to think in terms of systems, use systemic concepts to bridge disciplinary, organizational, and governance boundaries, and engage in inter-/trans-disciplinary collaboration for achieving health outcomes
- Develop a greater understanding of the socio-political, cultural, ethical, and historical dimensions and meanings of health
- Respect and learn to work with people from different perspectives and worldviews (including other disciplines)
- Be able to critically review the emerging literature on Ecohealth
- Improve their ability to work across disciplines and sectors, including the ability to develop conceptual frameworks and research questions that facilitate such collaboration.

Manual Users and Audience

This manual is intended as a resource for lecturers, teachers, and trainers who want to integrate Ecohealth principles into their teaching, or run courses specifically in Ecohealth.

Expected users of this manual include trainers who might be responsible for:

- Integrating lectures or classes about Ecohealth into another course program
- Designing and/or delivering stand-alone Ecohealth short courses
- Designing and/or delivering Ecohealth graduate courses.

This is a manual for trainers, providing guidance on learning and teaching principles, objectives, and activities on a number of topics of critical importance to Ecohealth. These topics, or modules, are divided into sections: much of the text is directed at trainers, providing background, objectives, and information about teaching the subject. In addition, specific sections are written as instructions for participant learners followed by handouts for participants. These can be modified and adapted according to trainers' needs. Each trainer using this manual will be expected to adapt, add, and research these topics to provide suitable examples for their learners.

The terms trainer and teacher are used interchangeably, as are the terms learner and participant.

How to Use this Manual

The full course outlined in this manual can be used to design a comprehensive course on Ecohealth, to be adapted to local conditions and case studies. Alternatively, individual modules, or sections from different modules, can be used to design classes on Ecohealth or integrated into other courses. Please refer to the Creative Commons license agreement for dissemination of materials.

Based on the experience of authors and other Ecohealth teachers, we recommend that courses on Ecohealth are most successful when delivered by a team of teachers/trainers who, while perhaps differing in perspectives and experience, nevertheless share a common vision and are able to collaborate in the planning and design of the overall course, as well as being able to co-teach some of the classes. Co-teaching can be most effective when trainers have different and complementary backgrounds and approach Ecohealth teaching with critical thinking and open minds. *Module 1: Approaches to Designing and Teaching Ecohealth Courses* discusses some of this in more detail. The level of experience of the trainer, context, and other factors will determine to what extent the trainer uses interactive, learner-centred approaches to engage learners and encourage self-discovery, and to what extent more traditional, teacher-led classes are appropriate.

Much Ecohealth education uses problem-based learning, and field visits and case studies are an important part of this approach. It is valuable for any course in Ecohealth that runs for more than a few days to integrate a field visit to allow more practical learning and engagement with non-academic stakeholders. A field visit can also provide material for a cross-cutting case study that can be integrated across modules.

The manual consists of the following parts and modules:

Part A: Introduction and Approaches to Ecohealth Training

Introduction

1. Approaches to Designing and Teaching Ecohealth Courses

Part B: Introduction to and Six Principles of Ecohealth

2. Introduction to Ecohealth
3. Participation
4. Using Systems Concepts in Ecohealth
5. Collaboration and Transdisciplinarity
6. Equity and Gender
7. Sustainability
8. Knowledge to action

Part C: Two Application Modules

9. Disease Ecology and Epidemiology
10. Agriculture and Health

Module 1: Approaches to Designing and Teaching Ecohealth Courses, differs from the other modules in that it is intended as a background reference for trainers and is not intended to be taught directly to participants. However, it does contain suggestions and examples of how activities in other modules can be designed, and trainers are encouraged to refer to it as they design and plan their courses.

Modules 2 to 10 are all topics that the trainer can teach directly to participants. The modules reflect different scales of transdisciplinarity and integration, as identified in the Preface. Modules 9 and 10, in particular, represent areas of investigation and practice in which Ecohealth has been applied in Asia.

Module Outline

Each module is structured according to the following outline:

Overview	Defines the topic, provides a summary of the aims and approach of the module and its relevance in an Ecohealth course.
Conceptual Map	Visual summary of the module learning objectives and activities.
Module Aims	Explains the scope of the module and what can be achieved in teaching it.
Why is this topic important?	Explains why this topic is part of the Ecohealth course.
Key Concepts	Provides themes for participants to reflect on during the course.
Guiding Questions	Provides questions for participants to explore during the course.
Basic Learning Objectives	Learning objectives for learners engaging with this topic for the first time or who come from different disciplinary backgrounds. These objectives are specific to each module and will reinforce the competencies learners should develop over a full course.
Advanced Learning Objectives	Learning objectives for learners with pre-existing experience in this topic who seek to reach a more advanced level of learning and ability.
Practical Notes	Provide preparatory information for the trainer to be able to effectively deliver the module.
Background Information	Provides information that may help the trainer understand the topic in more depth and become more familiar with relevant literature.

Activities	The core of the module includes instructions for the trainer and handouts for learners. Activities should be linked to learning objectives. (Handouts, when required, are provided at the end of each module to allow for easy printing/photocopying.)
Sample Timetable	Provides an outline of how the activities could fit together in a one day course.
Evaluation	Suggestions for learner assessment and module evaluation.
Terminology	Glossary of terms used in the module.
Key References	Essential references for trainers and learners.
Additional References	References for further, in-depth engagement and references made throughout module.

Companion Texts

The manual is designed to provide guidance to trainers, but cannot serve as a complete textbook on Ecohealth. Numerous books, articles, and free online resources are available to complement this resource.

Two Companion Texts have been chosen to complement the material in this manual. All trainers should be very familiar with these texts and they can be used as resources: as background on Ecohealth, its history, approach, and methods, and as a source of case studies. They are available free online and will be referred to often in the manual:

1. Charron, D.F., (ed) (2012). Ecohealth Research in Practice: Innovative Applications if Ecosystem Approaches To Health. Springer/IDRC. Especially Chapter 1, Ecohealth: origins and approaches. Available on the International Development Research Centre website at: http://idl-bnc.idrc.ca/dspace/bitstream/10625/47809/1/IDL-47809.pdf
2. Ecohealth: a Primer. David Waltner-Toews (2011). Veterinarians without Borders/ Vétérinaires sans Frontières – Canada. Available at: ecohealth.vetswithoutborders.ca

Duration of Course

The minimum time needed to teach each section is stated in each module. Overall, it is estimated that a minimum of five days is needed to cover the core essentials of the whole manual but this could be extended to a longer, more in-depth course and combined with other material. Each module can also be split into sections and could be taught over a series of classes.

Practical Notes

To deliver many of the activities described in this manual, particularly the ones that include small group work and interactive activities, the trainer will require the following:

- A training room that can accommodate 25 to 30 people and allow small group work, with chairs and tables easily moved
- An overhead projector
- Flipcharts, white paper, and marker pens
- Handouts of case study materials and presentations.

Guiding Questions

In addition to the Guiding Questions included in each module, the following questions provide advanced trainers and participants with cross-cutting questions to consider throughout the Ecohealth course:

1. What are the implications of defining health in different ways? For example, is health about doing good (if so, for whom?), or about empowering people, or about preventing disease? How can these questions be decided? Is there a fair way?
2. How can we manage the different agendas of scientists (who are looking for generalizable knowledge) and local communities (who want improvements in their lives)?
3. How do Ecohealth practitioners and scholars interact with people in positions of authority (government, financial) and differences in power and opinion? For example, what if a few people own all the land, or the factories, or run the government? What if women are not allowed to do certain kinds of work?
4. How can Ecohealth researchers negotiate situations where participation creates unrealistic expectations in the community? How can researchers determine who in a community is a legitimate representative? 5. What are the ethical implications of drawing systems boundaries in different ways? For example, if we draw a boundary around a community, how do we deal with people, resources, animals, etc. that come and go (migratory workers, animals, etc.) and their influences on the other places they dwell?

Assessment and Evaluation

Some suggestions for assessment are included in each module. Due to the varied nature of how trainers will deliver Ecohealth courses, there is no one prescribed set of evaluation tools. However, as with any course, evaluation can be helpful to assess participant learning and determine what further learning needs they may have. It would be especially interesting to track participant learning and recall over time, for example by assessing their learning and competencies during, immediately after, and sometime after the course.

A variety of evaluation instruments for teaching courses and projects have been, and are being, developed in different parts of the world. These include various combinations of such approaches as outcome mapping, quantitative and qualitative surveys, Most Significant Change techniques, and conventional examinations. Trainers using this manual can play an important role in developing standards and methods of evaluation.

Evaluation of the trainer and the course by learners is also recommended, to provide trainers with feedback on the structure, format, content, and delivery style of their teaching. Sharing feedback on participant preferences around Ecohealth course structure, format, content, and delivery style would also be valuable for the wider Ecohealth teaching community.

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FIELD BUILDING LEADERSHIP INITIATIVE

MODULE 1

Approaches to Designing and Teaching Ecohealth Courses

Suzanne McCullagh PhD (ABD), Lead Author

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MODULE 1 - APPROACHES TO DESIGNING AND TEACHING ECOHEALTH COURSES

REFERENCE MODULE FOR TRAINERS

Overview

This module is meant to help trainers teach Ecohealth, by guiding them in the design and delivery of their own Ecohealth courses. This module, unlike the other modules in this manual, is not designed to be taught to the learner/participant end-users.

Good Ecohealth courses are designed and taught in ways that facilitate collaborative learning among participants (ideally from different disciplines). To design and teach Ecohealth, trainers need to understand how participants learn, and to develop strategies for facilitating that learning. In particular, trainers need to appreciate how the subject of Ecohealth demands collaborative and participatory teaching and learning approaches. This module will look at some basic principles of learner-centred approaches, and what is often called "adult learning" (although is not restricted to adults and can apply to younger learners) and the importance of learning by doing: embodying Ecohealth principles in the teaching of Ecohealth.[1]

The rationale is that Ecohealth aims to build capacity in participatory, collaborative and transdisciplinary research, meaning participants and researchers need to develop skills such as working together, drawing different kinds of knowledge and "expertise" from different people, and involving different types of stakeholders in the research and learning process. It follows that Ecohealth educational experiences should be taught and designed in ways which will provide opportunities to develop these skills through practice. Trainers will develop understandings along these lines.

[1] It is not, however, meant to be a comprehensive resource for adult education per se. Trainers are referred to other comprehensive resources, such as ILRI's recent publication of Pedagogy and Adult Training.

Module Aims

This module aims to:

- Provide trainers with an opportunity to explore core features of learner-centred approaches and adult learning as they pertain to Ecohealth.
- Develop an understanding of how to design and deliver Ecohealth teaching materials.

Key Concepts

- Participation
- Collaborative and cooperative learning
- Transdisciplinarity
- Feedback and evaluation
- Experience and experiential learning
- Discussion and dialogue
- Reflective practice
- Active learning
- Debrief and review

Guiding Questions

1. Why is it important to integrate participant feedback into your course design, and how might you do so?
2. How can you facilitate transdisciplinarity during your course?
3. Why are reflective practices an important feature of Ecohealth education, and how can you build them into your courses?
4. What does Ecohealth have in common with adult learning, and why?
5. What skills are called for when teaching Ecohealth?
6. How would you approach the design of an Ecohealth course?
7. Who might you involve in the delivery of an Ecohealth course? Why?
8. How can you incorporate the capacities and experiences of your course participants into the curriculum of an Ecohealth course? Why is it important to find ways of doing so?

Basic Learning Objectives

After completing this module, trainers will be able to:

- Understand core principles and basic ideas of learner-centred approaches
- Recognize shared features of Ecohealth and learner-centred approaches – participation, equity, collaboration, systems thinking, sustainability, action
- Learn and practise how to facilitate collaborative learning and participatory curriculum design in Ecohealth
- Learn and practise how to design an Ecohealth course
- Reflect upon and develop strategies for how to build evaluation and assessment into an Ecohealth course.

Advanced Learning Objectives

Trainers will be able to:

- Understand why Ecohealth and learner-centred approaches have the shared features of participation, equity, collaboration, systems thinking, sustainability, and action
- Think of the place of learning (or classroom) as an ecosystem and why this may help to develop the approach to Ecohealth course design and delivery
- Involve members of the community in Ecohealth courses
- Design a complex case study and build it into your Ecohealth course.

The rest of this module will discuss some theories related to learning styles and the role of the learner.

LEARNER-CENTRED APPROACHES

Learner-centred approaches encourage participants/learners to reflect on their own learning, provide varied teaching techniques to suit different learning styles, and include activities where learners interact with the material, with each other, and with the instructor. These approaches have been researched and shown to be successful with both young and mature learners, including in schools. (Lambert & McCombs 2000; Alexander & Murphy 2000).

Activities

1. Introduction to Learner-Centred Approaches

LEARNER-CENTRED TEACHING

Learner-centred teaching places the emphasis on the person who is doing the learning (Weimer, M. 2002). Traditional methods of instructor-led teaching can encourage learners to be passive "recipients" of knowledge, whilst learner-centred approaches acknowledge that learners are active agents in their own learning.

Research into learning by adults tends to support theories around learner-centred approaches and furthermore, acknowledges the important role of greater life experience and critical thinking which characterizes adults.

There is no specific age when the characteristics of adult learners start: some exist already in young people, and some develop as learners mature and gain more life experience.

LEARNER CHARACTERISTICS

- People learn better and remember what they learned when they HEAR information, SEE demonstrations and illustrations, DISCUSS information and ideas, and DO or practice techniques.
- People learn best when teaching is interactive, meaning that they are given opportunities to work with the material on their own terms through discussion and practical activities.
- People learn better when they are encouraged to take an active responsibility for their learning processes. Ideally, education should strive to help learners gain autonomy and responsibility for their learning.

ADULT LEARNERS

- Adults are voluntary learners.
- Adults have accumulated a foundation of life experiences and knowledge that may include work-related activities, family responsibilities, and previous education.
- Adult learners are practical and may not be interested in knowledge for its own sake. They may prefer to focus on aspects of a lesson that will be most useful to them in their own work or life.

REFLECTION

- Consider the differences between teacher versus trainer or instructor, and versus participant or learner, by making a list of all the distinctions you can think of.
- How does thinking about adult learning help you understand the difference?
- How can you be more learner-centred in your teaching? (Hint: what are the characteristics of the learners?)
- Where and when can you provide your course participants with the opportunities to be able to see, listen, talk and do all the key features that you are teaching? (Hint: think of the experiences of the participants…)

LEARNER-CENTRED APPROACHES

Becoming aware of and reflecting on the following core theories related to learner-centred approaches will help to develop a learner-centred teaching practice. Keep in mind that it is probably not possible to incorporate all of these theories into your teaching practice, and it is important to consider the points above to judge which theories will help you the most in your teaching practice, and the degree to which you will be able to work with them.

I. EXPERIENTIAL LEARNING

- The work of the educator is to arrange for and organize certain kinds of learner experience. This includes paying attention both to the physical environment in which learning is going to occur, but also the inter-subjective environment, which includes individual work, group work, discussion, and time for reflection.
- The way you schedule your course or workshop and organize the place of learning is a key component of organizing the conditions of participant experience. When you are designing your curriculum, consider how you can influence the experience of learners by setting up an environment that interacts with the capacities and needs of those taught in a way that will enable worthwhile experiences.
- Active learning and learning by doing can be considered as aspects of experiential learning that focus on the experience of the learner. Encourage the trainer (and curriculum developer) to design learning situations that enable learners to have experiences that contribute to their learning development.

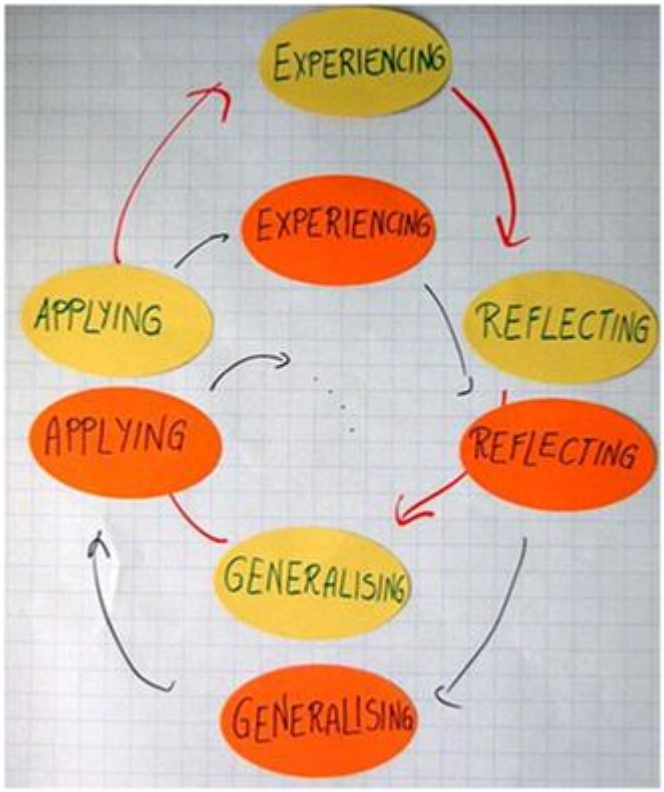

Figure 1.1 David Kolb's model of experiential learning

http://www.infed.org/biblio/b-explrn.htm

- When designing your curriculum, you can use the above diagram (Fig. 1.1) to help you provide the opportunities for meaningful experiences for learners. First, consider both any relevant experience that your learners will have had, and the actual experience that they will have when they are introduced to the material. Second, provide learners with time for reflecting on those experiences, either individually or in groups. Third, build in moments where the reflections are synthesized or generalized. This can be done through plenary discussions or debriefing after group reflections. Fourth, provide opportunities for learners to practise what they have learned by applying it. Fifth, wherever possible, repeat these cycles!

II. COLLABORATIVE LEARNING

- Collaborative learning, sometimes called cooperative learning, stresses high levels of learner participation. It is a core feature of problem-based learning, where learners work collaboratively to solve a problem.[2] This can be achieved by designing and delivering curriculum

[2] Problems can be framed by the participants (with instructor guidance), or if this is too time consuming, can be simply provided by the instructor/trainer.

in a way that both enables learners to collaborate with one another and with the trainer in generating content to be learned. Some methods for facilitating collaborative learning include making ample time for groups to reframe questions (e.g. come up with Ecohealth problem statements) or problem solving, and incorporating ways that the skills and experiences of participants can be shared. Analysis of case studies provides ample opportunity for collaborative learning and developing problem statements.

III. DIALOGUE IN LEARNING

- Paulo Freire drew attention to the importance of dialogue as part of the learning process. He encouraged teachers to consider themselves as learners, and learners as teachers. By questioning the role of the teacher as the one with the knowledge, and the learner as the one without knowledge, Freire stressed that we are all learner-teachers and can learn from one another. Learner-centred teaching, where the learner is the key agent in the learning process, grows out of these considerations.

IV. CONSTRUCTIVISM

- Constructivist learning theory encourages us to see the learner as actively constructing knowledge from their experiences through assessment, questioning, and exploring how new experiences connect with their prior knowledge. Through the process of reflection learners may change their previous beliefs, ideas, and frameworks or reinterpret their experiences so that it will fit with what they previously knew. This theory stresses the significance of the learner as an active participant in their own individual learning and in the learning of others (social learning, also discussed in *Module 5: Collaboration and Transdisciplinarity*). Knowledge is not what the teacher has and the learner lacks, but is instead what teacher-learners collaboratively construct through reflection, dialogue, and sharing skills and experiences.

2. Shared Features of Ecohealth and Learner-centred Approaches

Ecohealth and learner-centred theories share some important goals and features. Both recognize power relationships in society and aim at social change. Participation, transdisciplinarity, equity, sustainability, and an orientation towards action are shared by both Ecohealth and learner-centred approaches. This is a key reason why Ecohealth should be taught in a way that it consistent with learner-centred theory and practice. The best way to instil

Ecohealth principles in your learners is to model them in your teaching. As you develop your Ecohealth teaching practice, reflect and experiment with ways you can incorporate Ecohealth principles into your teaching practice.

REFLECTION

Once you have developed your Ecohealth course content, take time to brainstorm with your peers the ways your approach to teaching the principles of Ecohealth could reflect those same principles. See manual *Introduction* and *Module 2: Introduction to Ecohealth* to familiarize yourself with these strategies. For example:

- How can teaching the principle of participation be done in a way that is participatory and models the Ecohealth principle?
- Which principles are easiest to model in your teaching?
- Which is the most challenging?
- Why is it important to model the Ecohealth principles in your teaching? Are there some cases where this might not work?

3. Phases of Ecohealth Course Design

ASSESSING THE NEEDS OF PARTICIPANTS

A core feature of good instructional design is to know the needs of your participants so that the instruction you design and deliver is appropriate to them.

In Ecohealth teaching it is especially important because Ecohealth requires researchers to collaborate with many different people, including researchers from other disciplines, multiple members of local communities, policy-makers, etc. In order for you to develop an instructional design that will help to develop the transdisciplinary and collaborative skills of your participants, it will be helpful for you to know what skills, knowledge, and experience they bring with them. This will enable you to mobilize their capacities as part of the course, and to provide opportunities for participants to teach from their previous experiences. You may want to encourage transdisciplinary collaboration by designing groups with participants from a mix of disciplines. Sometimes groups can be designed according to skill or personality sets, although this can be more challenging. Knowing the expectations of the learners is also important, as is knowing the needs of the organization, if there is one that contracted you to do the training, so you can deliver training that is appropriate to their expectations.

METHODS

You can ask participants to do a one- or two-page survey before the course that will seek information on:

- Ecohealth-related experiences
- Interests in Ecohealth
- Expectations from this course
- Relevance of the course to broader learning, work, and life goals
- Potential application of learning from this course
- Their skill set
- How they usually participate in group situations.

If you are not able to do a pre-course assessment, you could incorporate this into your introductory session, by asking participants:

- Why are you taking this course?
- What are you hoping to learn?
- What relevant knowledge, skills, and experience are you bringing with you?
- What skills can you offer in teamwork?

CHALLENGES

This assessment step creates more planning for the course designer and instructor. Doing the assessment will create an expectation that it will have some effect on the course. If you do take the time to do an assessment, then it is important that you actually use it. This will require you to analyze the results and find ways to incorporate them into your instruction.

INSTRUCTIONAL DESIGN OF THE COURSE

KEY CONSIDERATIONS

- Who are the participants? What are their capacities and their needs?
- Do your participants come from different disciplines and institutions or the same discipline?
- How can you mobilize the capacities of your participants during your course? How can you enable them to share their experiences and learn from one another?
- What elements of Ecohealth will you be delivering?
- What order of content will best facilitate learning?
- How long do you have?

- What is the layout of the learning space?
- Who will facilitate the course? One instructor? A transdisciplinary team? One or two instructors with guest speakers?
- Are you able to build field visits or fieldwork into your course?
- What kinds of hands-on activities are possible?

COURSE DEVELOPMENT STEPS

1. Develop learning objectives [see sample course learning objectives].
2. Determine course length and content and begin a preliminary draft of the schedule. Make sure to include ample time for informal discussions and for participants to get exercise or a change of scenery, and to reflect quietly if need be.
3. Select a location. Ideally you will have:
   - A room with lots of room for moving around
   - Tables that can be moved into different formations
   - Walls for attaching posters
   - Outdoor space nearby so that participants can get fresh air, or if the weather is good some sessions or discussion might be held outdoors
   - Refreshment space (for drinks or snacks), if appropriate.
4. Decide who will be included in the teaching process.
5. Decide if you will bring in members of the community, policy-makers, or experts from different disciplines.
6. Decide whether you will organize a field visit. If yes, determine whether you can develop a case study or learning scenario where the visit has direct relevance.
7. Develop the case study or learning scenarios that will be part of your course. [See *Using and Developing an Ecosystem Approach to Health Case Study in your Teaching*: ecohealth.vetswithoutborders.ca.]
8. Design participant questionnaire [See "Pre- and post-course evaluation"] and send it to participants.
9. Analyze the capacities of your participants based on the results of your pre-course questionnaire and make appropriate adjustments in your course design. Keep in mind that you are looking for ways to incorporate their prior knowledge and experience so that they can contribute to the delivery of some of the course content. You also want to ensure that your course is responsive to their learning needs.
10. Analyze the order of sessions and activities in your course schedule.
    - Are the sessions ordered so they logically build on one another? Will participants be able to bring their learning and experience from previous sessions to later sessions? Can you build in exercises that will help create this kind of continuity?

11. Develop reflective questions for different moments in your course that will help participants to think about their experiences and develop their learning. Build in time for these moments! Nothing constrains reflection more than being rushed from one thing to the next.
12. Develop feedback questions and determine when and how you will conduct in-course evaluation. See "In-Course Evaluation" below.
13. Reflect on your capacities as a trainer and your goals in teaching this course. What do you bring? What skills do you hope to develop or strengthen?

4. Facilitation and Delivery of the Course

INTERACTIVE CONTENT

What facts are essential to communicate to participants and what concepts and tools can they explore together through group work and dialogue? In the delivery of content, try to make it as interactive as possible. For example, if you are teaching how to visualize complex systems, try building the system map with the learners rather than showing them maps and diagrams on PowerPoint. Their ability to understand and retain the concepts will be much greater if you construct it on the spot through dialogue.

ASKING QUESTIONS

The effective use of questions is one of the most important skills needed by trainers. By asking questions, the trainer helps the trainees to think for themselves and stimulates a process of discovery. If trainees think about a problem and come up with answers themselves, they are much more likely to remember the information than if they were just given the same information by the trainer. Open questions are those questions that start with words what, when, how, where, who, and why. These types of questions encourage people to think and analyze because there is not necessarily a predetermined answer. Some open questions are: What are the causes of poor growth in animals? How can the existing health services be improved?

SKILLS OF AN ECOHEALTH TRAINER

- Curious about multiple perspectives on issues
- Open to learning new terminology and approaches
- Able to teach in more than one style, to co-teach, or collaborate in curriculum design and facilitation
- Flexible in teaching – able to adapt the style of teaching and the curriculum of the course to meet the circumstances they encounter
- Comfort with higher levels of uncertainty (higher than is normally encountered).

CHALLENGE

Some content is best delivered in a traditional lecture (or supervisory) format and yet it is important to make sure that there is space for participants to question, elaborate, and work with any knowledge that is given to them. Although Ecohealth is an approach and not a discipline, it has principles and core features that need to be learned. As an approach it is not closed to further evaluation, refinement, and elaboration through dialogue, but neither is it entirely open to any kind of revision. In teaching Ecohealth, it is important to be continually cognizant of this tension between established knowledge (stable, constant) and constructive growth and development (flexible, dynamic).

COMPONENTS OF ECOHEALTH INSTRUCTION

- Transdisciplinary teamwork and problem solving
- Case study and fieldwork
- Collaboration and community involvement
- Reflection and debriefing
- Team teaching
- Feedback, evaluation, and assessment
- Group work and discussion.

5. Evaluation and Assessment

If there is time, this section can be delivered as an interactive lecture, and participants can be asked to develop (individually or in groups) some evaluation and assessment materials for the course. If there is not time, then this section can be used for instructors to read and use in developing evaluation and assessment components of their courses.

PRE- AND POST-COURSE ASSESSMENT OF PARTICIPANT'S CAPACITY

Questionnaire

As part of your pre-course questionnaire, try to ask some questions that will assess participants' level of Ecohealth knowledge and awareness. At the end of the course re-ask some of the same questions to gauge the degree of learning achieved.

IN-COURSE EVALUATION

I. EVALUATION OF PARTICIPANT PERFORMANCE

- How (and if) you evaluate participant performance in an Ecohealth course will depend on the context and institutional arrangements. Some potential areas for evaluation are:
    - Presentations

- Written proposals
- Written lesson plans
- Case study reports
- Participation
- Nature of collaboration.

- You may also want to include learner self-assessment as part of your evaluation strategy. Participants are asked to assess their own performance on each of the assigned tasks. This can promote higher levels of self-reflection in learners, and give the opportunity for teachers and learners to dialogue about performance, expectations, and evaluations. You may decide that learner self-assessment does not need to be shared with the trainer but used by the learners as an opportunity to reflect, or that learners could discuss in pairs.
- Another approach worth considering is to have multiple potential assignments and allow learners to select the ones they will include for evaluation in their "learning portfolios." This enables a high level of learner self-determination and ownership over their learning.
- Whatever you decide, it is very important to make your expectations clear about how participants will be evaluated, and wherever possible to provide learners with a marking rubric as soon as you assign the work.

II. PARTICIPANT FEEDBACK

Verbal Feedback

- At the end of each day it is a good idea to spend some time (from 15 minutes to an hour) debriefing the activities of the day. This is a great time to gather some feedback on how the course is working for the participants and any constructive changes or suggestions that might help to improve it. It is important to facilitate a realistic conversation about possible adjustments—some changes could already be in effect the next day, while others would have to be implemented in future courses. If you are not fully comfortable facilitating a discussion about course changes, then an option is to obtain individual feedback in writing.

Written Feedback

- During the course you can ask participants to provide brief feedback on what is working and what is not to this point in the course. You might also ask them to identify the moments when they have been engaged and moments when they have not felt engaged. This brief feedback can give you insight into your teaching and the course curriculum. In many cases it may be possible to make minor adjustments that can improve the rest of the course.

CHALLENGES

You do not want to raise participant expectations if you cannot meet them, but enabling participants to actively modify elements of how the course is structured and delivered can be a very engaging exercise, and can be beneficial for all involved. The important thing is to balance your capacity to facilitate both the conversation and the course with participants' ideas and expectations.

As a trainer, you should keep good records of participant feedback for your own reflection.

III. TRAINER SELF-ASSESSMENT:

- Did participants SEE it? (photos, real life examples)
- Did they HEAR it? (explanation, description)
- Did they TALK about it? (learner-centred discussions)
- Did they DO it? (practice technique, hold animal, use equipment, etc.)

POST-COURSE EVALUATION

Develop a short or long course evaluation survey for participants to complete after the course. If short, ask them to do it during the week after the course, after they have had a few days to reflect. If the evaluation survey is longer, you may want to wait a month. You might also consider following up with participants three months, one year, and (where possible) five years after the course. In seeking to conduct an evaluation you are often trying to probe:

- When they were most engaged
- When the setting was conducive to learning
- Whether the instructors facilitated learning
- What they learned
- What they used in their work following the course
- How the course may have affected them in other ways: new ideas, new contacts, etc.
- What worked and what did not
- Ideas for improvement.

ACTIVITY

Review the Ecohealth course or parts of the course (e.g. focus on one module section) in this manual as an example and reflect on its methods, effectiveness (objectives, lesson plans). How would participants improve on this and integrate this into their own courses? How would participants modify this manual to suit their context–country, institution, learner needs, etc.?

PEER FEEDBACK AND SUPPORT

Many educators find gaining feedback from their peers helpful in developing their capacities. This can be done in an informal way simply by asking for constructive feedback on your course design (or your facilitation) from someone you consider a peer.

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FIELD BUILDING LEADERSHIP INITIATIVE

MODULE 2

Introduction to Ecohealth

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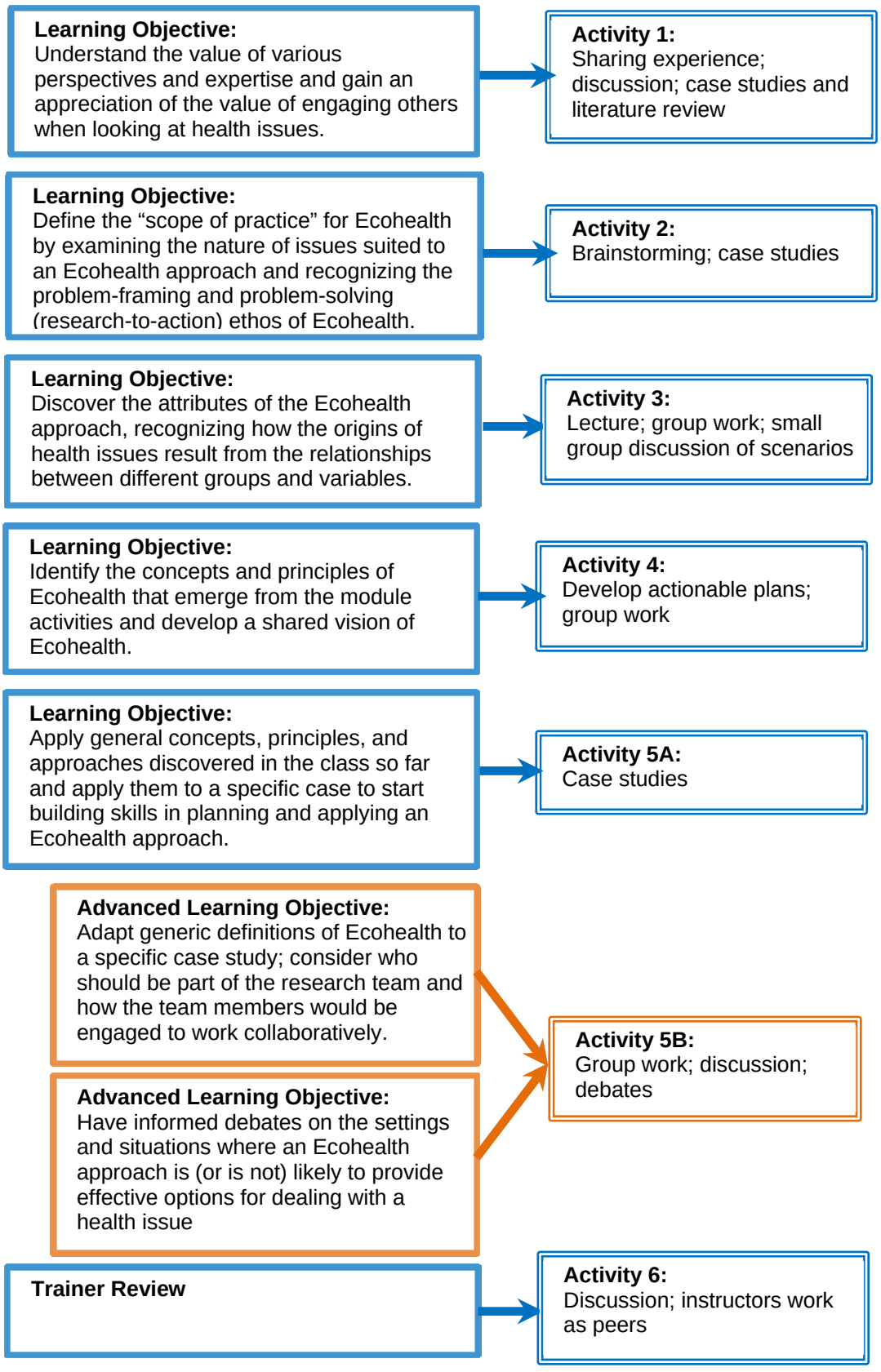
MODULE 2 – INTRODUCTION TO ECOHEALTH

Overview

This module helps participants discover the underlying ideas, concepts, and philosophies that define Ecohealth approaches. Ecohealth is an area of research and practice as well as an evolving set of concepts. It is not a distinct discipline like epidemiology or ecology or microbiology with its own set of defining theories and methods. In some instances, Ecohealth has been interpreted as singular – that there is an ecosystem approach to health. In other instances, while the general ecosystem orientation to health issues may be singular, the approaches used to apply that orientation are multiple. Hence, some speak of ecosystem approaches to health. The terms Ecohealth, ecosystem health and/or ecosystem approaches to health are not consistently used across disciplines, perspectives, or agencies. In teaching this material, trainers need to convey this openness, while emphasizing the underlying vision, principles, and concepts that bridge many of the different perspectives on Ecohealth. Ecohealth takes theory and methods developed for a variety of disciplines and combines them in a way to deal with health issues from the perspective of socio-ecological systems. The objective of this module is to provide a common foundation of key concepts for this perspective. This introductory module should be delivered near the beginning of the course.

Conceptual Map: Module 2



Module Aims

This module suggests a set of activities that will allow learners to develop, together with their fellow participants, a defensible conception of Ecohealth. The activities will provide trainers with a detailed outline for organizing a class that can be customized to local conditions. The module has been organized to illustrate some adult teaching methods that can help new trainers develop Ecohealth teaching skills.

The module also helps you as trainers to identify strategies and options for teaching Ecohealth by reflecting on the teaching approach used in this module (Activity 6). This process can be carried out after each day or set of activities.

The module enables you as the trainer to provide learners with a shared understanding of the core concepts and principles of Ecohealth. This will provide a common language and basis to support the remainder of the course.

These include:

- The need to see health as the product of a web of social and ecological interactions over time
- The importance of considering the experience, information and values of different disciplines, different communities and different people, introducing concepts such as transdisciplinarity and participation
- The understanding that health risks and benefits are not experienced equally across social groups or across species
- The introduction of concepts of social and gender equity and conservation
- The underlying emphasis of Ecohealth on effecting positive change, including the concept of knowledge to action.

The module also allows you to demonstrate how Ecohealth approaches can be applied in a way that is relevant to the learners. This will help learners understand the types of issues or situations for which an Ecohealth approach has advantages and disadvantages, and gain a personal understanding of how to frame a situation from an Ecohealth perspective, and the advantages of this approach.

Learners often quickly embrace the concepts of Ecohealth but remain frustrated until they understand why and how they can be used. This module will emphasize self-discovery of core Ecohealth concepts and principles by taking advantage of the experiences of the trainers and learners in dealing with local issues. By using cases or situations with which the learners already have some familiarity, the trainer will not need a prolonged introduction to case studies and learners will be more focused on the Ecohealth concepts and principles. This should give learners a better opportunity to apply and reflect

on Ecohealth ideas in situations for which they have some background knowledge and to see connections between Ecohealth and locally important issues.

Overall, this module allows you as the trainer to introduce learners to the shared concepts, principles, and philosophies that bind Ecohealth together as an approach. Two ways to meet this goal are:

1. Present learners with a summary of the foundation concepts and principles in the form of lectures, discussion, or other forms of presentation. The trainer is then responsible for summarizing the current literature and presenting this information. The principles and concepts can be illustrated by case studies or embellished by discussion with the learners. This approach is focused mainly on transmitting factual content to ensure learners have been exposed equally to some key pieces of information or definitions to help them develop the foundational understanding (which includes terminology) needed to progress through subsequent modules. This form of teaching suits less experienced trainers and learners who will have less opportunity to have more prolonged and interactive discussion. Trainers can refer to the references given throughout the modules to extract the content to transmit, using module-specific learning goals to identify the important issues.
2. A second option is to develop activities to help learners discover the core concepts and principles through interactive teaching and discussion. The teacher's role is as trainer and guide to help learners consolidate their observations and insights along core Ecohealth themes. The goal is less about transmission of a set of concepts than having learners develop an understanding of Ecohealth principles, including some of the reasons and needs for concepts. The trainer should be proficient in Ecohealth ideas and experienced in interactive teaching. The risk in this approach is that all learners may not discover the same concepts and this can be a problem if the concepts and principles cannot be further reinforced through subsequent learning opportunities. This risk can be reduced by having teacher-led summaries to ensure equivalent exposure of learners to an overview of key ideas. This approach allows the teacher to model Ecohealth principles (e.g. dialogue, participation, using multiple perspectives) and provides a foundation for learners to focus less on factual details and more on discovery of an approach to learning, research, and practice.

This module has been developed to support a teaching style focused on the learner and on self-discovery. Research in education has shown that students can learn more effectively when actively involved in the learning process. Whatever style is used, it is important that instructors clearly summarize learning goals, and identify ways that those goals are achieved.

Why Is This Topic Important?

Ecohealth represents a way to approach complex health issues. It strives to look at multiple perspectives at multiple levels of organization to find ways to protect and promote health through collective action of researchers, regulators, and citizens. An Ecohealth approach thinks about health outcomes as phenomena that arise from the interactions and relationships between social and ecological systems. The approach focuses research and management efforts into factors that act as the root causes of illness and health. These are sometimes referred to as "upstream" factors, "causes of causes," or, more generally, "determinants of health." If we use the upstream-downstream analogy, then "downstream" factors would be those that deal with treatment and rehabilitation of adverse health outcomes like poor nutrition and disease. In the following diagram, upstream factors are located in the "etiological phase" of a disease, while downstream factors are found in the clinical and post-clinical stages.

This metaphor can be very useful. However, learners need to be reminded that, in a complex ecosystem, over time "downstream" factors influence "upstream" factors, both positively and negatively. In the accompanying diagram on the clinical course of a disease in individuals, this is shown by the fact that the flow chart both begins and ends with connections to determinants of disease.

The situation is complicated when we think of interactions between individuals, communities, and social-ecological systems. Draining a swamp might prevent malaria but may also have other, less beneficial consequences to sustainable health. Equitable access to treatment may facilitate equity more generally, which in turn improves community health; on the other hand, certain drug treatments may be effective in treating individuals, but may also result in changes in disease resistance and access to treatment, and may make the health situation worse over time. Furthermore, some factors, such as nutritional status, may be components of health, and also influence other components, so that they are upstream from some aspects of health and downstream from others. Disease conditions may influence ability to work, as well as social status, and thus be upstream from the kinds of resilient and equitable communities we wish to promote. The situation is thus not at all as linear as it initially sounds. The recognition of these interactions leads to an understanding of complexity and systems, which are addressed in subsequent modules. Such "unintended" 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. In this manual, the terms wicked problems and complex problems will be used interchangeably. Even if the world we inhabit is full of complex interactions, we need to start somewhere to improve the problematic situations with which we are faced. Strategies and options to deal with them can be clarified if we have a better understanding of systems concepts, particularly those having to do with interrelationships, perspectives, and boundaries.

Although generally rooted in linear thinking and short time-frames, the notion of webs, upstream, and downstream factors is a useful starting place, particularly for those working in public health or environmental planning. The message that the metaphor gives us is one of intervention – to prevent downstream cases, intervention (often the domain of health prevention and health promotion) is directed towards upstream causes. This shifts the formulation of the "problem" away from a central theme of how to cure the sick (which of course remains important), to something much broader, working together with community members and colleagues to promote healthier, more resilient, social and ecological conditions.

CLINICAL COURSE OF A DISEASE: PRE- AND POST-DISEASE STAGES

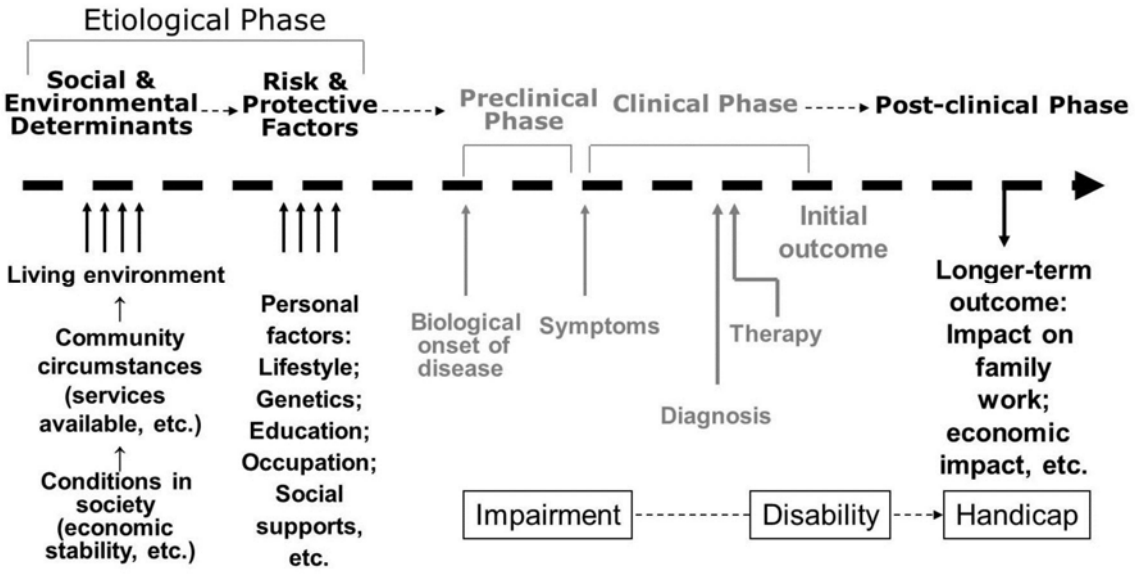


Figure 2.1: Diagram from the Association of Faculties of Medicine of Canada.

http://phprimer.afmc.ca/Part1-TheoryThinkingAboutHealth/Chapter2DeterminantsOfHealthAndHealthInequities/Riskfactors

As suggested, understanding this idea of social and ecological interactions that act "upstream" of health outcomes (however defined) is an important entry into understanding Ecohealth approaches. This module is dedicated to helping learners see health as a socio-ecological phenomenon informed by a wide suite of facts, values, and perspectives. Once this is understood, and after a deeper introduction to systems thinking, participation, collaboration, sustainability, and equity, learners can be asked how treatment and rehabilitation (downstream factors) influence health outcomes, both negatively and positively, often in unintended ways.

Key Concepts

KEY CONCEPT FOR THIS MODULE

Health is determined by a variety of social and ecological factors that are interacting, interdependent, and interrelated. (Such a set of complex relationships makes up a system.)

KEY PRINCIPLES TO EMPHASIZE IN THIS MODULE

1. By looking at the interactions and relationships within this system, new insights can be gained into how to protect and promote health by influencing root social and ecological causes of health outcomes (upstream factors).
2. Ecohealth provides a way of thinking about health from a systems perspective; by taking a systems view, learners can also consider how addressing root causes can have unintended consequences.
3. Resolving health problems or protecting health capacity, as well as anticipating unintended consequences, requires multiple disciplines and perspectives (including community) working together.
4. Ecohealth has an emphasis on knowledge to action.
5. Because every outcome (change in health status) is also a determinant of other outcomes, health is never achieved "once and for all," but is continually renewed over time.

Guiding Questions

1. What are some of the different definitions of health, and what perspectives influence these different definitions?
2. How do dominant ideologies influence societal approaches to health?
3. In an Ecohealth approach, what do we mean by determinants of health? How might this differ from how a public health professional thinks about them?
4. What are the conceptual links between determinants of health in an Ecohealth approach and a socio-ecological system?
5. What kinds of issues are best suited to an Ecohealth approach?
6. Have you encountered situations that might benefit from an Ecohealth approach? If so, how does the Ecohealth approach help you define/frame the problem differently?
7. When we think of socio-ecological relationships, can we be confident that the benefits of an Ecohealth approach will be distributed evenly or equitably? What about the risks? How do the distribution of benefits and risks relate to how determinants are viewed?

Basic Learning Objectives

After completing this module, learners will be able to:

1. Understand the value of various perspectives and expertise and gain an appreciation of the importance of engaging others when looking at health issues.
2. Learners are able to define the "scope of practice" for Ecohealth by examining the nature of issues suited to an Ecohealth approach and recognizing the problem-framing and problem-solving (research-to-action) ethos of Ecohealth.
3. Discover the attributes of the Ecohealth approach, recognizing how the origins of health issues result from the relationships between different groups and variables.
4. Identify the principles of Ecohealth that emerge from the module activities and develop a shared vision of Ecohealth among the learners and instructors from which the rest of the course can be built.
5. Apply general concepts, principles, and approaches discovered in the class so far and apply them to a specific case to start building skills of planning and applying an Ecohealth approach.

Advanced Learning Objectives

Advanced learners will be able to:

1. Adapt generic definitions of Ecohealth to a specific case study, consider who should be part of the research team and how the team members would be engaged to work collaboratively.
2. Critically discuss the definitions and core components of Ecohealth based on past experiences and debate if/how those definitions and attributes should evolve to meet local needs and perspectives.
3. Have informed debates on the settings and situations where an Ecohealth approach is (or is not) likely to provide effective options for dealing with a health issue.

Practical Notes

Ecohealth is not a single discipline or approach but rather a suite of approaches unified by their focus on looking at health as a system of interactions between social and environmental factors influencing health outcomes. While Ecohealth has been described in terms of principles and pillars which are central to its practice, there is no single right way to do Ecohealth and no single right way to teach it. There are many ways to adapt and apply the principles, theories, methods, and concepts associated with an Ecohealth approach; the specific combination will vary from problem to problem and place to place. This results in the need for learners to contribute their understandings from their own local situations, as well as for Ecohealth teachers to have a good understanding of the unifying principles, concepts, and philosophies of Ecohealth so that they can adapt them to specific teaching needs, audiences, and situations. It is critical, therefore, that Ecohealth teachers have taken sufficient time for self-teaching and experiential learning so that they have a firm understanding of these unifying concepts and can apply and adapt them confidently in a teaching situation. Throughout these modules, references are given to some key texts and papers that can serve as a foundation for this self-learning, but they should not be considered an exhaustive list. Practical experiences and self-directed learning are needed to help teachers mobilize their lessons into teaching insights.

This section requires significant interaction between the learners and instructors, so larger classes may need to be broken into smaller working groups. Ideally groups smaller than 20, but of at least five are best for generating ideas and material.

Ideally, some of the learners and teachers should have experience in dealing with health issues under field or community conditions (i.e. not just in

laboratory or clinical settings). This experience can be theoretical (e.g. graduate students) or practical (e.g. practitioners). Note that health is defined broadly in this module and is conceived of as relating to the well-being of people, animals, or environments. Therefore, many disciplines have insight into health issues (see key references below). For learners with no health experience, pre-reading the key references for this module is strongly encouraged.

It is best to have learners from a variety of backgrounds in the class (i) to model the collaborative approach of Ecohealth that strives to learn from and integrate various perspectives and disciplines and (ii) to avoid having a group of learners all with similar training and life experiences because this will not expose the learners to the core learning goal of the value of integrating multiple perspectives and skills when using an Ecohealth approach.

Some activities, such as a course introduction and "ice-breaking" activities, should precede this module to allow the instructors and learners to become familiar with each other and to feel comfortable having group discussions.

Case Studies

Case studies have an important role in developing learner skills and knowledge as well as increasing learner motivation and interest in a subject. Learning from practical and tangible examples is a very useful way to help participants understand the complexity of Ecohealth.

In the simplest terms, case studies are learner-centred activities that demonstrate theoretical concepts in an applied setting. In general, they require a description of the context of the problematic situation (locations, people and/or animals involved, when it occurred, why people were concerned, etc.); identification of the issue to resolve or decision to be made (framing the problem statement); and supporting information ranging from data, websites, site visits, interviews, images, videos, and/or documents.

A good Ecohealth teaching case has several features:

- It provides a "real world" context to help learners see how the course material applies outside the classroom and see how data are often ambiguous or not clearly defined in many situations.
- It exposes learners to different perspectives (viewpoints from multiple sources) and shows that different people may want different outcomes.
- It shows how an Ecohealth approach will define the problem differently from any one of these other perspectives.
- It reveals how a decision will affect different participants, both positively and negatively.
- It requires some critical thinking and integration of multiple sources of information and perspectives.

Things to consider in selecting a case study for this module:

- Will the case used in this module be used across all modules?
- Using a shared case across modules allows instructors to cover specific issues in more depth.
- If a case is shared, for this module, more emphasis can be placed on getting the participants familiar with the context of the issue than in examining all relevant Ecohealth principles at once.
- If each module has its own distinct case studies, each case study should be selected to reinforce one another and not seem redundant to learners.
- Adult learners learn best when they can see the application of what they are learning; therefore, case studies should be selected to ensure they are relevant to participants.
- Because Ecohealth is a complex topic, the instructors should be well versed in the details of the case studies in order to draw out the higher-level Ecohealth principles.

Resources and time restrictions will dictate if the case studies involve travel outside of the classroom, inclusion of guests such as stakeholders, and ability for learners to collect data on their own. When time and resources are limited for travel and guests, instructors will need to put in significant effort in advance to gather the required information, images, and data to effectively use the case study.

This module has been written on the assumption that there will be a case study used in several modules, allowing the learners time to revisit and reflect on the case. Therefore, the emphasis of this case study is to have the learners be able to identify and understand the link between what in conventional terms are called "upstream factors" and what information is required to fully describe the context of the case and the issue. If this assumption cannot be met, instructors are encouraged to replicate the field trip by a rich description of a local case through video, slides, and guests who can provide context on an Ecohealth issue in the classroom.

Links to Other Modules

As an introduction to Ecohealth, this module is ultimately linked to all other modules. It is important to coordinate with teachers of other modules to ensure any overlaps are reinforcing and not redundant, and to make sure there are no critical gaps. It is assumed that all trainers using this manual will be able to teach this module as well as at least one other module (see Trainer Competencies in *Introduction* to the Manual).

Background information

Teaching the introduction to a course requires some of the best teachers in order to effectively facilitate, integrate, and explain the complexity of Ecohealth in a way that is clear and not confusing. All instructors must be very familiar with the information provided in these two references as a minimum for teaching this module:

- Public Health Agency of Canada website on "What Determines Health." http://www.phac-aspc.gc.ca/ph-sp/determinants/index-eng.php
- Chapter 1 (Ecohealth: Origins and Approaches) by Charron, D.F., (ed) (2012). In: Ecohealth Research in Practice: Innovative Applications of an Ecosystem Approach to Health. Springer/IDRC. Available on the International Development Research Centre website at: http://idl-bnc.idrc.ca/dspace/bitstream/10625/47809/1/IDL-47809.pdf
- Some information on teaching based on case studies can be found in the following websites: http://www.stanford.edu/dept/CTL/cgi-bin/docs/newsletter/case_studies.pdf
- http://tlt.its.psu.edu/suggestions/cases/index.html

Activities

As this is the introductory module, the instructors should take the time to introduce themselves and their goals for the course and this module.

1. It is valuable to have all the core instructors from other modules present at this introduction as well.
2. Class members can be asked what they hope to gain from the course and to introduce themselves.

Activity 1

Learning Objective:

- Understand the value of various perspectives and expertise and gain an appreciation of the value of engaging others when looking at health issues.

Training focus

Teaching activities should help learners take the general idea that "it is good to work with others" and start to discover tangible examples within their sphere of experience on the breadth and diversity of experience and perspectives that could be brought into Ecohealth problems.

Examples of ways these can be achieved:

- Have learners share experiences where they have found a multi-faceted collaborative approach to be useful.
- Describe situations to the learners where you have found a multi-faceted collaborative approach to be useful.
- Review with learners some key case studies and literature that involve multiple disciplines, as well as collaborations with non-academic community members (transdisciplinarity).

Bring a health practitioner, community member and/or other stakeholders to describe how a collaborative effort led to improvement of community health or resolution of a health-related problem.

INSTRUCTIONS

1. Start the course with a round table of introductions. Focus on asking participants to explain their background and what they see as their expertise, and to identify at least one experience where working with someone with a different expertise challenged them and/or helped them (personally or professionally).
2. The module on approaches to teaching Ecohealth can provide some guidance on how to help learners connect their experiences with Ecohealth as well as with the experiences of other learners to show how skills and experiences can be complementary and help to broaden perspectives and capacity to deal with health issues.

ALTERNATIVE ACTIVITY

1. As above, start the course with a round table of introductions. Focus on asking participants to explain their background and what they see as their expertise, and to identify at least one experience where working with

someone with a different expertise challenged them and/or helped them (personally or professionally).

2. Break the learners into groups and have them develop definitions of health from the perspectives of different people, species, and scales. Refer to the "Define and Negotiate Health" activity for instructions and a discussion guide for this, in *Module 2 – Appendix I – Experiencing and Negotiating Health.*
3. As described in the appendix, bring the discussion back to the full group to debrief how they found the different perspectives helpful or challenging, and how it might have highlighted the need for different skill sets.

This activity can have a profound impact on the way participants think about health.

ALTERNATIVE ACTIVITY

- Have the learners pre-read a paper that focuses on the necessity of transdisciplinarity in Ecohealth and ask them to relate the paper to their experiences where similar approaches have or have not worked. Have them talk about what they mean by "worked," and whether others might have a different view of what "works."

Sample papers:

- Connell, D.J. (2010). Sustainable livelihoods and ecosystem health: exploring methodological relations as a source of synergy. Ecohealth 7(3): 351-360. http://www.springerlink.com/content/t33g3775124172q5/
- Parkes M. and Panelli R. (2001). Integrating catchment ecosystems and community health: the value of participatory action research. Ecosystem Health. 7(2): 85-106. http://onlinelibrary.wiley.com/doi/10.1046/j.1526-0992.2001.007002085.x/full
- Waltner-Toews D. et al. (2005). Agro-urban ecosystem health assessment in Kathmandu, Nepal: epidemiology, systems, narratives. Ecohealth 2 (1-2): 155–164. http://link.springer.com/article/10.1007/s10393-005-3874-8

Activity 2

Learning Objective:

- Define the "scope of practice" for Ecohealth by examining the nature of issues suited to an Ecohealth approach and recognizing the problem-framing and problem-solving (research-to-action) ethos of Ecohealth.

Training focus

Help learners recognize the characteristics of complex problems and create an understanding of the types of problems and issues for which an Ecohealth approach may or may not be suited.

Examples of ways these can be achieved

- Class brainstorming session in groups on a "messy" health issue (complex or wicked problem) they are familiar with, with trainers facilitating a collaborative framing of the problem and summary of cases to define shared features relevant to Ecohealth.
- You can present summaries of published case studies, such as in Charron et al. 2012 and work with the class to find commonalities.
- Assign learners well-documented cases before class and ask them to come prepared to summarize the main features of the cases for discussion in class.

INSTRUCTIONS

1. Have the learners come to a blackboard or flip chart and write issues or problems that they think would be suited for Ecohealth (e.g. rural water safety, nutrition) and next to it write a reason why this might be a good case study.
2. Review with the class the commonalities between the problems and start a list of defining features.
   i. Draw out some of the key features that will later help to define an Ecohealth approach (e.g. it is a complex health issue with multiple perspectives, values, and stakeholders involved, where there may not be an agreement as to what constitutes the "problem").
   ii. Select a few of the case studies for the next session (the number needed depends on the group size).

ALTERNATIVE ACTIVITY

1. Have ready a series of papers, technical reports, or book chapters in which the Ecohealth approach has been applied. These can come from the Manual Companion Texts. Ask the participants to read the papers and develop a description of the health issues involved, emphasizing the nature of the setting and context, who was involved, and how the problem was defined.

   i. You should not prejudice the learners by directing them to look for key features, but instead, facilitate a review or discussion of the learners' discoveries and thoughts after reading the papers and to help cluster those thoughts into Ecohealth themes.

   ii. Pre-select papers to reflect the diversity of settings in which Ecohealth can be used.

Examples include:

- Vanwambeke et al. (2007). Impact of land-use change on dengue and malaria in Northern Thailand. Ecohealth 4(1):37-51.
- Arunachalam et al. (2010). Eco-bio-social determinants of dengue vector breeding sites: a multi-country study in urban and peri-urban Asia. Bulletin of the World Health Organization. 88:173-184.
- Chapters in Ecohealth research in practice: innovative applications of ecosystem approaches to health. Available on the International Development Research Centre website at: http://idl-bnc.idrc.ca/dspace/bitstream/10625/47809/1/IDL-47809.pdf

Activity 3

Learning Objective:

- Discover the attributes of the Ecohealth approach, recognizing how the origins of health issues result from the relationships between different groups and variables.

Training focus

Help learners to recognize the connections between the various drivers and determinants that affect an Ecohealth problem and begin to see relationships between these factors in terms of a connected and interacting system.

Examples of ways these can be achieved

- Instructors provide a lecture on the socio-ecological approach to health issues.
- Group work to have learners develop relationship diagrams and maps, such as causal models for locally relevant health issues. Instructors circulate asking probing question to help learners see the "upstream drivers."
- Learners are to provide scenarios and asked to examine them in small groups, each group taking a disciplinary perspective. The groups are brought together to examine:

i) How different are the strengths and weakness of disciplinary approaches, and

ii) How can combining the information from different perspectives and disciplines reveal some new options for primary prevention or health promotion.

INSTRUCTIONS

1. Begin by selecting two or three case studies developed in the preceding activities that would (i) be suited for this activity and (ii) are relevant to the participants (e.g. reflect local issues). Additionally, try to find commonalities between issues raised in groups in the preceding activity because this would allow you to choose examples for which more learners have experience. Because the goal of this exercise is to develop diverse causal webs, rather than to look at the content per se, it will help if a number of the learners already have some content expertise. You should ensure you have two or three of your own examples to use in case good examples did not arise in the last activity. You should have ready a background document on the cases and try to select cases that have some local/regional prominence so the class members have some familiarity with the issues.

Introductory information on causal webs can be found at:
http://www.vetmed.wsu.edu/courses-jmgay/EpiMod2.htm
The Causal Web Project

Causal Web Analysis: A Model Approach to Joint Program Planning. WHO regional Office for Southeast Asia. WHO ICP/SCC/200. At http://203.90.70.117/PDS_DOCS/B0242.pdf

2. Find the "entry point." In other words, ask the class how/why they got involved in the problem. Note that an entry point can be a clinical case, a request/complaint from a stakeholder, a political inquiry, or similar events that first get someone interested in looking at the issue.
   - Write this entry point on a blackboard or a large piece of paper.
   - Repeat this for each case study.
   - If the examples used are ones provided by you, work with the class to develop a list of hypothetical entry points for each example and select the one most similar to the real entry point.

3. Break the class into groups; one group per example.
   - Have each group draw a causal network expanding from this entry point.
   - Help by prodding people to look at upstream factors that influence points in their network as well as to look at how different nodes in the network influence or affect each other.
   - The instructors will move between the groups, facilitating (but not leading) discussion to encourage learners to discover the various nodes in this network and to find the connections between causal factors.
   - Ensure the participants have plenty of space and paper to expand their networks.

4. After the original groups have drawn their network, ask them to describe it to the class.

5. Then, allow the groups to wander between each other's diagrams, inserting comments with "sticky notes" that will help to expand or contract different relationships and nodes in the networks.

6. During a break ask the group to consider the following:
   - What are the problems identified in each of the diagrams and how do they differ (or not) from the entry point?
   - Who has influence on the nodes and relationships diagrammed in each example?
   - Has drawing the causal network caused you to think differently about the nature of the problem you started with?

7. Ask the group to reconvene and discuss the questions.

ALTERNATIVE ACTIVITY

Select two or three case studies relevant to the local and regional needs and interests from Charron, D.F., (ed) (2012). In: Ecohealth Research in Practice: Innovative Applications of Ecosystem Approaches to Health. Springer/IDRC. Available on the International Development Research Centre website:
http://idl-bnc.idrc.ca/dspace/bitstream/10625/47809/1/IDL-47809.pdf

1. Ask groups to critically review the case studies. In their critical review, ask the participants to try to differentiate the approach taken in the case studies from other possible disciplinary approaches or methodological approaches to the problem. Can they see how the "problem" is defined differently?
2. Ask learners to describe the different factors studied, the groups involved, the activities undertaken and how these all relate to each other.
3. Ask learners to identify a problem in their jurisdiction that would fit the approach illustrated in the case study.
    - Who would be the equivalent groups who took part in the local study?

Activity 4

Learning Objective:

- Identify the concepts and principles of Ecohealth that emerge from the module activities and develop a shared vision of Ecohealth.

Training focus

Link the concepts of an interacting system of variables that affect an Ecohealth problem with the need to use multiple methods and incorporate diverse knowledge and perspectives to develop actionable plans. Identify the principles of Ecohealth that emerge from the module activities and develop a shared vision of Ecohealth among learners and instructors on which the rest of the course can be built.

Examples of ways these can be achieved

- Instructors can give a summary lecture that draws on standard text books or manuscripts that provide certain authors' opinions of what defines Ecohealth.
- The class can work as a group(s) to distil the day's activities and develop their own definition of Ecohealth. Those concepts can be shared and the instructors can identify the core concepts with learners. From the concepts, groups can determine the principles.

- Participant homework can be to reflect on the day's activities and ask how the concepts identified compare to standard definitions or descriptions of Ecohealth provided in assigned readings.
- Participants, as a group, draw a diagram or concept map of Ecohealth that does not need to be reviewed or critiqued in class, but can be continually re-visited after other modules so that, by the end of the course, learners have a well-developed understanding of Ecohealth.

INSTRUCTIONS

1. Using learnings from activities 1 to 3, work as a large group to extract the common features from the case studies.
2. Seek commonalities in the nature of the study and the scope of people/settings involved in the issues.
3. Facilitate the discussion to help learners categorize these commonalities in terms of the core concepts and principles of Ecohealth. For example, systems view, multi- to transdisciplinarity, participation, social factors such as gender and equity, sustainability, and knowledge to action.
4. You can next share a history of the origins of Ecohealth and help to bring the day's activities into a unified vision.

Options for this activity:

Option 1: You can provide a lecture on the origins and evolutions of Ecohealth, resulting finally in an integration of the day's work demonstrating how the learners identified key concepts.

> The lecture can draw from Chapter 1 (Ecohealth: Origins and Approaches) by Charron, D.F., (ed) (2012) in: Ecohealth Research in Practice: Innovative Applications of Ecosystem Approaches to Health. Available on the International Development Research Centre website at: http://idl-bnc.idrc.ca/dspace/bitstream/10625/47809/1/IDL-47809.pdf

Option 2: Provide summaries of key advances in systems approaches to health issues for the learners to read and give feedback to the class summarizing the main aspects of Ecohealth. Introductory papers and websites can be used.

ALTERNATIVE ACTIVITY

1. During the break, you can highlight the common themes in the learner networks to draw out the key elements of Ecohealth.
   - Guide learners through their review to describe why they selected these key elements and why these elements contribute to the Ecohealth approach.
2. Give a summary lecture to bring together the day's activities by introducing the origins of Ecohealth and current status and concepts of its practice.

3. Whichever activity is selected, this is a good time to create a poster that can remain up in the classroom. The poster would give a definition of Ecohealth and list its concepts, principles, and approaches. The poster can be re-visited at the end of each day to review if the class's conception of Ecohealth changes as they progress through the course. At the end of the course, the poster will be finalized through group discussion and by linking to core lessons from previous modules. Learners can take copies away with them.

Activity 5A

Learning Objective:

- Apply general concepts, principles, and approaches discovered in the class so far and apply them to a specific case to start building skills in planning and applying an Ecohealth approach.

Training focus

Help learners take their new theoretical or intellectual understanding of Ecohealth concepts and principles and apply them to a case study to see their practical applications. Demonstrate the concepts and theory discussed in the module to date in an applied setting to help learners reinforce the learning outcomes of the previous activities in this module.

Examples of ways these can be achieved

- Learners visit the FIELD STUDY site for a course case study and are introduced to the location, stakeholders, and problems and are asked to provide their initial impressions of how concepts and principles developed in this module might apply.
- Instructors give a multimedia presentation on a case study, discussing with the learners where or how Ecohealth concepts and principles might be applied.
- Instructors present a series of case vignettes (such as presented in Charron et al. 2012) and highlight how the core concepts and principles identified in class proved to be valuable.

NOTE TO INSTRUCTORS

This activity is an extension of the last activity and is intended to help learners take the theoretical or intellectual understanding of Ecohealth concepts, principles, and approaches and apply them to a case study to help them see the practical applications. If time is limited and a field trip cannot be organized, the alternative activity listed next may be more efficient. If the introductory module is held over a very short time, precluding the use of a detailed case study, it will be important for instructors to highlight the practical implications of the Ecohealth core concepts when undertaking the previous activities.

INSTRUCTIONS

Before the course begins, you should identify the case studies you wish to explore by field study or field trips. One of the field studies can be introduced at this point.

Learners will visit the field site for a course case study.

1. Refer to *Using and Developing an Ecosystem Approach to Health Case Study in your Teaching:* ecohealth.vetswithoutborders.ca to plan your visit. Consider the ethical implications of a field study, in terms of research ethics and the impact that your visit will have on the system you are studying. Prepare your field visit carefully and consider all aspects of risk management in your planning.
2. Case studies should provide exposure to locally relevant issues. Trainers should be familiar with the key stakeholders and communities involved, including regulatory authorities, and should secure all necessary agreements, ethics approvals, and risk assessments for this to be used as a case study. The case should allow the trainees to see multiple perspectives and should not be restricted to one discipline's approach to characterizing the case or its management. Practical considerations such as accessibility, how long it takes to travel to the case study site, and trainee safety need also be considered.
3. Learners will be introduced to this teaching case study as it exists in the field. Learners will be provided with an opportunity to meet with some local stakeholders (preselected and recruited by the instructors to help reflect key local perspectives); see the affected community; meet some community members; and see the local environment. They will be shown (or told) about the entry point for this issue.
4. After this field introduction, learners will be given time to talk among themselves to discuss how they think the Ecohealth approach would apply to this situation.

- Participants meet with the instructors to reflect on their assessment.
- Learners will be tasked with a homework assignment of nominating what they would do in the first two weeks if they were responsible for developing an Ecohealth approach to the case study.
- Encourage learners to work as a group – ideally giving them time in the field at the end of the day to do so.

ALTERNATIVE ACTIVITY

You can use a multimedia approach to describing in rich detail the field site for the case study.

- Bring some stakeholders and community members to the classroom to allow the learners to talk with them and to:

(i) See the problem from multiple perspectives

(ii) See how various disciplines or perspectives affect how the health issue is conceived or how actions are prioritized

(iii) Practice communicating outside their own discipline.

The remaining time is used as above but within the classroom setting.

Activity 5B

Learning Objective:

- Apply general concepts, principles, and approaches discovered in the class so far and apply them to a specific case to start building skills in planning and applying an Ecohealth approach. *This is a repeat of Activity 5, but is repeated when the class is finished.*

Advanced Learning Objective:

- Adapt generic definitions of Ecohealth to a specific case study, consider who should be part of the research team and how the team members would be engaged to work collaboratively.

Advanced Learning Objective:

- Have informed debates on the settings and situations where an Ecohealth approach is (or is not) likely to provide effective options for dealing with a health issue.

Training focus

Help learners take all the material they have learned in the course and apply it to a case study to see practical applications. Demonstrate the concepts and theory discussed in the course in an applied setting to help learners reinforce the learning outcomes of the previous activities in this module.

At the end of the course, have the participants consider the ways in which the modules they have covered change their understanding of Ecohealth, and of the case itself. In what ways do considerations of collaboration, transdisciplinarity, equity, systems, sustainability, and knowledge to action alter their understanding of the situation? Learners may be divided into groups according to the various modules, and then brought together to present their findings.

As a larger group, they can then be facilitated to integrate their new insights and implications of these for research and practice.

- Further activities can be developed to address the advanced learning objectives:
- Critically discuss the definitions and core components of Ecohealth based on past experiences and debate if/how those definitions and attributes should evolve to meet local needs and perspectives.
- Have informed debates on the settings and situations where an Ecohealth approach is (or is not) likely to provide effective options for dealing with a health issue.

Activity 6

Trainer Learning Goal:

- Identify strategies and options for teaching Ecohealth to adults by reflecting on the instruction approach used in this module.

NOTE TO INSTRUCTORS

This activity is for trainers to debrief and reflect on the teaching and learning approaches used during training. It is an opportunity to critique, develop, and explore instruction methods to best illustrate foundation Ecohealth concepts and principles.

Training focus

As a debrief after instruction, instructors work as peers to discuss the value and challenges of the various learning activities and to explore alternative ways to meet the learning goals and teaching foci presented to help subsequent trainers adapt the module to future instruction situations.

INSTRUCTIONS

1. As a group, you should reflect on the day's activities and discuss the advantages and disadvantages in terms of helping adult learners to understand Ecohealth.

- This is designed as a "learning by doing" exercise that will model an approach to Ecohealth. This session allows for critical evaluation of the particular approach.
- During this evaluation, instructors can discuss the day's/class' learning goals and discuss alternatives.
- Instructors can also discuss this openly with learners as a way of asking for feedback on alternative methods to meet those goals.

Sample Timetable: Module 2

TIME	INTENSE SHORT COURSE (1 DAY)	LONGER COURSE (1.25 DAYS)
08:30-09:15	Introduce goals and objectives	Introduce goals and objectives
09:15-10:00	Round table discussion on experiences with collaborative work	Round table discussion on experiences with collaborative work
10:00-10:15	Pick case studies for causal networks	Pick case studies for causal networks
10:15-10:45	Draw causal networks	Draw causal networks
10:45-11:00	Break	Break
11:15-11:45	Review networks for commonalities	Review networks for commonalities
11:45-12:30	Link morning activities to the history of Ecohealth activities	Link morning activities to the history of Ecohealth activities
12:30-13:15	Lunch (including local representatives of the case study)	**12:00-12:30** – Travel to field site
13:15-13:45	Instructors introduce study and describe field setting in terms of (i) the case/issue and (ii) the environments involved	**12:30-13:00** – Finish lunch
13:45-14:45	Meet with and talk with local representatives to develop an understanding of the social environment	**13:00-14:45** – Walk around the case study site to explore physical aspects (built and natural environments)
14:45-15:15	Allow learners to talk with each other and local representatives to develop an outline for a plan to approach the case study	**13:45-14:45** – Meet and talk with local representatives to develop an understanding of the social environment
15:15-15:30	Break	**14:45-15:30** – Allow learners to talk with each other and local representatives to develop an outline for a plan to approach the case study

15:45-16:15	Class discussion on (i) the Ecohealth features of the case and (ii) the people who would need to be engaged to understand, study, and manage the issue, and (ii) ideas on first steps towards applying the Ecohealth approach	
16:15-17:30	Review the day's activities to identify and discuss methods for teaching Ecohealth	Return to the classroom
Day 2: 08:30-09:30		Class discussion on (i) the Ecohealth features of the case and (ii) the people who would need to be engaged to understand, study, and manage the issue, and (iii) ideas on first steps towards applying the Ecohealth approach
09:30-10:30		Review yesterday's activities to identify and discuss methods for teaching Ecohealth

Evaluation

1. Evaluate pre-existing Ecohealth knowledge.

   The morning exercises will allow the instructors to identify the depth, breadth, and diversity of pre-existing understanding of Ecohealth concepts and thus allow them to adjust and refine what is emphasized in the rest of the module and course.

2. Evaluate the development of Ecohealth knowledge and understanding as the class continues and at the end of the class.

   The Ecohealth concepts and principles poster developed earlier will be a living document that the class can continue to edit, add to, and refine over the course of the class. Instructors should review the poster at the end of each day to identify any misconceptions, lack of understanding, or missing key concepts or strengths of the class, and adjust the remainder of the course.

3. Ask the learners to provide a one-page reflection at the end of this module on the top three challenges they perceive will exist in teaching Ecohealth and how they might deal with those challenges.

NOTE TO INSTRUCTORS

Trainers can evaluate their success by keeping a notebook that records the activities and instruction approaches they felt worked best each time they offered the course. The characteristics of their target learners should also be recorded for each class. The trainers can periodically find approaches and activities that consistently allow the learners to meet their goals. It is really important that instructors and trainers reflect on the success or otherwise of activities of the day, including how individuals have contributed and whether particular group configurations in the class are worth keeping for the next modules.

Terminology

Concept
An abstract idea; an idea or mental image that corresponds to some distinct entity or class of entities, or to its essential features.

Ecological system
A systemic description of living organisms (people, plants, animals, and microorganisms), their physical surroundings (e.g. soil, water, air), and the interactions and natural cycles that sustain them. Also known as an ecosystem.

Equity
The state, quality, or ideal of being just, impartial, and fair.

Etiology
The cause or origin of a disease; the study of disease causation.

Health
For definitions of health, see Chapter 1 in Charron 2012. Also see *Module 2 – Appendix I – Experiencing and Negotiating Health.*

Participatory (specifically, in research)
Marked by, requiring, or involving active engagement by those who will be affected by the research, or who are affected by the outcomes being investigated, as well as the researchers, in the design and implementation of the research.

Principle
A proposition that serves as the foundation for a system of belief or behaviour or for a chain of reasoning; a general scientific theorem or law that has numerous special applications across a wide field.

Social system
The people in a society considered as a system organized by a characteristic pattern of relationships. Social organization based on established patterns of social interaction between different relationships, regulated through accepted norms and shared values.

System
A group of interacting, interrelated, or interdependent elements forming a complex whole.

Transdisciplinary
A research strategy that crosses many disciplinary boundaries to create a holistic approach. It is also used to signify a unity of knowledge beyond disciplines.

Key References

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MODULE 2 – APPENDIX I

Experiencing and Negotiating Health

This Appendix is borrowed from the Copeh Canada Ecosystem Approaches to Health Teaching Manual. References within this Appendix are to the Copeh Canada manual, available at: http://www.copeh-canada.org/upload/files/en/english%20ecohealth%20teaching%20manual%20-%20copeh-canada.pdf

SECTION 1 – EXPERIENCING AND NEGOTIATING HEALTH

DESCRIPTION:

Health is a concept that can be intensely personal. It makes reference to one's own worldview and life context. To get past the differences a common vision of the health problem and the ideal state of health, is needed. In this section, common definitions of human, animal and ecosystem health are provided. There is, however, no consensus on health definitions and a working definition must be negotiated by each research project or intervention in its particular context. Following the definitions, some strategies and tactics for negotiating visions and definitions of health are presented. Creative tension is purposely generated to help students understand how health is integrated into real world situations.

LEARNING OBJECTIVES:

- Deepen our understanding of what it means "to experience" in general and of experiencing health in particular, through a reflection on health and experiencing it.
- Develop an appreciation of humility, through the sharing of experiences.
- Explore the definitions of health by negotiating from different perspectives
- Practice the process of negotiating a definition of health.

KEY QUESTIONS:

- What is experience, and how does one experience health?
- Is it possible to arrive at one common definition of health?
- How do you negotiate a health? (biomedical, socio-economic, etc.)
- In what ways is health a negotiable term?
- What are some of the processes by which we can negotiate health in our ecohealth work?

DISCUSSION QUESTIONS:

- Does how we define health make a difference to how we treat health? How we develop our research or intervention? How we approach our practice?
- Can the same definition of health lead to multiple approaches to dealing with health?
- Can certain definitions of health lead to erroneous choices in methodology with respect to health?
- How can we make links between the individual experience and equity and gender issues (socially defined identities)?
- Why are these valuable? Why is it important to foster sharing of one's values?
- What are you experiencing? What are you not experiencing?
- What are you capable of being aware or conscious of? What are you incapable of being aware of or conscious of?
- If the definition of health is always open to negotiation, how do we use it to inform our practice?

- How does the process of negotiating health affect the way YOU experience your own health?
- Is it necessary to reach a consensus on the definition of health?
- Does the definition of health change depending on the perspectives involved?
- How does the way we deal with or define human health issues affect animal and environmental health?

REFLECTIVE PROMPTS:

- What do you do when you are healthy?
- What is it like to be healthy?
- What do you do when you are sick?
- What is it like to be sick?
- How can illness be prevented?
- Does what makes you healthy also make others healthy? What about animal health or ecosystem health?

KEY CONTENT:

Defining Health

Health has a number of different definitions, and the concept of health challenges organizations that take up its cause. Classic definitions of health include those of the World Health Organization's (WHO) Consitution: "...complete physical, mental and social well-being and not merely the absence of disease or infirmity" (WHO, 1967) and the Alma Ata Declaration: "The extent to which an individual or group is able, on the one hand, to realize aspirations and satisfy needs; and, on the other hand, to change or cope with the environment" (WHO, 1978). The latter definition makes reference to an individual's relationship with the environment. It does not, however, draw out the interdependence of the ecosystem's health, human health and animal health. Some groups have attempted to rewrite the standard WHO definition of health; others go into more detail in mission statements or other documentation. One Health, for example, is dedicated to fostering collaborations between physicians, veterinarians and environmental scientists. The American Veterinary Medical Association defines it as "the collaborative effort of multiple disciplines – working locally, nationally, and globally – to attain

> *"Health offers an approach to assessing the multi-faceted well-being of organisms, populations, communities and ecosystems. The combination of health with sustainability brings together the notion of a currently desirable state with that of longevity. In this, the less focused notions of what has been called sustainable development are made clear" (NESH, 2011).*

optimal health for people, animals and our environment". James Kay's Diamond Diagram highlights how the needs of ecosystems are linked to the needs and wants of society in the presence of policy makers and other stakeholders (Kay et al. 1999).

Less attention has been paid to defining and refining the definition of "animal health". Indeed, a study looking at how animal health is defined in veterinary texts found that most did not present a definition of health (Gunnarsson, 2006). While it was rare that an author referred solely to animal productivity, this would never be considered a pertinent category when referring to human health. Furthermore, the environment was rarely taken into consideration in these texts. When it was, it was often in reference to disease (not health) or a "failure to produce."

> *"Since the ecological system may be fundamentally altered by the time that scientists attempt to describe and quantify pathology, the etiology of the disease is lost and analysis is primarily forensic or retrospective diagnosis."*
> *(Schaeffer et al. 1988, p. 447)*

Attempts to define ecosystem health in modern science are much more recent. An early definition is the following: "an ecological system is healthy...if it is stable and sustainable— that is, if it is active and maintains its organization and autonomy over time and is resilient to stress" (Costanza et al. 1992, p. 9). Ecosystem health is routinely defined with regard to a few parameters (such as diversity or productivity) and assessment relates to populations rather than individuals. A true evaluation, however, would also examine the interrelationships between populations (Schaeffer et al. 1988). Further, the original state of many ecosystems is not known to science, although traditional ecological knowledge can sometimes be used to reconstruct how the ecosystem might have looked before perturbation (Houde, 2007). In addition, our tools are not sophisticated enough to allow us to accurately establish how healthy an ecosystem is (Vogt, 1997). These complications lead some scholars to wonder whether it is even useful to speak of ecosystem health (Vogt, 1997). Definitions of ecosystem health also make frequent reference to human health and policy making. Viewing ecosystems in terms of human health provides important opportunities for the integration of social and health sciences into environmental management (Rapport et al. 1998). Ecosystem health can be linked to the services that ecosystems provide human communities to sustain them (Rapport et al. 1998), resulting in the Millennium Ecosystem Assessment definition of ecosystem health as "the ability of an ecosystem within its surrounding landscape to continue to provide a particular set of services." (MA, 2003, p.69)

Health is Multiperspectival:

When a problem is being defined, multiple perspectives are brought to the table. Each individual, species, or ecosystem will have its own definition or requirements for health. In order to fully understand the health problem, all of these perspectives need to be acknowledged and explored. Module 6: Participation and Research elaborates on this theme. This exploration often highlights the need to look at health in terms of complex systems [See Module 3: Complexity]. Further, bringing in different perspectives on health can often highlight issues of gender [See Module 5: Gender], power and equity.

Two particular perspectives, "Western" and "traditional" views of health, often clash. On the one hand, Western science is rooted in a worldview which grew out of the dualism of Descartes. In this system there is mind and body, humans and nature; elements which as antitheses to one another. Humans can understand nature because they are separate from it. Following Descartes, Hume and Berkeley introduced the inductive method and modern science as we know it was born (Russell, 1961). The methods presuppose a reductionist view of nature – by reducing nature to its constituent parts, scientists could understand its internal workings (Suzuki and Knudston, 1992). The health sciences, particularly with respect to quantitative methods (see Appendix), have largely adhered to these principals.

Traditional views, on the other hand, often recognize the complexity of nature. They engage with local dynamics of an ecosystem to try to understand it as fully as possible, while retaining a certain awe of the enigmatic mysteries that nature offers us. Traditional Ecological Knowledge (TEK) is intrinsically ecosystemic and interdisciplinary. Both the scientific information and the methods used bear a striking resemblance to the ecosystem approaches to health. See the *Appendix* for an example of where differing definitions and a disregard for traditional knowledge led to a backlash.

There is, however, some convergence between "Western" science and "traditional" views. Einstein's Theory of Relativity shows that one can never know both the velocity and the position of an object at the same time, Heisenberg discredited Newtonian physics by showing that pausing nature to study it gives a false representation since nature is inherently dynamic, and Bohr demonstrated that the behaviour of subatomic particles can only ever be expressed in terms of probabilities. Further, systems thinking has revealed cases of synergy, where the properties of systems do not seem to equal the sum of their parts. Traditional science has been criticized as a "disconnected, inadequate description of the whole" (Suzuki and Knudston, 1992). Ecosystem approaches to health attempt to retain a holistic focus.

Negotiating Health:

Ecohealth research and practice focuses on process. There can be as many different definitions of health as there are stakeholders. Different perspectives shed light on divergent worldviews and positions that are likely to come to the fore later on. Going through the process of acknowledging different perspectives can also help determine the positions and perspectives that are absent from the discussion. As the number of stakeholders and the complexity of the issue increases, the process of negotiating a common vision of health and of the issue at hand also becomes more complex. Yet, at the same time, the process of negotiating health can help foster a sense of community and better frame health issues. It highlights areas of convergence that can be used to develop a common vision. The focus is on the process instead of the outcomes, allowing us to understand where people are coming from and why they have a particular worldview. It then becomes part of the process of deciding how to go forward with the limitations expressed.

Box 1.

Sample perspectives for negotiating health activity

- *Pregnant waitress from small community*
- *International forestry company CEO*
- *Master tradesperson from a small riverside community who works for the forestry company*
- *Retired public health nurse*
- *Female salmon and her offspring 7 generations from now*
- *Boreal forest in the Springtime*
- *Unborn moose*
- *Provincial Ministry of Health*
- *Birch tree seeds*
- *Child who plays in a creek*

ACTIVITIES:

Activity 1: Define and negotiate health

TOTAL TIME: at least 60 minutes
OBJECTIVE: To facilitate participant's experience of the multiple perspectives of health and live the process of negotiation through a role playing game. This is a good activity to have in the beginning of the course as it creates a sense of community and builds relationships between the participants. To foster this sense of community, all participants – students and instructors – should be actively engaged in this activity.

STEP 1: *Specific definitions of health* (15 minutes)

- Divide the participants into small groups (3 or 4 max).
- Give each group a different perspective or standpoint (which has been decided upon beforehand by the team; see Box 2 for some ideas).
- Ask each group to develop a working definition of health that considers the imposed perspective.

Note:

- the diversity of perspective is important for the negotiation process in step 2;
- it is important to include standpoints from the non-human world;
- include time and scale dimensions.

STEP 2: *Negotiating health* (at least 20 minutes – give more time if you can. This round takes more time than the first step as this is where the real process of negotiation begins)

- Reorganize the groups to make up to 5 groups where the individuals from each group in step one are spread out.
- Ask the participants to present the definition that emerged in step 1 to their new group.
- Negotiate a new definition of health that takes into account the different perspectives at the table.

Note: *Each of the new groups doesn't necessarily have a representative of all the imposed perspectives of step 1. It may happen that some groups don't arrive at a consensus or a common definition in the time frame allowed.*

STEP 3: *Wrap-up discussion (30 minutes)*

- Bring the participants into plenary.
- Ask each group to state its definition of health. NOTE: *If a group hasn't arrived at a definition explore with them why and how this makes them* feel*. Probe into whether* words *were the hindrance and whether some other representation (image, sound, etc.) could better synthesize perspectives and experiences.*
- Extract commonalities and differences from the different definitions.
- See if the group can get the 5 definitions down to 3.
- Debrief the negotiation process. Some discussion questions could be:
    - How is "health" a negotiable term?
    - How did the negotiating process occur?
    - Are any of these definitions transdisciplinary?
    - What role does willingness play in negotiating a definition?

Note: *Be aware that there might be some frustrations at this point and be prepared to discuss and debrief this by looking at the process*

Note: *Definitions can be kept for other activities in the course. If they are put in a visible place, participants can go back to them as the course evolves. They can be a dynamic teaching tool. It is also a good idea to synthesize the process. Ask each group to bring up their hand written initial definition from step 1 and save the definitions produced in step 2. Create a document which shows the evolution of definitions through the three steps and provide this document to the group.*

- *This activity is designed as a good icebreaker and should be done at the beginning of the course.*

Activity 2: Reflection on our own definition of health

OBJECTIVE**:** To reflect on one's own way of experiencing and defining health.

DIRECTIONS: This activity can be part of a "reflective passport" and can be used as a transversal activity prompting reflections on the different fundamental concepts of ecohealth. The reflective passport is a journal where students can write their thoughts on the different concepts presented during the course and revisit them as they evolve during the course (See Module 5: Gender for an example of a reflective passport).

PRIOR TO THE COURSE: Ask students to write their own definition of health.

DURING THE COURSE: periodically (maybe 3 times during a 10 days course) ask students to go back to their definition of health and write their reflections/rewrite/adapt their definition. During sessions, field trips, and when debriefing health definitions, you can ask students how the definitions presented by groups, papers, or presentations resemble their own.

Note:

As an ecohealth researcher or practitioner, including one who is preparing a course on ecosystem approaches, it is important to reflect on our own worldviews, motivations and definitions of health and their limits. These essential reflections help to create the openness needed to deal with and appreciate the divergent worldviews that will be expressed by the different stakeholders involved in an issue or a course.

Activity 3: Mindfulness Meditation

10 minute presentation on the benefits of meditation (optional), 10 minutes of meditation and at least 30 minutes of discussion: The course itself can be a trying experience, with full schedules and constant contact with a new group of people. Ask students to reflect on how their health changes in these new circumstances, how they are "experiencing" health in the present. A mindfulness exercise can be carried out during class. Yale University has a research programme studying the impacts of mindfulness meditation and provides resources for carrying out meditation exercises. The first of the three audio exercises on their "resources" site (http://medicine.yale.edu/psychiatry/ytnc/care/resources.aspx) entitled "Body Scan Meditation" is an interesting exercise to bring peoples focus onto their own body and how it feels. Have people stay in their seats and close their eyes while you play the audio clip for them. Hold a discussion following the meditation, linking back to the concepts seen in the course and tying this personal "experience" of health into theory. Is it important to dedicate time to reflecting on health? To what extent is health an embodied experience? A theoretical concept? Does their own experience fit with the

FIELD BUILDING LEADERSHIP INITIATIVE

MODULE 3

Participation

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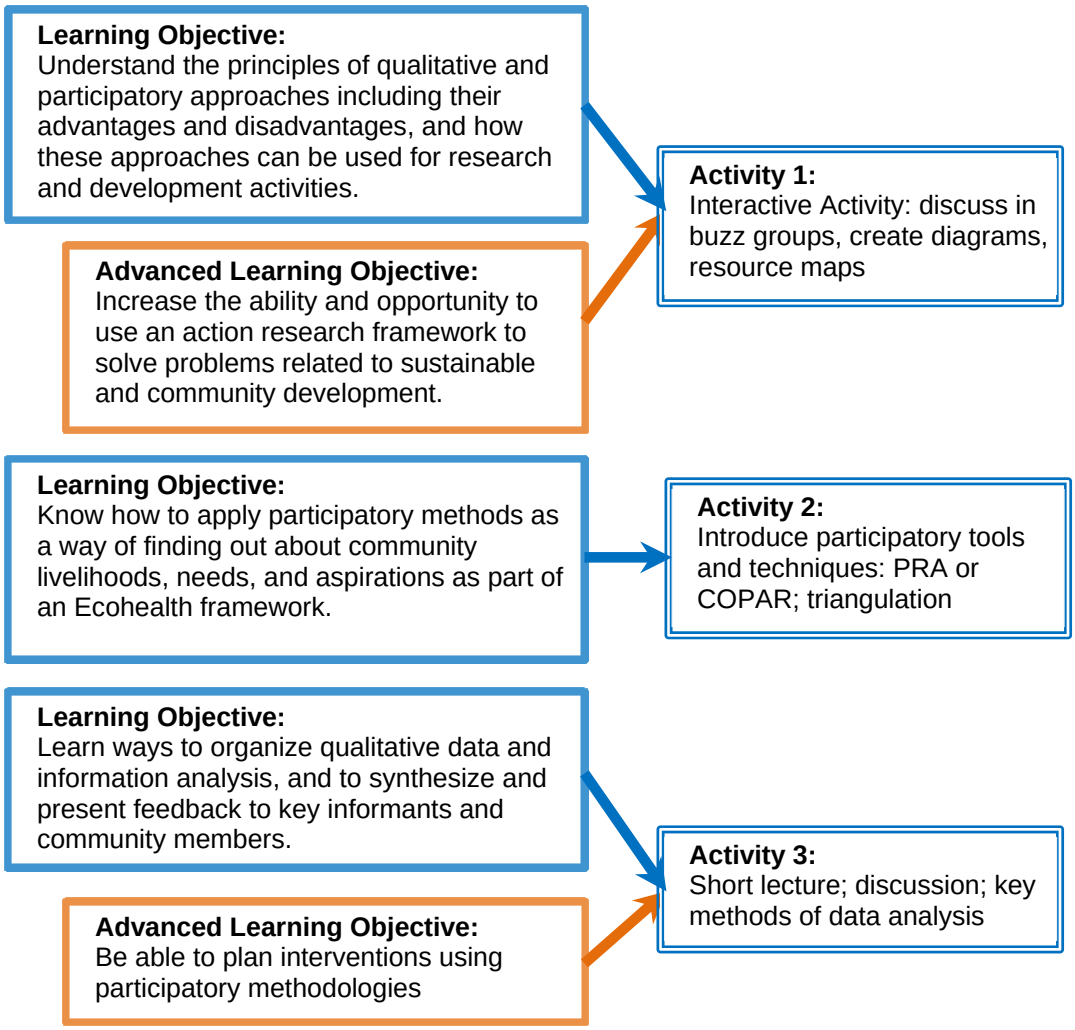
FÈVRE, S, HORWITZ, P, WALTNER-TOEWS, D (2013). (EDITORS). ECOHEALTH TRAINER MANUAL.
FIELD BUILDING LEADERSHIP INITIATIVE. VWB/VSF: CANADA

MODULE 3 – PARTICIPATION

Overview

Participatory approaches enable Ecohealth scholars and practitioners to work with stakeholders to understand problematic situations, design strategies, and shape activities. In this way, stakeholders are empowered to investigate and resolve the complexities of health-related issues they face. These approaches take into account people's health and their socio-economic, cultural, and environmental concerns. Participatory methods increase participants' opportunities to apply their specific knowledge more effectively and collaboratively. Often framed in terms of participatory research, these methods open up the range of possible sources of knowledge beyond a few experts to include the experiences and knowledge of a variety of stakeholders who bring different types of expertise. These methods also link research with action, one of the important principles of Ecohealth. If handled well, they facilitate deeper knowledge, more systemic understanding, and more effective action. Participatory research, in this module, is used to refer to this broad notion that bridges the search for knowledge with action to improve problematic situations. This module introduces learners and trainers to some of the important characteristics of participation and participatory approaches.

Conceptual Map: Module 3



Module Aims

This module introduces learners to concepts of participatory research and why and how participation is central to Ecohealth. Participation is essential to sustainable community development and brings a dimension to Ecohealth that many other research approaches do not include. Participation is about recognizing the role, rights, stakes, and capacities of different groups and making these central to both research questions and the way research is conducted. This module introduces Participatory Rural Appraisal (PRA) and Community-Oriented Participatory Action Research (COPAR) as well-recognized methodologies that can be used for engaging with stakeholders. It shows how PRA approaches allow researchers to investigate, analyze, and evaluate constraints and opportunities, to create sustainable solutions that involve key stakeholders, and enable informed and timely decisions regarding development projects.

The aims of this module are:

- To demonstrate why and how participation and empowerment of community members is important for understanding and managing complex Ecohealth issues.
- To build learners' understanding of how to become trainers of participatory processes when doing Ecohealth in the field.
- To familiarize learners with ways to interact with community members and enable them to take on facilitating roles in the field.
- To encourage learners and teachers to reflect on their role in the research process and how they can collaborate with other stakeholders.

Why is this topic important?

There are many reasons why participatory approaches to Ecohealth-defined problems are important. Foremost among them are the need for a) common understandings of a problem by those who are most affected by it, and b) people learning collectively, eventually becoming able to control their own destiny. Ecohealth seeks to recognize the expertise of a range of different stakeholders, and not just privilege the knowledge and perspectives of "scientific experts" who may leave and take their knowledge with them. One of Ecohealth's defining features is its emphasis on knowledge to action, which gives stakeholders the capacity to take ownership of the issues that affect them. Using research as a way of collective learning they can investigate and address these issues, and work through policy and other means to broaden the impacts of these actions. Participation is key to ensuring that the needs, opportunities, and strategies developed through this process engage stakeholders; the process will thus be meaningful to them, and will increase

the likelihood that the process will have sustainable (long-term) impacts. This module helps build understanding among learners about how and why they can engage people, how this in itself can be empowering, while recognizing the roles, rights, stakes, and capacities of different groups. This module also links to the *Module 7: Sustainability* which highlights the importance of sustainable development and how to build sustainability into research programs.

This pursuit challenges models of expert-driven, well-defined disciplinary approaches in the measurable sciences as the dominant source of solutions to ill-health. Many learners new to Ecohealth are trained in these scientific or clinical/medical backgrounds, areas where they are more familiar with collecting and analyzing quantitative data. The lived experiences of stakeholders – such as local people – are more perceptual, intuitive, traditional, and emotional, but no less important, and sometimes critical to health issues. These are the domains of qualitative analyses – a type of data often considered "soft" and not as reliable as quantitative data. This module will show how using qualitative, participatory approaches provides very different kinds of evidence and interpretations of the reality of situations. It provides some insight into how to analyze data collectively through participatory activities, a task which has its own challenges and tools.

Key Concepts

- Participatory research is a qualitative research approach that uses different principles, methodologies, and analytical tools from quantitative approaches.
- Participatory methods are a cumulative and flexible set of techniques to enable researchers and learners to study and work with communities, bearing in mind the complexity of socio-economic and socio-cultural conditions of the targeted communities.
- Participation is strongly related to empowerment. To empower people to participate, "outsiders" in this case could be learners, researchers, or development workers, and should also have other skills such as facilitation and communication that create a medium for collective learning, sharing, and discussing issues.
- Ecohealth research should be framed and developed in partnership with other stakeholders whose needs, solutions, and aspirations can help drive the process and sustain it in the future.
- The role of outsiders is to facilitate the development process and build capacity by creating the appropriate environment using the tools and techniques of participatory methods that allow community members to express their needs, problems, and opportunities. In return, the

outsiders are able – together with the community – to prepare an action plan for the intervention.

- The tools and techniques of participatory method serve as a medium to help researchers and learners to work with community members; the attitudes of outsiders are extremely important – a willingness to accept community members as equal partners, a willingness to listen and learn from community members, and to be patient.

Guiding Questions

1. Who has a voice and who doesn't have a voice in society? Why is this relevant for the concept of participation?
2. What other factors underlie the degrees of participation in a process?
3. Who is more likely, and who is less likely, to participate in a process? Who makes a decision about whether this is a problem, or even part of the problem, in an Ecohealth approach?
4. How can research address issues of participation? Why is qualitative research an approach of choice?
5. How can the formation of an inter- or transdisciplinary team contribute to an appropriate degree of participation?
6. How can participatory processes help address health inequalities that may exist within communities (such as gender, ethnic, socio-economic, age-related, or otherwise).

Basic Learning Objectives

After completing this module, learners will be able to:

1. Understand the principles of participatory approaches, including advantages and disadvantages, and how these methods can be used for research and development activities.
2. Know how to apply participatory methods as a way of finding out about community livelihoods, needs, and aspirations as part of an Ecohealth framework.
3. Learn ways to organize qualitative data and information analysis, and to synthesize and present feedback to key informants and community members.

Advanced Learning Objectives

Advanced learners will be able to:

4. Identify opportunities to create collective learning arrangements and be able to target problems from multiple perspectives.
5. Increase the ability and opportunity to use an action research framework to solve problems related to sustainable and community development.
6. Be able to plan interventions using participatory methodologies.

Practical Notes

- Learners with a background in community development, social science, geography, agriculture, or livestock may already be familiar with some of the concepts in this module. They should be directed to the advanced learning objectives and can be put in groups with learners who don't have this background to share their experience.
- This module can be a stand-alone of instruction materials but it is important to understand the context of Ecohealth research. It is a tool to help learners understand the needs of people in the target areas where learners will work, how to collect data and information about the interests of the community, and for the analysis, development, and implementation of an action plan.
- Beginners in the field of qualitative and participatory approaches would benefit from working with experienced trainers or instructors to guide them when starting fieldwork.
- This module is only an introduction to participatory approaches. To learn the participatory tools and techniques, participants must be exposed to field exercises. If your Ecohealth course allows, participatory tools could be practised during a site visit, and if learners are interested in using these techniques further they should be encouraged to get more training and practice. If you include field-based activities in this module, the ideal number of participants per course would be 15. Class size could be increased to 25 participants per course, but it is difficult to arrange for the fieldwork unless there are two or three good trainers and two or three sites for the field exercise.
- For a field exercise, refer to *Using and Developing an Ecosystem Approach to Health Case Study in Your Teaching*: ecohealth.vetswithoutborders.ca. It is

important to have preliminary visits in the target communities (such as meeting with the local authority and key persons) to arrange suitable times for the exercise. At the same time, you can collect secondary information from relevant organizations and local authorities. Bring with you flipcharts, markers, pencils, notebooks, tea, sugar, candy, candles, and, if appropriate, a token of appreciation for participants. Materials to be used for ranking and scoring for this exercise, such as dried beans, small stones, sticks, etc., can be found in the community.

Background information

WHAT IS PARTICIPATION?

The World Bank definition (1994) of participation is a process through which stakeholders influence and share control over development initiatives, decisions, and resources that affect them. Participation does not end with going to a meeting and listening to what researchers, development workers, or donors have to say, but is the continuous process of people's involvement in an intervention or development process. Participation can take different forms, ranging from information sharing and consultation methods to mechanisms for collaboration and empowerment that give stakeholders more influence and control. It is an active process where intended "beneficiaries" engage in the outcomes of the intervention programs and projects and gain personal growth. The beneficiaries can be people who are directly and indirectly affected by the intervention and they could be farmers (better off and poor or disadvantaged), local authorities (such as village head, district offices), local organizations (youth, women, and religious groups); most importantly, they should be partners of change.

It is often assumed that talking about participation refers to the act of involving physical, rural communities. However, as discussed in *Module 5: Collaboration and Transdisciplinarity*, Ecohealth approaches encourage the involvement of a range of stakeholders with different types of knowledge; the challenge of participation is to ensure they are adequately represented in the scoping, planning, analysis, and follow-up of Ecohealth projects. It is tempting to talk of communities as cohesive units, but any community consists of different individuals with a wide spectrum of viewpoints, needs, attitudes, and communication styles. Can all of these be represented in a participatory manner? Who chooses who gets represented? Communities can refer to physical, moral, religious, virtual, and other types of collectives, and how these are involved in a process may require different strategies.

When encouraging participation it is extremely important to empower people, allowing them to truly share information about the problems and opportunities of their community. Empowerment and participation are closely

interrelated. Empowering people enables them to actively contribute to the generation of new knowledge and social change, while participation provides the platform for them to contribute. Empowerment and participation can be with individual, family, community, and nation up to a global level. Empowerment and participation can also be economically, socially, and politically based. Participation implies "empowering people to mobilize their own capacities, be social actors, rather than passive subjects, manage the resources, make decisions, and control the activities that affect their lives" (Cernia 1985, cited by Duraiappah et al 2005).

Participatory Rural Appraisal (PRA) and Community-Oriented Participatory Action Research (COPAR) both aim to provide the opportunity for communities to understand and react to their own problems and situations, and to allow researchers to support groups in operationalizing actions stemming from locally-owned conclusions. It is a bottom-up approach that serves to empower communities and use the researcher more as a guide than as an external force providing top-down advice. It recognizes that communities themselves have the best knowledge of problems and resources, but that research can serve to explore issues and set local perspectives within broader complex systems processes, therefore identifying underlying drivers or challenges that may have been previously unrecognized. COPAR can also be used to ensure that research is inclusive of types of knowledge (including traditional knowledge) and populations (such as indigenous groups, women, and children) that are often marginalized and omitted from top-down methods.

Three important quotes!

"Participation means different things to different people and to avoid potential conflict, disappointment or 'burn out' it is important to clearly state, or agree, on a common definition." (Buchy and Hoverman 2000).

"Participation without the redistribution of power is an empty and frustrating process for the powerless. It allows the power holders to claim that all sides have been considered, but makes it possible for only some of those sides to benefit. In other words, it maintains the status quo." (Arnstein 1969).

"Participation can stimulate an ongoing learning process, increasing the awareness of collective responsibility within the community. This should be seen as an asset by professional agencies rather than as a threat." (Buchy and Hoverman 2000).

Although PRA and COPAR can be empowering tools for community involvement, they can be challenging to execute well and require ample skills and preparation. Effective participation means that individuals and communities need to invest their time and resources in activities, and it assumes that they have an interest in seeing research succeed and continue. To ensure that community expectations are managed, researchers need to clearly share, throughout project processes, the goals of each activity, for example, the stage of COPAR and possible outcomes. Community participants themselves should be inclusive, and this means that processes often involve groups of individuals, including marginalized populations, from a variety of cultural, social, economic, and physical backgrounds. Care needs to be taken throughout research processes to ensure that different perspectives are equally considered and that participation is inclusive of different community groups. These processes also demand that the researcher needs to be flexible to timelines and with lines of questioning (semi-structured processes are best), and considerate of community traditions and resources.

CHECKLIST OF THINGS TO CONSIDER

- How does the process allow for increased time and administration if required?
- Will the process allow disagreement/opposition to develop?
- Will the process raise exaggerated expectations?
- Are there problems of representation and legitimacy?
- Are there strong biases or inaccuracies in the information collected?
- How should trustworthiness be maintained?

Several terms have been used for this participatory approach – Rapid Rural Appraisal (RRA), Participatory Rural Appraisal (PRA), and Participatory Learning and Action (PLA). An important theme in these approaches is that being prepared to listen and learn from local people allows the generation of knowledge. Sometimes people or groups may not want to participate, because of historical grievances, lack of understanding, lack of confidence, or other reasons. These complexities must be considered and appropriate trainers encouraged to take a leadership role. Whose agenda is your research trying to promote?

ATTITUDES REQUIRED FOR RESEARCHERS WHEN PRACTISING PARTICIPATORY APPROACHES

1. Participation
2. Respect for community members
3. Interest in what people know, say, show, and do
4. Patience, not rushing or interrupting
5. Listening, not lecturing
6. Humility
7. Empowering community members to express, share, enhance, and explore their knowledge.

Effective participation relies on respecting a number of key principles, such as those identified by Egger and Majeres (1998), cited by Duraiappah et al. 2005:

- Inclusion – of all people, or representatives of all groups who will be affected by the results of a decision or a process, such as a development project.
- Equal partnership – recognizing that every person has skill, ability, and initiative and has equal right to participate in the process regardless of their status.
- Transparency – all participants must help to create a climate conducive to open communication and building dialogue.
- Sharing power – authority and power must be balanced evenly between all stakeholders to avoid the domination of one party.
- Sharing responsibility – similarly, all stakeholders have equal responsibility for decisions that are made, and each should have clear responsibilities within each process.
- Empowerment – participants with special skills should be encouraged to take responsibility for tasks within their specialty, but should also encourage others to be involved to promote mutual learning and empowerment.
- Cooperation – cooperation is very important; sharing everybody's strengths reduces everybody's weaknesses.

Triangulation is commonly used in PRA and is a way of verifying the validity of qualitative data by using different tools to collect information on the same topics. Qualitative techniques that can be used include interviewing and discussing with people, field observation, and structured group activities. Groups are stronger when they are interdisciplinary and involve both

outsiders (researchers) and insiders (beneficiaries), giving equal opportunity for participation of men and women while collecting data, sometimes interviewing men and women separately.

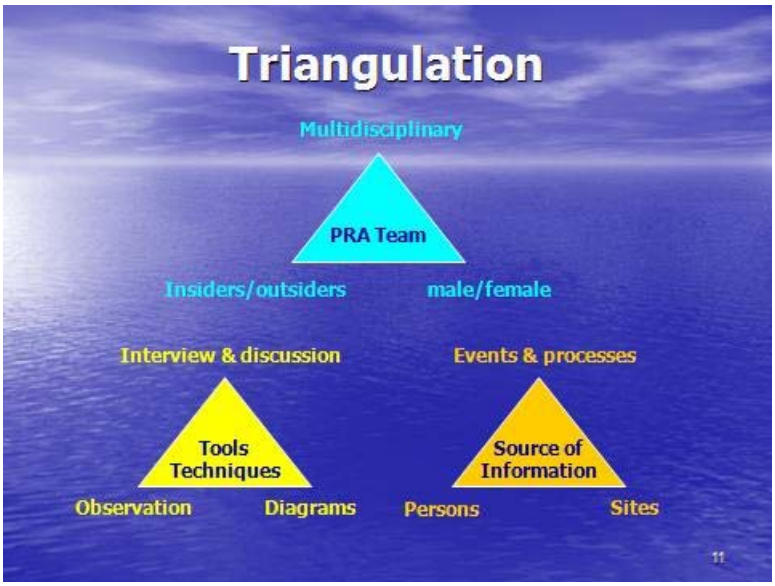


Figure 3.1 Triangulation.

For specific details about PRA and examples of tools such as resource maps and calendars, please refer to the following Key References:

Training Module on PRA tools (Jain and Polman 2003).

Rietbergen-McCracken and Narayan (1996).

Community-Oriented Participatory Action Research (COPAR)

INTRODUCTION TO COPAR

A type of Participatory Action Research (PAR), COPAR is one methodology that can be used to apply the principles of Ecohealth to health challenges. The method recognizes that there is a need to understand levels of health in a holistic manner, grounding community research in understandings of not only natural, but also social and cultural resources, ecosystems, social systems, governance and power, and public health. For Ecohealth, the approach adds value to other PAR tools, such as a PRA, as it frames research within a community setting to support the Ecohealth field's understanding of health as a concept that exists within links of social and physical environments, and between individuals, families, neighbourhoods, communities, and ecosystems.

PAR approaches, including COPAR, are useful for understanding complex relationships between human and environmental systems. Used in fields of health, environment, and development research, PAR approaches are useful and appropriate when the development of a collaborative relationship between researchers and targeted communities can be undertaken (see Parkes and Panelli 2001 for more detailed information on the academic foundations of PAR). PAR approaches extend beyond PRA approaches by grounding all decision-making processes in the communities themselves, letting local actors guide both research activities as well as action planning. PAR methods have two core components – action, for doing or achieving goals, and participation, with the involvement of targeted research populations being fundamental to research processes.

Introduced in academic literature as a research method that generates knowledge and processes of change as well as empowering involved communities, COPAR is "characterized by the involvement of a participatory research community in identifying and addressing a situation (or problem) through cycles of action and research" (Panelli 2002). COPAR can be used for Ecohealth research and learning for three main purposes:

- Knowledge generation (examining linkages between ecosystems, social systems, human health, and governance/power structures)
- Understanding change processes (learning about systems and challenges/influences/opportunities as they develop and are influenced by other community factors)
- Empowering communities (helping communities to identify issues and plan actions).

UNDERSTANDING COPAR

COPAR projects place the community at the centre of research agendas in both theory and practice. As with Ecohealth, the community is seen as the arena for research and as the hub for investigation. Undertaking COPAR leads researchers into cycles of participatory research, reflection, and then action, which can be limited or extended, depending on the problems assessed and the possible length of project cycles.

PHASES	PROCESSES
Initiations	• Meeting a community • Enabling community members to articulate problems, the contexts in which they arise, and the ways in which different issues in the community interact • Seeking understanding through partnerships.
Developing a partnership	• Recognizing the "players" • Establishing representation forms • Forming core research and reference groups.
Reflection	• Identifying community concerns and/or issues. •
Research design	• Explicitly deliberating over and designing inquiry processes.
Conducting investigations	• Seeking answers and completing fieldwork and research.
Reflection and further planning	• Analyzing data and reflecting on findings with a view to decide on and implementing new actions (review and reflect, participate and plan, research, and undertake more actions).

Table 3.1 General COPAR phases and processes (adapted from Parkes and Panelli 2001).

Based on the phases and processes outlined in Table 3.1, COPAR can then be summarized and applied throughout the four general stages of action shown in Figure 3.1, from research initiation, building of partnerships, collaborative initiatives, and through to further planning and future phases of research (again, see Parkes and Panelli 2001; after Panelli 2001, for more detailed discussions of COPAR stages). The initiation phase consists of first scoping issues and information, then preparing for the partnership. In practice, it is important to reflect on who leads the initiation process and how this may influence the outcomes. The phase in practice often centres on discussions on a key issue or problem that the community has already highlighted. The second phase of COPAR consists of building partnerships through developing relationships, mobilizing existing resources, and starting and continuing dialogues. This phase is when communities and researchers develop a work plan and build a stronger understanding of community issues. COPAR's third phase is formed of collaborative initiatives, where specific investigations are undertaken and plans are developed and shared, which in practice means completing fieldwork and research. The fourth phase involves further planning of future phases of participation and action, and evaluation of overall COPAR activities.

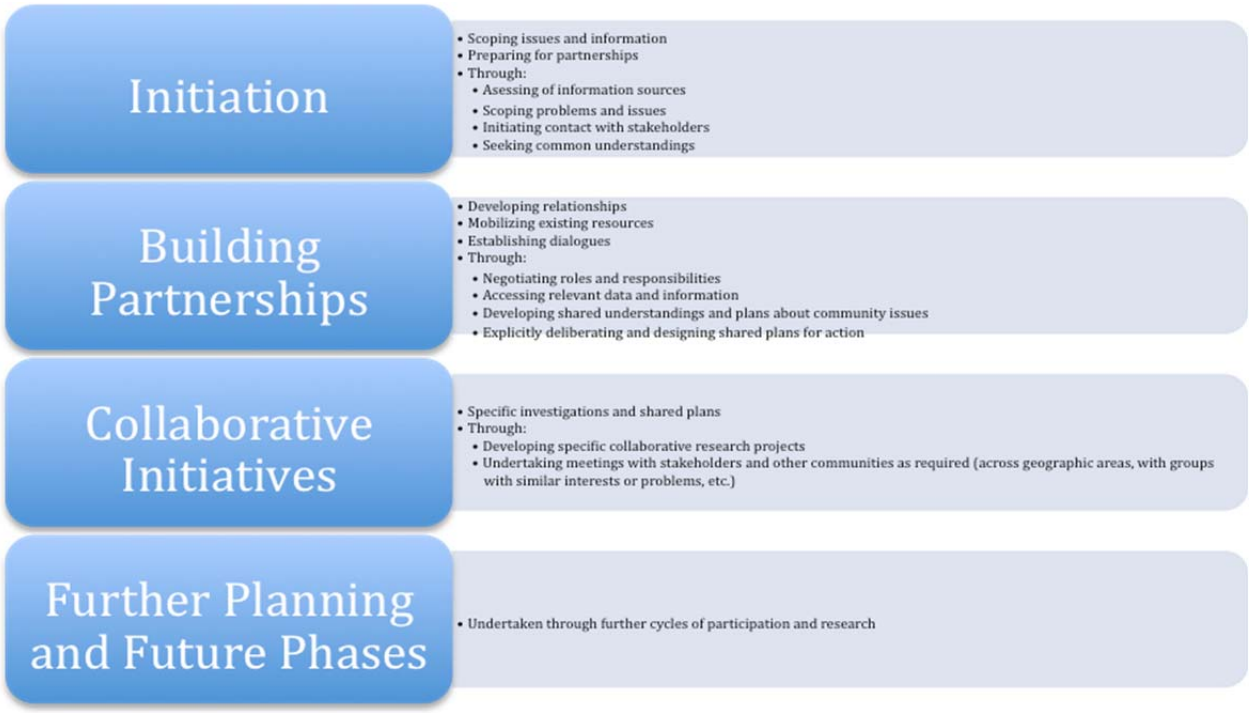


Figure 3.2 Stages of COPAR (adapted from Parkes and Panelli 2001).

The principles of COPAR, demonstrated in Figure 3.2, reflect the diverse contexts within which the approach can be used (e.g. for development, health, resource management, systems-based research). The approach is undertaken in a community context, with multiple stakeholders. COPAR relies on knowledge exchanges and the use of existing resources in a way that is equitable and sustainable. Its cycles of research, reflection, and action rely on participation and the development of partnerships that are fostered over time and strengthened through the consideration of feedback, and problem solving and planning processes that are evaluated and reassessed. COPAR can present a variety of outcome types, from conceptual and social to structural and practical, depending on the project.

TOOLS FOR COPAR: PARTICIPATORY VULNERABILITY AND CAPACITY ASSESSMENTS (VCAs)

WHAT ARE PARTICIPATORY VCAs?

Participatory vulnerability and capacity assessments (VCAs) are community participatory processes that can be adapted to research needs to identify risks and capacity levels of individuals, households, and communities. Stemming from development work and often used in disaster management, VCAs can examine physical, social, economic, and political factors to identify immediate and root levels of vulnerability and to identify ways that communities can manage current and future changes in their systems. A number of organizations have developed training packages on VCAs; those drawn upon throughout this section include Oxfam's Participatory Capacity and Vulnerability Analysis (PCVA) training package (2009) and the International

Federation of Red Cross and Red Crescent Societies (IFRCs) VCA training modules (2004), with terminology being used according to the United Nation's 2004 International Strategy for Disaster Reduction (ISDR).

> Vulnerability, in VCAs, is defined as a condition that reduces people's ability to prepare for, withstand, or respond to negative changes in their systems. It is determined by physical, social, economic, and environmental factors. Capacity is defined as the resistance of a system potentially exposed to negative changes to be able to reach and maintain an acceptable level of functioning and structure. Capacity is measured relating to resilience levels, with research identifying how people cope and survive daily and during times of crisis by assessing resources that are used to prepare, prevent, and reduce risk levels.

VCAs focus on finding ways to empower communities by having the end goal of raising community capacity levels. VCAs can be undertaken in a top-down manner, but are generally designed (and are most effective and representative) to be participatory, and in a way that stimulates discussion around the assessments and planning from findings with community members and key stakeholders.

HOW CAN VCAs BE USED FOR ECOHEALTH?

VCAs are useful in assessing the vulnerability and capacity levels of health of community members and their environment. Their broad consideration of the systems that communities function within suits well the cyclical and compounded risks that can influence health. We can use health as an indicator of the well-being of community settings, where a setting considered "healthy" would be one with a high level of resilience and capacity and low levels of vulnerability. Identifying the definitions of healthy communities can also be part of the process. VCAs are undertaken in two stages – first an assessment, using a variety of tools depending on the research setting, and then action planning, where assessment findings are operationalized into activities to build capacity and reduce vulnerability.

VCAs can be used for three general outcomes relating to Ecohealth:

- To understand the interdependence, at a community level, of animal, human, and ecosystem health
- To build interdisciplinary models that integrate health and sustainability, that can be used to increase community resilience
- To collect information that can be used in future COPAR initiatives as baseline data.

The information presented in this section is meant to serve as an introduction to VCAs, as a type of COPAR methodology. Detailed information on planning and undertaking VCAs is available in Oxfam's 2009 PCVA training

pack and IFRC's 2006 VCA training modules. Although aimed at assessing disaster risk, these resources include worksheets and templates for assessment methodologies that can be adapted for projects focusing on Ecohealth and related resources, or that can be used directly with a health impact being considered as a disaster itself (e.g. an outbreak of SARS).

WHAT ARE THE STAGES OF VCAs?

The first stage of a VCA, the assessment stage, examines three categories of community resources:

- Physical/material (including bio-physical, built resources, and economic resources)
- Social/organizational (including governance structures, justice and rights)
- Motivational/attitudinal (including culture).

Examples of these resources are illustrated in Table 3.2. Each type of resource has a direct or indirect influence on other resources, including levels of health.

CATEGORIES OF ANALYSIS		
Physical/ Material	**Social/ Organizational**	**Motivational/ Attitudinal**
• Location and type of housing/building materials • Land, water, animals, capital, other means of production (access and control) • Infrastructure and services • Human capital • Environment factors	• Family structures (weak/strong) • Leadership qualities and structures • Legislation, administrative structures and institutional arrangements • Decision-making structures and participation levels • Divisions and conflicts • Degree of justice, equality, access • Community organizations • Isolation or connectedness	• Attitude towards change, awareness • Sense of ability to affect their world • Initiative • Faith, determination • Religious beliefs, ideology • Dependent/independent (self-reliant) • Cohesiveness, unity, solidarity, cooperation • Orientation towards past, present, future

Table 3.2 VCA categories of analysis (content adapted from Turvill and De Dios 2009; IFRC 2006).

To conduct VCA assessments, a variety of tools and information sources can be used. Baseline data on resource levels can be found in existing community data and historical profiles. New sources of information can be found through semi-structured interviews and focus group discussions with communities, which also contributes to raising community awareness about potential risks and increases community ownership over developed projects. Assessments can also include tools of direct observation, transect walks, and mapping. Information on how to undertake these assessments and templates for these activities are available in Oxfam's PCVA training pack and IFRC's VCA resource modules. Table 3.3 presents a VCA analysis matrix that can be used to organize and assess research findings relating to the categories of analysis presented in Table 3.2.

VCA ANALYSIS MATRIX			
	Physical/Material	**Social/Organizational**	**Motivational/Attitudinal**
VULNERABILITY	• High level of poverty • Poor water quality • Lack of roads	• Limited community groups or involvement in decision-making processes • Low levels of local leadership • Lack of access to information and justice	• Lack of cooperation within community • Little planning for the future
CAPACITY	• Strong level of housing • Ownership of land	• Strong family structures • Respect and ties to neighbouring communities	• Faith • Independent (self-reliant) • Interest in change

Table 3.3 VCA findings analysis matrix.

The second stage of VCAs involves action planning based on assessment findings. Action planning can design project activities around four areas of capacity building:

- Elements at risk: Protect/raise capacity of elements at risk
- Root causes: Work to include root causes of risk in planning and development activities to mitigate/prevent their effects
- Dynamic pressures: Release pressures on communities through capacity building and empowerment

- Existing negative pressures and "unhealthy" conditions: Identify ways to manage pressures and raise health of community resources (natural and human systems).

This module provides guidelines for the participatory methods that can be used for different types of intervention in the community. However it does not provide a comprehensive overview and additional training and practice is recommended for those who will be actively using participatory methodologies. The module does require instructors to refer to other documents that provide detailed step-by-step practical instructions on how to use specific participatory tools: please refer to the module references.

Activities

Activity 1

Learning Objective:

- Understand the principles of qualitative and participatory approaches including their advantages and disadvantages, and how these approaches can be used for research and development activities.

INSTRUCTIONS

1. Provide an introduction to the module and its objectives. If participants are not familiar with each other, run an interactive activity to introduce themselves and their backgrounds, including any experience they may have with participatory approaches. This exercise could model a PRA activity. It could be simple buzz groups, or could include making a Venn diagram of the linkages between participants, drawing a resource map of the training area and people and resources in it, or drawing a social map of people's backgrounds/disciplines. Refer also to Module 1.
2. You can refer to the Background Information section of this module to present the definition of participatory methods, their principles and relevance for research and development work by cross-referencing to topics covered in Module 2. At this time, you do not need to describe participatory methods in detail, instead encourage participants to discover the meaning of participation throughout the module. Participants should be frequently reminded about the importance their attitude and behaviour plays in allowing successful participatory processes. Refer to the resource *Participation Lecture* (fbli_mod3_Participation_lecture_KBorin) at: ecohealth.vetswithoutborders.ca.
3. Engage the class in small group discussions or a class brainstorm about what qualitative research means and how it differs from quantitative

research – see *Module 3 – Handout 1 – Activity 1*, for example. (Refer to Newman and Benz 1998; Fife Council 2002; Creswell 2003).

4. Two tables can be prepared:
   i. The first table is labelled "Examples of qualitative (column 1) and quantitative (column 2) approaches." Consider surveys/questionnaires, biometric data collection, direct observation, consultation meetings, etc.
   ii. The second table is labelled "Characteristics, advantages and disadvantages of qualitative and quantitative approaches." Consider issues like sample size, depth of understanding, power dynamics (who controls the questions and the research method), stage of research, etc.
5. The Handout "About Participatory Rural Appraisal (PRA)" can be distributed to participants if considered necessary.

ALTERNATIVE ACTIVITY

(if learners have experience working with communities)

Some important questions to ask learners in the class: which tools or techniques have you used in development and research work with communities? What has been the reaction from community when the project started and ended? What types of villagers benefited from your project? What were the opinions, comments, suggestions, and recommendations of villagers about the result of your project? Do you expect that the villagers could use the result of your project in the future?

Sample papers can be found in Additional References. Look for Rifkin and Kangere (2006), Mason et al. (2001), and Axner (2013).

Activity 2

Learning Objective:

- Know how to apply participatory methods as a way of finding out about community livelihoods, needs, and aspirations as part of an Ecohealth framework.

INSTRUCTIONS

1. Introduce participatory tools and techniques as examples of tools that generate broader or general information and those that generate more specific information. You can choose to focus on PRA or on COPAR tools (see Background Information). The instructions here assume a focus on PRA, but can equally be adapted to working with COPAR tools if learners are already familiar with PRA approaches. Remember that each tool has its own potential to collect specific information, but there are techniques that apply to many tools, such as facilitation, mediation, dialogue, semi-structured interview, etc.

   The following tools could be presented as examples of PRA techniques with which learners should become familiar:

   - Area/resource map
   - Seasonal activity calendar
   - Timeline
   - Transect walk
   - Scoring exercise

   Please refer to the FAO references, the handouts, and Participatory Rural Appraisal, PRA by Khieu Borin (2001) for more details.

2. Once learners are familiar with the participatory techniques, organize the learners into small groups. Each group will carry out a role play to simulate one type of PRA technique. In each group, some learners will be the interviewers/trainers, and some will be the participants/interviewees.

Option 1:

Provide the learners with a case study that will allow them to contextualize their role play. They should imagine they are using participatory techniques at the early stage of research to identify the core issues of community concern. One or two group members can act as trainer for each group, and the rest will participate in the exercise.

Refer to a case study from one of the companion texts: Ecohealth research in Practice (Charron 2012) or Ecohealth: A Primer (Waltner-Toews 2011). Topics for the role plays could be drawn from one of the case studies used in the other modules, such as the Dengue case study from *Module 4: Using Systems Concepts in Ecohealth*.

Option 2:

Alternatively, you can give instructions to the whole class and each group can do the activity as participants. In this option, learners should use real-life experience rather than a role play. For example, to do a community map they should do a map of their area (either where they live individually, or of the site where they all work/study together).

Your trainers/interviewers should take notes during this exercise and present back to the rest of the class, describing how the participatory activity unfolded, what they learned from being interviewers and interviewees, how they could improve their techniques for real-life situations, and how this might be relevant for their Ecohealth work. See Recoup manual handout "Reflexivity" (Singal and Jefferey 2008). If you have time, ask some of the groups to play out the role play in front of each other.

3. If the training venue has access to practical exercise, you can organize learners in groups to test the tools they have learned in the class. For example, they could practise these techniques on other learners.

ALTERNATIVE ACTIVITY

Keep asking learners about their attitudes and behaviour when doing fieldwork. They can note these in their learning journals. How do these change as they gain more practice using these tools. How is it different being a trainer compared to being a participant of a PRA exercise? (See Recoup manual handout Reflexivity (Singal and Jefferey 2008).)

Activity 3

Learning Objective:

- Learn ways to organize qualitative data and information analysis, and to synthesize and present feedback to key informants and community members.

INSTRUCTIONS

1. Begin by delivering a short lecture on how to synthesize and analyze qualitative data. References are given in this module. Provide the class with examples of a few key methods, such as story-based methods, coding, and summarizing, and the use of triangulation.
2. The next exercise uses the data gathered during classroom PRA exercises, and, if time has allowed, from the field exercises.
3. Organize learners in groups to work on their data and consider how they would analyze and present the data. It may be best to combine learners from the earlier groups so they can bring the results from their different exercises together and consider how to combine these different types of information.
4. Identify the group leaders, note takers and presenters for presenting the results to the plenary session. In the feedback session encourage learners to formulate problem statements that take into account different viewpoints around the issues.
5. Encourage learners to discuss the importance of community participation in the analysis and interpretation of the data. They should be reminded that the outcomes of the field exercise with findings and recommendations are for both beneficiaries and the research team.

EXAMPLES (SEE REFERENCE LIST)

- Pankaj et al (2011)
- Bellon and Reeves (2002).

6. Close the session by eliciting reflections from the class on key learnings. If more time is available, a second day can be used for a field visit that includes participatory techniques. An evaluation of the module can be done using participatory techniques such as scoring/ranking. Learners and trainer can write in their learning journals.

Sample Timetable: Module 3

TIME	INTENSE SHORT COURSE (1 DAY)
08:00-08:30	Introduction to the module and class introductions.
08:30-09:00	Learning goal 1 Introductory lecture Principles of qualitative and participatory research in relation to the conventional research/survey.
09:00-9:20	Lecture/discussion: Why is participation important in development?
09:20-09:30	Break
09:30-12:00	Learning goal 2 Introduction to participatory tools and techniques with group work a) Area/resource map b) Seasonal activity calendar c) Timeline d) Transect walk e) Scoring exercise.
12:00-13:00	Lunch
13:00-14:30	Learning goal 3 Organization, synthesis, and presentation of data.
14:30-15:00	Wrap up and evaluation.

Evaluation

Refer to Modules 1 and 2.

Terminology

Beneficiaries
Beneficiaries can be people who are directly and indirectly affected by the intervention; they could be farmers (better off and poor or disadvantaged), local authorities (village head and commune council), or local organizations (youth, women, and religious groups). They actively engage in the outcomes of the development programs and projects and gain personal growth.

Capacity
Capacity is the resistance of a system potentially exposed to negative changes to be able to reach and maintain an acceptable level of functioning and structure. Definition as used in Community-Oriented Participatory Action Research (COPAR).

COPAR
Community-Oriented Participatory Action Research.

Trainer
The trainer is a person with the ability to create and brainstorm the discussion and meetings to the agreeable outputs; not limited to researchers, community members can also take this role.

Empowerment
People are encouraged to take responsibility for tasks within their specialty, but should also encourage others to be involved to promote mutual learning and benefit.

Outsider
Outsiders are considered to be people who are not the residents of the intervention areas but involved in the intervention. It can be researchers, development workers, donors, etc.

Participation
Participation is the continuous process of people being involved in the development or intervention. Participation can take different forms, ranging from information sharing and consultation methods to mechanisms for collaboration and empowerment that give stakeholders more influence and control of the development process.

PRA
Participatory Rural Appraisal.

Vulnerability
Vulnerability, in VCAs, is defined as a condition that reduces people's ability to prepare for, withstand, or respond to negative changes in their systems. It is determined by physical, social, economic, and environmental factors.

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MODULE 3 – HANDOUT 1 – ACTIVITY 1

Tables for Flipchart "What is Qualitative Research?"

EXAMPLES OF RESEARCH APPROACHES	
QUALITATIVE	**QUANTITATIVE**

CHARACTERISTICS, ADVANTAGES, AND DISADVANTAGES OF RESEARCH APPROACHES	
QUALITATIVE	**QUANTITATIVE**

MODULE 3 – HANDOUT 2 – ACTIVITY 2

Village Resource Map

(for Learning Goal 2) (VWB/VSF 2009)

Description:	The Village Resource Map is a tool that helps us to learn about a community and its resource base. The primary concern is not to develop an accurate map but to get useful information about local perceptions of resources. The participants should develop the content of the map according to what is important to them.
Objectives:	To learn the villagers' perception of the natural resources found in the community and how they are used.
With whom:	Female and male focus groups
Time needed:	2 hours

KEY QUESTIONS

1. What resources are abundant?
2. What resources are scarce?
3. Does everyone have equal access to land?
4. Do women have access to land?
5. Do the poor have access to land?
6. Who makes decision on land allocation?
7. Where do people go to collect water?
8. Who collects water?
9. Where do people go to collect firewood?
10. Who collects firewood?
11. Where do people graze livestock?
12. What kind of development activities do you carry out as a whole community? Where?
13. Which resource do you have the most problem with?

HOW TO FACILITATE

The Village Resource Map is a good tool to begin with. It is easy and fun for the villagers to do. It helps initiate discussion within the community and with the PRA team. All team members should observe the mapping exercise because it provides an overall orientation to the features of the community and its resources.

In our PRA, we would like to do this map with separate groups of men and women in the village. This is because women and men may use different resources. The women will map the resources they think are important (like water sources, firewood sources, etc). The men will map the resources they think are important (like grazing land, infrastructure, etc). Maps may include: infrastructure (roads, houses, buildings, bridges, etc.); water sites and sources; agricultural lands (crop varieties and locations); soils, slopes, elevations; forest lands; grazing areas; shops, markets; health clinics, schools, churches; special places (sacred sites, cemeteries, bus stops, shrines, etc).

1. Find a large open place to work.
2. Start by placing a rock or leaf to represent a central and important landmark.
3. Ask the participants to draw the boundaries of the locality or village.
4. Ask the participants to draw other things on the map that are important. Don't interrupt the participants unless they stop drawing.
5. Once they stop, you can ask whether there is anything else of importance that should be added.
6. When the map is completed, trainers should ask the participants to describe it. Ask questions about anything that is unclear.

Use the key questions to guide a discussion about resources in the village. One or more trainers should ask the questions, another should take notes on what is said.

Be sure to draw a picture of the map on a piece of paper. Be sure that the final map includes direction indicators (north, south, east, west).

MATERIALS NEEDED

Sticks, pebbles, leaves, sawdust, flour, dung, or any other local material.

Figure 3.3: Example of Village Resource Map

MODULE 3 – HANDOUT 3 – ACTIVITY 2

Seasonal Calendar

(FOR LEARNING GOAL 2) (VWB/VSF 2009)

Type of group:	**Mixed group for women and men**
Description:	A seasonal calendar is a participatory tool to explore seasonal changes (e.g. gender-specific workload, diseases, income, expenditure, etc).
Objectives:	To learn about changes in livelihoods over the year and to show the seasonality of agricultural and non-agricultural workload, food availability, human diseases, gender-specific income and expenditure, water, forage, credit, and holidays.

KEY QUESTIONS

1. What are the busiest months of the year?
2. At what time of the year is food scarce?
3. How does income vary over the year for men and women?
4. How does expenditure vary over the year for men and women?
5. How does rainfall vary over the year?
6. How does water availability for human consumption vary over the year?
7. How does livestock forage availability vary over the year?
8. How does credit availability vary over the year?
9. When are holidays and how many days in which months?
10. When is most agricultural work carried out by women?
11. When is most agricultural work carried out by men?
12. When is most non-agricultural work carried out by women?
13. When is most non-agricultural work carried out by men?
14. Which could be the most appropriate season for additional activities for men and women? What time constraints do exist and for what reasons?

HOW TO FACILITATE

1. Find a large open space for the group. The calendar can be drawn on the ground or very big sheets of paper.
2. Ask the participants to draw a matrix, indicating each month along one axis by a symbol.
3. It is usually easiest to start the calendar by asking about rainfall patterns. Choose a symbol for rain and put/draw it next to the column that participants will now use to illustrate the rainfall. Ask the group to put stones under each month of the calendar to represent relative amounts of rainfall (more stones meaning more rainfall).
4. Move to the next topic and ask people during which months the food is usually scarce. Discuss the reasons why it is scarce and make sure that the different kinds of food donations that people receive are discussed and that this information is shown in the map.
5. Go on like this, topic by topic. After finishing all the columns your matrix should have covered the following 14 topics:

   (1) Rainfall

   (2) Food scarcity (many stones means less food available, indicate during which time people receive food donations; e.g. food for work).

   (3) Income (cash and kind) for women.

   (4) Income (cash and kind) for men.

   (5) Expenditure for men.

   (6) Expenditure for women?

   (7) Water availability for human consumption.

   (8) Livestock forage availability.

   (9) Credit availability.

   (10) Number of holiday days.

   (11) Agricultural work load for women.

   (12) Agricultural work load for men.

   (13) Non-agricultural work load for women.

   (14) Non-agricultural work load for women.

7. After the calendar is finished ask the group which linkages they see among the different topics of the calendar. Encourage the group to discuss what they see on the calendar.
8. Make sure that your copy of the seasonal calendar has a key explaining the different items and symbols used on the map.

MATERIALS NEEDED

Documentation sheet, this handout, white paper for copying the seasonal calendar.

1. If drawing on the ground: soft ground, stones, sticks, and other available material to produce symbols, or
2. If drawing on paper: a large sheet of paper, pencils, markers.

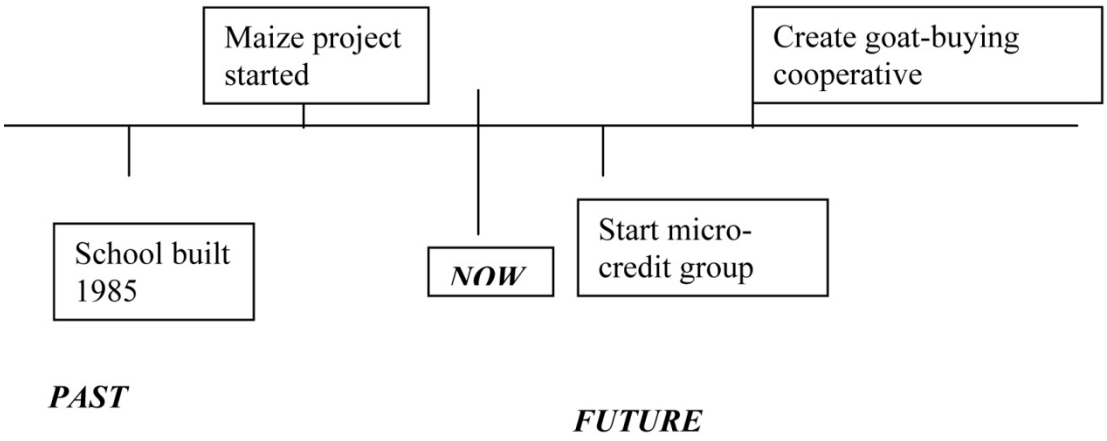
MODULE 3 – HANDOUT 4 – ACTIVITY 2

Timeline

(FOR LEARNING GOAL 2) (VWB/VSF 2009)

- A record of events in the past and present
- A vision of what the future should or could be like

e.g. types of crops growing, number of people in village trained, etc.



MODULE 3 – HANDOUT 5 – ACTIVITY 3

About Participatory Rural Appraisal (PRA)

The history of using participatory methods began in the late 1970s with the introduction of a new research approach called Rapid Rural Appraisal (RRA), which immediately became popular with decision-makers in development agencies. Building on close collaboration with local populations, RRAs were designed to collect first-hand data from local people about their perceptions of their local environments and living conditions in rural areas. A limitation of an RRA, however, was that it was extractive; the role of the local people was limited to providing information, while the power of decision-making about the use of this information remained in the hands of others.

Later a new terminology of Participatory Rural Appraisal (PRA) was developed to increase local people's involvement in the development process, leading to a sound "ownership." It built up rural people's own capacities for analyzing their circumstances of living, their potentials, and their problems for the decision on changes, while PRA trainers accepted more and more the role of learners. This interactive mutual learning of both local people and PRA trainers becomes the means for more sustainable development. One of the most important principles in PRA is the sharing analysis results, decisions, and planning efforts among the community members by open and public fora. PRA strongly supports and facilitates the introduction of more demand-responsive ways of managing development interaction, and process-oriented thinking.

Rural people have developed ability and skill to survive in coping with the changes of the environment and the available natural resources. Natural resources such as soil, water, forests, livestock, wildlife, river systems, etc., are closely linked to rural livelihoods. Methods in PRA help both researchers/trainers and local people incorporate "participation" to achieve the development goal. These methods are used not just to enable the voice of local people – especially those who are marginalized – to be heard, but also to encourage all stakeholders to make their own analysis of their conditions.

It is important to stress that development strategies do not depend only on monetary assistance, credit, materials, and technology; development depends on the thinking and perception of the members of the community. Development that pushes people to accept what they do not choose for themselves leads to problems. The active participation of local people starts with identifying the real needs and searching for a suitable strategy to meet those needs.

Participatory methods and techniques tend not to follow a blueprint or standardized procedure. They are used creatively and generatively, often in combination with other tools. The methods used are often considered less important than the attitudes and beliefs of those carrying out the investigation.

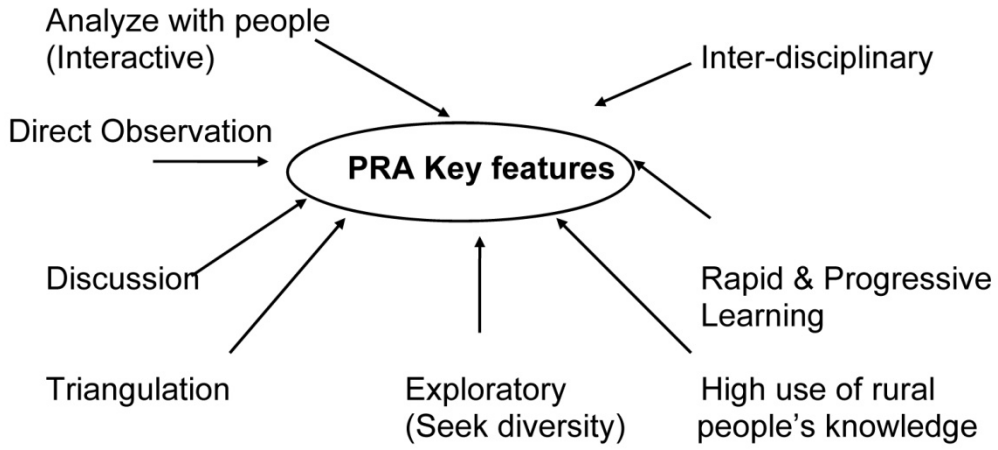
The prosperity of a nation depends not so much on its monetary policy as on the expectations of its people.

Prof. Robert Lucas, Nobel prize in Economics

MODULE 3 – HANDOUT 6 – ACTIVITY 3

Data Collection

There is a need to understand and appreciate traditional management systems, livelihood systems, indigenous technologies, and the ways and reasons why people feel, see, think, and act in rural areas. Researchers need to take into account certain key features:



Key features of data collection in PRA

FIELD BUILDING LEADERSHIP INITIATIVE

MODULE 4

Using Systems Concepts in Ecohealth

Bob Williams, Lead Author

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FIELD BUILDING LEADERSHIP INITIATIVE. VWB/VSF: CANADA

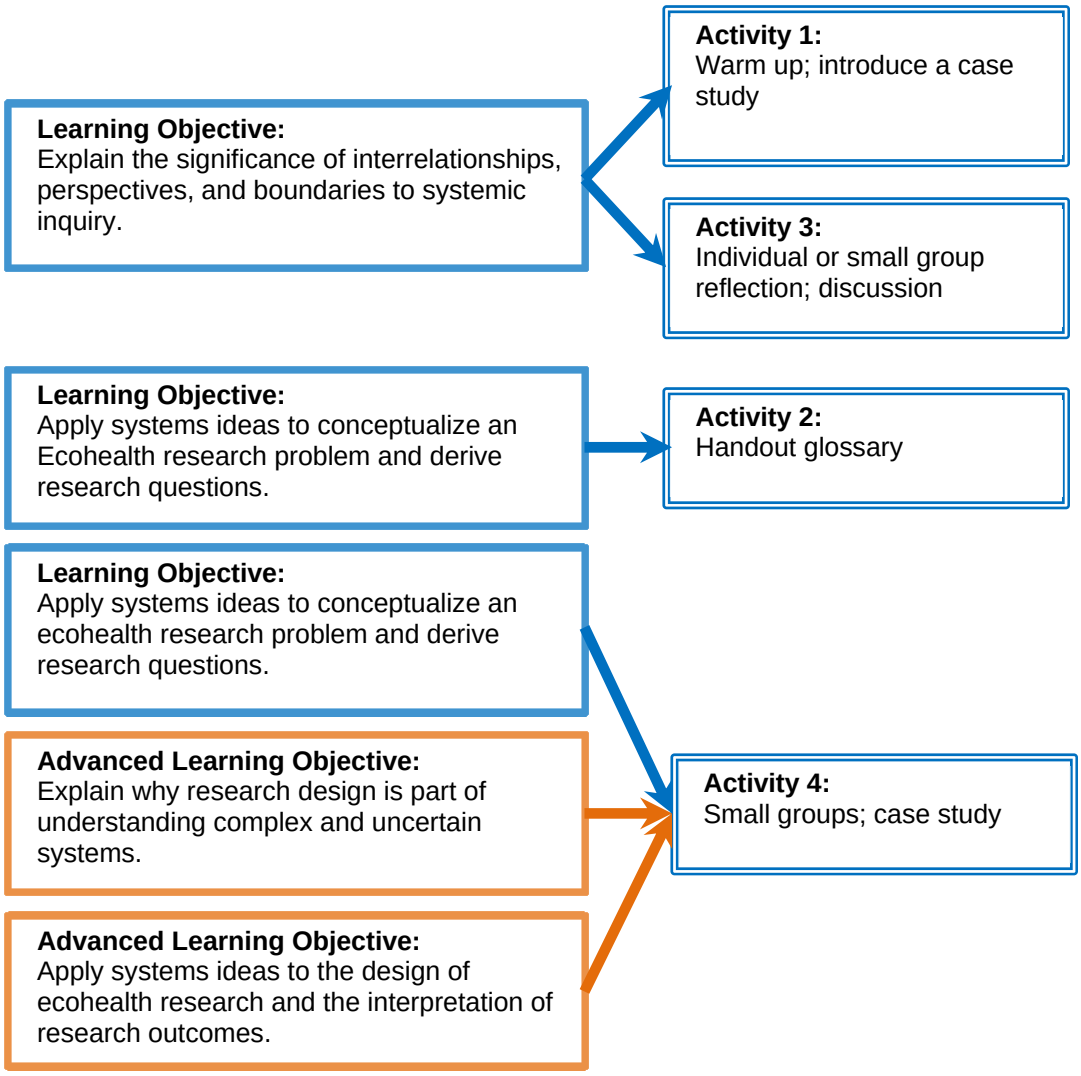
MODULE 4 – USING SYSTEMS CONCEPTS IN ECOHEALTH

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



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?
9. 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?
10. What does it mean to conduct Ecohealth research in a way that uses systems principles and ideas?
11. 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?
12. 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

S*imple 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

sustainable and effective policies and infrastructure to deliver safe water to households (the government level)? 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).

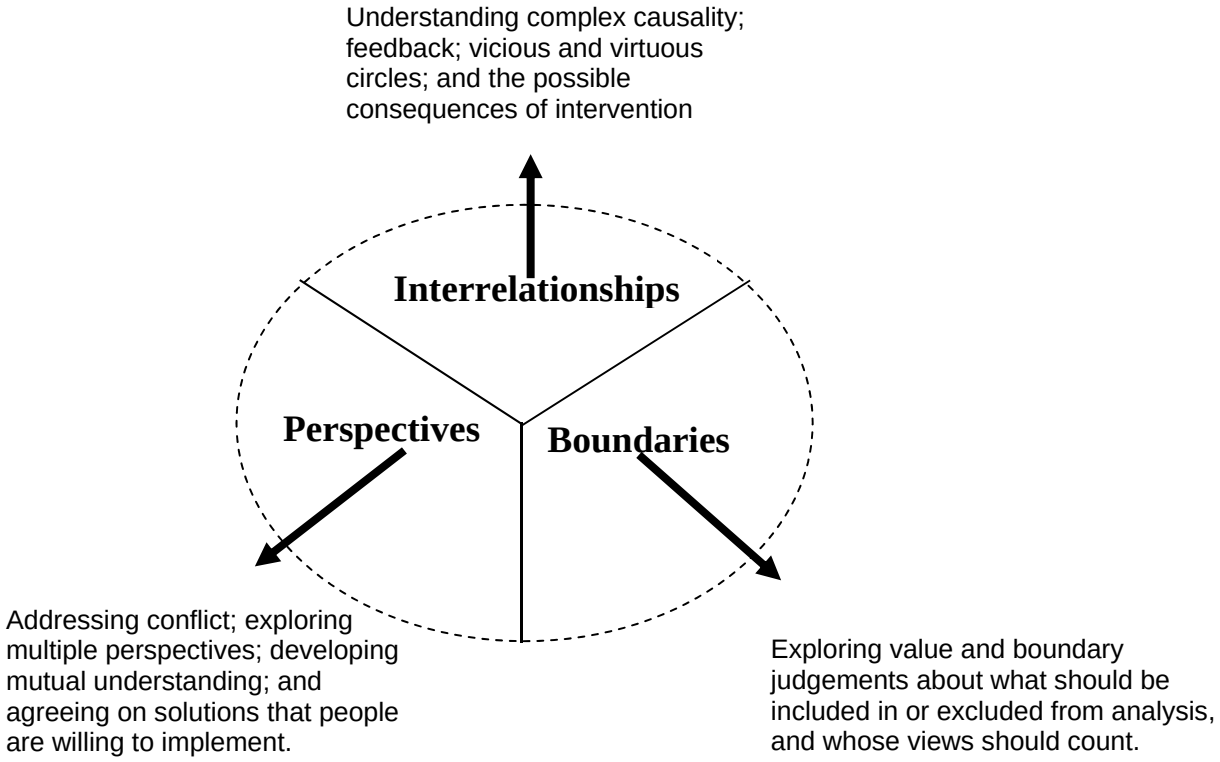


Figure 4.1 Three core concepts for systems thinking: interrelationships, perspectives, and boundaries.

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 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

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

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
- Open University: http://openlearn.open.ac.uk/

Publications

Waltner-Toews, D. (2011). Ecohealth: a primer. Available at ecohealth.vetswithoutborders.ca.

Waltner-Toews, D., Kay, J.J., and Lister, N.M. (eds) (2008). The ecosystem approach: complexity, uncertainty, and managing for sustainability. New York: Columbia University Press. (This volume introduces many of the ideas discussed in this module, along with case studies focusing on ecosystem approaches to health, agriculture, and environmental management.)

Williams, B., and Hummelbrunner, R. (2011). Systems concepts in action: a practitioner's toolkit. Stanford University Press.

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

Bunch, M.J., McCarthy, D., and Waltner-Toews, D. (2008). A family of origin for an ecosystem approach to managing for sustainability. In: Waltner-Toews, D., Kay, J.J., Lister, NM (eds) The ecosystem approach: complexity, uncertainty, and managing for sustainability. New York: Columbia University Press.

Reynolds, M. Open University, UK. Available at: http://openlearn.open.ac.uk/mod/oucontent/view.php?id=406458&section=3.1 Accessed May 2012

Systems thinking and practice: diagramming. Course Material T552. Open University. http://systems.open.ac.uk/materials/T552/pages/rich/rich.html Accessed February 2012.

Boundaries

Flood, R. L., and Ulrich, W. (1990). Conversations on critical systems thinking. In R. L. Flood and M C. Jackson (eds). Critical Systems Thinking: Directed Readings. Chichester: Wiley.

Reynolds, M. and Williams, B. (2012). Evaluation for equity: fostering development results, in Evaluation for Equity, UNICEF.

MODULE 4 – HANDOUT 1 – ACTIVITY 1

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 SETTINGS 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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MODULE 4 – HANDOUT 2 – ACTIVITY 2

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 toaddress 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.

MODULE 4 – HANDOUT 3 – ACTIVITY 4, STEP 1

Construct a "Rich Picture" of the Situation of Interest

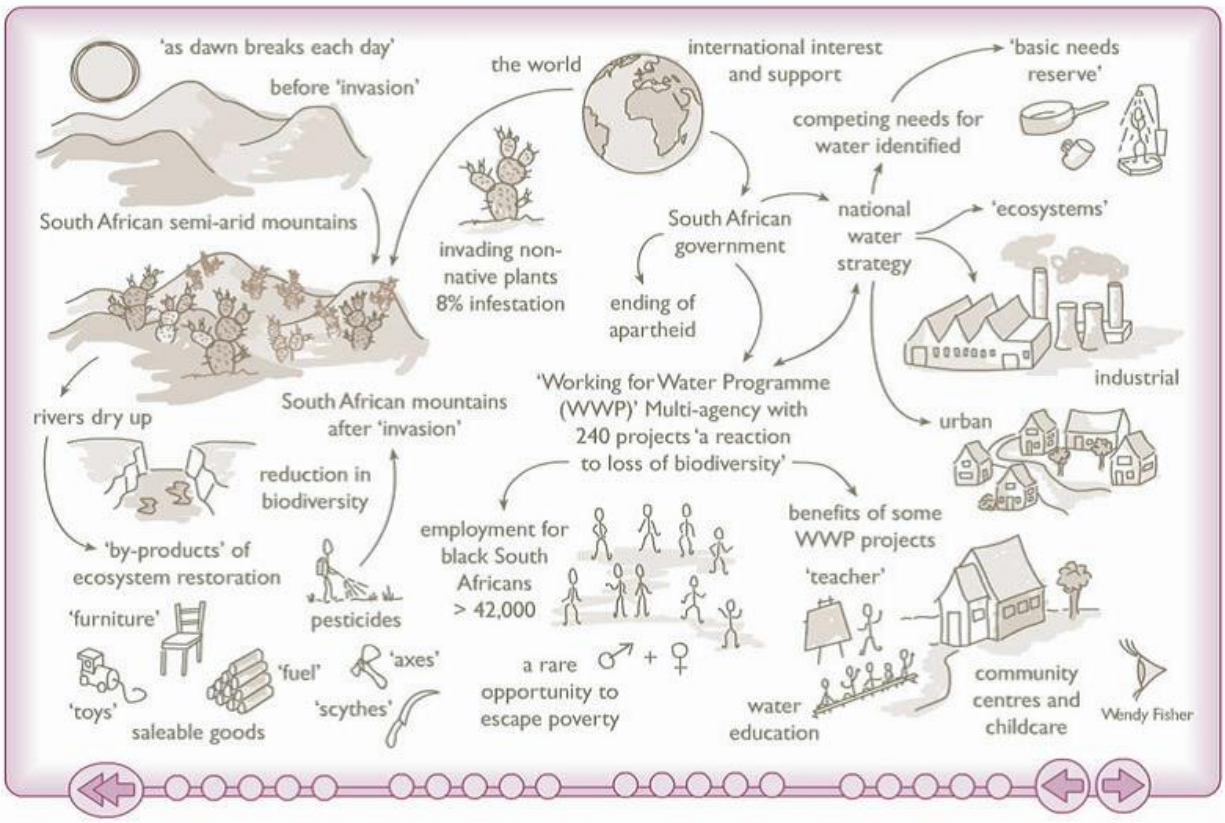
This is a mapping process where you display all the key aspects of the situation you want to research.

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

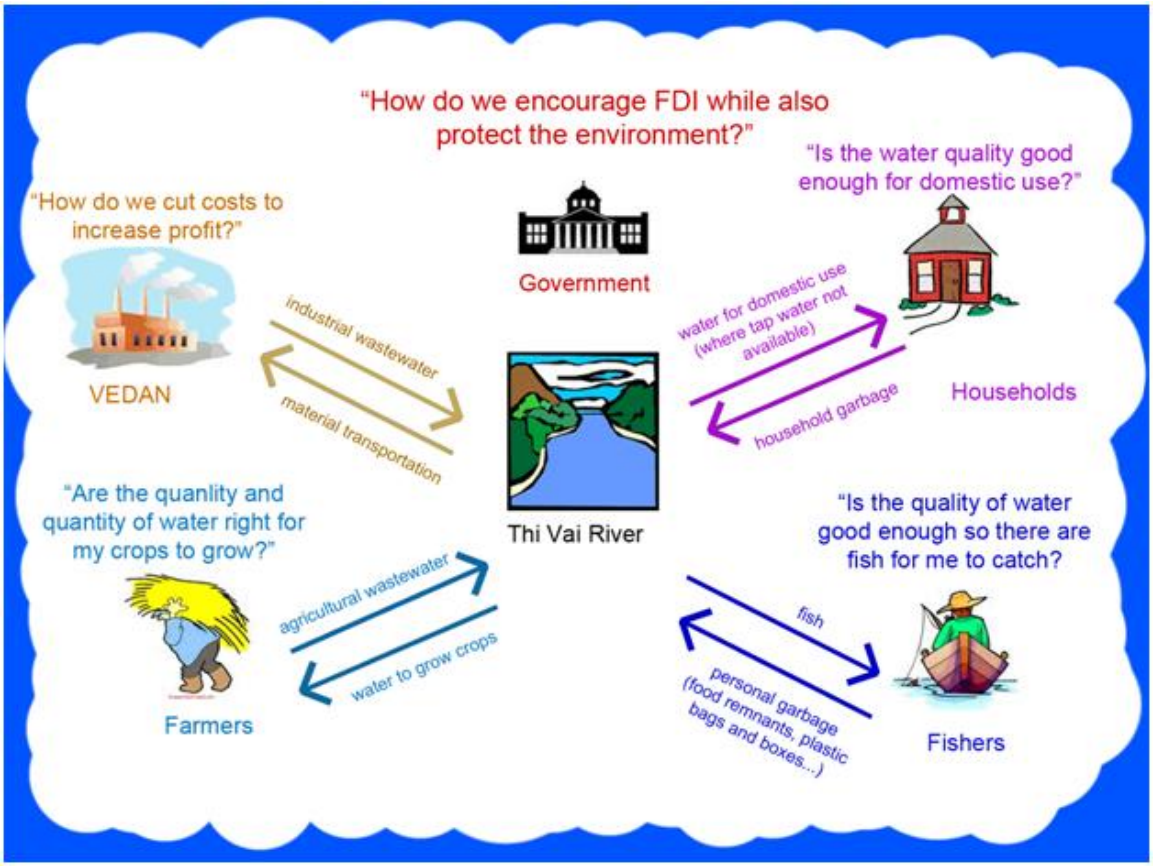
The Open University (2012). Diagramming for development -1: bounding realities. OpenLearn Unit published online through Creative Commons Licence. Accessed: 18 March 2013, http://www.open.edu/openlearn/ocw/mod/oucontent/view.php?id=4838&extra=thumbnail_idp2505248

(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:

Winstanley, A., Baker, V., Foote, J., Gregor, J., Gregory, W., Hepi, M., Midgley, G. (2005). Water in the Waimea Basin: community values and water management options. A Report by ESR for the Waimea Water Augmentation Committee and the Tasman District Council.

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.

MODULE 4 – HANDOUT 4 – ACTIVITY 4, STEP 2

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?

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?

MODULE 4 – HANDOUT 6 – ACTIVITY 4, STEP 4

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.

FIELD BUILDING LEADERSHIP INITIATIVE

MODULE 5

Collaboration and Transdisciplinarity

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FÈVRE, S, HORWITZ, P, WALTNER-TOEWS, D (2013). (EDITORS). ECOHEALTH TRAINER MANUAL.
FIELD BUILDING LEADERSHIP INITIATIVE. VWB/VSF: CANADA

MODULE 5 – COLLABORATION AND TRANSDISCIPLINARITY

Overview

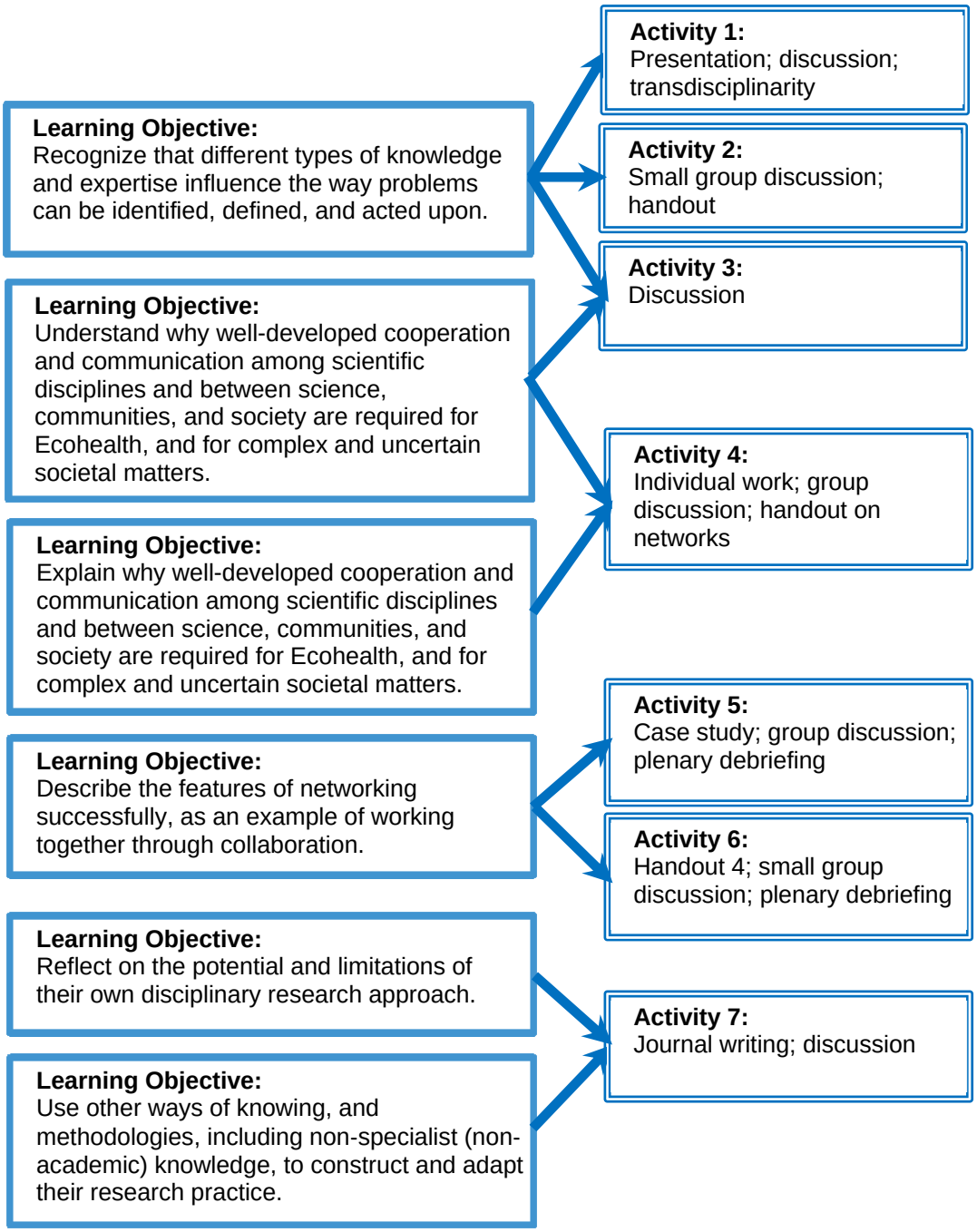
An Ecohealth approach is used to understand and solve complex problems of health and environment, which necessitates involvement of different disciplines. Transdisciplinarity, usually referring to research, is considered one of the main pillars of Ecohealth, integrating the social and natural sciences in a common approach (interdisciplinarity) and simultaneously including knowledge systems that are not of a specialist or expert nature, in a participatory and interactive process. Contributors to the development, planning, and implementation of Ecohealth projects are diverse. Researchers come from different disciplines, different types of communities may be stakeholders, and policy-makers come with a variety of agendas. The success of a project depends on how these people work together. The conditions for, and skills to enable, working together are essential for an Ecohealth project.

This module is designed to help you teach understandings of transdisciplinarity, Ecohealth perspectives of it, what it can mean in practice, and its application to your (and your learners') research context. The reasons why "working together," across disciplines and schools of thought, is equivalent to "transdisciplinarity" and the reasons why this may be desirable but difficult to attain, are discussed.

Module Aims

- To provide strong guidance on the meanings of interdisciplinarity and transdisciplinarity and how to explain the need for transdisciplinarity in an Ecohealth project
- To allow participants to formulate their own explanations for the importance of different types of knowledge and expertise, and therefore the necessity for collaboration, in Ecohealth
- To allow participants to develop social and communication skills for collaboration and team-building
- To help participants identify the most appropriate style of working together for a particular task, and the levels of agreement, resources, and management support necessary for that style
- To highlight the "network" as one particular form of working together.

Conceptual Map: Module 5



Why is this topic important?

We are faced with complex and uncertain ("messy" or "wicked") problems of environmental change and human well-being, where the health sciences' dedication to a clinical/medical model is exposed as not just limited, but potentially part of the problem. This situation demands that we go beyond disciplinary norms and their theoretical frameworks and methodologies. "Real-world" problems require proper characterization and not only integration of theory and methods from multiple disciplines, but also perspectives and knowledge from the public themselves, where problems will be formulated, and with whom solutions will be found. This collaboration, considered central to Ecohealth approaches, shifts the focus of attention to place-based activities, demanding an exploration of case studies, each with a unique set of socio-cultural circumstances. Ecohealth involves understandings from not only different academic disciplines but also other knowledge systems (including local, traditional, intuitive, and strategic). Such research and intervention go beyond interdisciplinary research in a collaborative, transdisciplinary venture, where knowledge is legitimately derived from different value systems, different ethical bases, and different philosophical traditions.

Key Concepts

The module explores the importance of "working together" in both the instructing and learning of Ecohealth, as well as in Ecohealth research processes. The idealized goal of working together across disciplines and schools of thought can be termed transdisciplinarity, and the reasons why this may be desirable, but difficult to attain, are discussed. On a practical level, the module discusses successful features and strategies of collaboration and how these apply to teamwork situations in which the learners have been involved. It thus aims to help learners develop strategies and a better understanding of how to use collaborative approaches in their work.

Guiding Questions

1. How does one distinguish between different categories of knowledge?
2. How do "learning" and "research" contribute to any of these types of knowledge?
3. Why do we need different types of knowledge (and those who are "particularly good at" those types), to understand and solve a problem?
4. Why then does working together become needed for a particular task?
5. What skills, attitudes, structures, processes, and resources does one need to ensure that different styles of working together become more successful?
6. What else (in addition to the above) would you consider important to fully comprehend the scope of transdisciplinarity?

Basic Learning Objectives

After completing this module, learners will be able to:

- Recognize that different types of knowledge and expertise influence the way problems can be identified, defined, and acted upon
- Understand why well-developed cooperation and communication among scientific disciplines and between science, communities, and society are required for Ecohealth, and for complex and uncertain societal matters
- Describe the features of networking successfully, as an example of working together through collaboration.

Advanced Learning Objectives

Advanced learners will be able to:

- Integrate different types of knowledge and expertise in developing research and action plans, including using principles of participation and equity in the integration
- Reflect on the potentials and limitations of their own disciplinary research approach
- Use other ways of knowing, and methodologies, including non-specialist (non-academic) knowledge, to construct and adapt their research practice.

Practical Notes

- Ideally instructors should have experience using collaborative approaches in teaching or conducting research. Instructor knowledge of Ecohealth or experience in Ecohealth research is an asset.
- The module can be completed within 2 to 3 hours, although it can be extended if more time is available.
- No prerequisites are required of the learners, although participants ideally should be in a position where they will have further opportunities to work as part of collaborative groups. If possible, learners should be asked to read the case studies before attending the course.

Case study

This module will use a case study on land management as an example to stimulate learners to discuss transdisciplinarity and collaboration. Learners are requested to read carefully and critically the case study before the module starts. It is best to send the file to learners beforehand, depending on how trainers use and adapt this for the other module.

Background information

The following information can be included into Activity 1 below if trainers feel that participants will benefit.

Disciplinary and multidisciplinary research

Disciplinary research follows cognitive and practical goals within a clearly defined scientific school and related institutional framework. Disciplinarity embraces growingly specialized fields of knowledge related to a single discipline that evolves in isolation from other disciplines. Therefore a person may, in fact, study biology and handle it well without the need to consider specific knowledge related to physics or psychology. A discipline uses standard and accepted methods and techniques, with centralizing theories and dogmas that appear stable and generate power, capable of maintaining boundaries between other such pursuits.

In multidisciplinary research, the different disciplines look at one research object from different perspectives. Multidisciplinary research is based on a combination of several scientific disciplines, without implying that continual interaction and negotiation between these disciplines is necessary (as opposed

to interdisciplinary research). Each discipline carries out its analyses separately, applying the approaches and methods inherent to their individual disciplines. Generally, the final result is a multi-faceted picture of an object of study. No systematic integration or synthesis is made. Results are often expressed in disciplinary journals.

Interdisciplinary research

Interdisciplinary research integrates two or more scientific disciplines with the goal of advancing the understanding of complex cognitive and practical problems. It involves the development of a common conceptual or theoretical framework and, to a great extent, also a methodology that integrates or connects the research methods of the participating disciplines. In research programs focusing on complex society-health-environment interrelations like Ecohealth, interdisciplinary research usually incorporates the natural and technical sciences and social sciences and humanities, coordinated to achieve a higher-level purpose, or value, or desirable achievement.

Transdisciplinary research

Transdisciplinary research integrates the social and natural sciences in a common approach (interdisciplinarity), and simultaneously includes non-academic knowledge systems as well to understand and solve socially relevant problems. Max-Neef (2005) argues that transdisciplinarity coordinates four critical questions: what exists? (the disciplines), what are we capable of doing? (multidisciplines), what is it we want to do? (interdisciplines), and finally what we must do, or rather, how to do what we want to do?

Social learning for transdisciplinarity

Societal learning, which is necessary for moving towards a more Ecohealth approach, is a combination of social learning at all three levels:

- Individual level: sharing knowledge and information, developing social, emotional, and learning competences (openness, taking others' points of view), improving communication, adapting prevailing ways of thinking, and personal attitudes, intentions, and behaviour
- Organizational level: individuals often work in organizational setups that do not allow them to put suggested changes of attitudes and intentions into practice; therefore, organizational and institutional norms, values, and rules need to be adapted simultaneously
- Structural level: most complex adjustments have to be made at the social, economic and political levels where different organizations and institutions interact, representing different parts of society or nations.

Skills required for transdisciplinarity

- Communication among scientific disciplines on the one hand, and between science and society on the other hand, are key challenges in

trying to achieve societal learning. Societal learning requires a shift from individual to collective learning, which is reflected in various levels and types of collaboration, from simple information-sharing to struggling together with others to define and resolve problematic situations (see Activity 4 and the related handout for more on this). Indeed, apart from sound disciplinary knowledge, Ecohealth research also calls for inter- and transdisciplinary research, which in turn involves social, ethical, and communication skills, such as:

- A reflective and critical attitude towards one's own discipline, knowing its potentials but also its limitations, and being able to question one's own standpoint
- An open, tolerant, and respectful attitude towards colleagues from other scientific disciplines, as well as towards non-academic actors
- The ability to manage conflicts of interests
- Learning the language of the other
- Develop reciprocity; being prepared to give time to the agendas of other people
- Clarity when communicating.

Activities

Section One: Transdisciplinarity

Activity 1

What is transdisciplinarity and when do we need it?

Learning Objective:

- Recognize that different types of knowledge and expertise influence the way problems can be identified, defined, and acted upon.

INSTRUCTIONS

TRANSDISCIPLINARITY AND SOCIAL LEARNING

Introduce the module by giving a presentation on transdisciplinarity, which will take about 20 to 30 minutes. The introduction will focus on the discussion of different types of research: disciplinary, multidisciplinary, interdisciplinary to transdisciplinary research within an Ecohealth context. Discuss the skills required for transdisciplinary research.

Several schools are discussing the definition of these terms, but finding a common and acceptable term for a common understanding will be part of this exercise.

The following points can be covered:

- Transdisciplinary research is often a new form of learning and problem solving for learners, involving cooperation among different parts of society and academia to meet complex social challenges and to solve socially relevant problems.
- Those who contribute to the development, planning, research, and follow-up of Ecohealth projects usually include researchers, community members, and policy-makers. These general groups include many subsets, such that researchers from different disciplines would normally work together, and different types of communities may be stakeholders. The success of a project depends on how well these people work together.
- Discuss the differences between disciplinary, multidisciplinary, interdisciplinary, and transdisciplinary approaches. Refer to the section Background Information for more detailed discussion of these terms.

Activity 2

Determining the degree of transdisciplinarity.

Learning Objective:

- Recognize that different types of knowledge and expertise influence the way problems can be identified, defined, and acted upon.

INSTRUCTIONS

This exercise aims to stimulate learner discussion about the degree of transdisciplinarity in a project. Split the class into groups of three to five participants, briefly introduce the selected case study on dengue fever intervention (see *Module 4 – Handout 1 – Activity 1: Case Study: Dengue Fever Prevention*) to be analyzed. Alternative case studies (e.g. Charron 2012) can be used if desired.

1. Instruct the class to read the dengue fever case study if they are not already familiar with it.
2. Encourage the groups to work through the table and engage in the discussions suggested in the handout.
3. Alternatively, deliver a lecture using a different case study that provides an analysis of transdisciplinarity for the learners.

Handouts for this activity:

- Case study, suggested: Dengue Fever Prevention (*Module 4 – Handout 1 – Activity 1*).
- *Module 5 – Handout 1 – Activity 2*, Transdisciplinarity table ranking matrix.

After the group discussions, guide the class in a discussion to show that transdisciplinary working is not always appropriate or desirable, and when appropriate, can be achieved to different degrees of success. Have learners discuss when it is best to have high levels of transdisciplinary working or low levels, and when interdisciplinary working or disciplinary modes of working might be more appropriate and useful.

Activity 3

Discussion of research processes involving a transdisciplinary approach.

Learning Objective:

- Recognize that different types of knowledge and expertise influence the way problems can be identified, defined, and acted upon.
- Understand why well-developed cooperation and communication among scientific disciplines and between science, communities, and society are required for Ecohealth, and for complex and uncertain societal matters.

INSTRUCTIONS

Discuss the research processes that involve a transdisciplinary approach with different phases of disciplinary research, interdisciplinary research, and societal discourse.

Lead a discussion about how different types of disciplinary integration can be relevant at different phases of research. Figure 5.1 provides a good talking piece.

- Transdisciplinary approach: The shaded "wave" in Figure 5.1 represents a possible sequence of different phases of integration over time.
- Level of societal discourse: The research process begins with a societal discourse of negotiating research questions and hypotheses among researchers and other actors involved (1). At regular intervals, scientists and non-academic actors meet (2) to exchange knowledge and identify collective action (to solve the problem under consideration). Further exchange opportunities occur informally during fieldwork (3). After the program ends, a final workshop can be conducted to share results and implementation, and prepare future collaboration (4).
- Interdisciplinary level: Joint development and continuous adaptation of an integrative conceptual framework and methodology (5), and joint fieldwork (6) help build mutual understanding and ease synthesizing the findings at the end.

- Disciplinary level: At this level individual researchers conduct their specific experiments or studies (7).

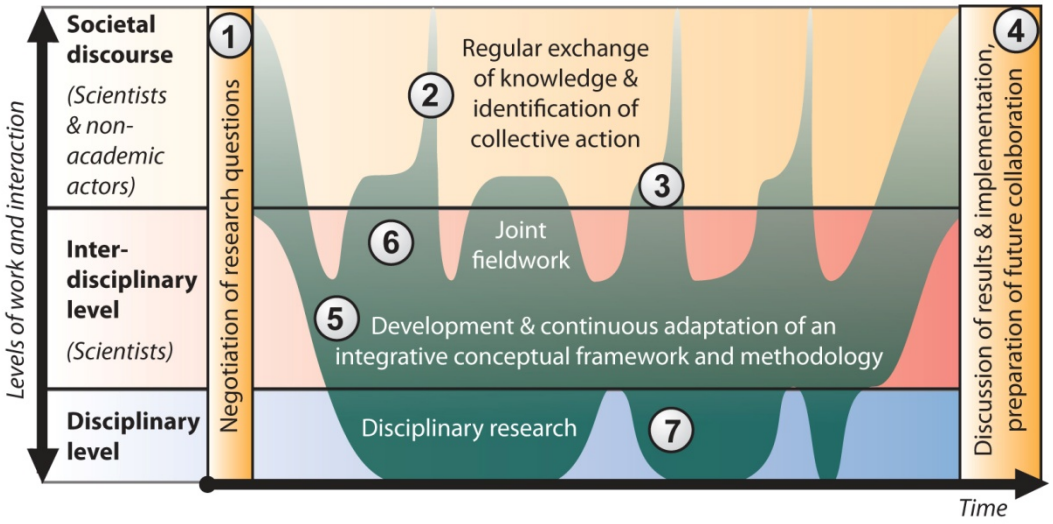


Figure 5.1 Interlinkage of disciplinary research, interdisciplinary research and societal discourse in a transdisciplinary approach (Herweg et al. 2010, adapted from Hurni et al. 2004).

Section Two: Collaboration

Activity 4

Reading exercise or brief lecture on collaboration.

Learning Objective:

- Explain why well-developed cooperation and communication among scientific disciplines and between science, communities, and society are required for Ecohealth, and for complex and uncertain societal matters.

INSTRUCTIONS

This section focuses on two aspects of working together:

- The conditions necessary for effective collaboration (using networks as an example)
- Ensuring effective teamwork.

This session is best achieved through a mix of individual work and group discussion.

Be prepared to hand out pens of various colours.

The first task is to provide the handout on Networks and allow time for learners to read.

Alternatively, you can provide a short lecture about collaboration and working together, based on the contents of the *Module 5 – Handout 2 – Activity 4: Networks*.

Activity 5

Key features of successful collaboration.

Learning Objective:

- Describe the features of networking successfully, as an example of working together through collaboration.

INSTRUCTIONS

This section is based on a case study and learners will need time to read it. Ideally refer to a case study that has already been covered in another module.

There is a risk that participants will only undertake the first two or three items on the list below. To overcome this problem, spread the work around the groups and ask each group to start off with one of structure, process, or resources.

Emphasise that participants should go into as much detail as possible and avoid restating the positive and negative versions of the original statement. So, for example, alongside the feature "roles are clearly defined" it is not helpful to write "roles are not clearly defined" as a hindrance. Participants should explore the case study and their knowledge and assess what might be a cause of roles not being clearly defined.

Suggest linking these discussions to the issue of interrelationships, perspectives, and boundaries identified in *Module 4: Using Systems Concepts in Ecohealth* and the issues raised in *Module 3: Participation*.

This section will need to conclude with a good plenary debriefing.

ABOUT COLLABORATION

Collaboration is an expensive business. A lot of time and energy is needed to create and sustain effective collaboration. Therefore, like the point made earlier about transdisciplinary working, collaboration should be used under quite specific circumstances. If these circumstances are not present, then much less intensive means of "working together" should be attempted. Sometimes just staying in touch with each other is enough.

The three key features of a situation that require the collaboration option are :

- When the issue, situation, or problem is complex.
- When it is necessary to have vision and goals shared by key stakeholders.
- When it is necessary to share resources (i.e. people, knowledge, money, skills).

INSTRUCTIONS FOR LEARNERS

It has been decided that the intervention described in the case study requires a high degree of collaboration. The table "Key features of successful collaborations" in *Module 5 – Handout 3 – Activity 5* features what research tells us are key conditions necessary for successful collaboration. These conditions may not be present at the beginning of the work and may need to be developed.

From what you know from the case study and your past experience, describe what might help and what might hinder the establishment of these conditions, and how you might make the hindrances weaker and the helps stronger.

Activity 6

What are the basic components of successful teams?

Learning Objective:

- Describe the features of networking successfully, as an example of working together through collaboration.

INSTRUCTIONS

This section is based on personal experiences.

Refer to *Module 5 – Handout 4 – Activity 6: What Are the Basic Components of Successful Teams?* for specific instructions. Ask the class to think of a time when they worked together with others successfully, and to use the diagnostic tool "Scoring your responses" in the handout to think through that experience.

If participants have worked together already in the course it is possible that they could choose that same process of working together as an example. This would need careful handling. If sufficient participants in the class have participated in the same team then their similar and different assessments of that team could be an important opportunity for learning (e.g. different motives and perspectives lead to different assessments of the team).

Alternatively, learners can choose examples of working together with others from outside the course.

Suggest linking these discussions to the issue of interrelationships, perspectives and boundaries identified in *Module 4: Using Systems Concepts in Ecohealth* and the issues raised in *Module 3: Participation*.

This section will need to conclude with a good plenary debriefing.

INSTRUCTIONS FOR LEARNERS

Ask the learners to think of a time when they worked together with others successfully and use the diagnostic tool in the Handout to think through that experience. (Refer to handout for more detailed instructions).

After the class has been through the table once, provide these subsequent instructions:

They should next think of a time when a team was going badly. The worst possible example. Choose a pen of another colour and go through the table again.

After the exercise, lead a discussion as follows:

As a whole group, add up the scores for each item and discuss these questions:

1. What are the three big differences between a successful and an unsuccessful team?
2. What can be done to ensure that the positive factors are most favourable in teams?

Activity 7

Learning Objective:

- Debrief and evaluation.

INSTRUCTIONS

This module has covered a lot of ground, dealing with two substantial topics: transdisciplinarity and what the module terms "working together." It is important that participants have time to process what they have learned, in particular the relationship between the parts of the module and their own work. There is no single best way of doing this; it will depend on the time available, the energy of the participants, and the size of the group.

Allow time for learners to reflect on what they have learned. They could do this through personal reflection and writing in their learning journals. You could also give them time to talk in pairs or to contribute to a plenary discussion.

INSTRUCTIONS FOR LEARNERS

Explain to the learners that the module has covered some important ground in a few hours. Ask them to spend some time reflecting on what has been covered and its implications for their work. You will find the following questions useful:

- What are the implications for my own work in adopting a transdisciplinary approach? When would it be appropriate to work in this way, and when not? What are the opportunities for transdisciplinarity and how can I develop them? What are the barriers and how can I reduce them?
- How can I further develop transdisciplinary skills and learning opportunities?
- In terms of the networks that are useful to me, how can I make sure they have the appropriate balance of purpose, structure, process, and resources?

Sample Timetable: Module 5

TIME	ACTIVITY
30 minutes	Introduction to module Section One Activity 1: What is transdisciplinarity and when do we need it?
30 minutes	Activity 2: Determining the degree of transdisciplinarity using a case study
10 minutes	Activity 3: Discussion on research processes involving a transdisciplinary approach
15 minutes	Break
15 minutes	Section Two Activity 4: Reading exercise or brief lecture on collaboration
30 minutes	Activity 5: Key features of successful collaborations using case study
60 minutes	Activity 6: What are the basic components of successful teams
20 minutes	Activity 7: Debrief and evaluation
Total: 3 hours, 30 minutes	

Evaluation

Refer to *Module 1: Approaches to Designing and Teaching Ecohealth Courses* and *Module 2: Introduction to Ecohealth*.

Terminology

Collaboration Network
A network with the primary purpose of achieving joint and mutually agreed goals

Communication Network
A network with the primary purpose of exchanging information or resources

Cooperation Network
A network with the primary purpose of preventing duplication and promoting individual and shared goals

Coordination Network
A network with the primary purpose of ensuring that decisions are taken with some degree of synchronicity

Discipline
A specific branch of knowledge

Interdisciplinarity
The integration of more than one discipline in a particular task or situation

Multidisciplinarity
The application of more than one discipline to a particular task or situation

Network
A structure that exchanges information or resources

Resources
People, money, skills, time, and other artefacts that enable things to be achieved

Transdisciplinarity
An approach that integrates the social and natural sciences in a common approach (interdisciplinarity), and simultaneously includes nonacademic knowledge systems as well to understand and solve socially relevant problems. This approach considers what exists? (the disciplines), what are we capable of doing? (multidisciplines), what is it we want to do? (interdisciplines), and finally what we must do, or rather, how to do what we want to do? (Max-Neef 2005).

Key References

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Mandell M.P. and Steelman T. (2003). Understanding what can be accomplished through interorganizational innovations: the importance of typologies, context and management strategies. Public Administration Review, 5(2).

Williams, B. (2003). A review of collaborative relationships between government agencies and community organizations. Available http://www.bobwilliams.co.nz/Writings_files/Networks.pdf [accessed Feb 10, 2012] or http://users.actrix.com/bobwill/.

Additional References

Additional background reading. These can be general and are not essential reading. If possible, please provide at least one reference which relates to the Southeast Asian context.

Nicolescu, B. (2009). A new vision of the world transdisciplinarity. International Centre for Transdisciplinary Research [Accessed 25 Oct 2011] http://basarab.nicolescu.perso.sfr.fr/ciret/english/visionen.htm

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Lélé, S., Norgaard, R.B. (2005). Practicing interdisciplinarity. Bio Science, 55(11): 967-975.

Max-Neef, M. (2005). Foundations of transdisciplinarity. Ecological Economics, 53: 5-16.

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MODULE 5 – HANDOUT 1 – ACTIVITY 2

Determining the Degree of Transdisciplinarity

EXPLANATIONS:

- Table 5.1 provides you with a list of (proposed) criteria and ranking categories to analyze the degree of transdisciplinarity in the case study; discuss the criteria and adapt or improve them as necessary. Note: a worked example for the Dengue Case study is available.
- Evaluate the degree of trandisciplinarity as "high," "moderate," or "low" in the selected study, if possible for each criterion and for each phase of the study; if you consider it impossible or not meaningful to evaluate (rank) selected criteria or phase combinations, explain why.
- Optimizing the degree of transdisciplinarity means involving other actors in a meaningful way, depending on the theme and the purpose of the study; it does not mean letting everybody interfere at any time and at any cost!
- Note that these four phases of research are depicted as if they occur in linear sequence, but they rarely do – if reality the phases are iterative, with steps "back" and "forward" continuing from start to finish of the research.

Table 5.1 Ranking matrix of transdisciplinarity in a research project

Transdisciplinarity criteria	Categories	Phases of a research project			
		Defining the research question or hypothesis	**Determining the objectives & methodology**	**Fieldwork**	**Experiences, results, analysis, outputs, interpretation**
Involvement of societal actors (negotiation of what problem will be the focus)	Low: Involvement of < 25% of all key actors Moderate: 25-50% High: > 75%				
Involvement of academic disciplines (degree of inter-disciplinarity)	L: only natural or social sciences (disciplinary) M: social & natural sciences separately (multidisciplinary) H: social & natural sciences integrated through joint objectives & methodologies (interdisciplinary)				
Worldviews ("realities") involved (philosophical background of knowledge)	L: no consideration of any epistemology M: different scientific epistemologies/ ontologies considered (social & natural sciences, qualitative & quantitative approaches) H: explicit dialogue between scientific and other epistemologies/ ontologies				

Transdisciplinarity criteria	Categories	Phases of a research project			
		Defining the research question or hypothesis	**Determining the objectives & methodology**	**Fieldwork**	**Experiences, results, analysis, outputs, interpretation**
Knowledge of other key actors considered	L: not explicitly considered M: at least one other key actor's knowledge explicitly involved H: explicit consideration of > one other key actor's knowledge				
Type of knowledge involved in knowledge sharing	L: systems knowledge ("how the system works") M: systems and target knowledge ("where to go," development visions) H: systems, target and transformation knowledge ("what to do and how," searching for solutions)				
Mutual learning orientation 1. Bilateral 2. Focus groups 3. Workshops with 2/3 of key actors	L: option 1 only M: options 1 & 2 H: options 1, 2 & 3				

Table 5.1 Ranking matrix of transdisciplinarity in a research project. Worked example

Transdisciplinarity criteria	Categories	Phases of a research project – Dengue Case study			
		Defining the research question or hypothesis	**Determining the objectives & methodology**	**Fieldwork**	**Experiences, results, analysis, outputs, interpretation**
Involvement of societal actors (negotiation of what problem will be the focus)	Low: involvement of < 25% of all key actors Moderate: 25-50% High: > 75%	High	Moderate	Low	Low – unless results suggest problem needs renegotiation – moderate or high)
Involvement of academic disciplines (degree of inter-disciplinarity)	L: only natural or social sciences (disciplinary) M: social & natural sciences separately (multidisciplinary) H: social & natural sciences integrated through joint objectives & methodologies (interdisciplinary)	High	Medium	Low	Medium → High
Worldviews ("realities") involved (philosophical background of knowledge)	L: no consideration of any epistemology M: different scientific epistemologies/ ontologies considered (social & natural sciences, qualitative & quantitative approaches) H: explicit dialogue between scientific and other epistemologies/ ontologies	High	Moderate	Moderate (involvement of other worldviews in fieldwork will be useful!)	High

Transdisciplin-arity criteria	Categories	Phases of a research project – Dengue Case study			
		Defining the research question or hypothesis	**Determin-ing the objectives & method-ology**	**Field-work**	**Experiences, results, analysis, outputs, interpret-ation**
Knowledge of other key actors considered	L: not explicitly considered M: at least one other key actor's knowledge explicitly involved H: explicit consideration of > one other key actor's knowledge	High	Moderate	Low-Moderate	High
Type of knowledge involved in knowledge sharing	L: systems knowledge ("how the system works") M: systems and target knowledge ("where to go," development visions) H: systems, target and transformation knowledge ("what to do and how," searching for solutions)	High	Medium	Low, medium or high depending on willingness of key actors to share in each other's fieldwork	High
Mutual learning orientation 1. Bilateral 2. Focus groups 3. Workshops with 2/3 of key actors	L: option 1 only M: options 1 & 2 H: options 1, 2 & 3	High	Medium	Low	High

Interpretation: "Determining the degree of transdisciplinarity"

- In case you have ranked the degree of transdisciplinarity as "low" or "moderate" for several criteria, list possible reasons for this.
- It is not always possible or meaningful to increase the degree of transdisciplinarity in every phase of the study or for every criterion. Discuss where in the selected study it would be useful to increase the degree of transdisciplinarity. Develop some ideas about how to do this.
- Identify key skills/competences required of researchers and other actors for practising successful transdisciplinarity research (you can conduct a small role play simulating a typical working situation in which researchers, extension workers, and local actors meet).
- On the basis of this analysis, identify ways of further optimizing transdisciplinarity at two levels:
- List factors that support or hinder transdisciplinarity work at the individual level
- Based on your own experience, propose how to optimize the preconditions for successful transdisciplinary work at the organizational level (university, municipality, etc.) by describing the prevailing challenges and limitations of transdisciplinary research.

MODULE 5 – HANDOUT 2 – ACTIVITY 4

Networks

Transdisciplinary approaches rely heavily on people being able to work together effectively, over time, and with the highest degree of collaboration. This part of this module will help you identify what conditions need to be established for effective collaboration in networks.

What does research tell us about high-level collaboration?

First, let's step back a bit. The degree of working together can vary from just keeping in touch with people (basic communication) to the kind of high-level working together that we describe as collaboration. In between there is coordination (where you keep in touch and respond to what you hear and see) and cooperation (where you work together more actively, but in a limited way). Here are some key findings from research about these ways of working together (Williams 2003), using "networks" as an example.

- Different kinds of networks are best for different kinds of tasks and need different kinds of strategies. In particular, the strategies for establishing and supporting networks that primarily share information are very different from partnerships that undertake joint projects and work.
- All forms of networks usually take longer than expected to establish themselves.
- A critical part of building a network is managing the positive expectation of that network.
- Networks' tasks must reflect their constituency. Therefore, local networks are most effective in dealing with local issues, local agendas, and local priorities. Local networks cannot be expected to deal with national issues, agendas, or priorities, unless they have local relevance.
- One of the big challenges in establishing networks is to move them beyond information sharing. A critical part of building more ambitious networks (e.g. cooperation and collaboration) is the articulation of a clear mission, guiding purpose, and agreed shared values.
- Network participants need the active support of the organizations they represent, especially when the network starts taking decisions about projects and resources. Indeed networks rarely operate effectively when their participants do not have the active support of their own agencies.
- Networks are not organizations, they cannot be expected to do what organizations do.

- Networks that are made up of a wide range of different perspectives and knowledge are likely to be more creative than networks that have few differences.
- Not everyone has to be involved all the time. Typically networks tend to have core and peripheral members, who participate at different levels in the overall task.

MODULE 5 – HANDOUT 3 – ACTIVITY 5

Key Features of Successful Collaborations (in "Networks")

Feature	What helps this to happen?	What hinders this happening?
Structure		
All players in the network are capable of making decisions on behalf of their organizations		
Roles are clearly defined		
Links between members are formal and written into agreements		
Process		
High levels of leadership and trust		
Ideas and decisions equally shared		
Highly developed communication, adapted to needs and communication styles of different participants (community members, policy-makers, etc.)		
No significant conflict between goals of network and goals of members or member agencies		
Ability of network members to "champion" the network		
Network members' authority to take decisions		
Resources		
Extended time horizons		
High support from external bodies, participants' management, and professional agencies		
Flexible financial arrangements		
Ability of members to get resources for the network		

Collaboration Strategies

How can the factors that help be strengthened and the factors that hinder be reduced?

Feature	**Strategies**
Structure	
All players in the network are capable of making decisions on behalf of their organizations	
Roles are clearly defined	
Links between members are formal and written into agreements	
Process	
High levels of leadership and trust	
Ideas and decisions equally shared	
Highly developed communication, adapted to needs and communication styles of different participants (community members, policy-makers, etc.)	
No significant conflict between goals of network and goals of members or member agencies.	
No significant conflict between goals of network and goals of members or member agencies.	
Ability of network members to "champion" the network	
Network members' authority to take decisions	
Resources	
Extended time horizons	
High support from external bodies, participants' management and professional agencies	
Flexible financial arrangements	
Ability of members to get resources for the network	

MODULE 5 – HANDOUT 4 – ACTIVITY 6

What Are the Basic Components of Successful Teams?

A major feature of collaborative working is through teams. What are the basic components of a successful team?

Here is one way of identifying those basic components as well as a way to identify well and poorly performing teams.

Think of a time when a team you were working in was working really well. It felt great to be part of it. This could have been at your work, or with a sports team, or with a group of neighbours or in your family. Set this experience very clearly in your mind. Make some brief notes of what happened.

The table provides a diagnostic tool for you to complete.

INSTRUCTIONS

If you totally agree with one of the statements and disagree totally with the other, circle the number nearest the statement you agree with (either 1 or 5).

If your agreement is partial or "somewhat" rather than "total," circle the number next to the end (2 or 4).

If you feel divided because each of the statements is true about half of the time, circle the number in the middle (3). If you feel that the question is not applicable then you should also choose this option.

Respond to all 20 pairs of statements. As you record your ratings, think of the full range of your experience in the team, not just the most recent activities. You may wish to note in the margin the reasons for your rating.

1	I was unclear about the goals or performance standards we were trying to accomplish in our team.				I understood our mission and the goals and performance standards our team was expected to meet.
	1	2	3	4	5

2	Our members were more concerned with personal goals and roles than with the team's.				We learned to put personal agendas aside and work cooperatively to achieve team goals.
	1	2	3	4	5

3	We were not very effective at dealing with problems that came up in our team's work.				We were able to reduce or eliminate most of the problems that arose in connection with our work.
	1	2	3	4	5

4	We were not very good at dealing with conflict and differences of opinion among our members.				We valued differences of opinion, explored reasons, and made better decisions because of the differences.
	1	2	3	4	5

5	We were hindered by organizational barriers that blocked our work effectiveness.				We were free of organizational barriers that might have blocked our effectiveness as a work team.
	1	2	3	4	5

6	Team decisions were made without full input of all members so commitment was sometimes lacking.				Decisions were discussed, issues were understood, and we attempted to get consensus whenever possible.
	1	2	3	4	5

7	We were often side-tracked and had a hard time sticking to the tasks we had to perform.				Our activities were productive and focused on the tasks we had to perform. We did not let distractions derail us.
	1	2	3	4	5

8	Our communication with one another tended to be guarded rather than open and honest.				Our communication with one another was open and honest. We talked freely, and shared our true feelings about issues.
	1	2	3	4	5

9	A lot of time that we spent in team meetings was wasted and not used productively.				Our meetings were highly productive and were conducted in an efficient and a time-conscious way.
	1	2	3	4	5

10	Our team was not very well respected or thought of by others with whom we interacted.				Our team was held in high regard and respected by others with whom we interacted.
	1	2	3	4	5

11	Our team could have functioned more effectively if we'd had a different mix of members and skills.				We had a very effective mix of members and skills in our team – the right faces in the right places.
	1	2	3	4	5

12	We did not listen to one another or respect other's views and suggestions.				We listened to one another and respected the viewpoints of others, even when they didn't agree with the group.
	1	2	3	4	5

13	We could have functioned a lot more effectively in our team if the leadership were to change.				The leadership of our team was very effective in helping us to work together in achieving our goals.
	1	2	3	4	5

14	We rarely took time to review progress and discuss how we could improve as a team.				We often reviewed progress and agreed on actions to improve the way we functioned as a team.
	1	2	3	4	5

15	As a team we rarely heard from management. Sometimes we wondered if they knew we existed.				We got feedback or support from management on a regular basis, and knew that they were aware of how we were doing.
	1	2	3	4	5

16	Membership in the team has not done much to develop my skills and growth.				My personal growth and skills have benefited from my membership of the team.
	1	2	3	4	5

17	We were so busy with tasks that we neglected to improve our teamwork.			We had a good balance between getting the work done and improving our teamwork.
	1	2	3	4	5

18	Our productivity would have been the same or higher if we'd worked as individuals and not as a team.			Our members were far more productive as a team than they would have been if they had worked as individuals.
	1	2	3	4	5

19	I'm not very proud to have been a member of that team.			I'm proud to have been a member of that team.
	1	2	3	4	5

20	For me, job satisfaction was no better in this work team. I'd have been just as happy working alone.			My job satisfaction was greater because of my membership in that team. The work was more satisfying.
	1	2	3	4	5

Scoring your Responses: Exercise: What are the basic components of successful teams?

The odd numbered items describe organizational issues relating to the effectiveness of your group.

The even numbered items describe interpersonal issues that affect the members of your group.

Place your scores for each item in the tables and total them.

ORGANIZATIONAL ISSUES	
Odd Item	**Your Score**
1. Mission /goals	
3. Problem solving	
5. Barriers	
7. Focus	
9. Meetings	
11. Skills/mix	
13. Leadership	
15. Management support	
17. Task/process balance	
19. Pride	
Total (A)	

INTERPERSONAL ISSUES	
Even Item	**Your Score**
2. Cooperation	
4. Conflict/differences	
6. Decision making	
8. Open communication	
10. External relationships	
12. Listening/respect	
14. Review/improvement	
16. Personal development	
18. Collective productivity	
20. Job satisfaction	
Total (B)	

Add Total A and Total B to get Total C

I.e.. Total A …… + Total B …… = Total C …….

To achieve a team score: average the totals A and B for the team.

I.e.. Team Score = Average Total A ……. + Average Total B …… = ……. Out of 100

FIELD BUILDING LEADERSHIP INITIATIVE

MODULE 6

Equity and Gender

Pongsri Maskhao PhD and Céline Surette PhD, Co-Authors

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FIELD BUILDING LEADERSHIP INITIATIVE. VWB/VSF: CANADA

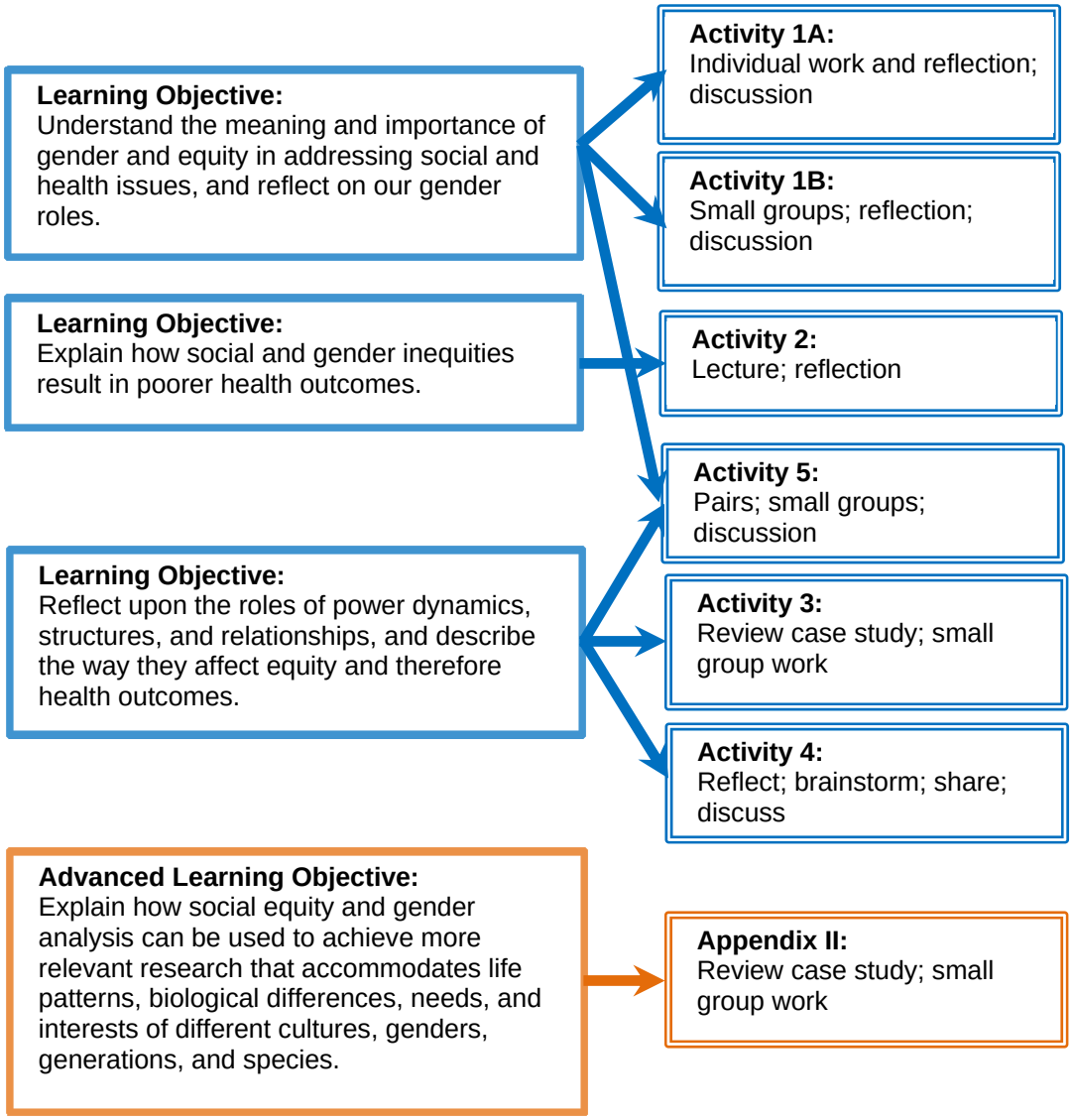
MODULE 6 – EQUITY AND GENDER

Overview

Social and gender equity is one of the six core principles of Ecohealth identified by Dominique Charron of Canada's IDRC (2012). Social and gender inequities and inequalities are considered major determinants of health. Nevertheless, they have resisted change, in part because they are deeply embedded in political, cultural, and social processes, which themselves are rooted in deeply-held beliefs. Understandings of power dynamics, relationships and social, economic, and political structures are essential if we seek to intervene to address social and gender equity issues, and improve health outcomes.

Introduction to Ecohealth (Module 2) emphasized the importance of considering the complex interactions among social and ecological factors that support or undermine health. *Using Systems Concepts in Ecohealth* (Module 4) clarified ways in which framing and perspective can influence which variables are deemed important and how that influences research and action. As you will read, *Knowledge to action* (Module 8) emphasizes the importance of putting knowledge into practice and linking it to decision and policy making. The Ecohealth principle of gender and social equity takes a firm, value-based perspective and offers a concrete example of an issue that can be used to frame the situation socially. This module aims at introducing critical thinking concerning power relationships, equity, and gender as well as presenting techniques and tools that can help clarify the issues and identify opportunities for change. While many activities in this module are framed in terms of gender, researchers and practitioners may substitute other categories of stakeholders, using similar forms of analysis.

Conceptual Map: Module 6



Module Aims

1. To develop working definitions for social equity, gender, and power, and understand the need to work towards social and gender equity as one of the principles of Ecohealth.
2. To explore how power relationships, dynamics, and structures play a defining role in equity and gender issues.
3. To understand how working towards social and gender equity leads to health outcomes that are more just and fair.

Why is this topic important?

Ecohealth research and practice need to explicitly consider equity at every step and to integrate it systematically in all interventions. Health inequities research demonstrates quite conclusively that those without a voice, with lower socio-economic status, with diminished access to services and facilities, and so on, have poorer health outcomes. And vice versa. This means that any intervention that seeks to improve the health of individuals in a population must address these inequities. Otherwise the chances are that it will fail. Although Ecohealth practitioners have sometimes been successful at looking at gender and equity issues in the research part of a project, they still struggle to take them into account when it comes to outcomes, long-term interventions, knowledge to action, and policy. As such, there is a need to better address these issues in Ecohealth and continue to develop our understanding and our tools to do so.

This principle of equity does not necessarily imply that we need to eliminate all health differences so that everyone has the same level and quality of health. Rather, we aim to reduce or eliminate those differences that result from factors that are considered to be both avoidable and unfair; to do this requires first identifying and understanding these factors. Equity is therefore concerned with creating equal or balanced opportunities for health, and with bringing health differentials down to the lowest level possible. The unfair conditions impinging on people because of gender, race, ethnicity, economic background, age, language, literacy, political and economic power, religion, and so on, are often stubbornly resistant to change, in part because they often interact in self-reinforcing ways, and have been inadequately considered when interventions are planned.

Since people are embedded in relationships, they form patterns and structures from which power dynamics emerge. It is therefore essential to understand power as a relationship issue and not as something that is owned. Understanding how power and equity are intertwined is a first step in addressing social and gender inequities.

Key Concepts

1. Those who "have" are more likely to be healthier than those who "have not." Any attempt to improve the lives of people must therefore address this "have/have not" divide related to poverty and socio-economic status.
2. Power dynamics emerge from relationships between people and play a defining role in social and gender equity issues.
3. Addressing social and gender equity helps to build healthy communities and ecosystems, and creates better health and living conditions for all, including non-human beings.
4. Integrating considerations of equity in the design, implementation, evaluation, and communication of projects will improve both the understanding of complex situations, and facilitate more effective, sustainable, fair, and just solutions to health challenges.
5. All inequities reflect relationships and power imbalances. It is the power imbalance in relationships that needs to be addressed; the issue cannot be reduced to focusing only on the vulnerable group without considering the context. For example, gender inequity cannot be reduced to a "women's issue" or "women's health."

Guiding Questions

1. What is equity? Why is it important to address social and gender equity in Ecohealth research?
2. What is gender? What is the difference between sex and gender? How does gender influence health inequities? Why are gender issues often invisible or uncomfortable?
3. How do social and gender inequities relate to poorer health outcomes?
4. How are power relationships between people and/or groups important to Ecohealth?
5. What role do power dynamics play in the different equity issues relevant to our research/practice? How should we address the underlying power within our research/practice context(s)?

Basic Learning Objectives

After completing this module, learners will be able to:

1. Understand the meaning and importance of gender and equity in addressing social and health issues, and to reflect on our gender roles.
2. Be able to explain how social and gender inequities result in poorer health outcomes.
3. Reflect upon the roles of power dynamics, structures and relationships, and describe the way they affect equity and therefore health outcomes.

Advanced Learning Objectives

Learners will be able to:

1. Explain how social equity and gender analysis can be used to achieve more relevant research that accommodates life patterns, biological differences, needs, and interests of different cultures, genders, generations, and species.

Practical Notes

1. Participants need to have a basic pre-requisite understanding about Ecohealth, including transdisciplinarity, participation, and systems thinking. Hence Modules 2, 3, 4 and 5 provide excellent preparation for this module.
2. It is helpful for participants to have had hands-on experience in research or practice in Ecohealth, or working with communities on health or environmental issues.
3. Pre-reading of the Key References is strongly recommended.
4. The module will work best if participants include men and women from different disciplines, cultural and ethnic backgrounds, and age groups; be aware that this will almost certainly create the situations that we seek to redress and that trainers need to be comfortable with such a prognosis (see Notes to Trainers below).
5. The module could be delivered in one half day or extended/integrated into a more in-depth course.
6. More advanced learning objectives may be addressed by using the tools and case studies in the Appendix.

NOTE TO TRAINERS

In all the activities in the course, and especially in this module, careful attention needs to be paid as to who participates actively and who does not, and why this might be so. Is this related to: language skills? Personality type (introverts and extroverts)? Culture? Gender? Do the rules of participation favour some groups (e.g. extroverts, men, women, certain cultural or age groups) over others?

In other words, this module might create the conditions under which some people are "voiced" and some are "voiceless," for much the same reasons as this module explains. It could be challenging for participants, and for instructors, to be exposed to this, and create difficult interpersonal situations that would ordinarily require trained professionals, like counsellors, to deal with appropriately. Instructors should be aware of this likelihood from the outset. It is possible that you feel that you are not equipped to deal with these outcomes. If so, it is suggested you consider a few options:

- Not delivering the module at all
- Delivering only the theoretical or more straightforward activities in the module (e.g. Activity –)
- Employing the services of a co-instructor who has these facilitation skills.

A useful technique that instructors can adopt is to create "ground rules" to encourage everyone to participate; for instance, you can make a rule that only a person holding a stick ("talking stick") or other object is allowed to speak, and then only for a specified time. Periodically, trainers should work with the class to review who is participating and who is not and to explore why not. In participatory work, there are various ways to manage groups and minimize the influence of overly-dominant personalities, or involve very shy people, by taking them aside, carefully assigning members to different small groups, etc. Again, seeking professional advice about these matters is the best approach, if you feel you don't have the experience to deal with the situations that are likely to arise. It is also recommended to allow time, within the course or after class, to encourage participants to reflect on and process the ideas and issues raised during the module.

Background information

According to the World Health Organization, "while inequality implies differences between individuals or population groups, inequity refers to differences which are unnecessary and avoidable but, in addition, are also considered unfair and unjust...Not all inequalities are unjust, but all inequities are the product of unjust inequalities. The definitions of just and unjust are subject to various interpretations. The Pan-American Health Organization has interpreted "just" to refer to equal opportunities for individuals and social groups, in terms of granting access to and using the health services, in accordance with the needs of the various groups of a population, regardless of their ability to pay." (WHO 1999). One might also characterize "justness" in terms of equal opportunities and capacities to access nutritious food, clean water, and meaningful work, as well as treatment, regardless of age, gender, ethnicity, and the like.

Large, measurable, inequalities in health outcomes such as life expectancy, infant mortality, chronic and infectious diseases, exist between different groups in society, and between individuals within households and neighbourhoods. Many of these inequalities reflect unfair or unjust differences in access to food, water, health care, and other known determinants of health. The principle of equity in Ecohealth says that we are concerned with reducing unfair differences in these determinants. For instance, the principle of equity in relation to health care means that health services are accessible on the basis of need rather than who you are, where you are, or how much you can afford to pay.

"Equity in health" puts forward the ideal that everyone should have a fair opportunity to attain their full health potential and, more pragmatically, that none should be disadvantaged from achieving this potential. This ideal, then, is related to the social and natural environments within which people live, and reflected in the ability to access food, water, education, and social opportunities. Equity is therefore concerned with creating equal opportunities for health, and with bringing unequal health differentials down to the lowest level possible. Improving access also implies an outcome goal of improving health status of different groups in society.

There are often unfair conditions affecting the health and well-being of women and other disadvantaged groups, such as specific age groups, people of lower socio-economic status, and indigenous populations, due to multi-faceted socio-economic and cultural patterns. Health services may not recognize the specific and different needs of women and men, girls and boys. Relations between aboriginal and non-aboriginal groups, or between wealthy business owners and poor workers, result in inequitable access to knowledge about, and access to, health services.

In Ecohealth, any response or action will be ineffective and may have unintended, and even negative impacts, if differences in gender roles and responsibilities are not taken into account. A research agenda that examines cultural and socio-economic differences of gender and other forms of equity will help lead to more equitable solutions.

Activities

Activity 1A

Defining power and equity

Learning Objective:

- To understand the meaning and importance of gender and equity in addressing social and health issues, and to reflect on our gender roles.

INSTRUCTIONS

1) **Define**: Ask participants, on their own, to:

   i) Write down a definition of power according to what they think it is, or have experienced

   ii) Write down their own definition of equity according to what they think it is, or have experienced

   iii) Reflect upon, and make notes about how their belonging to a social group (based on gender, ethnicity, language, social class, etc.) places them in terms of equity. Do they have equal possibilities to access resources (material, informational, educational, etc.)?

Note for instructor: This part can be done prior to the session, and be part of a journalling exercise.

2) **Share**: Present the learners with various definitions of power and equity from the literature.

3) **Discuss**: As a group, discuss the various definitions from learners and from the literature.

   i) Start with power: Discuss recurring and interesting aspects of the definitions and develop a working definition of power. The following questions may be useful for prompting group discussions:

      - Are some power positions "good" and others "bad"? Is power necessary? Is power avoidable?
      - Why is it important to frame power as a relationship issue in Ecohealth? (You may want to refer to the Module as background for this)
      - How is status quo a power position? Does neutrality exist?

ii) Continue with equity: Discuss recurring and interesting aspects of the definition and develop a working definition of equity. The following questions may be useful:
   - What does equity mean?
   - What are some examples of equity?
   - Is equity subjective (can it mean different things in different situations)? How so? Why is this important?
   - How are power and equity related?
   - What is the difference between equality and equity?

Activity 1B

Defining gender and sex

Learning Objective:

- To understand the meaning and importance of gender and equity in addressing social and health issues, and to reflect on our gender roles.

INSTRUCTIONS

(1) Divide participants into groups of 3-4 persons. Each group uses a flip chart to make five general statements about what "gender" means and applies to, and five statements about the meaning of "sex." Examples of such statements could be:

"When we think a man should do certain types of work and women other types of work, this is based on gender roles."

"Sex determines the role that men and women can play in biological reproduction."

Note for instructor: see the terminology below for definitions that can be used as reference.

(2) Each group takes turns to report their statements to the class. Ask participants to discuss why their statements reflect sex or gender. The following questions may be useful:

- What are the differences between sex and gender? How are sex and gender related to each other? Can we separate the two?
- The trainer may point out that the statements reflect the beliefs of the participants, which are generally influenced by society, as well as biology. However, society is constantly changing, and the roles and status of women and men are also changing.

(3) Go through the definitions with the participants along with the discussion, feedback and explanations. Then ask the participants to discuss the questions below to round up their understanding of the gender concepts.

- What is the difference between saying "women in development" and talking about "gender in development"? Why is gender a preferable term to women in development?
- Why is gender/sex an important component of Ecohealth research and practice?
- Why is there a need to address gender/sex specifically, as well as social equity in general?

NOTE TO TRAINERS

Some issues for the trainer to consider in talking with participants about their responses to "women in development" and gender:

The move to gender-equitable development can be summed up as follows:

(1) It is an approach to people centred development

(2) It is a focus on relations between women and men – not centred only on women

(3) It highlights the problem of unequal relations that prevent equitable development and women's full participation

(4) It aims at equitable and sustainable development with men and women sharing decision making and power

(5) It seeks to empower disadvantaged women and transform unequal relations and structures rather than just integrating women in existing structures

(6) It addresses the practical needs determined by women and men to improve their conditions, strategic needs of women and men and the poor through people centred development (UNDP).

Activity 2

Brief presentation: on the consequences of inequities for health outcomes

Learning Objective:

- To be able to explain how social and gender inequities result in poorer health outcomes.

INSTRUCTIONS

The trainer gives a brief review of the term "Social Equity" and explains how equity influences health and how it persists in social contexts. Of critical importance here is the underpinning concept of social determinants of health – that is, an individual's health is not just a product of their genes, age or sex. Their health is determined by a range of social and environmental factors. The determinants mean that some people are more likely to be unhealthy than others. This inequality is, in most cases, a societal construction, and reversible; given that we don't address it effectively it is unjust, and deserves our attention.

The 2008 final report of WHO's Commission on Social Determinants of Health provides an excellent background document for this, and should be consulted by the trainer before teaching this module. The summary article by Marmot on social determinants of health (Lancet 2005) provides useful background. See *Module 6 – Appendix II – Gender Analysis Framework* for an online reference to the full report.

Some essential messages for this presentation can be covered by a discussion of Figure 6.1.

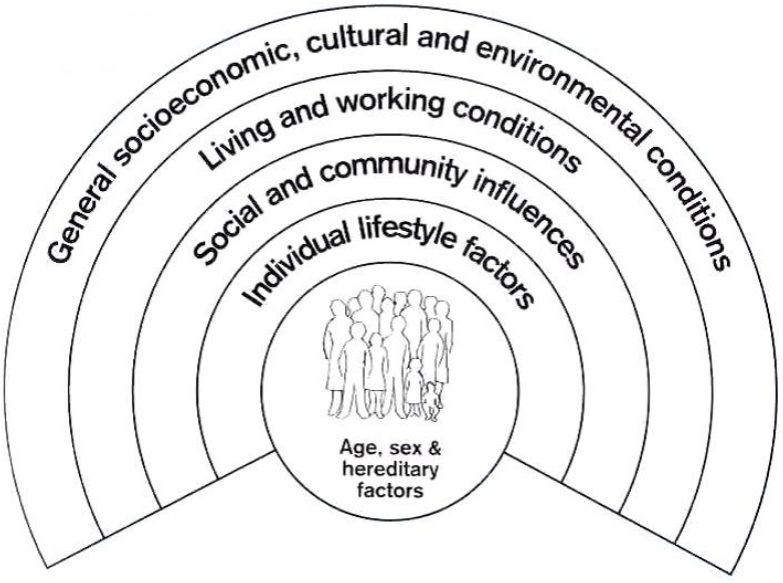


Figure 6.1 Multiple Layers of Influence on Health Source: (Whitehead & Dahlgren 1991)

The Figure refers to the multiple layers of influence on health, the so-called "determinants":

- At the extreme perimeter is the national and regional environment, that sets limits on the social and environmental "infrastructure" available to support health. Opportunities for education, housing, and nutrition are constrained by global and national distribution of wealth.
- Closer to individuals but still largely outside of their control are the conditions in which they live and work. Safe, healthy environments are critical to the level of population health.
- Cultural and social factors are next, reflecting a range of norms and practices that affect health. Consumption patterns are a good example of this. Cultural values, amplified through sophisticated marketing, largely influence the types of food that are available and that we choose to eat; try to find a fast food burger in a wealthy suburb.

Individual behaviours exert a direct influence on health, but as some examples above illustrate, they also are affected by socio-economic factors. Driving a motor vehicle at a dangerous speed may be an immediate cause of injury. However fatigue from having to drive long distances to reach essential services is more likely if you live in rural areas, having a tyre blow-out may be more likely for those with lower paying jobs because of high maintenance costs, or having more passengers may be influenced by the size and closeness of your extended family. Individual level interventions, such as driver education programs, are not going to change any of these determinants.

The recent explorations of the socio-economic, cultural, and environmental determinants of health have occurred alongside increasing concerns about worsening health inequities, despite improvements in overall health. During the last 50 years of the twentieth century the health status of many countries has improved more than ever before. However, when this national-level data is disaggregated, disparities in mortality rates and health outcomes between different groups become apparent. These inequities are not only an issue for developing countries, but also for more developed countries that experience overall good health, such as the Netherlands, Sweden, Denmark, and the USA. For example in the USA although life expectancy for the overall population improved between 1984 and 1989, closer inspection revealed that the increase only applied to the health of white people, while the health of black people actually decreased. This is despite a narrowing of this gap in previous decades when the life expectancy for black people increased more rapidly than for white people. In the USA it is suggested that "race" is a proxy for underlying socio-economic differentials, such as living and working conditions.

Activity 3

Meaning and description of social and gender inequities/inequalities in Ecohealth

Learning Objective:

- To reflect upon the roles of power dynamics, structures and relationships, and describe the way they affect equity and therefore health outcomes.

INSTRUCTIONS

Have the participants read the study by Renaud de Plaen et al (2004). The paddy, the vector and the caregiver: lessons from an ecosystem approach to irrigation and malaria in Northern Côte d'Ivoire. Acta Tropica 89 (2): 135-146. (If you can't get the original paper, you can find a summary in Health: An Ecosystem Approach by J. Lebel, available from IDRC.)

http://www.idrc.ca/EN/Resources/Publications/Pages/IDRCBookDetails.aspx?PublicationID=338

NOTE: Other case studies can also be used to do this exercise and others in this module.

A case study well known by the trainers (or even better, the case study used in the course) is a good example to use as you are able to dig deeper and offer insights to participants. IDRC's Ecohealth research in practice, edited by Charron (2012) also offers examples of case studies. Several case studies are summarized in the Appendix for Module 5. If using an alternate case study, some of the questions from the handouts below may need to be adapted.

> Using the de Plaen et al. (2004) example:
>
> The study revealed that disease patterns reflected complex dynamics among agricultural practices, gender, access to wealth, access to markets, and cultural expectations.
>
> *Question for the exercise:*
>
> How would you introduce equitable change into this society, and what are the ethical implications of doing this?

Divide the participants into three groups:

1. Legislative/regulatory issues in relation to social determinants of health
2. Organizational and operational matters
3. Inequities arising from competing demands for finite resources.

Each group works by discussing and explaining problems from the participants' personal and academic experiences. Provide handouts for the guiding questions for each of the groups.

Group 1: Legislative/regulatory issues in relation to social determinants of health (e.g. access to land and markets, to nutritious food, access to medical care, public health services).

Guiding questions for discussion:

- What regulations/systems are hampering different stakeholders/ groups (e.g. men/women; rural/urban; aboriginal/non-aboriginal; poor/wealthy) from changing the social determinants of health in the community in the case study?
- Who developed the regulations?
- Who is the most affected? Why? How might research in gender and other social inequity contribute to the reduction of social inequities?

Group 2: Organizational and operational matters

Guiding Questions for discussion:

- Do people in the rural areas receive the same quality health services as people in the urban areas?
- Do different groups (e.g. men/women; rural/urban; aboriginal/non-aboriginal; poor/wealthy) have different access to health care?
- With regard to health care and gender specifically:
    - Are the services distributed more to men than women?
    - Are there more male doctors than female doctors in the rural hospital?
    - Are males better doctors than females? What does better mean?
    - How is the concept of "better" related to the sex of the patients? To religious or cultural beliefs?
    - Will the patients be better served by a doctor who is aware of gender roles?
- What are the organizational and institutional arrangements that maintain differences in access to better nutrition, education, and work?
- Are there organizational arrangements for more equitable (re-) distribution of wealth within communities or within the larger society (e.g. taxation, mutual aid organizations, cooperatives, religious groups)?

Group 3: Inequities arising from competing demands for finite resources

Guiding Questions for discussion:

- Are health care services and supports equally available for people of different backgrounds, or with special needs related to their physical

or mental condition, and/or age or chronic diseases? Who will mostly access the resources?

- Who controls the food, educational, and livelihood resources?
- When resources are scarce or constrained, are there differences in priorities between men or women, poor/wealthy, aboriginal/non-aboriginal?

(3) Give the participants 30 minutes to discuss in small groups, and share the information of inequity analysis to the other group members. Provide references and cases for further discussions and analysis.

Activity 4

Reflecting on power and equity

Learning Objective:

- To reflect upon the roles of power dynamics, structures and relationships and describe the way they affect equity and therefore health outcomes.

Note: If participants do not have their own research work, this exercise can easily be done using a case study. Case studies are available in Charron (2012) or consider those suggested in other modules, or use a local case study base on the work of local stakeholders/partners/colleagues.

INSTRUCTIONS

- Brainstorm: Using flipchart paper and coloured markers, ask participants to map out (diagram or draw) power, equity, and equality within their own research or work, or based on the case study chosen for this activity. This can be done by identifying the people and social structures involved in their work and diagramming the power relationships among them. Ask them to think about who is concerned, where they are, resource distribution, etc.
- Share: Divide participants into small groups and ask them to share their maps with each other and help each other develop their maps further.
- Discuss: Using examples from participants' maps, facilitate a broader discussion to address the following questions:
- How are power relationships between people important to ecosystem approaches to health?
- What are my own relationships and power dynamics within my research/practice context(s)/studies/hobbies, or in the case study? How should I take these into account?

- How can I identify and address the underlying power relationships within my research/practice context(s), or those in the case study?
- What is the difference between equality and equity? How are these differences related to power?
- What role do power dynamics play in the different equity issues relevant to my research/practice, or those in the case study?
- What roles do desire and emotions play in power dynamics?

Activity 5

Gender roles and expectations, stereotypes, and influences

Learning Objective:

- To understand the meaning and importance of gender and equity in addressing social and health issues, and to reflect on our gender roles
- To reflect upon the roles of power dynamics, structures and relationships and describe the way they affect equity and therefore health outcomes.

INSTRUCTIONS

(1) Divide the participants into pairs. If possible, pair people who don't know each other very well. Give pairs three minutes to interview each other then, in a group session, everybody introduces his/her neighbour within one minute. Next in the group session, everybody introduces his/her neighbour for another minute. This may have been done in an initial ice-breaker session in the course. If so, go immediately to (2).

(2) If the participants have taken part in the group activities from Module 2, 3 or 4, ask them to reflect back on those sessions, and to comment on who spoke and who didn't, who took notes, etc, and whether that reflected skills, or power, or both. What activities or behaviours have been gendered?

(3) Divide participants into groups of three. Assign to each group one of the following institutions: family, communities, health care, sciences, religion, law and order, education, military, media etc). Ask each group to discuss the questions and allow each group to present the findings:

- How does the institution/system create and maintain gender stereotypes? Give examples of stereotypical behaviours, practice, and policies in the institution.
- What are some of the situations in which we see gender differences? (social, political, educational, economic).

Keep in mind that many other factors relate in complex ways to these institutions. As a trainer, you can choose to discuss the interrelationships between all factors, or limit the discussion to gender.

Sample Timetable: Module 6

TIME	SHORTER COURSE	TIME	LONGER COURSE
10 min	Introduce goals and objectives: Focus on equity or gender	**15 min**	Introduce goals and objectives: Focus on both equity and gender
90 min	Activity 1: Terms and definitions Activity 1A – Defining Power and Equity OR Activity 1B – Defining Gender and Sex	**90 min**	Activity 1: Terms and definitions Activity 1A – Defining Power and Equity
		90 min	Activity 1: Terms and definitions Activity 1B – Defining Gender and Sex
30 min	Activity 2: Brief Presentation: On the consequences of inequities for health outcomes	**45 min**	Activity 2: Brief Presentation: On the consequences of inequities for health outcomes (include longer discussion period)
60 min	Activity 3: Meaning and description of social and gender inequities/ inequalities in Ecohealth.	**90 min**	Activity 3: Meaning and description of social and gender inequities/ inequalities in Ecohealth.
60 min	Activity 4: Reflecting on Power and Equity	**90 min**	Activity 4: Reflecting on Power and Equity
60 min	Activity 5: Gender, roles and expectations, stereotypes and influences	**90 min**	Activity 5: Gender, roles and expectations, stereotypes and influences
5h10	**Total time**	**8h30**	**Total time**

Evaluation

Participants may benefit from time outside the structured session to reflect on what has been discussed. You could suggest options like participants writing in their journal, or doing a quiet walk. You could also allocate time during your classes for such an activity.

A short survey or class discussion could be used to obtain feedback from the learners about the module and teaching of this topic.

Observation of group discussion can be used to assess participant interaction, confidence, and use of analytic approaches and emotional intelligence.

Terminology

Power
The capacity or ability to direct or influence the behaviour of others or the course of events (http://oxforddictionaries.com)

Social equity
The state, quality or ideal of being just, impartial, and fair.

Gender and Sex definitions:

NOTE FOR INSTRUCTORS

Gender

"The roles and responsibilities of men and women that are created in our families, societies, and our cultures. The concept of gender also includes the expectations held about the characteristics, aptitudes, and likely behaviour of both women and men. These roles and expectations are learned. They can change over time and they vary within and between cultures. The concept of gender is vital because it facilitates gender analysis, revealing how women's subordination is socially constructed. As such the subordination can be changed and ended.

"**Sex** describes the biological differences between men and women, which are universal and determined at birth" (UNESCO 2005).

Gender equity
Fairness and justice in the distribution of benefits, power, resources, and responsibilities between women and men. The concept recognizes that women and men have different needs, power, and access to resources, and that these differences should be identified and addressed in a manner that rectifies the imbalance between the sexes (WHO).
Gender equity in relation to health addresses inequalities between women and men in terms of their resources and their opportunities for health, including differences in how well health systems meet their specific needs.

Gender equality
The result of the absence of discrimination on the basis of a person's sex in opportunities, allocation of resources or benefits, and access to services (UNDP).

Gender issues
The addressing men and women in a holistic way while considering their options, quality of life, experiences, perceptions, power resources, physical traits, and family relations (relations between men and women).

Gender roles
Vary by age, social and economic status, ethnicity, religious affiliation, and other social characteristics, including differences in status, power, roles, vulnerability, and access to resources.

Gender mainstreaming
The shift from sex-counting to a transformative approach. Gender mainstreaming addresses issues of male/female equity and equal opportunities to access and control over resources, development benefits and power in decision making at every stage of the development process, projects, programs, or policy.

Gender sensitivity
Acknowledges and highlights existing gender differences, issues, and inequalities and incorporates these into strategies and actions. Gender sensitivity indicators compare the situation of males to that of females, and show an aspect of advantage or disadvantage.

Empowerment
Both men and women taking control of their lives by setting their own agendas, gaining skills, building self-confidence, solving problems, and developing self-reliance.

Key References

Commission on Social Determinants of Health (2008). Closing the gap in a generation: health equity through action on the social determinants of health. First Report of the Commission on Social Determinants of Health. Geneva, World Health Organization.

Marmot, M. (2005). Social determinants of health. Lancet, 365: 1099-104.

de Plaen, R., Seka, M-L., and Koutoua, A. (2004). The paddy, the vector and the caregiver: lessons from an ecosystem approach to irrigation and malaria in Northern Côte d'Ivoire. Acta Tropica, 89 (2): 135-146.

USAID (2009). A manual for integrating gender into reproductive health and HIV programs: from commitment to action [2nd Edition]: 88.

Other case studies, as well as some tools, are described in the Appendix.

Additional References

Azarbaijani-Moghaddam, S. (2007). Gender awareness and development manual: resource material for gender trainers. Ministry of Woman's Affairs Training and Advocacy Department, 209.

CIHR Institute of Gender and Health (2012) What a Difference Sex & Gender Make: A Gender, Health and Sex Research Casebook. http://www.cihr-irsc.gc.ca/e/documents/What_a_Difference_Sex_and_Gender_Make-en.pdf

Durairaj, V. (2007). Enhancing equity in access to health care in the Asia-Pacific region: remediable inequities. Report prepared for the UN Regional Thematic Working Group on Health. World Health Organization, 51.

European Commission (2001). Gender in research: gender impact assessment of the specific programmes of the fifth framework programme. Directorate General for Research. ftp://ftp.cordis.europa.eu/pub/science-society/docs/women_gender_impact_fp5_en.pdf

Farmer, P. (1996). Social inequalities and emerging infectious diseases. EID, 4: 259-269.

Gender and Health Collaborative Curriculum Project: http://www.genderandhealth.ca/

Mongeau, P., and Saint-Charles, J. (2005). Communication et émergence du leadership dans les groupes. Communication: horizons de pratiques et de recherches, Québec: Presse de l'Université du Québec, 109-130.

PAHO/WHO (1999). Principle and basic concepts of equity and health. Oxford: Oxford University Press.

Payne, S. (2009). How can gender equity be addressed through health systems? Health System and Policy Analysis, 45.

Standing, H. (1997). Gender and equity in health sector reform programmes: a review. Health Policy and Planning, Oxford University Press, Oxford, 12(1): 1-18.

UNESCO Bangkok (2005). Exploring and understanding gender in education: a qualitative research manual for education practitioners and gender focal points, 86.

MODULE 6 – APPENDIX II

Gender Analysis Framework

This Appendix will be most useful for more advanced learning objectives.

ADVANCED LEARNING OBJECTIVE:

- Explain how social equity and gender analysis can be used to achieve more relevant research that accommodates life patterns, biological differences, needs and interests of different cultures, genders, generations, and species.

The tools presented below are all oriented towards gender analysis. The process and concepts presented in them can but adapted to look at other types of inequities. The following link presents a social equity audit tool from the Social Equity Watch http://www.socialequitywatch.org/.

An introduction to social equity audit (2007):
http://www.socialequitywatch.org/images/Files/social%20equity%20audit.pdf

Working in Communities where Inequities are Deeply Embedded

Depending on how rigidly gender and other inequities are embedded in a community, different approaches may be taken. In some communities differences are very deeply entrenched and researchers and practitioners cannot address them directly. For instance, in some communities, it will not be possible, at least at first, to have men and women, or people of different economic classes, attending the same workshops, or, if they do, one group will dominate the other. Some approaches take advantage of existing gender inequities, behaviours, and stereotypes, or respond to different roles and identities of women and men. Thus the research and interventions may target men and women differently and separately (e.g. through male and female doctors, or separate schools, self-help groups and markets). They do not deliberately challenge unequal relations of power or address underlying structures that perpetuate gender inequities; however, by giving equal attention to different groups, researchers may begin to help the community "soften" some of the boundaries.

"Gender Transformative" approaches explicitly engage women and men to examine norms, question, and change the institutions and norms that reinforce gender inequalities, and as a result achieve both health and gender equality objectives.

(1) Ask the participants to examine the sample case studies used in this course (or their own work) for examples of gender and social differentials, how they interact, and how one might work with them or transform them. You could also identify new examples to use for this module. Suggestions for the types of scenarios could include:

- Communication campaign promoting the importance of men's participation in family planning decision making on television
- Targeting poor rural women for cell-phone-based banking systems

- Engaging women and men in a process of critical reflection leading to an understanding of human rights to eliminate harmful cultural ritual practices
- Working with communities affected by Agent Orange in Vietnam to work through differential impacts of dioxins on men and women, and relationships of those differential impacts to poverty and cultural history.

More Tools: Gender Analysis Framework

Background Information: What is gender analysis?

Gender analysis is a systematic analytical process used to identify, understand, and describe gender differences and the relevance of gender roles and power dynamics in a specific context. Gender analysis examines different gender roles, rights, constraints, and opportunities of men and women and its relation between them. The analysis also involves examining the different impacts of development policies and programs of women and men, and the collection of sex-disaggregated or gender-sensitive data.

An analysis of gender relations provides information on the different conditions that woman and men face, and the different effects that policies and programs may have on them because of their situations. This information can inform and improve policies and programs, and is essential in ensuring that the different needs of both women and men are met.

Tools for Gender Analysis: two tools that have been used for analyzing gender and other power relationships are The Activity Profile and a Gender Analysis Table.

The Activity Profile

This tool assists in identifying the productive and socially reproductive activities of women and men, girls and boys. Other data disaggregated by gender, age, or other factors can also be included. It can record details of time spent on tasks and their location.

Doing an activity profile:

- Identify the tasks in the activity (e.g. agriculture-production of beans)
- Examine the tasks done by women/girls and men/boys in the activity
- What resources are needed to perform each task?
- Who has access to/control over the resources?
- What are the main benefits?
- What are the gender issues identified?
- Do the activity profiles differ according to economic status or ethic group?
- What are the effects of the above issues on success of the activity?
- How can we solve the identified issues?

Activity Profile:

Specifically, what roles women/girls, men/boys perform in each activity and at what times:

Productive activities: Agriculture, income generation, employment, marketing crops.

Reproductive Activities: Firewood collection, water collection, cooking, household cleaning, childcare.

Community Activities: Meetings, community road construction and repair, community activities for public health.

The trainer may ask the following questions after presentation of daily activity – CLOCKS

- How is the time for each category of people (women/men) divided?
- How much time is devoted to productive activities, domestic activities, community activities, leisure, sleep, and how do they vary by season?
- For each category, it is time fragmented among several different kinds of activities or concentrated on a few?
- How do the women's and men's clocks compare?
- Whose clock is the busiest?

Daily Activity Clocks for women and men in the hot and rainy seasons

These show that both women and men work long hours in the fields during the rainy season, but during the hot season men enjoy a great deal of leisure time while women carry out a multitude of activities, including gardening. Within a community, how do the activity clocks differ by social and economic class? Are some groups expected to engage in different patterns of activity within the community (business and political leaders versus farmers, for instance)?

A FRAMEWORK FOR GENDER ANALYSIS (DATA COLLECTION AND ANALYSIS)
(Source: USAID 2009)

DATA COLLECTION AND SYNTHESIS STEP 1	DATA COLLECTION AND SYNTHESIS STEP 2	ANALYSIS STEP 1	ANALYSIS STEP 2
What are the key gender Relations related to each domain And to power?	What additional information is needed about gender relations?	What are the gender-based constraints to reaching program objectives?	What are the gender-based opportunities for reaching program objectives?
Consider these relations in different contexts – individual, partners, family and communities, health care and other institutions, policies.			
Access to Resources Land, labor, capital, entrepreneurial skills Information/communication Education/training Income/debt Health services Employment benefits (Family assets e.g. bicycle, radio, food, clothing shelter/new house, decision-making)			
Knowledge, Beliefs, Perceptions: Knowledge Stereotypes Beliefs/ideology Behaviours Daily activities Self-perceptions Self-confidence Religion/ritual			

DATA COLLECTION AND SYNTHESIS STEP 1	DATA COLLECTION AND SYNTHESIS STEP 2	ANALYSIS STEP 1	ANALYSIS STEP 2
What are the key gender Relations related to each domain And to power?	What additional information is needed about gender relations?	What are the gender-based constraints to reaching program objectives?	What are the gender-based opportunities for reaching program objectives?
Practices & Participation: Freedom Activities (meetings, training, political process, health, social services) Development activities Allocation and availability of time to participate			
Legal Rights and Status: Inherit and own property Legal document (ID card, house registration) Reproductive choice Healthcare security card			
Power, Control, and Decision-making: Acquiring resources and disposing of resources Choosing to believe One's own body Reproductive choice Occupation			

MODULE 6 – APPENDIX III

Examples of case studies that can be used in this module

Cadmium, Sex and Gender

The statements below are all based on scientific studies. Read them through, then talk with the participants about sex, gender, and equity questions that arise.

During the post-war years in Japan, several hundred women who worked in, and ate from, certain rice fields, developed a severe, very painful, and often fatal disease of the bones referred to by those affected as "itai-itai" (ouch-ouch) disease.

The rice fields were irrigated with cadmium-contaminated water from a zinc mine.

The miners were men, who generated income for their homes.

Cadmium attacks the kidneys. While only about 5 per cent of cadmium is absorbed by people, it takes about 30 years for half the cadmium to be cleared from the human body once it's there.

Cadmium is concentrated through industrial processes, batteries, electroplating, and is a contaminant in other metals we use.

In some studies, women have double the concentrations of cadmium in their blood than men. This could be linked to iron transport mechanisms: the body is trying to compensate for iron loss during menstruation, taking up iron through intestinal transporters. Possibly aiming for iron but having an affinity for cadmium.

Iron deficiency during pregnancy leads to increased cadmium absorption and body burden. Multiparous women exhibit additional increases with increasing age.

Smoking remains a major source of cadmium exposure to people; women of the developing world are currently the fastest growing group of "smokers."

Relative to other foods, the highest levels of cadmium are in the healthiest foods: root vegetables, whole wheat, unpolished rice.

Case study

The Case of Agent Orange in Vietnam

"Millions continue to suffer": Excerpt from a speech delivered to the launch meeting of Agent Orange Justice Australia Vietnam Solidarity Network, held in Sydney on June 1, 2011, by the Vietnamese consul general in Sydney, Mai Phuoc Dung.

"A recent investigative study conducted by US scientists showed that US forces from 1961 to 1971 deployed in Vietnam about 80 million litres of toxic chemicals (more than half of which was Agent Orange) containing nearly 400 kg of dioxin, an extremely dangerous substance which has destroyed much of our environment and many people's health.

With about 80 million litres of toxic herbicides, mostly Agent Orange, containing high concentrations of dioxin, the most powerful toxin ever known, this "chemical warfare" was sprayed on at least 4.8 million Vietnamese and poisoned three million of them. Out of this population, many have died or are dying; many who survive, especially children born with severe deformities, suffer a fate even worse than death.

Right from the first spraying in the early 1960s, many US scientists raised their voices to protest the use of toxic chemicals in Vietnam.

The war is over. Vietnam has made its marvellous rebirth. Nevertheless, millions of people continue to suffer from deadly incurable diseases caused by dioxin exposure. Thousands of those affected have died in agony with deep indignation towards the perpetrators of these crimes. Many women suffered reproductive complications or even lost their right to be a mother. More painfully, their descendants, who had nothing to do with the war, have been, are, and will be victims of dioxin, born with inherited diseases and without even a minute of the happiness of living like an ordinary human being. The victims of Agent Orange/dioxin are the poorest and the most miserable people and, with many deformed offspring, their families live in poverty. Despite all efforts by the government and people of Vietnam, supported by the contributions of progressive humanity, the life of Vietnam's Agent Orange victims is still extremely wretched. Many of them face ever worsening illnesses or new diseases; many others can no longer work to earn their own living and support their families; and many children with birth defects are suffering and getting nearer to death."

Further notes: Many of the people who have moved into the heavily contaminated sites are very poor, as this is the cheapest land available. Women are expected to "produce" healthy children to help work and earn money. The form of dioxin in the herbicide is one of the most toxic substances ever produced, causing a variety of cancers and severe birth deformities. The babies that survive require high levels of care, which poor families are not equipped to provide.

See also: Gendreau, F.; Henaff, N. and Martin, J.Y. (2006). Demographic and economic consequences of agent orange spraying. Research Centre for Gender, Family and Environment in Development (CGFED). International Scientific Conference: "Victims of Agent Orange/Dioxin in Vietnam – The Expectations" Hanoi, 16 - 17 March. Accessed at: http://www.ffrd.org/AO/CGFED/07Gendreau.pdf

Case study

Case study example: A case of the Plague

David Waltner-Toews, in his book "The chickens fight back: pandemic panics and deadly diseases that jump from animals to humans" (Greystone 2007), describes the following situation:

In the nineteenth century, the plague arrived in an area of what is now Tanzania along the trade routes, and became established in several parts of the country, but in one particular village and its environs. Then, in the 1940s, the inhabitants of this village were plagued with an explosion of the rodent population, but without the occurrence of the plague. Nevertheless, the damage from the rats was sufficient to require the intervention of a special healer, who, in the manner of any good epidemiologist, intervened when the epidemic was at its peak and would thus decrease no matter what he did. A couple of decades later, the rat plague returned, this time carrying human disease with it. Local people consulted the healer, who, it turns out, had not been paid the last time; after receiving appropriate apologies and offerings, he again suggested some cures. This time, however, perhaps because the people didn't believe hard enough or do exactly the right things, the plague persisted. Over the decade of the 1980s, thousands of people became sick, and hundreds died.

In the meantime, veterinary scientists were trapping rats and taking blood and fleas from a random sample of people and dogs, looking for Yersinia pestis, or antibodies to it. Every possible preventive action seemed to have been tried, but nothing worked, at least not very well. Some research suggested that dogs were carrying the disease; maybe if they got rid of the dogs the problem could be solved. An anthropologist was sent in to talk to the people to see if he could determine why nothing seemed to work.

A complicated picture emerged from the anthropologist's report, including what had been tried, and why it hadn't worked.

Doctors tried to quarantine sick people, but they resented this intrusion into their daily lives. Under quarantine, they were prevented from leaving their homes or villages to take part in agricultural activities, gather food, care for sick relatives, or attend special occasions; some people could find loopholes, however, especially through bribery. In any case, if rat fleas were carrying the disease, it was not clear that quarantine would have any effect besides making it look as if something were being done.

One could fall back on simply diagnosing and treating cases as they came up. Since the plague is generally treatable with inexpensive antibiotics such as tetracycline or streptomycin, this approach is often the most cost-effective for sporadic (non-epidemic) cases of the plague. Treating people

quickly is dependent on local treatment centres that are accessible, well-staffed and stocked with antibiotics, however. In Tanzania, the local treatment centres were accessible but not always stocked with drugs; patient records were sometimes mixed up, lost, or leaked beyond the centre, raising questions of confidentiality. Patients were to bring their own bed-sheets and the like; some could not do so, or were ashamed of their poverty.

In many parts of the world, diagnoses are made by playing the odds. "If you hear hoof beats," our professors at veterinary school in Saskatchewan used to say, "think horses, not zebras." But that advice needs to be taken in context. In Kenya, you might well think "zebra" at the sound of hoof beats. In North America, we often call a fever together with either respiratory or gut problems the flu; but often it's not influenza (especially the gut form, since influenza in people is usually a respiratory disease). Sometimes that doesn't matter; "flu-like" illnesses in North America are often caused by viruses, and doctors usually treat "flu like" viral diseases similarly (chicken soup and bed rest). In parts of Africa where the plague is known to be endemic, a lot of non-plague diseases are called the plague, including malaria. Unfortunately, malaria is not treatable by antibiotics. If only some forms of the plague, broadly interpreted as any general illness, responded to antibiotic treatment, then what advantage did those modern methods have over traditional healers?

Public health authorities tried pesticide spraying and rat poisoning in houses. People from households that had been sprayed were asked to shut all windows and doors for six hours, as well as not to clean house for three to six days. Those householders did not like to share a dwelling with dead rats and fleas for that amount of time. Moreover, the pesticides had good market value and were either allocated according to favouritism, or resold to farmers as treatments for crops and foodstuffs. Some people complained of becoming ill after spraying; chickens sometimes died, and cattle became ill.

Authorities proposed that villagers plaster and seal their houses, so that the rats couldn't get in from outside. Most of this work was supposed to done by women and children under twelve, who were the ones getting sick, and who did not have the energy for house renovations. Besides, there was a shortage of water needed for plastering, and men controlled the money that would pay for plastering. It was not done.

Households could move food storage outside so that the rats wouldn't come into the house: traditionally, the maize was stored outside the house. However, a decline in maize production associated with an increase in cash crop production related to an opening of world markets made maize more valuable as a food commodity; this development, together with a decrease in social trust (related in part to competitiveness and modernization), increased the need for vigilance. Hence the maize was now stored in the wooden ceiling of the house. Rats followed the

maize into the house; this move made the dogs happy to stay around the house as well.

Public health officials recommended that householders clear shrubs and bushes from around the houses and field crops so that rats would have fewer places to hide. But arable land was scarce, and people wanted to maximize land use by planting very close to the house. Borders of fields were planted with trees to prevent soil erosion, with grasses as cattle feed, and with medicinal plants for household use. These practices were encouraged by some government agencies (obviously not those involved in eradicating the plague) to conserve soil and water. Some shrubbery was also maintained as a link to family ancestors, who were believed to live in the shrubs near the house.

Even something as apparently simple as removing food scraps from near dwellings was a problem, since this organic "waste" was thrown into the fields around the house to serve as fertilizer for the crops.

Since women and young girls prepared the food, they were disproportionately affected by the disease. Since children played with dogs that were infected by fleas from rats, they also got the plague.

What should these people do? To keep up agricultural production and prevent soil erosion, farmers should plant bushes and shrubs around their houses and fields. To prevent the plague, they should pull them up. To make more money, they should plant more cash crops. To bring down the price of local food, they should plant more maize. To improve their health, they should cooperate with their neighbours and move their grain into outside storehouses. To become more competitively efficient in the global market, they should compete with their neighbours.

What questions might you ask with regard to gender? Access to money? Distribution of wealth within families and communities? Inequality? Inequity?

FIELD BUILDING LEADERSHIP INITIATIVE

MODULE 7

Sustainability

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FÈVRE, S, HORWITZ, P, WALTNER-TOEWS, D (2013). (EDITORS). ECOHEALTH TRAINER MANUAL.
FIELD BUILDING LEADERSHIP INITIATIVE. VWB/VSF: CANADA

MODULE 7 – SUSTAINABILITY

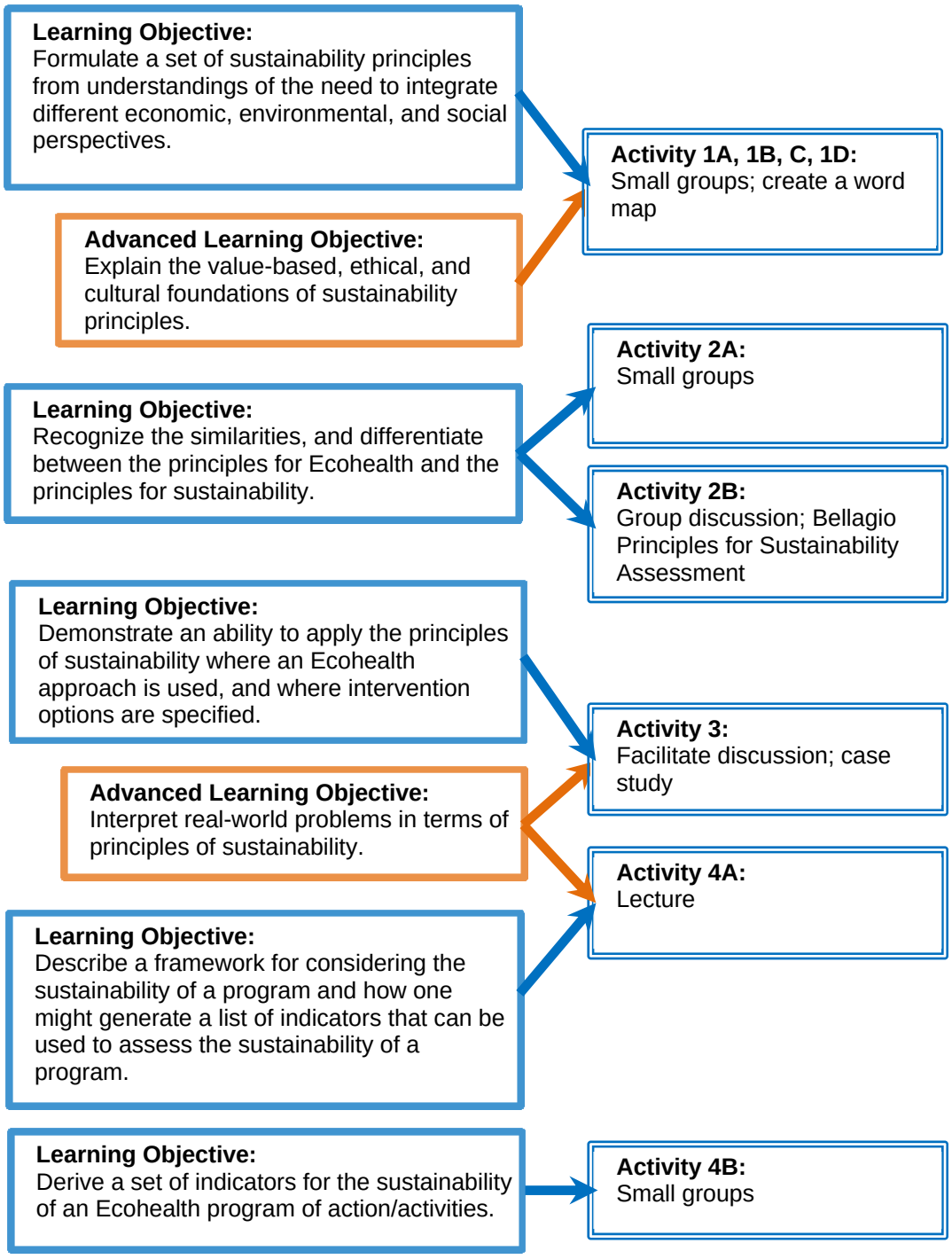
Overview

This module describes different understandings of sustainability, built around the simple concept that we must meet the needs of the present generation in social, environmental, and economic terms, without comprising those of the future. Sustainability is central to Ecohealth because it keeps us asking the question: "Why does Ecohealth matter"? If researchers and stakeholders are interested in helping facilitate long-enduring change for communities, they need to be sure their work will have long-term and meaningful impacts. Building sustainability into a research framework is not easy and often requires adaptive approaches. Because sustainability is rooted in an understanding of the dynamics of social-ecological systems, many solutions relating to adaptive governance have their roots in environmental management.

The module then describes the concepts of program/project sustainability, what it means for an intervention to be sustainable, exploring specific factors affecting sustainability and presenting methods of assessing the sustainability of Ecohealth intervention research. Maintaining the long-term benefits of health interventions depends on sustaining innovations beyond short program timelines, and increasingly, under conditions of unstable and interacting social, ecological, climatic, and economic forces.

Combined with short lectures on sustainability, this module contains active sections where participants workshop sustainability principles and learn how to assess sustainability, how to measure a program/project's sustainability, and what indicators can be used to determine if a program/project is sustained. Thus, this module provides the opportunity to help learners to start thinking about how they can contribute to ensuring lasting Ecohealth interventions.

Conceptual Map: Module 7



Introduction to the Topic – Education for Sustainability

Sustainability seeks to meet the needs of present generations without compromising the ability of future generations to meet their own needs. Beyond that important concept lie a number of uncertainties and complexities, and consequently the concept of sustainability can mean different things to different people. In fact, the definition of sustainability needs these ambiguities because of the very uncertain, complex, and ambiguous problems we face in society. More specific definitions of sustainability, through attempting to identify precisely what it is that needs sustaining, are inherently controversial and the subject of much debate. In this module, we have chosen not to use the (otherwise valuable) phrase "sustainable development" since it deals with a "developmental studies" context for what is sustainable; "sustainability" is broader and less constrained in that sense (see Terminology for definitions).

Principles for sustainability include: to ensure life support systems in perpetuity, including the resources that sustain the economic system; to encourage people to live cooperatively and in harmony with each other and have their basic needs satisfied in a fair and equitable way; to have appropriate development to ensure that people can support themselves in a long-term way; and to have a democratic system to ensure that people have a fair and equal say over how natural, social, and economic systems should be managed.

Arguably our global environmental trajectories and current societal progressions over the past few hundred years are becoming more and more unsustainable. This non-sustainability is reflected in such outcomes as climate change, loss of biodiversity, inappropriate personal behaviours, over-use of resources, and cultural and socio-economic inequalities. Professionals knowledgeable in principles of sustainability will contribute to their resolution, by recognizing the multi-faceted nature of broad societal problems, and by being able to propose and know how to implement systemic, lasting changes to ensure inter-generational equity.

The debates about sustainability are often represented by proponents of the so-called notions of weak and strong sustainability. The weak notion of sustainability is based on a strong faith in three things: technology, normative science, and human ingenuity (*"we can use science, technology and the infinite capacity of humans to solve whatever challenges we face"*). Its supporters' view of the world is largely one of a machine, where nature is given use-values only, and where humanity is thought to be the only situation in which intrinsic values can be found. The notion of weak sustainability interlocks with anthropocentrism, which represents the almost unchallenged, dominant social paradigm in western society.

Contrastingly, the notion of strong sustainability is based on more pessimistic assumptions. Proponents of this approach have philosophical allegiances to a more eco-centric worldview and therefore challenge culture-specific structures and beliefs. They reject economic rationality, absolute faith in technology, and what they perceive as the arrogance of humanism, which in their view

perpetuates the division between humanity and nature and contributes to human domination of the non-human world. Sustainability, according to this worldview, is therefore contingent on radical social, political, and economic reform. The intellectual tools of the pessimists are trans-scientific in nature, and based on holistic and integrative conceptualizations of human economy-ecology relations.

The adoption of either notion of sustainability has implications for the development of sustainability strategies. On the community level, the degree of optimism/pessimism about the future held by members of a community will determine their treatment of risks and the way they exercise precaution. It also determines their visions of the future, the means they choose to accomplish community goals, and their definition of a sustainable community.

> In general terms, it is held that a sustainable community continues to thrive from generation to generation because it has:
>
> - A healthy and diverse ecological system that continually performs life sustaining functions and provides other resources for humans and other species
> - A social foundation that provides for the health of the community, respects cultural diversity, is equitable in its actions, and considers the needs of future generations
>
> A healthy and diverse economy that adapts to change, provides long-term security to residents, and recognizes social and ecological limits (Sustainable Community Roundtable 2003).

Module Aims

The aims of this module are two-fold. Participating learners will derive principles for sustainability based on different notions of sustainability, their disciplinary experiences, and shared problem statements that concern inter-generational issues. These principles will be compared with those of Ecohealth, and the first aim is for learners to determine the contributions that the principles might make to an ecosystem approach to human health.

The second aim relates to a specific application of the notion of sustainability. Where an Ecohealth approach is used to intervene to improve human health and well-being, the program itself will need to be sustainable. This module aims to provide opportunities for participants to identify factors affecting program sustainability, including the social-ecological context, to use indicators to assess the likelihood that a research program will ensure lasting impacts, and to suggest ways in the proposal development and

implementation phases to ensure more sustained Ecohealth programs/projects.

Why is this topic important?

Sustainability is important in its own right, in all circumstances. It is important to Ecohealth researchers and practitioners for two reasons.

Sustainability relates directly to global concerns of sustainable development, political, environmental, and economic instability, and deep human desires for fair play and equity. It is an ethical position that starts with the assumption that the current trajectory of human society cannot be sustained, and that we are undermining the foundations of life on this planet. The consequences for human health and well-being are unacceptable unless we intervene – by understanding the integrated nature of human societies, their economies, their cultures and the environment – at all levels, from local to global.

Our interventions must also themselves be sustainable, based on integration, and at all levels. If researchers and stakeholders are interested in helping facilitate long-term change for communities, they need to be sure their work will have long-term impacts. More importantly, because Ecohealth research tends to work directly with communities (participatory), and has implications not just for health, but for all aspects of life (systemic and trans-disciplinary), Ecohealth research generates high expectations in communities where it is carried out. Ecohealth researchers and practitioners become stakeholders in the communities, and, in so doing, have ethical responsibilities to those communities.

Building sustainability into a research framework is not easy and requires adaptive approaches, learning as we go. This module will help learners start thinking about how they can contribute to this process of adaptive learning.

Key Concepts

1. Principles of sustainability can be derived from listening to multiple perspectives that come from integrating, and keeping foregrounded, environmental, social, economic, and cultural concerns (without privileging any of them)
2. The concept of "health" is integral to the concept of sustainability, which includes principles such as healthy and diverse ecological systems, equity and cultural respect, and a healthy and diverse economy
3. Views of what sustainability means are sometimes classified by "weak" and "strong" views of sustainability. These views have different implications for what type of action is considered necessary.

Guiding Questions

1. The nature of sustainable solutions depends very much upon the construction of problem statements – what sort of problems are implied by the principles of sustainability?
2. Why do some people think that changes in attitude, and behavioural change, are central to the design of sustainable solutions?
3. How does sustainability relate to the other principles of Ecohealth – are they synonymous? How can we depict the relationship between sustainability and systems thinking, collaboration, transdisciplinarity, participation, and gender and equity?
4. What is program (or project4) sustainability? What is the conceptual framework for program sustainability?
5. How do we know whether a program is going to be long-enduring? What are the indicators of program sustainability? Should we consider these when designing and implementing research?
6. What barriers and enablers have you encountered regarding the sustainability of Ecohealth/public health/environmental health/community health interventions?

Basic Learning Objectives

After completing this module, learners will be able to:

- Formulate a set of sustainability principles from their understandings of the need to integrate different economic, environmental, and social perspectives
- Describe the similarities, and differentiate between the principles for Ecohealth and the principles for sustainability
- Demonstrate an ability to apply principles of sustainability where an Ecohealth approach is used, and where intervention options are specified
- Describe a framework for considering the sustainability of a program and how one might generate a list of indicators that can be used to assess the sustainability of a program.

Advanced Learning Objectives

On completion of this module, advanced learners will be able to:

- Describe why principles of sustainability need to be formulated from value-based, ethical, and cultural foundations
- Interpret real-world problems in terms of principles of sustainability
- Assess program sustainability for an Ecohealth research program/project (when designing, implementing and/or evaluating it)
- Present/introduce the concept of program sustainability to other researchers/participants.

Practical Notes

The instructors for this course should be familiar with the overall contents of all modules and should have relevant experiences in both i) the principles of sustainability and their application to complex societal problems; and ii) the sustainability of programs/projects where interventions are involved.

One trainer and an assistant trainer are ideal for this module. Trainer and assistant trainer should have good active teaching and facilitating skills.

This is conceived as a half day module, but can be extended to a full day for more advanced participants who are seeking some additional introduction on considering both i) principles of sustainability and ii) factors affecting program sustainability when designing, and implementing Ecohealth research program/project as well as assessing program/project's sustainability. It can also be divided into shorter modules for an on-going course.

It is assumed that learners will have completed *Module 2: Introduction to Ecohealth* and will be familiar with the six principles of Ecohealth.

If the class is composed of many people without background in proposal development, program implementation, monitoring, and evaluation, then the lecture should be combined with group discussions on the current status of program sustainability, the gaps, barriers and enablers, and recommendations for strengthening the sustainability of Ecohealth research programs/projects at different stages, e.g. proposal development, program implementation, evaluation etc.

It is desirable that the participants in the course have diverse disciplinary backgrounds and/or experiences including program/project development, implementation, monitoring and evaluation, public health, social sciences etc.

Approximately 20 to 30 participants are the ideal number for delivering this module; the class can be divided into 4-5 small groups for discussion. This half day module is composed of lecture materials, sharing experiences and group discussion, and group activities. The design of the instructing/training setting should facilitate the sharing and exchange of information and experiences among participants.

Background information

The role of education

Education (like this training module) is something of a paradox in the context of sustainability. It seeks to enable the future through training, yet more often than not does so by reiterating the successes of the present and the past, which maintain the status quo. However, if we start with the premise that our current behaviour is diminishing the choices of future generations then education must adjust, and challenge the status quo.

The UN declared 2005-2014 the decade of Education for Sustainable Development. A UN report states that education for sustainability is the best framework for future development (UNESCO 2010) and universities and other education providers have a role in the development of future leaders in sustainability. A paradigm shift from unsustainable growth to that of sustainable economies, communities, and ecosystems requires a fundamental shift in people's behaviour. However, it is very difficult to change behaviours. Top-down approaches that aim to dictate the behaviour of individuals are rarely effective (Lautensach 2011). Instead, changing beliefs and attitudes is the most effective way to instigate lasting changes and education at all levels has an influential role in shaping people's beliefs and attitudes.

For genuine changes to be made in the community and within industry, leaders are required with a deep understanding of sustainability as well as the necessary skills to enact lasting change and encourage the involvement of others. It has been argued that traditionally education has failed to provide learners with the necessary skills that form the basis for sustainable living (Orr 2010; Lautensach 2011). Graduates who are able to lead sustainable lives and promote sustainable living need to have a deep understanding of moral reasoning and strong analytical skills, as well as understand at least basic ecological and social justice concepts. Ideally, these are skills all graduates possess, however, it is evident that this is currently not the case, although changes are in progress (Lautensach 2011).

Educating for sustainability varies considerably from educating about sustainability, which implies only the dissemination of knowledge. Instead, it is now understood that sustainability is *"a process of adaptive management and systems thinking, requiring creativity, flexibility, and critical reflection"* (Tilbury et al 2004).

Furthermore, education for sustainability builds the individual's capacity to instigate and manage change, skills which are an integral part of sustainability. Higher education has a role in providing these skills to learners, who ideally come from a wide range of interests and life experiences.

What has this got to do with Ecohealth? Program/Project Sustainability?

In the field of Ecohealth, sustainability can be referred to as follows:

"An ecosystem approach to health is predicated on an understanding that protecting ecosystems and improving degraded environments are fundamental requirements for human health and well-being now and for future generations… As research for development, Ecohealth research aims to make ethical, positive, and lasting changes. Sustainability implies that these changes be environmentally sound and socially sustainable" (Charron 2012).

This module will focus on *what it means for an intervention to be sustainable*. This is defined as **"the capacity of a project to continue to deliver its intended benefits over a long period of time"** (Bamberger and Cheema 1990), and can also be considered as **the continuation of programs without outside help, i.e. when the financial, organizational, and technical aid of external donors/organizations ceases** (Swiss Development Corporation 1991). The sustainability of projects is grounded in both social process and the ecological contexts in which those processes occur. Modules 2 and 4, on introducing Ecohealth and systems thinking, suggested how well-intentioned interventions might have negative outcomes; in part this occurs because of feedback loops between the natural world and social activities. Thus, an irrigation project to improve food production and local economies (an agriculturally-related social goal), will fail if water flows, soil types, and habitats for disease vectors, as well as land-ownership and equity, are ignored. Projects and organizations built around the original objectives can fail as problems arise if they cannot adapt and change along with changing ecological and social realities. This is especially important as we enter a period of climatic, ecological, economic and social instability, after decades of relative stability.

Experiences show that the sustainability of a program is usually affected by three broad groups of factors: how the project was designed and implemented; how the project was organized; and external factors operating at the local, national, and international levels. Using an Ecohealth approach, sustainability is one of six core principles which guide Ecohealth research. Ecohealth research programs aim to bring ethical, environmentally sound, positive, and sustained changes.

In recent years, attention to the sustainability of intervention projects/programs has been increasing, but little consensus occurs on the conceptual and operational definitions of sustainability (Rizkallah & Bone 1998). Maintaining the long-term benefits of interventions depends on sustaining innovations beyond short project timelines. While identifying determinants of program sustainability is still a challenge for researchers, a large body of research has identified key features of adaptive governance that fosters sustainability in the face of change and uncertainty. Participatory

approaches and management are considered to be integral to ensuring the long-term acceptability and continuation of initiatives. In part because of poor lines of communication between research communities devoted to public health, agriculture, ecology, and equitable socio-economic development, it is difficult for public health practitioners to know how and when to influence programs' sustainability, for decision makers to know how and when to evaluate, and for researchers to study them.

Activities

Activity 1A

Language and synonyms

Learning Objective:

- Formulate a set of sustainability principles from understandings of the need to integrate different economic, environmental, and social perspectives.

Advanced Learning Objective:

- Explain the value-based, ethical, and cultural foundations of sustainability principles.

This is an important activity for two reasons – we ground our understandings of what it is "to sustain," while sharing our experiences of languages around this concept (since they are different). This manual is in English but the concepts in southeast Asian languages need to be explored too.

INSTRUCTIONS

Ask working groups of four to construct two word maps for the term "sustain"; one in English, and one for one other language (try to make sure group members have another common language – if not, just complete the map for English).

A word map starts when participants write the key word in the centre of a piece of paper or on a whiteboard. Participants try to find other words, like synonyms, that have a similar meaning, or share a part of a meaning. These new words are arranged around the central word in a meaningful way, clustered or spread out, near or distant, relative to the central word. The size of the font can be used to emphasise more commonly used words, or words the group thinks are more important in the map. The map is complete when no more new words can be added meaningfully.

Activity 1B

Clustering perspectives

Learning Objective:

- Formulate a set of sustainability principles from understandings of the need to integrate different economic, environmental, and social perspectives.

Advanced Learning Objective:

- Learners should be able to explain the value-based, ethical, and cultural foundations of sustainability principles.

INSTRUCTIONS

Start this activity by setting a context. The context can be as follows, or a similar example:

a) Our family life

b) The street/neighbourhood where the workshop is being held.

Then, starting with the phrase:

> "To meet the needs of the present generations without compromising the ability of future generations to meet their own needs."

Divide participants into working groups to develop answers to the following three questions:

What are our "needs" of the present?	
Which of these will be the needs of the future?	
How are these needs compromised/at risk of not being met?	

These answers to abstract questions can be exchanged in a plenary session, or groups can share their answers with each other.

Activity 1C

Integration

Learning Objective:

- Formulate a set of sustainability principles from understandings of the need to integrate different economic, environmental, and social perspectives.

Advanced Learning Objective:

- Learners should be able to explain the value-based, ethical and cultural foundations of sustainability principles.

INSTRUCTIONS

Ask working groups to choose one of the "needs" discussed in Activity 1B as a goal for society, and answer the following questions:

How will these needs be met? What actions are required in each domain: economic, environmental, social, cultural to achieve this goal?

Need	
Economic	
Environmental	
Social	
Cultural	

When the group has successfully completed the table for one row, ask them to consider the following: What would happen if actions were pursued along only one of these lines (like only environmental, or only social, or only economic)? In other words, in what way will these actions, done in isolation, undermine the achievement of the goal?

What is the solution?

Activity 1D

Deriving principles

Learning Objective:

- Formulate a set of sustainability principles from understandings of the need to integrate different economic, environmental, and social perspectives.

Advanced Learning Objective:

- Learners should be able to explain the value-based, ethical, and cultural foundations of sustainability principles.

INSTRUCTIONS

Based on the discussions so far, assign the groups to discuss:

What approaches to sustainability, or what values of sustainability, are universally applicable?

The groups can chose three approaches or principles that are meaningful to them, and write them on sticky notes.

Bring workshop participants back together in plenary. Use a collation process to cluster and word principles. Many of them will have similar intent, if not wording. You can facilitate a process where six or less principles can be derived.

Emphasize that the participants have produced a set of principles that are as valid as any that have been found in the literature. All sets of principles have strengths and weaknesses!

Alternatively, you can give learners task/homework to write an essay or an account of the values of sustainability using a specific socio-ecological context, expanding on to what extent they are universally applicable.

For this activity ensure that each learner has made a record of these (less than) six principles. Give them a copy of *Module 7: Handout 1 – Activity 1: The Principles of Sustainability* used by Gladwin et al (1995) as a supplement or an alternative perspective.

Activity 2A

Overlaps and distinctions

Learning Objective:

- Recognize the similarities, and differentiate between the principles for Ecohealth and the principles for sustainability.

INSTRUCTIONS

Assign learners to work in groups of four people. Make sure these groups are different from the groups formed in the previous activities.

Instructions for learners:

Using Table 7.1 (Module 7: Handout B), relate the two sets of principles (Ecohealth and sustainability), and in abstract terms, discuss which ones are encompassed by others.

Activity 2B

Assessing sustainability: "sustainable outcomes"

Learning Objective:

- Recognize the similarities, and differentiate between the principles for Ecohealth and the principles for sustainability.

INSTRUCTIONS

Introduce "assessing sustainability" to the whole group in the following way:

Many attempts have been to measure progress towards sustainability – something some say is impossible. Researchers say our "measurement" tools are not sophisticated enough for such complex processes; some also argue a lack of agreement concerning the scope of what sustainability actually is.

This said, useful schemes have been devised to assess progress towards sustainability. The Bellagio Principles (Table 7.2) seek to enable an assessment of a proposal, development, idea, policy, or law for its contribution to sustainability, providing:

1. A starting point, establishing a vision and goals that reflect sustainability in practical terms
2. The substance or "what" sustainability is
3. The process or "how" of sustainability
4. Institutional capacity for entrenching a capacity for continuous learning (Hardi and Zdan 1997).

Facilitate a discussion with the whole group around the four points listed above (1-4) and the 10 Principles outlined in Table 7.1 in *Module 7 - Handout 2 – Activity 2: Ecohealth and Sustainability Principle Sets*. (In other words, use the four guiding points as a way of making sense of the ten principles.)

Activity 3

Plenary discussion around the following questions

Learning Objective:

- Demonstrate an ability to apply the principles of sustainability where an Ecohealth approach is used, and where intervention options are specified.

Advanced Learning Objective:

- Interpret real-world problems in terms of principles of sustainability.

INSTRUCTIONS

Facilitate a discussion with the entire participant group around the following two questions:

1. How do we know whether an action, a policy, a decision, a law etc. will have outcomes that conform with principles of sustainability?

2. How do we know whether an intervention strategy will have sustainable outcomes?

Use the Case Study in Box 7.1 to exemplify the questions.

Endpoint: the critical endpoint of this activity will be to distinguish between two equally valid approaches to "sustainability": i) whether an outcome of a program is sustainable (following the principles of sustainability), and ii) whether a program intervention itself is sustainable and durable.

Box 7.1: Case Study

(sourced and adapted from Lehmann et al. 2003)

Indigenous Australian children have very high rates of pyoderma (pus-producing skin lesions) and otitis media (glue ear). In some communities as many as 70 per cent of children have been found to have skin sores at any one time. The major pathogen of pyoderma is group A streptococcus, which is also associated with chronic renal failure and rheumatic fever, both of which have high incidence rates in Indigenous communities in Australia.

Some people say that these conditions are exacerbated when children swim in surface waters in remote communities where the water quality is poor (turbid, nutrient rich, and warm).

Impaired hearing, a symptom of otitis media, can seriously affect performance at school, subsequent employment, and social circumstances in adulthood. Between 10 and 67 per cent of Aboriginal school age children have perforated tympanic membranes, and between

14 and 67 per cent have some degree of hearing loss; remote communities have the highest prevalence.

Drowning occurs at a higher rate in the Aboriginal population in Western Australia than in the non-Aboriginal population. With the introduction of the Royal Life Saving Societies' "Swim and Survive" program (conducted by Royal Life Saving Societies pool managers) all school age children in the communities currently attend swimming lessons.

People in remote Aboriginal communities have little or no opportunities for physical exercise, and changes in diet and lifestyle have made Aboriginal people more prone to the group of conditions known as "syndrome X"—obesity, Type 2 diabetes, cardiovascular, and renal disease.

As part of a public health intervention, the Western Australian government built 25 metre, part shaded, salt water swimming pools in three remote Aboriginal communities.

Activity 4A

Assessing the sustainability of an Ecohealth intervention – a mini lecture

Learning Objective:

- Describe a framework for considering the sustainability of a program and how one might generate a list of indicators that can be used to assess the sustainability of a program.

Advanced Learning Objective:

- Interpret real-world problems in terms of principles of sustainability.

INSTRUCTIONS

Following are notes provided as ideas for a lecture on how to assess the sustainability of an Ecohealth intervention. Develop a presentation around these concepts.

Definitions and Frameworks for Program Sustainability

The following are suggested "definitions" of program/project's sustainability:

- The concept of sustainability refers to the continuation of programs without outside help, i.e. when the financial, organizational, and technical aid of external donors/organizations ceases (Swiss Directorate for Development Cooperation and Humanitarian Aid 1991)

- A sustained program is a set of durable activities and resources aimed at program-related objectives (Scheirer 2005).
- A program/project's sustainability is the maintenance of activities and results after external financing and support has been withdrawn (US Agency for International Development 1988).

Maintaining the long-term benefits of interventions which improve human health depends on sustaining innovations beyond short program timelines, and this presents a major challenge to many organizations. If sustainability can only be measured in decades, and if needs and circumstances are constantly changing, how can one identify factors that might predict sustainability? Just as one might be able to characterize healthy or resilient people without knowing how long they will live, researchers have studied characteristics of social-ecological systems that seem to predict the ability to transform and adapt in the context of a changing world. Just as healthy people can adapt to changing environments, so healthy communities and projects within those communities require adaptive forms of governance.

Rizkallah and Bone (1998), in their study, listed three similar groups of 11 factors as potential influences on project sustainability, as shown in **Table 7.3**.

Table 7.3 Factors influencing program sustainability (Rizkallah & Bone 1998)

Project design and implementation factors

1. Project negotiation process
2. Project effectiveness
3. Project duration
4. Project financing
5. Project type
6. Training component included

Factors within organizational setting

7. Institutional strength
8. Integration with existing programs/services
9. Program champion/leadership

Factors in the broader community environment

10. Socioeconomic and political considerations
11. Community participation

Studies have shown that sustaining the long-term benefits of successful interventions involved change at individual, organizational, and institutional levels as organizations adopted innovations and effective approaches were diffused into other parts of the system (Paine et al. 2000; Swerissen and Crisp 2004). Factors shown to enhance uptake included: an appropriate and modifiable project design; building and maintenance of technical capacity among health personnel; strong community involvement; political support; adequate financing; and management and leadership capacity (Scheirer 2005).

In general, health intervention projects have been demonstrated to be successful and sustainable when they: (1) demonstrate effectiveness in reaching clearly defined goals and objectives; (2) integrate their activities fully into established administrative structures; (3) gain significant levels of funding from national sources (budgetary and cost-recovery) during the life of the project; (4) negotiate project design with a mutually respectful process of give and take; and (5) include a strong training component. SDC (1991) also proposed six principles of project sustainability, which are summarized in the following Figure 7.1.

The most important characteristics of a sustainable program are good leadership, trust, and vision. After this, what is required is legislation that enables local communities to undertake innovative ideas and funds. All of these, in turn, are dependent on the ability to draw on a variety of sources of information to monitor changes, and to learn from this information, and then to respond.

If we consider the above, then we can say that for Ecohealth research to create sustainable programs, we need to be able to foster these qualities in the communities where we work. In short, as implementers, we help empower communities with the capacity to continue (and preferably leave only when the community has that capacity). Community capacity is made up of interdependent factors such as knowledge, skills, leadership, trust and honesty, forms of participation, resources and infrastructure, sense of community, external networks, and so on. Some people say that community capacity takes a long time to build, but a short time to erode! The importance of community capacity is emphasized in Figure 7.1 (Rizkallah and Bone 1998).

A significant element of this community capacity is the importance of ensuring program aims are co-determined with stakeholders, that there is "buy in" and a benefit to stakeholders, and that they take ownership of the interventions and their outcomes. In other words, *creating sustainable programs inevitably involves participation, and the material covered in Module 3 (Participation) is very relevant here.*

Figure 7.1 Aspects of Program sustainability (Rizkallah & Bone 1998)

Indicators of Program Sustainability

Some researchers have suggested that, since indicators are measures of progress towards achieving goals, and goals in a project which takes an ecosystem approach are generated by stakeholders, the indicators themselves cannot be pre-determined, but only a participatory process for identifying them (Boyle and Kay 2008). Others have used a combination of indicators, some generated within the project and others set ahead of time by the researchers. Ecohealth projects in Kenya (Gitau et al 2008), Peru (Murray et al 2008), and Nepal (Neudoerffer et al 2008) have used such a mixed approach.

Some indicators are intended to measure the sustainability of the project itself (that is, how long does it last, and why); other indicators refer to the substance of the project (are the activities in the project sustainable?). These are not always the same. For instance, a project to create large open-pit mines may be sustained if a lot of money and resources are devoted to it; such a project would not be sustainable in the same way, however, as one that trains people to grow and distribute foods that improve nutrition. This alludes to the fact that sustainability is both about "acceptability" of an intervention as well as the enduring nature of that intervention. Furthermore, some indicators are more useful by governments and researchers and others by local people. Indicators always measure progress against a stated goal, and for an identified group. These indicators should be made clear before they are used.

Bamberger and Cheema (1990), after presenting case studies of project sustainability: Implications for policy and operations from Asian experience (World Bank, Washington, D.C), developed four groups of indicators for assessing program sustainability, combining quantitative and qualitative aspects of program performance (Table 7.4). This set of indicators is used to assess the sustainability of most kinds of social development programs, including programs in agriculture and rural development; urban development; population health and nutrition; and education (Bamberger & Cheema 1990). These indicators may require some slight modifications adjusted to the characteristics of particular sectors, while significant modifications were required for the assessment of industrial and commercial projects (Bamberger and Cheema 1990).

Table 7.4 Indicators of project sustainability by Bamberger and Cheema (1990)

A. Continued delivery of services and production of benefits

1. Comparison of actual and intended benefits and their stability over time
2. Efficiency of service delivery
3. Quality of services (benefits)
4. Satisfaction of beneficiaries
5. Distribution of benefits among different economic and social groups

B. Maintenance of physical infrastructure

1. Condition of physical infrastructure
2. Condition of plant and equipment
3. Adequacy of maintenance procedures
4. Efficiency of cost recovery and adequacy of operating budget
5. Beneficiary involvement in maintenance procedures

C. Long-term institutional capacity

1. Capacity and mandate of the principal operating agencies
2. Stability of staff and budget of operational agency
3. Adequacy of interagency coordination
4. Adequacy of coordination with community organizations and beneficiaries
5. Flexibility and capacity to adapt project design and operation to changing circumstances

D. Political support

1. Strength and stability of support from international agencies
2. Strength and stability of support from the national government
3. Strength and stability of support from provincial and local government agencies
4. Strength and stability of support at the community level
5. Extent to which the project has been able to build a broad base of support and to avoid becoming politically controversial

The frameworks proposed by Rizkallah and Bone (1998) and Bamberger and Cheema (1990) have been used to assess the sustainability of most kinds of social development programs, including programs in agriculture and rural development; urban development; population health and nutrition; and education. One possibility is that Ecohealth researchers can adapt a framework such as this and develop indicators that are grounded in the participatory processes of particular projects. By doing this, the process of identifying the indicators promotes support from the stakeholders and helps to achieve the ends that we wish to achieve.

Activity 4B

Working groups

Learning Objective:

- Derive a set of indicators for the sustainability of an Ecohealth program of action/activities.

INSTRUCTIONS

Form groups of five people, and have each choose an Ecohealth Intervention. Participants can use a case study example, e.g. from Charron's book – Chagas disease in Guatemala, sanitation in Yaoundé, Cameroon, or improved soil and nutrition in Malawi etc.

I) Each group should work together to come up with a list of indicators for what would make that intervention sustainable.

II) For each indicator, ask learners to describe a) what type of data are important; b) where the sources of data are likely to be found; c) who would find these indicators most useful.

Participants should be reminded to think about other modules. How do the indicators of sustainability relate to gender and equity? To participatory work? To a systems understanding of the community and the project?

III) Have the groups report back to plenary and list out the indicators they have suggested. Ask the group if any indicators are missing.

NOTE FOR TRAINERS

Major Ecohealth research projects in Kenya (Gitau et al) and Nepal (WT et al) found that indicators chosen by local community people were easy to measure and easy to use. E.g. Are there piles of garbage in the street? Is the water dirty? How far away is the school? How many projects does our community undertake every year? How many people willingly volunteer for community activities? Indicators chosen by researchers tended to be expensive, time-consuming, and technical. For instance, measurements of soil and water quality, distribution of disease, and so on; without a relevance to local people, what are the uses of each of these? In the plenary, encourage participants to consider whether local people will readily understand the relevance of the selected indicators.

In plenary, generate a broad ranging discussion with learners: ask what kinds of outcomes, and over what time frame, would be of interest to community members, in relation to the case studies discussed? If we don't know, how would we find out? Who would measure them? Why? Who would respond? How would Ecohealth researchers ensure that the appropriate outcomes are measured and responded to?

Ask what kinds of outcomes, and over what time frame, might researchers, governments, and funders be interested in? If we don't know, how would we find out? Who would measure them? Why? Who would respond? How would Ecohealth researchers ensure that the appropriate outcomes are measured and responded to?

For each indicator, have the group identify who in the community cares about it, whether they have an interest in measuring it, and whether they have the funds or capacities to measure it. For each indicator, suggest who has the responsibility to respond to what has been measured. If those who monitor and those who respond are not the same, what kinds of communication or organizational networks are needed?

What is the role of the Ecohealth research in this process?

IV) Conclusion, questions, and answers.

Ask participants if they have any questions or issues that have not discussed. Briefly conclude on the main concepts and learning objectives of the module to clarify if the objectives are met.

Sample Timetable: Module 7

ACTIVITIES	TIME ALLOCATED	ACTIVITIES
Introduction	30 mins	Mini lecture: Instructors/trainers introduce themselves, get to know participants' background, and introduce the topic
Part 1	20 mins	Group work 1A: Language and synonyms
	15 mins	Group work 1B: Clustering perspectives
	15 mins	Group work 1C: Integrating
	20 mins	Group work 1D: Deriving principles
Part 2	20 mins	Group Work 2A: Overlaps and distinctions
	15 mins	Group Work 2B: Assessing sustainability: "Sustainable outcomes"
Part 3	30 mins	Activity 3: Plenary discussion
Part 4	30 mins	Activity 4A: Assessing the sustainability of an Ecohealth Intervention – A mini lecture
	45 mins	Group Work Activity 4B: Derive a set of indicators for the sustainability of an Ecohealth program of action/activities
Conclusion, questions and answers	15 mins	Trainer asks if participants have any questions or issues that have not discussed. Briefly conclude on the main concepts and learning objectives of the module to clarify if the objectives are met.
Reflection task	Done in their own time	Reflection exercise based upon: the three most important elements participants would seek to include to ensure the sustainability of a hypothetical program where an intervention based on an Ecohealth approach is to be implemented.
Total time allocated	**4 hours and 15 minutes**	

Evaluation, Assessment or Reflection

Ensure that each individual has made a record of the principles of sustainability which they identified.

A) Give them a copy of *Module 7 – Handout 1 – Activity 1: The Principles of Sustainability* used by Gladwin et al. 1995 as a supplement, or alternative perspective. Ask them to answer the following questions:
   - What are the similarities and differences between the two sets principles?
   - Are any of these due to cultural perspectives?

B) As an end of module exercise, ask learners to work on their own, and to write in their reflections, the three most important elements they would seek to include to ensure the sustainability of a hypothetical program where an intervention based on an Ecohealth approach is to be implemented. Reflect on the following three questions: Why do they think these are the three most important? How do they relate to the two sets of principles used in this module (one derived by participants, one set from Gladwin et al). Why do they think sustainability is so notoriously difficult to define?

C) For Advanced learners/Ecohealth practitioners, ask: "If you are designing and implementing a project/program, what will you do to ensure its impacts will be long lasting?"

D) Ask participants to develop a list of indicators for assessing an Ecohealth research program that they are developing/ implementing/ assessing.

Terminology

Community Capacity
"…the set of assets or strengths that residents individually and collectively bring to the cause of improving local quality of life" (Easterling et al 1998). The authors of this definition highlight three aspects of it. The first is that the assets need to contribute to increased quality of life for the whole community, not just one individual or organization. Secondly, it refers to assets that already exist in the community, rather than those imported in by outside organizations or the government. Finally, although many of these assets reside with individual members of community, the definition refers to the synergistic effects of these combined individual assets. Five dimensions are identified: skills and knowledge; leadership; a sense of efficacy; social capital; and a culture of learning (Easterling et al 1998).

Indicators
From indicate – to be a sign of, to imply, to show; indicator may be something that points out that a remedy or treatment is necessary. Indicators should be measurable in some way, and reliably establish a connection between a cause and an effect. Perhaps the most obvious criticism of the concept of the indicator is that it tries to convey something complex (like sustainability) in a simple measurement. If we reduce something whole to a component of it, how can we be sure that component is meaningfully representing the whole? The art of indicator selection is a trade-off between simplification and meaningfulness in the context of the whole. So the indicator spectrum goes from narrow, component-like indicators (like pH of water, amount of cars on the road between 5 and 6 pm), others are composites – representing simply many interrelationships (like indices of diversity, the gross domestic product). Comprehensive indicator selection may need to cover this spectrum. According to Bell and Morse (1999), some sustainability indicators are State Indicators – describing the state or quality of a variable (like the nutrient concentration in paddock soil), while others are Control Indicators – describing the magnitude or extent of a process (like the rate of fertilizer application to paddocks). Again, comprehensive indicator selection may need to include both.

Sustainability
"A process of adaptive management and systems thinking, requiring creativity, flexibility and critical reflection" (Tilbury et al 2004). "An ecosystem approach to health is predicated on an understanding that protecting ecosystems and improving degraded environments are fundamental requirements for human health and well-being now and for future generations…. As research for development, Ecohealth research aims to make ethical, positive, and lasting changes. Sustainability implies that these changes be environmentally sound and socially sustainable" (Charron 2012).

Sustainable development
A mode of human development that seeks sustainability. Task: search online i.e. Wikipedia for the definition – can you determine the differences between sustainability and sustainable development?

Systems thinking
See *Module 4: Using Systems Concepts in Ecohealth*

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MODULE 7 – HANDOUT 1

The Principles of Sustainability used by Gladwin et al. 1995

A systemic approach developed by Gladwin et al (1995) for components of sustainable development has produced the following five principles: inclusivity, connectivity, equity, security, and prudence.

Inclusivity

Sustainability demands a shift to more inclusive behaviours in the forming of perspectives and opinions, and integrative in devising approaches to problem specifications and problem solving. Correspondingly, inclusive communities need to consider the different sectors our communities are comprised of and the different groups within these communities. Inclusivity should also be considered in terms of space and time, i.e. local and global issues, as well as concerns for the present and the future (futurity – inter-generational equity). Finally, inclusivity also stands for respect and tolerance. In short, inclusivity seeks to recognize boundaries and barriers, and bridge or breach them as an appropriate response to the quest for diverse, pluralistic, and sustainable communities.

Connectedness

Connectedness is an ecological concept, and one that demands that we appreciate the multi-faceted consequences of our actions. Connectedness applies just as much to the domains of economy, environment, society, and culture. Wealthy communities will suffer long-term consequences from the erosion of natural resources and ecological harm. Poverty has important political, cultural, and ecological dimensions that must be addressed. Just as traditional approaches to social, economic, and environmental problems lack inclusivity, they also rely on, and promote, a disconnectedness between these domains. Connectedness is also about our life support systems. Water air and earth connect all of life. A separation of humanity from its settings, giving rise to a perception that humans are more important than, and independent of, bio-physical systems, has become culturally entrenched.

Equity

A sustainable community is an equitable, fair, and just community, one that is accessible and open to all groups within it and one that redistributes social goods and resources. Equity involves provision for basic needs, equal opportunity, and rules of interaction and distribution which are perceived as fair, for current and for future generations. Sustainability also demands special protection for vulnerable groups such as infants and youth, women, Indigenous people, disabled and elderly, and the very poor. The notion of sustainability extends equity to include inter-generational equity. Futurity, per se, is not a dimension of health as consideration is usually given to

communities and individuals presently alive or soon to be born. Health, future development, and ecological integrity are inextricably linked.

Prudence

Humanity has to live with incomplete knowledge, yet ought to act prudently in the face of ambiguity so as to avoid adverse, irreversible outcomes. Prudence encompasses a sense of care and protection of the world's connected systems as a means of preventing irreversible damage to social, ecological, and economic support systems. In practical terms, this means that the recognition of resilience and capacity of systems needs to be at the forefront of political, technological, and scientific decisions. Resilience and capacity, however need to be considered against the principles of inclusivity and equity; in fact, resilience and capacity may indeed work to maintain exclusive and inequitable systems.

Security

Security is a warrant for quality of life, assuring that current and future generations can lead safe and healthy lives and are being protected from chronic threats and harmful disruptions. The notion of security is rooted in the "harm principle," an ancient ethical principle within moral philosophy which implies a moral right of an individual not to be harmed and in turn assumes a moral duty not to violate an individual's inalienable right to be unharmed. Security is seen as the pre-condition for peace, health, equity, democratization, and social integration, and thus integral for the achievement of sustainability. The safeguarding of ecological and social integrity is of utmost importance; irrespective of their culture, race, gender, income, etc. Security, however, is not to be achieved at the cost of inclusivity; the two principles must be thought of together, as well as what one assumes of the other.

MODULE 7 – HANDOUT 2

Ecohealth and Sustainability Principle Sets

Table 7.1 Ecohealth and sustainability principle sets

5 ECOHEALTH PRINCIPLE SET
• Systems thinking • Gender and social equity • Participation • Transdisciplinarity research • Knowledge to action

One more Ecohealth principle: Sustainability (insert your derived principles, or use handout principles)

Which set seeks to be universally applicable to all human endeavours?	
Which principles are value-based, or derived from an ethical stance?	
Which principles are methodological?	

MODULE 7 – HANDOUT 3

The Bellagio Principles for Sustainability Assessment

Table 7.2 The Bellagio Principles for Sustainability Assessment (adapted from Hardi and Zdan 1997)

1. GUIDING VISION AND GOALS

- Assessment of progress towards sustainable development should be guided by a clear vision of sustainable development and goals that define that vision

2. HOLISTIC PERSPECTIVE

- Review of the whole system as well as its parts
- Well-being of social, ecological, and economic sub-systems, their state as well as the direction and rate of change of their component parts, and the interaction between parts
- Positive and negative consequences of human activity, reflecting the costs and benefits for human and ecological systems, in monetary and non-monetary terms

3. ESSENTIAL ELEMENTS

- Equity and disparity within the current population and between present and future generations, including resource use, poverty, human rights, and access to services
- Ecological conditions on which life depends
- Economic development and non-market activities that contribute to human/social well-being

4. ADEQUATE SCOPE

- Long time horizon to capture both human and ecosystem time scales, thus responding to needs of future generations as well as those of current to short term decision-making
- Space of study large enough to include local and long distance impacts on people and ecosystems
- Build on historic and current conditions to anticipate future conditions – where we want to go, where we could go: Principles in Practice

5. PRACTICAL FOCUS

- Explicit set of categories or organizing framework that links vision and goals to indicators and assessment criteria
- Limited number of key issues for analysis
- Limited number of indicators or combinations to provide a clearer signal of progress
- Standardized measurement to permit comparison
- Comparing of indicator values to targets, reference values, ranges, thresholds, or direction of trends, as appropriate

6. OPENNESS

- Make methods and data accessible to all
- Make explicit all judgments, assumptions, and uncertainties in data and interpretations

7. EFFECTIVE COMMUNICATION

- Address the needs of the audience and set of users
- Draw from indicators and other tools that are stimulating and serve to engage decision-makers
- Simplicity in structure and use of clear and plain language

8. BROAD PARTICIPATION

- Broad representation of key grass-roots, professional, technical, and social groups, including youth, women, and indigenous people – to ensure recognition of diverse and changing values
- Participation of decision-makers to secure firm link to adopted policies and resulting action

9. ONGOING ASSESSMENT

- Develop capacity for repeated measurement to determine trends
- Iterative, adaptive, and responsive to change and uncertainty due to complexity and frequent change
- Adjust goals, frameworks, and indicators as new insights are gained
- Promote development of collective learning and feedback to decision-making

10. INSTITUTIONAL CAPACITY

- Clearly assign responsibility and provide ongoing support in the decision-making process
- Provide institutional capacity for data collection, maintenance, and documentation
- Support development of local assessment capacity

FIELD BUILDING LEADERSHIP INITIATIVE

MODULE 8

Knowledge to Action

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FÈVRE, S, HORWITZ, P, WALTNER-TOEWS, D (2013). (EDITORS). ECOHEALTH TRAINER MANUAL.
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MODULE 8 – KNOWLEDGE TO ACTION

"Knowledge is the enemy of disease. That is a powerful metaphor. Applying what we know already will have a bigger impact on health and disease than any drug or technology likely to be introduced in the next decade… There are huge gaps in knowledge application, and a link is needed between knowledge and effective decision-making…"

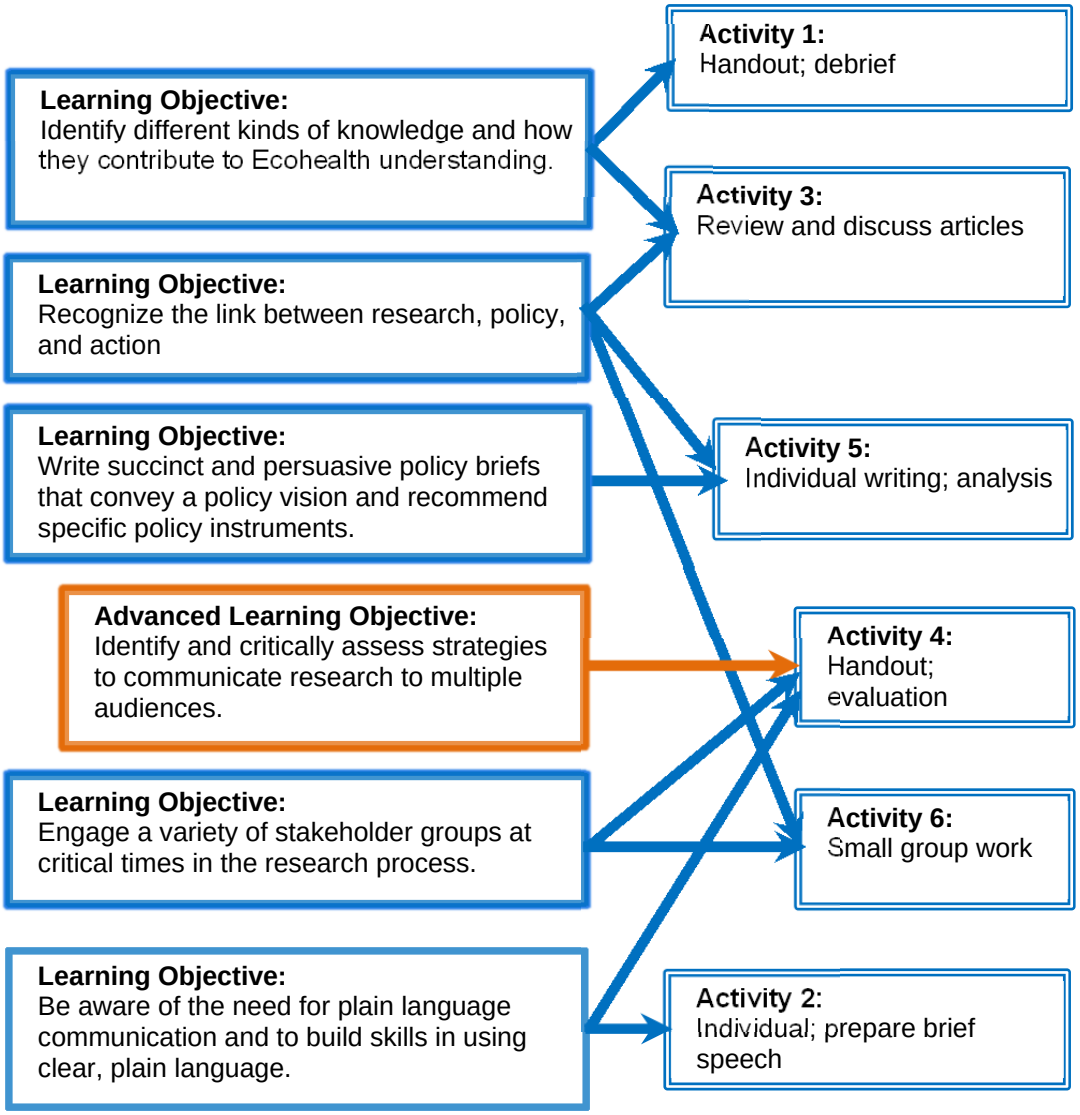
Tikki Pang, Muir Gray, Tim Evans
The Lancet
January 28, 2006

Overview

Knowledge derived from research and experience may be of little value unless it is put into practice. As a way of thinking about this challenge and how to start closing the "know-do" gap, the process of knowledge translation has emerged. It is defined as "the synthesis, exchange, and application of knowledge by relevant stakeholders to accelerate the benefits of global and local innovation in strengthening health systems and improving people's health."

Knowledge to action is considered one of the six principles of Ecohealth, as defined by Dr. Dominique Charron of Canada's International Development Research Centre. It is an aspect of applied research that is often absent in traditional research and is important in ensuring that Ecohealth research is embedded in relevant social and economic issues. In an ideal world, those who will take actions to improve a particular situation – the decision-makers and policy-makers – will be stakeholders in every Ecohealth study. Realistically, this occurs much less often than we would like, however, and a good understanding of i) how to best communicate knowledge in such a way that it leads to action, and ii) when decision-makers and policy-makers should be involved in the research process, are important. This module aims to provide a brief overview about what knowledge to action means, why it is an important part of Ecohealth research and how it can be achieved through linkages with decision/policy making.

Conceptual Map: Module 8



Module Aims

This module will provide a brief overview about what knowledge to action means, why it is an important part of Ecohealth research and how it can be achieved through strategic engagement with a variety of audiences. This module will guide the trainers to:

- Identify different terms and concepts used in moving knowledge into action
- Provide background information about processes and strategies for creating and applying knowledge in Ecohealth
- Provide activities that encourage participants to interact in diverse ways during the training, thereby exposing them to a range of communication techniques useful for knowledge transfer.

Why is this topic important?

One of the features that distinguishes Ecohealth from discipline-based, curiosity-driven, or theoretical research, is its participatory engagement with stakeholders; that is, the people affected by the issues which an Ecohealth research project investigates are actively involved in the research process; this includes communities of different types, and policy-makers.

Knowledge to action is considered one of the six principles of Ecohealth (Charron 2012). It is an aspect of applied research that is often absent in traditional research and is important in ensuring that Ecohealth research is embedded in relevant social and economic issues. As explained by Charron, "the notion that knowledge from research is used to improve health and well-being through an improved environment is fundamental to an ecosystem approach to health."

Knowledge to action is important topic of Ecohealth research because:

- Ecohealth research generates knowledge to solve problems and to implement positive changes
- Single disciplines cannot solve the kinds of complex public health, social, and environmental problems being faced in the twenty first century
- Much research only ends with recommendations that are not implemented or even necessarily shared with those who can help bring about change.

In a rapidly changing world, policies informed by scholarly evidence are becoming increasingly important as a means for decision-makers to develop more effective and feasible policies and programs, known as "evidence-based policy." Nevertheless, Ecohealth, with its complex practice and theory, can be

difficult to articulate clearly in policy terms. The challenge is how Ecohealth investigators and practitioners work with policy-makers and to help equip them with the evidence they need, as well as how to tailor research findings to the needs of the policy-makers. Many research reports related to Ecohealth are currently available to policy-makers, but are in complex technical languages or forms that are difficult for them to digest and use effectively, given their limited time and attention spans.

Key Concepts

What does knowledge to action really mean? What are the basic concepts around this topic?

A number of concepts need to be clarified when studying this module including Knowledge to action (KTA), Knowledge Translation, Knowledge Transfer (KT) and Knowledge Exchange (KE). In literature, the terms of KTA, KT and KE are used synonymously. In practice, the specific words used are not really important – what is important is how these terms are operationalized. However, according to Charron (2012) knowledge to action is preferred to the commonly used knowledge translation. It reflects the point that KTA is an interactive process that balances knowledge creation and problem solving actions implemented in a collaborative context with data-driven collaborative analysis and research to understand underlying causes enabling future prediction about individual, community, and organizational change. **Table 8.1**, below, lists the terms and their definition.

Guiding Questions

1. What kind of knowledge is relevant to Ecohealth? How can such knowledge be harnessed to influence real world action?
2. What is the role of the research community in implementing knowledge to action strategies?
3. Why should policy-makers be engaged?
4. How can knowledge be best structured for use by communities?

Basic Learning Objectives

After completing this module, learners will be able to:

1. Be aware of the need for plain language communication and build skills in using clear, plain language

2. Identify different kinds of knowledge and how they contribute to Ecohealth understanding
3. Recognize the link between research, policy and action
4. Write succinct and persuasive policy briefs that convey a policy vision and recommend specific policy instruments
5. Engage a variety of stakeholder groups at critical times in the research process.

Advanced Learning Objectives

After completing this module, advanced learners will be able to:

1. Identify and critically assess strategies to communicate research to multiple audiences.

Background information

Table 8.1 Definition of terms similar to Knowledge to action

TERMS	DEFINITION
Knowledge translation	"The exchange, synthesis, and ethically-sound application of knowledge – within a complex system of interactions among researchers and users – to accelerate the capture of the benefits of research for [people] through improved health, more effective services and products, and a strengthened health care system." Canadian Institutes of Health Research (http://www.ncddr.org/kt/products/focus/focus18/ accessed June 10, 2012).
Knowledge transfer	"A systematic approach to capture, collect, and share tacit knowledge in order to transfer it to become explicit knowledge. By doing so, this process allows for individuals and/or organizations to access and utilize essential information, which previously was known intrinsically to only one or a small group of people." Government of Alberta (http://www.pao.gov.ab.ca/learning/knowledge/transfer-guide/index.html accessed May 31, 2012). "Knowledge transfer is about transferring good ideas, research results and skills between universities, other research organizations, business, and the wider community to enable innovative new

	products and services to be developed." UK Department for Business Innovation & Skills (http://www.bis.gov.uk/policies/science/knowledge-transfer accessed June 10, 2012).
Knowledge exchange	"Knowledge exchange is collaborative problem-solving between researchers and exchange decision makers that happens through linkage and exchange. Effective knowledge exchange involves interaction between decision makers and researchers and results in mutual learning through the process of planning, producing, disseminating, and applying existing or new research in decision-making." Canadian Health Services Research Foundation (http://www.chsrf.ca/keys/glos-sary_e.php accessed June 10 2012).
Knowledge into products	"A systematic process of turning scientific evidence and audience research into programs, policies, interventions, guidelines, toolkits, strategies, and messages that will assist and support audiences or users in putting science into practice" (Wilson et al. 2011).
Knowledge to action	"The notion that knowledge from research is used to improve health and well-being through an improved environment is fundamental to an Ecosystem approach to health" (Charron, 2012). "About an exchange of knowledge between relevant stakeholders that results in action" (Graham et al. 2006).

Activities

Activity 1

Knowledge, Action and Public Policy Primer

Learning Objective:

- Identify different kinds of knowledge and how they contribute to Ecohealth understanding.

INSTRUCTIONS

This exercise is about how to engage a variety of stakeholder groups at critical times in the research process.

Instructors should provide the *Module 8 – Handout 1 – Activity 1: Knowledge, Action and Public Policy Primer* to participants at least one week prior to the training.

This handout is essential to successfully achieve all learning outcomes for this module. The handout contains valuable background information that supports and enhances the activities.

A brief discussion at the start of the module about key points in the handout may be a good way to introduce the topic.

Alternatively, instructors will need to encourage learners to become familiar with the content of the handout during the course. Learners should supplement the text with their own examples and experiences.

Activity 2

What does your work mean?

Learning Objective:

- Be aware of the need for plain language communication and to build skills in using clear, plain language.

INSTRUCTIONS

In this activity, participants will become sensitive to the inaccessibility (and seeming irrelevance?) of academic language to the general public and learn to express the meaning of their work in clear, plain language.

This is a variation on the 30-second elevator pitch that is popular in business and marketing schools. As an introduction to "media skills" and plain language communication, the (pretend) audience should be either the local media or a community group (women's group, co-operative, etc).

INSTRUCTIONS TO STUDENTS

Craft a brief speech that will convey to the selected audience what your research means (or what your work means) to them. How do they benefit from what you do – directly or indirectly.

A good talk will use plain language techniques (see Activity 3) and may have a clear "hook" at the beginning to get the audience's attention. Alternatively, you could try to create a bond with your audience – for example, by discussing something that you have in common with them. Ask the audience questions, if you have time.

Overall, however, make sure to focus your talk on your current research, project, or work and what it means to the daily life of the audience (or the public at large). **Do not discuss what you actually do.** Finding this connection will make it much easier to communicate the real value of your work.

Activity 3

Newspaper review

Learning Objective:

- Identify different kinds of knowledge and how they contribute to Ecohealth understanding
- Recognize the link between research, policy, and action.

INSTRUCTIONS

Have learners bring in a recent newspaper or news magazine. Ask them to go through a variety of articles that relate broadly to human, animal, and/or environmental health in order to:

a) Identify policy instruments (information campaigns, taxes, by-laws, standards, subsidies, taxes, new commissions, etc.)

b) Infer policy directions from the description or critique of the instruments (what is the government really trying to achieve here?)

c) Discuss how what other instruments were available to decision-makers and/or how the current one could be improved using Ecohealth approaches.

This activity can also be done with articles from other sectors (economics, arts, etc.) as the policy instruments are broadly the same, the difference is the use to which they are put.

Activity 4

Plain language writing

Learning Objective:

- Become aware of the need for plain language communication and build skills in using clear, plain language
- Engage a variety of stakeholder groups at critical times in the research process.

Advanced Learning Objective:

- Identify and critically assess strategies to communicate research to multiple audiences.

INSTRUCTIONS

See *Module 8 – Handout 2 – Activity 2: Background on Plain Language Writing* at the end of this Module.

Give each participant either a paragraph from a journal article, an article abstract, or the whole article (even an Ecohealth article!), and ask them to rework it so that the language is accessible to the general public. The activity works best if everyone is given the same text, which is then subjected to peer review and discussion. This can be done in English or in a language in which they are most comfortable.

> Classes with more time can evaluate the reading level of the revised paragraphs using one of several plain language "tests." There are a number of different tests (Flesh-Kincaid Readability Tests, Fry Readability Formula, Simple Measure of Gobbledegook, etc.), all of which focus on sentence length and the number of syllables in a text. A number of free on-line calculators are available, such as:
>
> http://www.mancko.com/readability-tests/en/
>
> This website also includes Spanish and French readability formula.
>
> http://www.readability.info/
>
> This site allows you to upload a Word document or website page for testing.
>
> Microsoft Word also includes the Flesh-Kincaide Reading Ease and Grade Levels tests directly in the software program – it is generally found in the "options" section of the spelling and grammar check (depending on the version of the software you have).

Readability tests (in English) judge the average reading comprehension level of the text. Plain language writing should aim for between a Grade 4 and 6 reading comprehension level or lower, depending on average literacy levels in the country.

In places with very low literacy, a shift to oral communication (plain language for the radio), or pictorial and other visualization techniques may be preferred over text. In general, however, all plain language techniques should include more than "just language" – they should also focus on design and graphics.

Activity 5

Individual or small group exercise: writing a policy brief/briefing note

Learning Objective:

- Recognize the link between research, policy and action
- Write succinct and persuasive policy briefs that convey a policy vision and recommend specific policy instruments.

Advanced Learning Objective:

- Identify and critically assess strategies to communicate research to multiple audiences.

INSTRUCTIONS

Have participants draft an outline of a policy brief on a topic of their choice, focusing on articulating a clear argument and noting the evidence they would use for each section, and where more information would be needed to complete the draft. The policy brief should clearly convey the policy (or policies) that are being put forward, as well as the policy instruments that are recommended to implement the policy.

The more specific the policy brief (i.e. exactly which government agencies should be involved, at what level (local, provincial, national), how the recommendations fit with current policies, etc.), the better.

A longer course may include writing a complete policy brief as an assignment in the course.

Activity 6

Media skills training: "27 words, 9 seconds, 3 messages"

Learning Objective:

- Recognize the link between research, policy and action
- Engage a variety of stakeholder groups at critical times in the research process.

INSTRUCTIONS

In this activity, students will recognize the interests of media in covering Ecohealth issues, and become introduced to media skills training that can help positively leverage the communication opportunities provided by the media.

After providing some background material about the topic, divide learners into groups of three. Have each group develop a message on a different topic using the 27/9/3 template (see *Module 8 - Handout 4 – Activity 6: Media Skills* in this module) of "27 words, 9 seconds, 3 messages" and present the message back to the larger group for comment.

A longer session could be set up as a videotaped "town hall," where people work individually and each participant presents his/her statement to the group, and then takes questions from the audience. This allows participants to work on their oral and non-verbal communication as well as their re-direction and question answering skills. Audience members can be asked to play different roles (i.e. difficult parents, local media, skeptic, doomsday prophet, etc). It is important to challenge the presenters to take all questions professionally and answer them seriously (i.e. no "mocking" of bizarre questions, etc.) – as you never know what will end up "on-the-air."

Sample Timetable: Module 8

The activities in this module can be taught as a one day intensive course, as two half-day sessions, or as separate activities in different classes.

If possible, *Module 8 – Handout 1 – Activity 1: Knowledge, Action, and Public Policy Primer* should be given to learners before the training session.

Activities 1, 2, 3, and 4 are somewhat "shorter," while Activities 5 and 6 require additional time. Instructors may want to consider selecting one of each, if teaching for only a half-day session, as per the example in the sample timetable below.

Activity 2 can serve as an icebreaker. Taking the time to explain the purpose of the Activity 2 (to focus on the purpose of one's work, not what one does)

is very important to ensure that the exercise is both challenging and meaningful. Participants should be given at least 5-10 minutes of quiet time to prepare their individual talks.

Activities 1,2 3 and 5: Elevator Speech, Newspaper Review and Policy Briefs

TIME	ACTIVITIES
8:30 – 8:45	Activity 1: Introductory discussion about *Module 8 – Handout 1 – Activity 1: Knowledge, Action, and Public Policy Primer*
8:45 – 9:30	Activity 2: What does your work mean? Preparing an elevator speech
9:30 – 10:15	Introduce Activity 3 : divide class into small groups to review articles and identify policy instruments Go from group to group facilitating the discussion of policy instruments, and linking them to policy positions.
10:15 – 10:30	Break
10:30 – 11:00	Convene larger group and discuss results for each article. Ask for alternative instruments that could have been used, or that are used elsewhere. Have the group think about how similar policy instruments can lead to different policy positions.
11:00 – 12:00	Introduce *Activity 5: Writing a Policy Brief.* Divide into small groups, or have people work individually. Have individuals or groups draft a detailed outline of a policy brief – check on groups to make sure the overall argument is succinct and coherent, and that specific policy instruments are being recommended. Allow groups to indicate where more research is needed (i.e. to identify specific government agencies, existing programs, etc.) and focus on the overarching policy and policy instruments suggested – not the details of the problem.
12:00 – 12:30	Discuss policy brief exercise in general, linking it to the need for clear, specific and well-reasoned arguments for policy-makers.

Activities 4 & 6: Plain Language Communication and Media Skills

TIME	ACTIVITIES
8:30 – 9:15	Introduce Activity 4 and provide background regarding the importance of plain language writing. Provide individuals with a paragraph of text to "translate" into plain language.
9:15 – 9:45	As individuals work on the "translation" go from person to person reminding them of some of the techniques (active voice, short sentences, etc.). At the end of the time, ask them to run their text through an online (or Word-based) readability test.
9:45 – 10:15	Convene larger group and discuss the process and results. Ask for volunteers to read their plain language text. Ask for examples of the different techniques and discuss any challenges. Have the group discuss the social importance of plain language.
10:15 – 10:30	Break
10:30 – 11:50	Introduce Activity 6, and explain assignment to class. Divide into small groups, or have people work individually.
10:50 – 11:30	Group should work on their 5-step communication plan – with limited time, you may want to skip the third step (fleshing out the argument).
11:30 – 12:00	Convene larger group and discuss the process and results. Ask for volunteers to read their communication statements and see if there is a clear 27/9/3 "sound bite." Have the group discuss the different approaches and the need to have some control over the message sent to the media.

Evaluation

- Evaluating pre-existing KTA understanding through brainstorming, discussion, group work, and presentation
- Trainers can use pre/post testing to evaluate learners' change in understanding the topic
- Several activities can be turned into assignments (i.e. plain language activity, policy brief, newspaper article review, media statement, etc.)
- Trainers can evaluate their teaching success by keeping a notebook that records the activities and teaching approaches that they felt worked best each time they offered the course. The characteristics of their target learners should also be recorded for each class. Trainers can periodically find approaches and activities that consistently allow learners to meet their goals.

Terminology

KT, KE, KTA are presented in Table 1 in this module

(Public) Policy maker
Someone involved in the formulation of policies and/or who sets the plan pursued by government.

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

Communication channel
The medium through which a message is transmitted to its intended audience, such as print media, or television.

Communication vehicle
The specific way a message will be delivered (i.e. brochure, public service announcement, etc).

Plain language
Succinct clear writing designed to ensure the reader understands as quickly and completely as possible.

Policy entrepreneur
Stakeholders who, from outside the formal positions of government, introduce, translate, and help implement new ideas into public practice.

Policy statement
Defines the problem, sets the goals that are to be achieved, and indicates the instruments or means whereby the problem is to be addressed and the goals achieved.

Policy instrument
Means chosen on how to address the problem and achieve the policy result.

Key References

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MODULE 8 – HANDOUT 1 – ACTIVITY 1

Knowledge, Action and Public Policy Primer

Cite as: Morrison, Karen, Handout for Students: Knowledge, Action and Public Policy Primer. In Fevre, S., Horwitz, P., Waltner-Toews, D. (eds) (2013). Ecohealth Trainer Manual. Field Building Leadership Initiative. VWB/VSF: Canada

What is the nature of knowledge?

Noted systems thinker Russel Ackoff classified the content of the human mind into the following five categories (Ackoff 1988):

1. **Data**: symbols
2. **Information**: data that is processed to give meaning or be useful – answer "who, what, where, and when" questions
3. **Knowledge**: application of data and information – answer "how" questions
4. **Understanding**: appreciation of "why" questions
5. **Wisdom**: evaluated understanding.

Ackoff felt that the first four categories are backward looking (i.e. trying to understand previous experience), and the last – wisdom – is forward looking. Wisdom, however, is also very individualized, hence our respect for "elders" and those with much experience to share. Understanding brings in the normative nature of knowledge – what is included in our understanding depends on the scale of the initiative and the perspective (and wisdom!) of the observer (See *Module 4: Using Systems Concepts in Ecohealth*).

Knowledge, the focus of this section, is defined as: the facts, feelings or experiences known by a person or group or people, the state of knowing, and/or the awareness, consciousness or familiarity gained by experience or learning (HarperCollins 2009). **Knowledge, understanding, and wisdom** assist in the presentation, organization, communication, and reflection of experiences to find patterns that can be extrapolated to new situations.

There are many different kinds of knowledge; these are not limited to scientific facts or findings. Ecohealth research acknowledges a wide variety of forms of knowledge, including lived experience, indigenous knowledge and the non-science based insights that are gained though engagement with the arts and humanities.

In a presentation to the 2012 Ecohealth conference in Kunming, Dr. Valerie Brown highlighted seven different kinds of knowledge that frame her work on transformation science: biophysical (which gives facts); social (tells about customs); ethical (provides rules); aesthetic (links to suitability); sympathetic (unites people – we/us/us all); personal (brings in identity); and reflective (helps discover patterns). In her view, transformation science relies on all seven types of knowledge to arrive at a coherent, holistic body of knowledge. It combines subjective and objective knowledge and is based on the idea of collective learning (Brown 2012).

While much of knowledge translation literature focuses on technical syntheses of "objective" research findings, such as systematic reviews and meta-analysis, Ecohealth researchers

acknowledge a similar need to go beyond this focus on one kind of information (i.e. scientific studies) to bring together a wide range of "ways of knowing" to improve the quality of action "on-the-ground" – locally, regionally, and internationally.

Following on the lines of the creation of "best evidence pathways" in the health sector, Ecohealth approaches can lead to new pathways or suggestions for interventions that incorporate the knowledge of a wide range of stakeholders – pathways to sustainability, or transformation (i.e. Leach et al 2007; Thompson et al 2011). The systems approach helps identify "points of intervention" in systems. There is a strong correlation between these points and the recommended actions that arise from Ecohealth research and/or practice (see *Module 4: Using Systems Concepts in Ecohealth*). By virtue of being grounded in many different kinds of knowledge, Ecohealth "pathways" consider from the outset socio-cultural, economic, and environmental parameters. Thus, they are less likely to be completely rejected by the key stakeholders (who helped frame the findings) or to become unwanted responsibilities.

Knowledge is generated from a wide range of information resources, and the emphasis of the Ecohealth approach on gender, equity, stakeholder participation, and community-engagement are all in the service of improving our knowledge of the social-ecological context of the issue at hand (see *Module 2: Participation* and *Module 6: Equity and Gender*).

An important element of knowledge translation is the ability to link knowledge generated to existing change-processes, or to leverage it to help create new change processes. Doing so involves understanding early on who the potential knowledge users are, and what their interests are, or could be, in the Ecohealth project.

How can knowledge be harnessed to influence real-world action?

In order to implement a strategic approach of "knowledge to action" (Figure 8.1) it is important to think about who the key stakeholders are, and their communication preferences. Outcome mapping (Earl et al 2001) is one formalized approach to thinking about who the key stakeholders are, and how the information generated from a project can be most strategically used to influence change in communities.

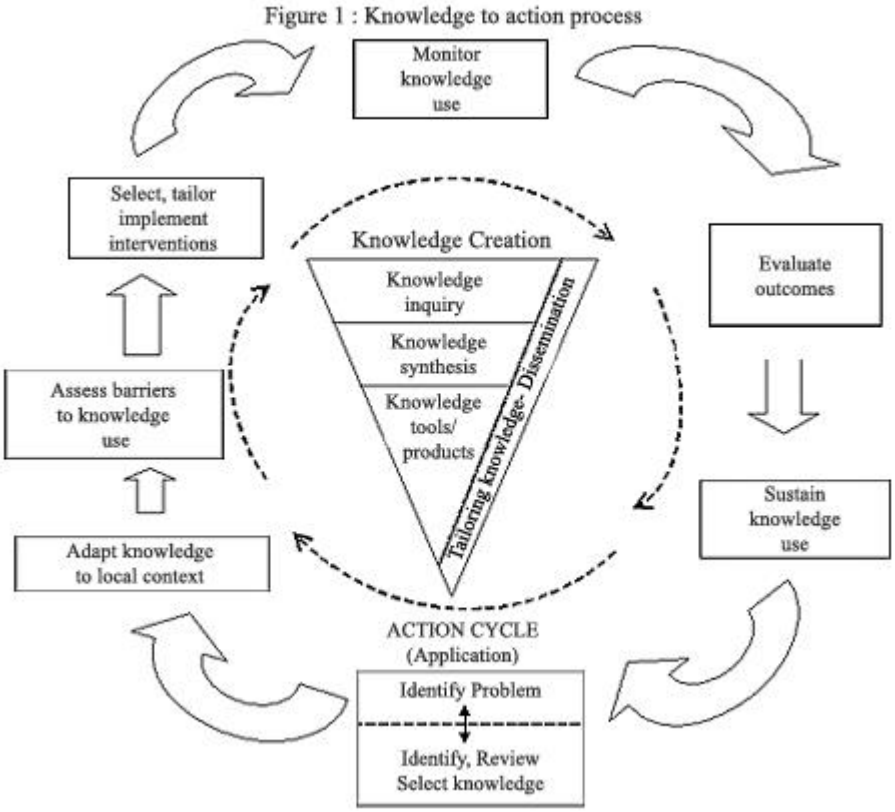

Figure 8.1 Knowledge to action process Source: Graham et al 2006

Other, less systematic approaches – such as brainstorming – are also applicable.

Understanding who the "knowledge users" are is critical. Knowledge users are members of the target audience for the initiative. They may include senior policy analysts or members of an at-risk population, as well as secondary knowledge users such as journalists, media professionals, and community leaders, etc. Ideally, knowledge users are identified very early in the research process and are then engaged in its design and implementation. This creates a sense of ownership among this critical audience for the eventual findings of the study, and identifies follow-up opportunities and plans.

It is important to bear in mind that knowledge to action is a normative process – what is considered to be "knowledge" generated by the projects, and the suite of recommended actions that arise from the study, can have implications for society at large. There are significant power imbalances that can arise, particularly when the results of the project challenge the status quo. This is another important reason to engage knowledge users early on in the process, so that they are not "surprised" by the eventual findings, and thus potentially more resistant to them. It is also a reason that those most affected by a project have a clear and strong voice, particularly where marginalized populations are involved. Dominant stakeholders (government officials, bureaucrats) tend to be those who already have power – part of an Ecohealth project may be to help more vulnerable populations find their voice in the change process.

The sustainability of KTA projects thus becomes an issue. It is important to be honest in terms of what support is available to the knowledge to action processes and the timelines that those involved in the Ecohealth project are working along. It can be difficult for

researchers to obtain funding for KTA projects, as they may be seen as "development" and not research initiatives. Nonetheless, there are always things that can be done (basic educational materials, support writing policy briefs, etc.) and an honest and open approach will build the necessary trust among the stakeholders that will serve everyone well in the future. The more limited the time-frame and resources, the more difficult it may be to get the truly powerful stakeholders to the table. In that case, researchers need to work where they are with the people who are supportive – KTA efforts focused locally can also be very influential. Not every Ecohealth project will change the world, but – done well – many will have long-term influence in an area (see, for example, Charron 2012; VWB One Health Compendium; IDRC Ecohealth case study series – all available online).

While much attention is often paid to identifying key stakeholders and analyzing either their potential role in a project, or their power (see *Module 3: Participation* and *Module 6: Equity and Gender*, also IIED 2005), less attention is often paid to the place where this participation will take place. In Ecohealth projects, this place can sometimes be thought of as another stakeholder – it can dramatically influence who comes to meetings/events and the kind of engagement and conversation that take place.

As architects and geographers know, place matters. Taking a group of interested policy-makers for a guided tour of a community, or a watershed, or a sewage treatment centre can build a sense of community and provide a powerful introduction to the issues being addressed by an Ecohealth study. Meeting policy-makers in their own offices can be a sign of respect. It can also be very intimidating for people not used to official environments and the symbols of power that accompany them. This may make casual conversation difficult, but may provide a good location for relationship building and a detailed discussion of a policy brief or position paper. Thinking about who you work with, how you engage them (reciprocating!) and where you meet them can all have both operational and strategic significance for your project (Figure 8.2).

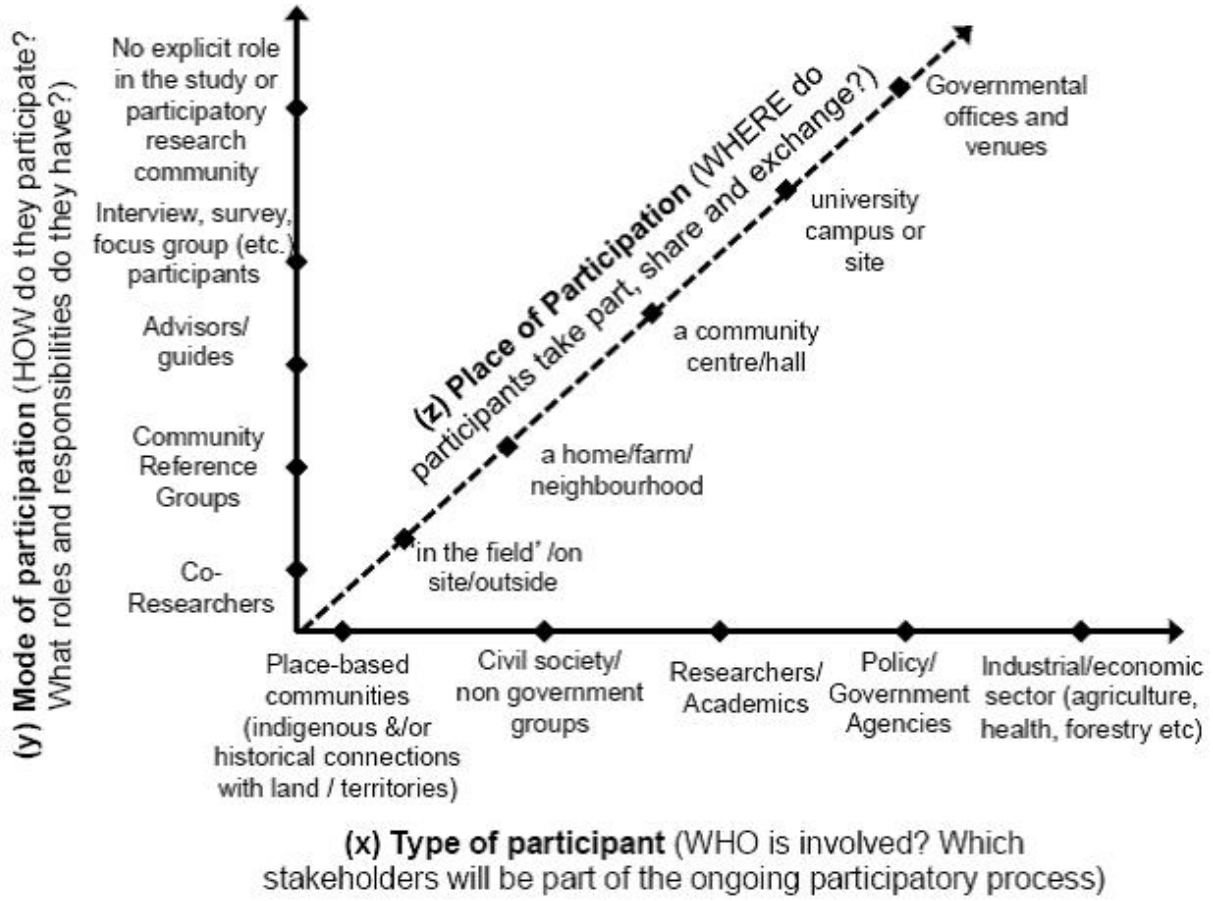

Figure 8.2 Type, mode, and places of participation (Parkes et al 2010)

Effective communication is a fundamental component of the knowledge to action approach that is best understood in relation to the major stakeholder groups involved in Ecohealth projects. Knowledge brokers are organizations or individuals who facilitate the exchange of information between the researchers and the knowledge users, thus they are most involved in the later steps of knowledge translation. This role can be filled by members of the research team but requires a particular set of skills (strong interpersonal skills, good communication skills, a sound understanding of the knowledge to be exchanged, community interests and policy requirements, and commitment to all parties) to ensure the process goes smoothly (CIHR 2012). The more integrated the KTA process is in the research process, the sooner those with the relevant skills will emerge from the group. Knowledge brokers may also be thought of as "policy entrepreneurs" (see policy section).

The role of the research community in implementing knowledge to action strategies

As mentioned above, the research community (in the natural and social sciences, as well as the arts and humanities) plays a key role in the KTA process, not only in terms of developing and implementing research programs, but also by acting as potential knowledge brokers (or policy entrepreneurs) working between different stakeholder communities. The Canadian Institutes of Health Research (2007) developed a framework to integrate the traditional research cycle (square boxes) with knowledge translation elements. Figure 8.3 illustrates six main opportunities researchers have during the traditional research process to

facilitate knowledge translation. They are very much in line with the Ecohealth approach, with their emphasis on community engagement and participation.

KT1: Defining research questions and methodologies

KT2: Conducting research (as in the case of participatory research)

KT3: Publishing research findings in plain language and accessible formats

KT4: Placing research findings in the context of other knowledge and sociocultural norms

KT5: Making decisions and taking action informed by research findings

KT6: Influencing subsequent rounds of research based on the impacts of knowledge use.

These six areas represent opportunities to directly engage with key knowledge users in the design, implementation, analysis, and dissemination of the research plan.

Publishing the results of the studies in plain language and accessible formats is a key step, particularly if the research community is to begin a conversation with communities and policy-makers over the findings of the research program (although some would say that if it is left to this late stage of knowledge dissemination it will be too late). Helping contextualize the knowledge and identify potential action items is another important role for the research community.

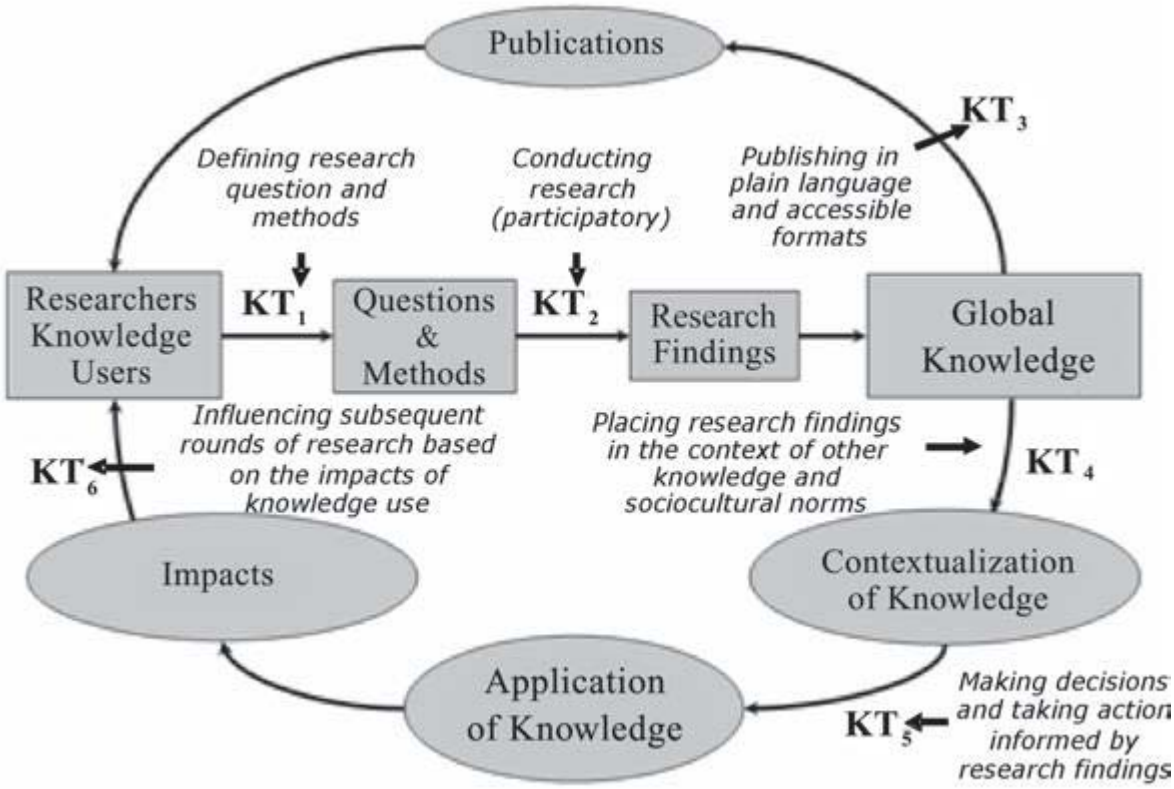

Figure 8.3 CIHR knowledge translation model, based on the research process

Source: CIHR 2007 in Sudsawad 2007.

One of the most important lessons that researchers need to remember is that some communication tools (such as research reports, journal articles, posters, and academic talks) are only for academic audiences – they are not very effective for KTA strategies that involve non-academic partners.

Respect for this notion can be demonstrated by thinking about how to talk to the media or other stakeholders interested in your work. The key lesson: ***do not talk about what you are doing – talk about what it means***. The public are generally not interested in the whether or not you are doing a case control or a cohort study – they are not interested in the methods you follow or the ways you are controlling for bias – they want to know why you are studying this issue at all – what does it mean for them, and society? Why is it important? Too often scientists focus on their actual study. Then the overall message – and the language and concepts used – are inaccessible to their audience. Practicing the art of saying what your work means, instead of what it is, is an important knowledge to action skill.

Why should policy-makers be engaged?

Because Ecohealth projects are embedded in local or regional communities, and are concerned with "real world" and "value laden" issues, they have the opportunity to help shape public policy. Public policy can be defined as designing solutions to real-world problems by presenting value-driven arguments; or as "a course of action or inaction chosen by public authorities to address a given problem or set of problems" (Pal 2010).

Policy-makers in the public policy arena are government personnel – particularly civil servants and government officials (elected or otherwise) who can "work from within" to shape public policy discussions.

Policy-makers can be very local – at the scale of the community or local government. They are also readily identifiable at the national, regional, and international levels, corresponding to a country's government system. They include city staff, local counsellors, bureaucrats in a wide variety of Ministries, politicians of all stripes, United Nations' staff, among many others. Identifying policy-makers with shared interests and goals, and policy-makers whose work could be affected by a project early on is an important way to engage them in shaping Ecohealth projects in a way that could have a lasting impact.

One of the biggest barriers to researchers engaging in the policy process is a lack of understanding of what the process is and how it works. While the specific institutional and legal situations vary by country, there are a few important concepts to bear in mind:

- **Public policy is not rational – it is political**

While many policies (particularly narrowly focused and specific ones) are either based on, or incorporate some element of, good scientific knowledge and information, the most important aspect of public policy that researchers need to recognize is that public policy is fundamentally political. This means that it represents the values of the government that is implementing it. Information, facts and "reality" are only one part of the equation – beliefs, ideas and interests also play a key role (Lasswell 1936).

Vickers (1965) describes public policy as the art of judgment – it falls between a judgment of what is (reality) and what ought to be (values). These lead to judgments regarding the best actions to take to move from "what is" to "what ought to be." These actions can be thought of as policy directions.

- **Scientists are only one voice among many**

It is worth remembering the huge range of actors that are interested in influencing public policy – scientists and researchers are only one voice among many. Other actors include political parties and influential economic and social lobbyists and groups.

The focus of the Ecohealth approach on participation and engagement with communities and stakeholders is one way to leverage the power of a multitude of voices who can agree to promote certain future actions – these actions are policy statements.

- **Policy statements are visions – not dull documents**

Policies are often understood to be mechanical or mundane devices that are not accessible to the everyday person. This could not be further from the truth as the reality is that most public policy is not written down.

Public policies are political, and therefore can also be changeable. Only a small fraction of policies are "codified," or written in to legal documents (laws, standards, etc). Much public policy directs action (and inaction) in a country in a more political sense. This is why those interested in the field of public policy pay an inordinate amount of attention to what elected officials say and do – these are the true indicators of a government's strategic direction. Getting public officials to be part of, and ideally take credit for, Ecohealth programs is an important way to influence future policy development in a region.

Policies can therefore be defined as:

- A course of action or plan
- The strategy by which goals are reached
- An authoritative allocation of values.

The final definition highlights both the authority of governments to make decisions that affect people's behaviour, as well as the value-laden aspect of public policy in moving society toward a "desired future," through policy action (and inaction). Doing nothing (i.e. the status quo) is always a policy option.

- **Policy instruments are what bring policies to life – there are not that many of them**

Policy instruments are the tools and techniques used by policy-makers to bring the "strategic direction" and/or "vision statements" of a policy to life. Ironically, the policy instruments that are available are the same whether you are implementing economic, social, environmental, cultural or any other public policy. It is the way you employ the instruments at your disposal, and the creativity you use to design them that make for more or less effective policy interventions.

Policy is fundamentally about inspiring behaviour change in populations (toward the "desired future") and policy instruments provide the support for this through information and education, as well as the provision of incentives and disincentives for various actions (the so-called "carrots and sticks").

Those who benefit from public policy may not be the public, however. Many policies shape public behaviour in a way that supports the "desired future" of powerful stakeholders, such as large companies, and the political elite.

Common categories of public policy instruments include: regulation, information, market-based instruments, voluntary initiatives, and organization. Note that regulation is only one of many categories of policy instruments, it is not "policy" per se but is one tool for implementing a particular public policy (or strategic direction). Table 8.2, below, provides some examples of policy instruments in each category. Note that these are only the "instruments" of a public policy – the policies that the instruments are promoting may be (and often are) unwritten.

Table 8.2 Examples of common policy instruments

INFORMATION	ORGANIZATION	FINANCIAL	AUTHORITY	VOLUNTARY
Advice, Exhortation	Commissions, Inquiries and Committees	User charges; Deposit-refund systems	Binding: Regulation, including laws and by-laws	Labelling schemes
Monitoring and Surveillance	Government re-organization	Taxes and tax expenditures	Permits, Licenses, Certificates	Self-organization
Advertising, Awards	Direct provision of services	Grants and Loans	Control orders, Stop orders	Service delivery
Labelling; "Right to know"; Rankings	Interest group creation and funding	Subsidies and rebates; Market creation; Liability schemes	Non-binding: Standards, Guidelines, Objectives, Criteria	Codes of practice/ Industry standards / Self-regulation

To reiterate: it is a mistake to think of policy instruments (particularly regulation) as policies – they are "tools" to implement policy – they are the tools that drive behaviour change. In addition, public policy is implemented at a variety of scales: thus community, local government, national, regional, and international policies are all at work using similar tools to influence stakeholders' behaviour.

As your skills identifying policy instruments grow, you will start to see political meaning in their selection and form. For example, controversial issues with little political upside are often shuffled off into government special commissions or think tanks. Thus, the policy instrument of organization (i.e. the government's ability to create new organizations) is used to implement an (unwritten) policy decision to put off decisions about controversial issues, while still allowing the government to appear to take action.

At other times, the perverse incentives created by the instruments may be clear. For example, an Ontario green car rebate program (a financial instrument to implement a policy encouraging clear emissions from cars and thus improved air quality) was changed by a newly elected government to include any car built in Ontario on the rebate list – thus shifting the instrument to reflect an economic growth (not an environmental) policy. This enabled the new government to succeed in "greenwashing" the issue. The new government

kept the popular rebate program for a few months before – very quietly – phasing it out entirely. Most of the public would never have noticed the shift in the rebate list – the environmental community called attention to the hypocrisy of the government's action.

One reason to focus on newspapers and magazines is that the media often do a good job of publicizing new policy tools and questionable ones. Perverse policies (that say one thing, and so another) can make for sensational stories that get people talking. Such stories can spread quickly on social media (Facebook, twitter, etc), which can help shame the government into changing them.

- **Policy recommendations/ statements should be prepared in advance and "discovered" when opportunities for change arise**

There are many models that try to explain how public policy is made, from the relatively straight-forward policy cycle to the perhaps more realistic "garbage can" model (Cohen et al 1972) to Kingdon's well-regarded policy streams model (Kingdon 1994). The main criticism of the policy cycle (Figure 8.4) is that it is too logical and implies a linear flow from agenda setting through to implementation and monitoring. The real world has proven to be much messier, but the policy cycle does help people think about the differences between stages of the policy process, and the potential for different actors to influence policy-making at different times. Kingdon's policy streams model is very briefly described in Figure 8.5, and is mentioned again in the paragraphs below.

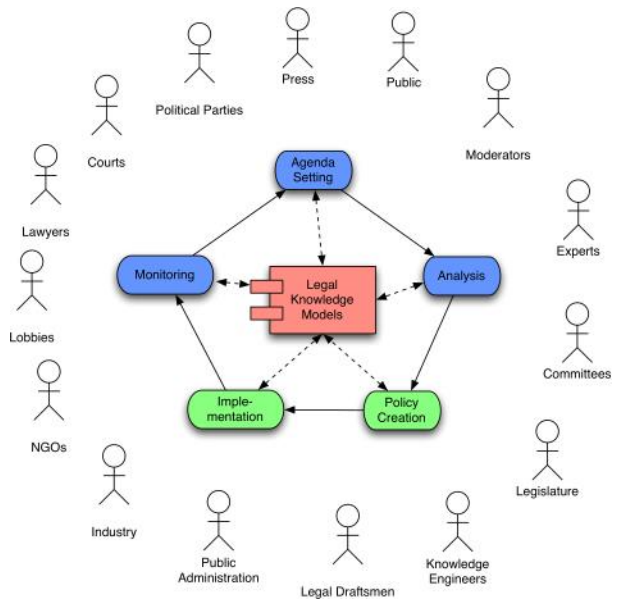

Figure 8.4 Policy cycle, showing multiple stakeholders

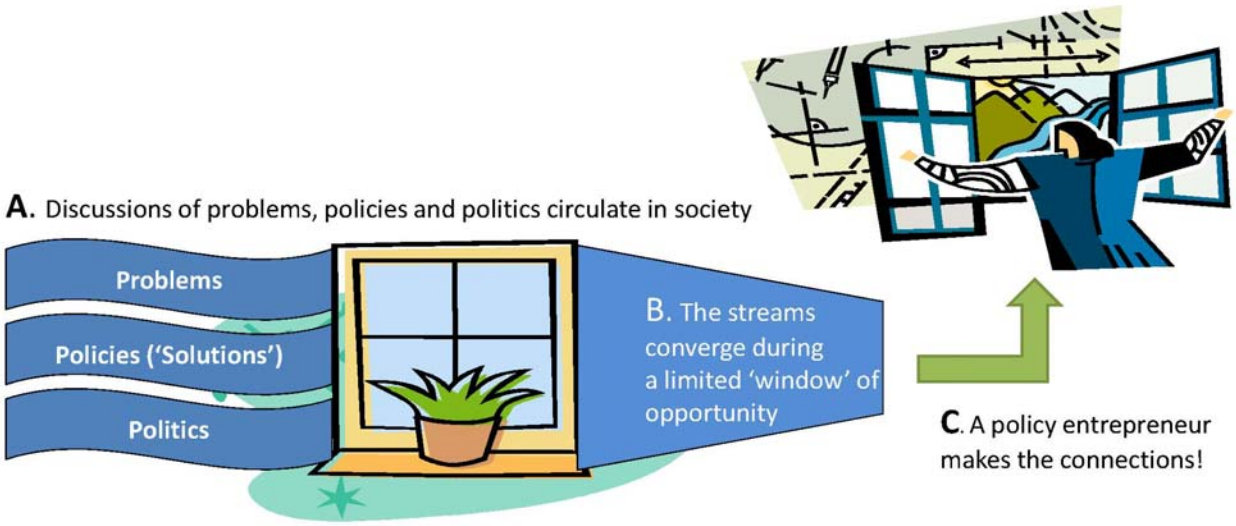

Figure 8.5 Summary of Kingdon's policy streams model (Kingdon 1984)

NOTE: A "window of opportunity" may be an election, a crisis, or another key event (anniversary, etc).

Downs' Issue-Attention cycle provides another important framework (Downs 1972) for understanding policy change. It highlights the role that crises and other major events can play in generating political and public demand for policy change. Downs' model demonstrates the importance of the pre- and post-problem stages in policy development (Figure 8.6). When the actual "crisis" hits, politicians will be under intense pressure to demonstrate action. The public will be highly engaged and pushing for evidence that politicians are aware of the problem and are "solving" it.

As soon as the problem seems to be under control, public interest will shift – or it may be replaced by another crisis on another topic. The public will become aware of the significant costs or structural changes required to really "solve" the original problem (i.e. hunger, poverty, homelessness, climate change). Their interest will drop off and the stakeholders for whom the problem remains a serious issue will work diligently to take advantage of the flurry of interest to make changes to current public policies. When that is done, they will begin to think strategically about what else needs to be done, and will develop policy positions and policy briefs and maintain their network of relationships with key stakeholders until the next crisis presents an opportunity for action. Crises in this model are very similar to "windows of opportunity" in the Kingdon policy streams model.

For the purposes of this module, although three models have been briefly introduced, one key feature of the models will be highlighted: the need to develop public policy proactively.

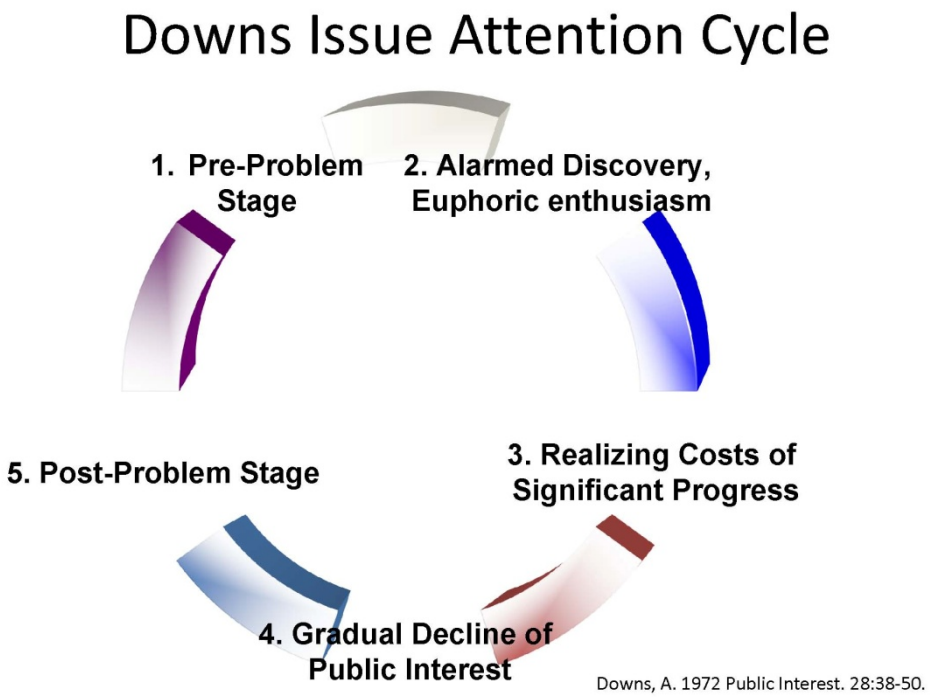

Figure 8.6 Downs' issue attention cycle, calling attention to the role of "crises" in shaping public policy (Downs 1972)

New ideas and approaches to public policy can become influential very quickly – particularly when politicians need to show an innovative response to a crisis. Change is often driven by particular "problems" that governments decide, for strategic reasons, need to be addressed. Hessing et al. (2005) refer to public policy as "matching solutions to problems in a limited window of opportunity." These windows of opportunity need to be rapidly identified and taken full advantage of by the Ecohealth community.

Public policies can be thought of as "collections of values, goals, and instruments attached to definitions of public problems that require attention." Defining the "problems" in new ways, and thus influencing the kinds of solutions that are appropriate is one of the main roles that the Ecohealth community can play. Ecohealth stakeholders can act as policy entrepreneurs who bring well-crafted solutions to the attention of the policy-makers charged with solving the problem (Figure 8.6).

How can knowledge be best structured for use by communities?

Good communication is essential to the effective update of new information and ideas. Communication can be defined as "the activity of conveying meaningful information."

There are many different forms of communication, however – including verbal, non-verbal, written, tactile, and visual/graphical. In many ways, the written form is one of the most limiting – 70% of communication is said to be non-verbal (i.e. facial expressions, body position), and people are much more likely to remember what they see and hear as opposed to what they only read (Figure 8.7).

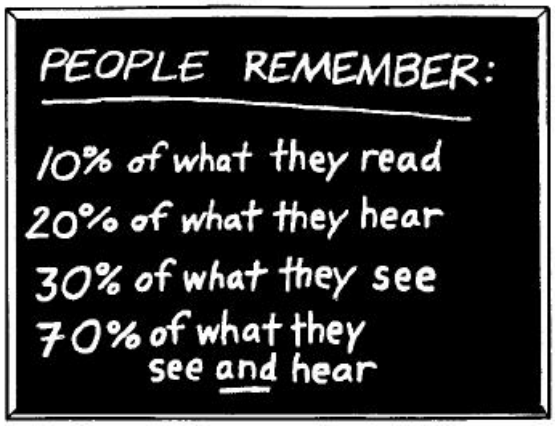

Figure 8.7 Memory retention of different kinds of information; Source: AMC Cancer Research Centre (1994)

According to CIHR (2012), the "study and use of knowledge translation involves determining and enacting the most effective manner in which to convey information to a particular community, ensuring that the new information has a meaningful impact within the community and that the results of the new knowledge impact future research and policy."

Thinking carefully and cultivating effective communication with key stakeholders, particularly community participants and representatives, is an important task.

Just as academic posters and presentations do not go over well with policy-makers, policy briefs and position papers are not effective techniques for communicating with communities. Other approaches are needed. Plain language is very important for communication to non-academic audiences.

Fortunately, there are an infinite number of creative options to exchange knowledge about research findings with communities. The feedback received from this dialogue will help improve the quality of the analysis as well as the usefulness of the results.

Knowing the target audience for the communication, and being clear on the point of the communication activity are two of the most important steps. It is important to focus on one or two clear messages and not overcrowd the message by trying to say too much.

Professional communicators talk about communication channels and communication vehicles. The channels are the way in which a message is sent (i.e. TV, interpersonally, by mail, etc.); the vehicles are the specific ways to deliver a message through a channel (TV via advertisements; interpersonally via a town hall meeting; by mail via brochures, etc). A variety of channels and vehicles can be used to get your ideas and calls to action circulating throughout the community.

Some example of communication channels and vehicles to engage community audiences are listed below:

- Print
  - Advertisements, brochures, comics, stories,
  - Press releases, fact sheets, etc.
- Mail
  - Generic/tailored letters, kits, brochures, etc.

- Outdoor
  - Non-traditional placements – e.g. construction sites, grocery stores
  - Warning labels, billboards, transit ads, etc.
- Radio
  - Radio ads, call-in shows, documentaries
- Audio-Visual
  - TV ads, pre-movie (theatre) ads, TV interviews, documentaries, short films
- Interpersonal
  - Talks, meetings, panels, town hall, courses, etc.
- Artistic
  - Storytelling, puppet shows, theatre, poetry, songs
- Promotional Items/Displays
  - Pens, magnets, hats, condoms, bags, etc.
- Telephone
  - Direct calling, hotlines, information line, etc.
- Events
  - Contests, fund-raisers, awards, give-aways, guerrilla marketing, etc.
- Social and New Media
  - Original (blogs, tweets, SMS messages), plus traditional media (above) in electronic form
- Many more!

Another important concept to think about when reaching out to the community is that of earned media. Earned media (the opposite of paid media) is the attention your communication efforts generate in the press or in other people's communication efforts. Articles ABOUT your communication efforts are even more powerful than your efforts on their own. They reach large audiences and create "buzz" about your work. Earned media magnifies the reach of a communication campaign at no additional cost. However, the media can also distort the message if the communication is not clear. The articles often include quotes from the research team (remember to talk in plain language about why your work is important – not the work itself!). Making a concerted effort to let the media and other groups know about your work and your outreach efforts could leverage additional attention and support. Developing your own media skills and preparing your media strategy in advance will enable you to take full advantage of the opportunities provided by earned media.

MODULE 8 – HANDOUT 2 – ACTIVITY 2

Background on Plain Language Writing

Albert Einstein had quite a bit to say about plain language writing, although he was not likely thinking in those terms. *"Any fool can make things bigger, more complex, more violent. It takes a touch of genius and a lot of courage to move in the opposite direction."*

and,

"If you can't explain something simply, you don't understand it well."

These quotes underscore the importance of plain language communication. Fundamentally, the purpose is not to "dumb down" information, but to make it accessible to your target audience – the general public. There are some general characteristics of the kind of language – in English – that is associated with higher versus lower reading levels. These characteristics may not be universal for other language groups. As indicated in Figure 8.8, in general, plain language writing requires that authors use more personal language ("you should do this"), concrete recommendations ("get vaccinated"), shorter sentences ("Eat many colours of vegetables"), and should use shorter words whenever possible ("help" instead of "facilitate").

Plain language writing techniques put the needs of the audience first. Its techniques can improve everyone's writing style, and are very important in making knowledge more accessible, thus improving the quality of services provided (particularly when it leads to clearer forms, documents, letters, and signs). It promotes honest and open communication. It is neither patronizing nor simplistic, and the information provided must be accurate and complete. At times, technical terms are necessary, and they should be defined in plain language for the reader.

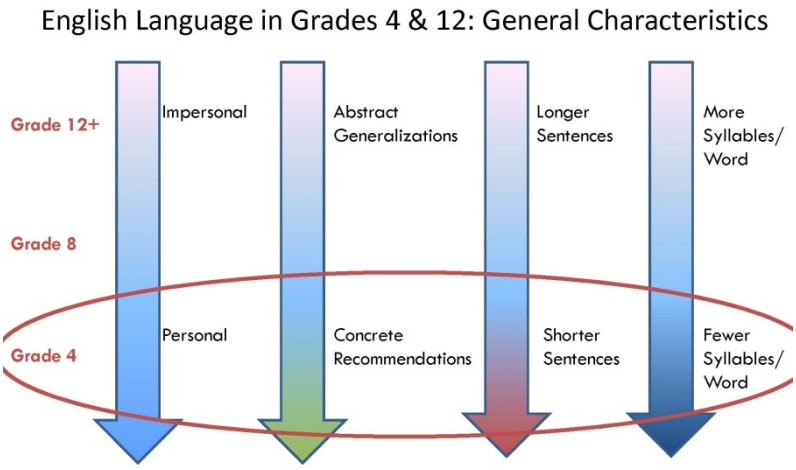

Figure 8.8 Different characteristics of Grade 4 and Grade 12 writing

10 Plain Language Writing Tips:

1. Use the active voice (present, past tenses)

I see, not I have seen (passive verb tense).

2. Write directly to your reader

Use terms like "you" and "your family".

3. Use a positive tone wherever possible

People are more receptive to positively framed messages.

4. Use common words rather than technical jargon

If you must use a technical term, make sure to define it in plain language.

5. Use short words and sentences

Avoid semi-colons.

6. List important points separate from the text

Bulleted lists can be easier for people to read.

7. Write instructions in the order you want them carried out

Make sure the instructions are clear and detailed. A numbered list may help.

8. Don't change verbs into nouns

For example, use "requires" not "the requirement is to"; or "establish" not "work on the establishment of".

9. List items in a parallel form

Use a parallel structure for lists – i.e. all starting with the same kind of word (verb, adjective, etc).

10. Pre-test what you write

Take your message to your target audience and ask them questions about what they think it means – then redraft your text to make it clearer.

MODULE 8 – HANDOUT 3 – ACTIVITY 3

Background on Policy Briefs

Policy briefs can be written by bureaucrats for their Ministers, or by non-governmental actors who are interested in influencing public policy. In government, they are used to keep decision-makers informed about issues for which they are responsible; in fact, briefings may be the principle means of communication between managers and their Ministers.

Outside of government, policy briefs provide a succinct mechanism for presenting a policy position. They are shorter than a position paper (or "white paper," a more detailed presentation of a policy argument), and can be more persuasive than an advocacy letter, particularly when multiple organizations agree with the premise of the policy brief, and support it with their logos or signatures.

Policy briefs enable senior officials to be versed on a topic which they may not have any background in, or the time to research on their own. As such, they must be clear, concise, and reliable.

In government, there are often very specific rules surrounding the content of policy briefs, including the formatting and approval process. Many departments have their own briefing note/policy brief template; for example, Health Canada has approximately sixteen different templates. Government authors must be incredibly conscious of the language chosen as these documents can be the official record of a government's position on an issue.

Policy briefs are generally limited to two to five pages. Before writing a policy brief, the author(s) should be clear about:

- The purpose (why they are writing a briefing note)
- The reader (for whom they are writing the briefing note)
- What that person needs to know
- What points they will cover
- How they will structure the information.

There are often standard formats for briefing notes; however, they generally include the following elements:

- The purpose
- A summary of the main facts
- The conclusion.

Sections that may be relevant to include in a briefing note include, but are not limited to:

Issue: A brief summary of the purpose of the policy brief; the issue, proposal, or problem that sets out what the rest of the note will be about.

Background: A factual description of the issue including information such as a chronological history, context, precedents, etc. This section should include all of the information the reader needs in order to understand the rest of the brief, without repeating information from other sections.

Current status: A brief description of the current situation, including who is involved in the issue.

Key considerations and options: An unbiased summary of the important facts, considerations, problems, and developments that will be necessary for the reader to make an informed decision. This section may also include a concise description of the plausible options available to the decision maker, including possible risks and opposition.

Conclusions and/or recommendations: Outline a recommended course of action and explain why.

References for Plain Writing

Doyle, S. (2009). How to write a briefing note. English 302 Writing for Government. http://web.uvic.ca/~sdoyle/E302/Notes/WritingBriefingNotes.html

Prepare and Present a Policy Memorandum (2006). Retrieved from http://www.ewc-popcomm.org/pdf/8_Writing_a_Decision_Memo_and_Giving_a_Policy_Briefing/Policy_memorandum_exercise.pdf

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Vrana, I. R. (2006). The Art and Skill of the Written Briefing. Retrieved from http://www.carleton.ca/mapa/docs/Workshop%20-%20Briefing%20Notes.pdf

MODULE 8 – HANDOUT 4 – ACTIVITY 4

Media Skills

The first part of any media training exercise should start with a discussion regarding the media itself. The motivations of the press are very different than those of academics or professionals. The press has to "sell" their story – they need people to click on the link to their articles, or to keep watching or listening to their TV or radio report. Thus, sensationalism and entertainment can be as motivating (perhaps more) as getting the facts of a matter across to the public. Understanding this, it is important that people prepare themselves in advance to speak with the press. Talking to the media is a great way to communicate the value of the work that is being done – as mentioned in the researcher section, above, it provides an opportunity to talk about why your work is important – not the specifics of what you are doing.

Keeping control of the interview or public event (press release, town hall meeting) is important to keep your message on track. The WHO guide "Effective media communication during public health emergencies" outlines a number of practical steps to interacting with the media in a way that helps ensure that they report what you mean.

Using the five step model in the WHO guide and the related worksheets as a resource, encourage the group to think of an Ecohealth-related topic that they could be asked to comment on – for example, a zoonotic disease outbreak, or an environmental disaster.

The key steps are outlined in Table 8.3 below. Note that the first step is to express your common humanity with the audience (empathy, caring, compassion, listening, etc). The second step is to state the key message. The WHO's 27/9/3 formula is based on reviews of the "sound bites" used on television and radio – essentially, to get on the air, the core message should be approximately 27 words, take a maximum of 9 seconds to deliver and can contain up to three clear messages. The message template provided in the Guide can help participants craft their message. Examples of 27/9/3 statements include:

- Smallpox spreads slowly. This allows time to trace those who have come in contact with the disease. Those who are traced can be vaccinated to prevent illness.
- Mosquitoes carry the West Nile virus. Protect yourself from mosquito bites. Report dead birds to local health authorities.

Try reading them out!

The third step is to provide additional information using three additional facts per message and/or a personal story. Then you should repeat the key 27/9/3 message and lastly, state specific next steps.

While the WHO Guide is tailored to health emergencies, the techniques are equally valid for other messages that involve the press. Practice is essential to being able to confidently and consistently get your message across to the media.

	Answers Should:	By:
1.	Express empathy, listening, caring or compassion as a first statement	• Using personal pronouns, such as 'I, we, our, us' • Indicating through actions, body language and words that you share the concerns of those affected by events • Acknowledging the legitimacy of fear and emotion • Using a personal story, if appropriate (e.g. My family...) • **Bridging to key messages**
2.	State the key messages	• **27 words, 9 seconds, 3 messages** • Using positive, constructive and solution-oriented words, as appropriate • Setting messages apart with introductory words, pauses and inflections
3.	State supporting information	• Using three additional facts per message • Using well-thought out and tested visual material • Using a personal story • Citing credible 3rd parties or other sources of information
4.	Repeat the key messages	• Summarizing or emphasizing key messages
5.	State future actions	• Listing specific next steps • Providing contact information for obtaining additional information, if appropriate

Table 8.3 WHO 5 Step Model for Effective Media Communication during public health emergencies
Source: (WHO 2007)

Resource for Media Skills:

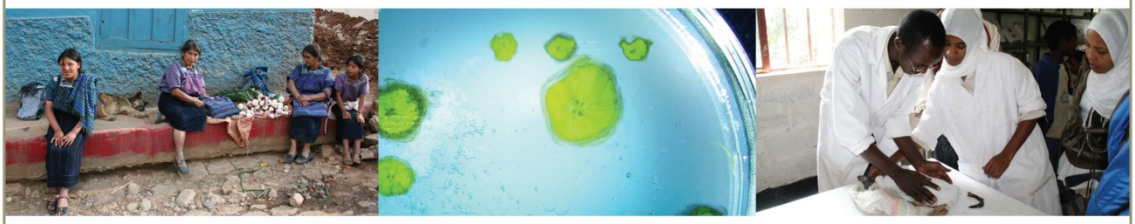
WHO (2007). Handbook on Effective Media Communication during Public Health Emergencies. 2007 http://www.who.int/csr/resources/publications/WHO_CDS_2005_31/en/

This guide may be available in a number of different languages.

FIELD BUILDING LEADERSHIP INITIATIVE

MODULE 9

Disease Ecology and Epidemiology



Craig Stephen DVM PhD, Lead Author and Iwan Willyanto DVM PhD, Co-Author

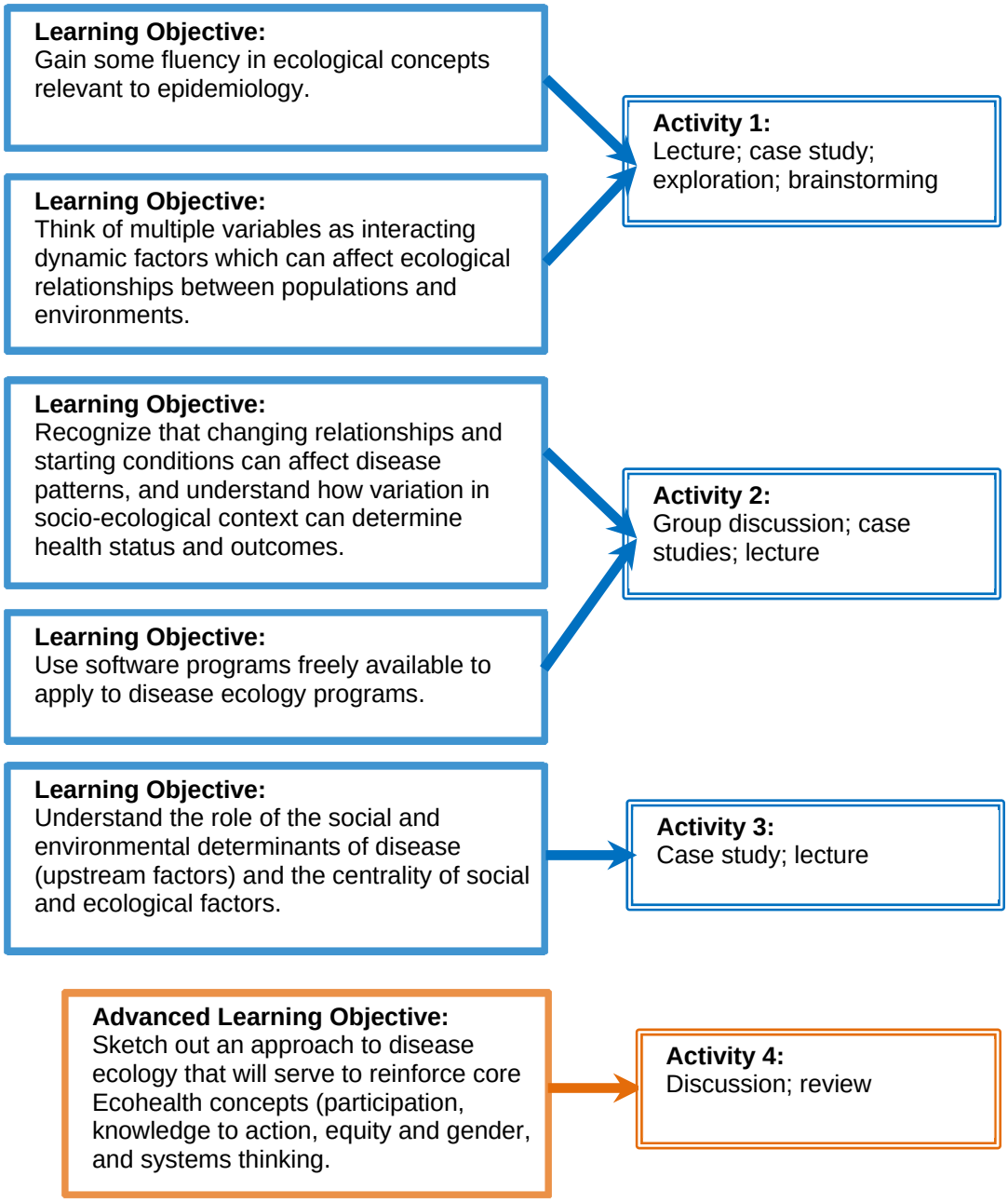
FÈVRE, S, HORWITZ, P, WALTNER-TOEWS, D (2013). (EDITORS). ECOHEALTH TRAINER MANUAL.
FIELD BUILDING LEADERSHIP INITIATIVE. VWB/VSF: CANADA

MODULE 9 – DISEASE ECOLOGY AND EPIDEMIOLOGY

Overview

Ecology, the science of how living things relate to each other and the world around them, has contributed significantly to Ecohealth. In this module participants are exposed to systems thinking within a context of disease ecology to reinforce the ideas that adverse health outcomes are influenced by – and influence – the interactions between hosts, etiological agents, and socio-ecological conditions. The module also exposes learners to the modelling approach to describing disease ecology, giving them a chance to consider how modelling applies to Ecohealth thinking and complex systems. Disease ecology models are used in this module as a "shorthand" to describe relationships between variables and to help learners see how variations in relationships within a system can have profound impacts on disease outcomes. This module is not intended to make learners proficient in disease ecology but rather to expose them to how some researchers attempt to describe ecological relationships in health, as well as to reinforce systems thinking by explicitly examining system components and interactions through class activities. Finally, although non-infectious diseases such as mercury and pesticide poisoning are embedded in social-ecological processes, this module focuses on infectious diseases.

Conceptual Map: Module 9



Module Aims

This module will help you enable learners to relate concepts of disease ecology to the principles of Ecohealth and its pre-analytic vision. The aims are threefold: (1) to introduce a way of thinking about disease that can be helpful in conceiving of and studying infectious diseases – a subject common to many Ecohealth projects; (2) to demonstrate the utility of an approach to disease ecology that links multiple disciplines (using a specific example); and (3) to use disease ecology to reinforce the concept of health as a property of a socio-ecological system.

Using models

In this module, models are used explicitly to achieve these aims as well as to provide an opportunity for discussion about the role of quantitative modelling in Ecohealth. All of us have models that we use to understand the world; these models may be qualitative or quantitative, or a mix of the two, and range from pictures we have in our heads and the rich pictures we introduced in the systems module to complicated mathematical and computer models.

Models are useful tools for learning and teaching. The mathematics are shorthand versions of paragraphs that describe relationships and variables that are associated with disease outcomes.

They are used for two reasons in this module. Firstly, they are a convenient way to describe relationships that can be manipulated in class to demonstrate the effects of changing conditions on health outcomes. Secondly, mathematical modelling is routinely used by those who study disease ecology, allowing researchers to conduct "what if" experiments based in available information. Learners require exposure to it to understand the disease ecology approach as well as to begin to contemplate the role of modelling in complex dynamic systems.

The models themselves should not be emphasized as teaching outcomes, but rather as learning tools. In creating the models investigators are forced to clarify the variables they think are important and how they are related to each other. As well, building models often enables participants to identify important missing information.

Why is this topic important?

Ecohealth practioners often struggle with defining and applying the concept of health. Since disease may seriously compromise the ability of people to achieve satisfying lives, many researchers still approach health from "ill-health" – a disease prevention or curative model. Others may have had training that has focused them on specific causal agents of disease. Sometimes it can be better to introduce the participants to ecological thinking by having them think about diseases and pathogens, parasites and hosts – topics with which they are perhaps more familiar. Once learners understand the relationships that led to health "failures" such as disease, they can begin to better understand how to prevent those failures and to promote health. Disease ecology can, therefore, serve as a bridge to help people re-conceptualize health outcomes not solely as a result of interactions of hosts and etiological agents, but rather as the result of interactions of a suite of host, social, and environmental variables.

Historically, many Ecohealth projects and programs have focused on infectious diseases, including in Southeast Asia. Disease ecology provides analytical and conceptual approaches that allow us to examine potential interactions of population, individual, pathogen, environment, and management variables, and how these interactions affect disease patterns. It is a topic with which many infectious disease epidemiologists and public health workers have some familiarity.

Disease ecology combines information and thinking from biology, microbiology, epidemiology, and ecology to study ecological influences on the abundance and distribution of infectious diseases. It can be defined as the study of the interactions between the behaviour, management, and ecology of hosts with the ecology of pathogens, and how these interactions lead to different disease patterns in populations. It therefore considers factors from the molecular to social to systems levels. It is an example of a multidisciplinary topic, which can be compared and contrasted with Ecohealth.

In Ecohealth, we often talk about looking at socio-ecological systems to understand the manifestation of health outcomes. Understanding the basic principles of disease ecology provides learners with a powerful conceptual model and the methods to understand and analyze the ecological component of this system. By looking at upstream or associated determinants of these ecological components of infectious disease epidemiology, we are also able to identify and integrate social factors in a disease system. (See Module 2 for discussion of what is meant by "upstream" factors.)

Disease ecology can be introduced at a conceptual level to Ecohealth learners, helping them to blend the ideas of ecology and health outcomes, or sophisticated analytical methods for modelling disease ecological interactions can be presented to the advanced learner. In this module, learners are introduced to basic concepts of disease ecology and work with these concepts to expand their ability to think of disease in ecological terms and to improve their ability to conceive of health in ecological terms.

The basic equations in disease ecology will serve as the foundation for this module. They will be used to reinforce understanding of the importance of interactions between multiple variables in the manifestation of health outcomes.

Key Concepts

1. Factors in addition to the disease etiological agent play critical roles in the manifestation and control of disease.
2. The abundance, distribution, and impacts of a disease are influenced by the relationship between a suite of biological and environmental variables.
3. Social factors (such as those discussed in the modules on Equity and Gender, and Participation), often affect the aforementioned variables and therefore influence the ecology of a disease.

Guiding Questions

1. How is the concept of a socio-ecological system relevant to infectious disease prevention and control?
2. Why is the idea of a disease ecosystem relevant to Ecohealth?
3. How is contact between hosts and transmission between them a function of their behaviour, and in what ways is their behaviour a function of gender and power relationships, occupations, the natural ecology of households and livelihoods, ethnicity, and religion?
4. What might be the unintended population and ecological consequences of different interventions to prevent disease?

Basic Learning Objectives

After completing this module, learners will be able to:

1. Gain some fluency in ecological concepts relevant to epidemiology
2. Think of multiple variables as interacting dynamic factors which can affect ecological relationships between populations and environments
3. Recognize that changing relationships and starting conditions can affect disease patterns, and understand how variation in socio-ecological context can determine health status and outcomes
4. Use various software programs freely available to apply to disease ecology programs

5. Understand the role of the social and environmental determinants of disease (upstream factors) and the centrality of social and ecological factors in health protection, prevention, health promotion, and action when studying and managing infectious disease. Clearly identify these issues in a case study involving infectious diseases.

Advanced Learning Objectives

After completing this module, advanced learners will be able to:

- Be able to sketch out an approach to disease ecology that will serve to reinforce core Ecohealth concepts (participation, knowledge to action, equity and gender, and systems thinking.

Practical Notes

This is conceived as a half-day module. It can be extended to a full day for more advanced learners who are seeking some additional introduction to further methods in disease ecology.

Learners should have completed *Module 2: Introduction to Ecohealth* and *Module 4: Using Systems Concepts in Ecohealth*, and/or be familiar with a causal network, upstream determinants of health, and socio-ecological systems.

This module may be used effectively in conjunction with computerized epidemic simulation software such as Win Episcope or other Reed-Frost simulators available on the internet; see

http://www.nd.edu/~gdavis2/ReedFrostMalaria.html

Instructor(s) will require an understanding of basic epidemiological concepts and infectious diseases.

If desired, this module can be taught independent of the other modules as an introduction to disease ecology.

There can be benefits to timing this module early in the Ecohealth course to help people transition from a more conventional biomedical approach to health to an ecological conception. The timing will depend on the audience.

If the class is composed of many people without background in basic epidemiology or infectious diseases, there can be benefit in preceding this module with a primer on key concepts of infectious disease epidemiology.

Background information

Disease ecology can be defined as the interaction of the behaviour and ecology of hosts with the biology of pathogens, as it relates to the impact of diseases on populations. Epidemiology can be defined as the study of the causes, distribution, and control of disease in populations. Disease ecology, therefore, provides insights and understanding that can be used for epidemiological studies and disease control planning. The line between infectious disease ecology and infectious disease epidemiology can blur because they can use very similar methods and approaches. Disease ecology tends not to be concerned with pathology in individuals (like clinical medicine) or with characteristics of specific diseases (like epidemiology). Rather, it seeks to understand general processes of population interactions that influence patterns and impacts of infectious diseases.

Basic to the idea of disease ecology is the understanding that the spatial and temporal distribution of a disease is a factor of interacting populations (hosts and pathogens) with their shared environments (abiotic, biotic, and social). (See the Kathmandu example, and the cases in Waltner-Toews et al 2008). Those multi-dimensional environmental conditions that affect where and when a species (or disease) can survive are together known as a niche. Variations in disease patterns are a result of how populations and niches overlap and interact over space and time. Disease ecologists study these interactions to help predict how changes in some component of this population–niche interaction (an ecosystem) will affect disease outcomes. Mathematical modelling is often used to help foster understanding and prediction capabilities.

At their simplest, disease ecological models contain three components: host, pathogens, and environment. The Mass Action Principle establishes that the interaction between infectious and susceptible individuals is a key factor determining the distribution and abundance of an infectious disease.

The Reed-Frost model is a simple model that was developed to help predict how an epidemic would change over time (it will be used in some of the exercises below). This model assumes that infection is spread directly from infected individuals to others by an amount of "adequate contact." Any non-immune individual in the group, after such contact with an infective individual in a given period, will develop the infection and will be infectious to others only within the following time period. In subsequent time periods, an individual who has been ill is considered to be wholly and permanently immune. Each individual has a fixed probability of coming into adequate contact with any other specified individual in the group within one time interval, and this probability is the same for every member of the group because the individuals are wholly segregated from others outside the group. This model thus makes assumptions that are not often met in nature, and does

not account for changing social-ecological dynamics; nevertheless, it has provided some useful insights into how epidemics unfold. Understanding even such a simple model illustrates how model building can be useful as a tool for understanding diseases in populations.

The traditional notation for the Reed-Frost model (described by Fine) is as follows: The Reed-Frost equation defines what happens in a given time period as a function of what happened in the previous time period.

The Reed-Frost equation is:

$$C_{t+1} = S_t(1-(1-P)^{C_t})$$

where

C_{t+1} is the number of cases expected at the next time point

C_t is the number of cases observed at the current time point

S_t is the number of susceptible individuals at the current time point

P is the probability of effective transfer from one individual to another within any given time point.

Elaborations of these concepts are part of SIR models: where S = susceptible; I = infectious, and R = recovered or removed (dead). Individuals in a population can only be part of one of those groups at a time. In these models, susceptible can only become infectious if the infectious agent is transmitted. Variables have been developed to explore this transmission coefficient, which can be affected by properties of the environment, the pathogen, and population interactions. SIR models examine transitions between these categories.

The basic reproductive number, known as R_0, helps to describe the number of secondary cases that will arise when an infectious individual is introduced to a wholly susceptible population. Although once again this may not reflect nature, R0 models are the foundation for many disease ecology models. It is used to help forecast if an infectious disease will continue or fade out, either due to natural conditions or interventions, such as a vaccination program. Generally, the larger the value of R_0, the harder it is to control the epidemic. The basic reproductive rate is affected by several factors, including the duration of infectivity of affected hosts, the infectiousness of the organism, and the number of susceptible individuals in the population that the affected hosts are in contact with.

These basic concepts are expanded upon in the references provided below. Instructors unfamiliar with disease ecology are strongly encouraged to read and understand these references to provide the foundational knowledge required to effectively implement the proposed learning activities below.

Some Ecohealth scholars question our ability to reduce complex systems to "simple" mathematical formulae. This module will provide the opportunity to discuss how one can learn from building even simple models.

For example, this simple model can then be used as a basis for participants to ask more in-depth questions. How is contact between hosts and transmission between them a function of their behaviour, and in what ways is their behaviour a function of gender and power relationships, occupations, the natural ecology of households and livelihoods, ethnicity, and religion? Do changing demands for food result in changes in the way livestock are reared and encroachment into wilderness areas, and how do these influence the probability of adequate contact between individuals? What happens when you get multiple species, with different relationships within and among them? What if the infectious agents do not confer immunity? What might be the unintended population and ecological consequences of different interventions to prevent disease? All of these questions can be used to discuss links with other modules, as well as the Ecohealth vision and principles. Trainers and class participants should think about these issues as the module continues to explore more complicated models.

Instructors are encouraged to read the following papers as background on modelling in complex health systems, especially if they choose to make this topic a focus of the introductory or advanced module:

- Homer and Hirsch (2006). System dynamics modelling for public health: background and opportunities. American Journal of Public health, 96(3).
- Galae et al (2009). Social epidemiology and complex systems dynamic modelling as applied to health behaviour and drug use research. International Journal of Drug Policy, 20(3).
- Eran et al (2000). A simple model for complex dynamic transitions in epidemics. By Science, 287.

There are a few reasons to discuss disease ecology in an Ecohealth course. First, many Ecohealth projects deal with infectious diseases. Second, disease ecology helps to provide a conceptual foundation for learners to understand that patterns of disease are affected by ecological process – in other words, they are affected by interactions of the host with the world around them. Third, it shows learners that there are quantitative methods that can be applied to describing and assessing ecological relationships affecting diseases. Finally, if presented properly, learners can see that ecology includes human ecology and social interactions. Disease ecology thus can help bridge the gap between a clinical or laboratory understanding of disease and the conception of disease as a socio-ecological phenomenon. For learners not from a veterinary or medical background, the basic concepts of disease ecology will help them to develop some basic understanding of disease dynamics and how diseases are ecological and social phenomena.

AN EXAMPLE: HYDATID DISEASE IN NEPAL – STARTING SIMPLE

The easiest way to present the life cycle of the tapeworm Echinococcus granulosus is the inner circle in the Figure 9.1 below: adult tapeworms live in the intestines of dogs. Gravid segments are released in the excrement and into the environment. Intermediate hosts eat the eggs inadvertently. In that host (often ruminants taking poop in along with grass; people who haven't washed their hands) the parasite takes on a cyst form. If the intermediate host dies and the cysts becomes available for a dog to eat, then the dog is infected. People are usually considered a "dead-end" host; they get sick but the cysts don't become available for dogs to eat. So there is a relatively simple causal loop, and infection transmission can be modelled. But now consider all the "upstream" influences on whether dogs get to eat cysts, or people or domestic animals ingest traces of infective dog faeces. We now ask who takes care of the dogs? Where do they defecate? Do children crawl on dirty floors? Where are animals butchered? Why? Where do the sheep feed? Is there clean water for people to wash? The simple model is an excellent place to start when considering disease ecology, but is rarely a place to stop.

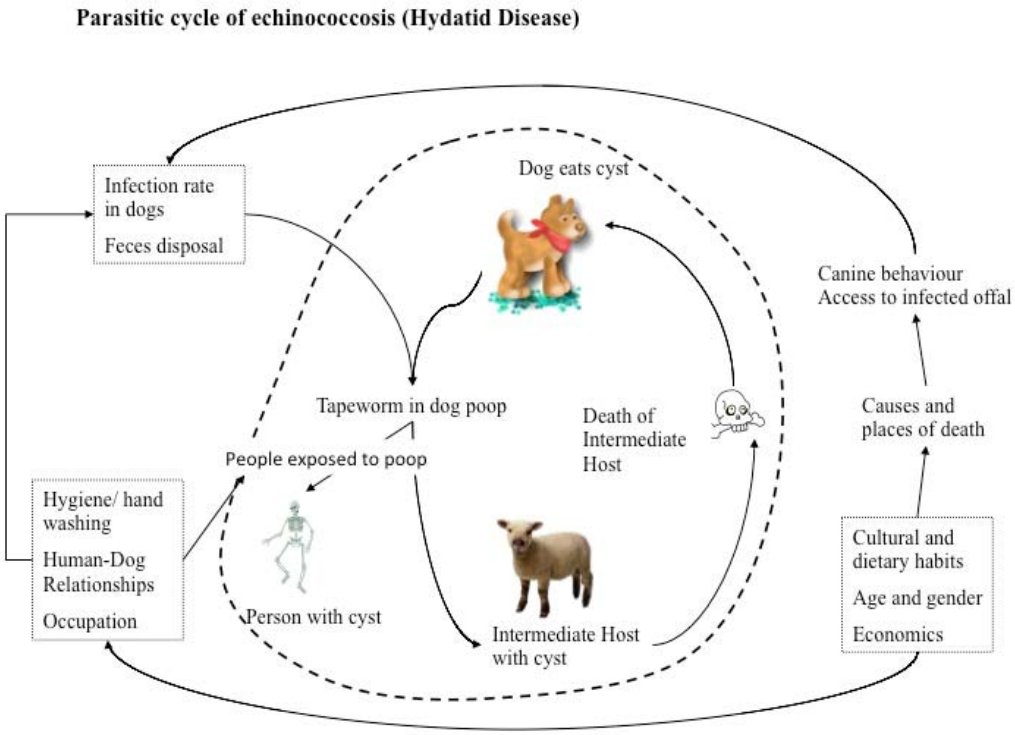


Figure 9.1 Parasitic cycle of echinococcosis (Hydatid disease)

Activities

Activity 1

Learning Objective:

- Gain some fluency in ecological concepts relevant to epidemiology
- Think of multiple variables as interacting dynamic factors which can affect ecological relationships between populations and environments.

Training focus

- Activities should emphasize that different variables have different effects on health outcomes (some might increase disease, some might decrease disease) and that factors other than the etiological agent and host immune systems play significant roles in determining disease outcomes.

Examples of ways these can be achieved

- Lectures on basic ecology and introduction to ecology of disease to transmit factual information on basic disease ecology.
- Case studies used to highlight how different variables act differently or contribute differently in different diseases. Have learners create their own case study, beginning with what appears to be a straightforward outcome (e.g. a sick person or animal), and then elaborating with rich pictures and causal webs the social-ecological dynamics that resulted in that individual being ill.
- Explore a conceptual model or standard formula for disease risk and expand from basic models to reveal a hierarchy of interacting social and environmental factors.

INSTRUCTIONS

1. Start by introducing a generic model for zoonotic disease risk (which is a variation of the Reed-Frost SIR model) such as:

$$\frac{HcN\beta}{(h+\alpha)}$$

Where H = human density, c = rate of contact between people and wildlife that allows for pathogen transmission, N = density of the wildlife host, β = transmission of the pathogen between wildlife hosts, h = mortality rate of uninfected hosts, and α = mortality rate of infected hosts.

The instructor may choose to present this conceptual model written as a mathematical formula and then talk about it, explaining what each variable is and how it may influence whether or not people get the disease. There are two alternative ways to present this information.

First, the instructor may present the concepts of this formula as a simple description. For example, s/he may start by saying, "It makes sense that if there are more people in an area and they encounter an infected wild animal more often, the chances of them getting a disease from that animal is higher than in areas with low human density and few wildlife encounters. But that risk is modified by the likelihood that the human-wildlife encounters result in transmission of an infectious agent." This simple narrative has introduced the ideas represented by H, N, and β. S/he could subsequently say something like, "but, if an infected person or animal dies soon after being infected, there are fewer opportunities for transmission," thus introducing the variable α. The instructor need not write the mathematical formula down initially, but instead, summarize all the relationships by first writing formula as a paragraph and then summarizing the ideas of the paragraph by the formula. This helps learners see the relationship between the concepts and their symbolic representation.

The second option is to have a brainstorming session with the learners to see if they can conceive of variables that could influence the risk of people getting disease from wildlife, and the instructor facilitating the discussion, to group the ideas thematically based on the formula variables.

Note that it is important to tell the learners that this is a conceptual model only and not one that can be used for quantitative analysis in specific situations. Instructors can represent the thinking about relationships of variables as a formula, as a conceptual map, or in any other way that allows the variables to be shown relating to each other and the zoonotic disease risk.

2. You may leave the discussion general and generic for this exercise or introduce a local wildlife zoonotic disease to help the learners think more specifically about the possible factors affecting the disease risk, preferably not a vector-borne disease because these diseases have more complicated mathematical formulae.

   For example the following paper uses concepts of disease ecology to discuss rabies elimination:

   Hampson K. et al. (2009). Transmission dynamics and prospects for the elimination of canine rabies. PLoS Biol 7(3): e1000053. doi:10.1371/journal.pbio.1000053 (Available at

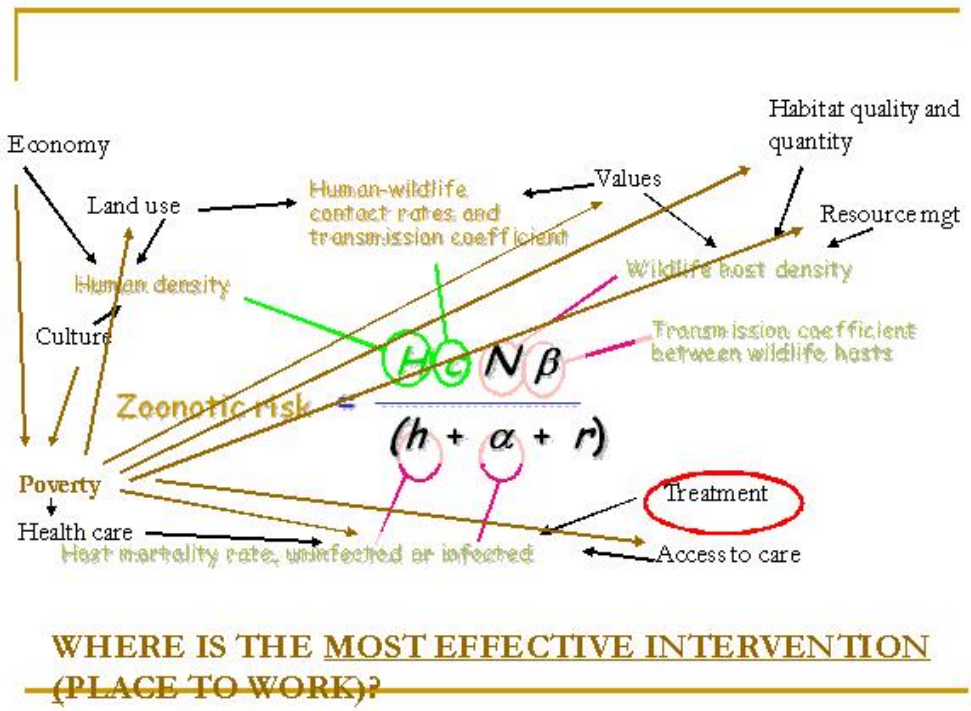
   http://www.plosbiology.org/article/info%3Adoi%2F10.1371%2Fjournal.pbio.1000053

3. After writing the formula on the board to represent the summary of the class thinking about the disease, for each of the variables work outwards to

brainstorm what factors (social and ecological) would affect each of the variables, looking for interactions among them.

This will allow the learners to link disease ecology to the exercise in *Module 2: Introduction to Ecohealth*, where causal networks were drawn.

The diagram shows an example of how the formula can be built on to bring in upstream determinants of the formula's variables and how this formula can be used to demonstrate the critical role of poverty in determining the ecology of a zoonotic infection.



4. Next, define an ecosystem.

   Use a simple definition first. For example, an ecosystem is the interaction of the thing that interests you (a species, population, or disease) with its environment, where the environment is everything that is not that thing.

   Follow with a standard text book definition such as "a localized group of interdependent organisms together with the environment that they inhabit and depend on" or "a system formed by the interaction of a community of organisms with their environment."

   Then ask the class to review the diagram drawn and decide if this represents an ecosystem.

ALTERNATIVE ACTIVITY

1. Display a causal web model which includes an infectious disease. If available, you can use a causal web developed in Module 2. For examples, you may refer to some of the causal webs in the chapters by Gitau et al,

Neudoerffer et al, and Charron et al in the 2008 book edited by Waltner-Toews et al in the additional readings below.

2. Post the diagram up for learners to see (note, instructors may wish to neaten the copy developed in Day 1 to clarify and make it easy to see the relationships).

   Learners are assigned to four groups:

   - Demography group
   - Susceptibility group
   - Immunity group
   - Transmission group.

   Each group is tasked with identifying factors diagrammed in the causal web that can influence the subject of their group (i.e. demography, susceptibility, immunity, or transmission). Each group works independently. After sufficient time, the groups compare their lists to look for differences and similarities and interactions.

3. Next, define an ecosystem.

   Use a simple definition first such as "an ecosystem is everything that affects the thing (species, person, disease, etc.) that you are interested in" and supplement that with a standard text book definition such as given above.

   Then ask the class if a disease has its own ecosystem, encouraging discussion and debate within the class.

Activity 2

Learning Objective:

- Recognize that changing relationships and starting conditions can affect disease patterns, and understand how variation in socio-ecological context can determine health status and outcomes.
- Use software programs freely available to apply to disease ecology programs.

Training focus

- Teaching activities should focus on the theme of variation and co-dependence between population processes and health outcomes.

Examples of ways these can be achieved

- Use simple disease models and vary the conditions, either instructor-led or learner group work, to illustrate dependence of disease patterns with variable conditions.
- Disease case studies of how interventions (such as an immunization program, poverty reduction, or conservation) affected disease outcomes, and explore through class discussion how those changes may have come about.
- Lectures introducing some classic disease ecology models used to control disease and explore how those variables relate to real-world situations.

INSTRUCTIONS

This activity will allow the class to apply some basic concepts to manipulate ecological interactions and discover how such changes can affect the course of a disease. The activity may be computer based, or can be physically acted out by the class, depending on the time of day (tired participants and teachers may prefer acting out), availability and functionality of computers, and comfort of the participants with computer programs.

PHYSICALLY ACTING OUT

Have the participants stand in tight circles around the tallest persion in the class. Let us suppose we have a disease agent that is transmitted by droplets in the air over a distance of one metre; the disease results in the deaths of half of those exposed; the other half is immune. Have that tall person sneeze. Half the people within one metre drop to the floor, dead. The other half stay standing but are immune. What happens if the index case sneezes again? Are some in the outer rows protected? Why? What if those who are immune also sneeze, facing outwards? What if one group of unifected participants runs to re-group in a corner of the room. What happens if one of the immune individuals runs to join them and then sneezes?

Draw a graph over time of the number of cases.

Now try this again with the participants more spread out; suppose the first row is within one metre but the next row is too far away to be affected. What happens to the disease spread? Divide the class into two groups: one group (wealthy Europeans) stand more than one metre apart. another group (poverty-ridden aboriginal people) stand closely bunched together. In which group would the epidemic spread more quickly? What would you say is the cause of the disease?

What happens if all the females become immune and the males die? Identify half of the group as children and the other half as parents. What if only children are affected by the disease? Try to mimic what people would do if someone around them is sneezing. How does one create distrance between oneself and an infected person? What if that someone is their child? Their mother?

Try this again, but with a disease that is spread by touch.

Graph the number of cases over time for each of the scenarios you try.

Talk about what "probability of adequate contact" means and what might influence this.

COMPUTER SIMULATIONS

Using a program such as Win Episcope, select a program that allows the manipulation of the Reed-Frost model of infectious diseases. Briefly introduce the model and define its variables, relating it to the concepts introduced in the previous activity. Once again, reinforce to the learners that the formula is just shorthand for some of the immediate variables that affect disease, and that the simple model used in this exercise can be elaborated into a network of interdependent variables, as was illustrated in the last exercise.

- In Win Episcope, the model is introduced in the index under the help menu. The program is found under the "Models" tab.
- Find this program at:

  http://www.clive.ed.ac.uk/cliveCatalogueItem.asp?id=B6BC9009-C10F-4393-A22D-48F436516AC4

Break the class into groups according to scenarios below. These scenarios are the assumptions for different starting conditions. (You can introduce other variations depending on class size.)

- Scenario 1: One (1) case is introduced into a small population (5,000) of which none are immune. The disease has a low probability of spread (0.1%).
- Scenario 2: One case is introduced into a small population (5,000) of which none are immune. The disease has a high probability of spread (30%).

- Scenario 3: One case is introduced into a small population (5,000) of which 50% are immune. The disease has a low probability of spread (0.1%).
- Scenario 4: One case is introduced into a small population (5,000) of which 50% are immune. The disease has a high probability of spread (30%).
- Scenario 5: 100 cases are introduced into a small population (5,000) of which 50% are immune. The disease has a low probability of spread (0.1%).
- Scenario 6: 100 cases are introduced into a small population (5,000) of which none are immune. The disease has a high probability of spread (30%).
- Scenario 7: One case is introduced into a large population (500,000) of which 50% are immune. The disease has a high probability of spread (30%).
- Scenario 8: One case is introduced into a large population (500,000) of which none are immune. The disease has a high probability of spread (30%).

Have learners develop graphs. If possible, print off the graphs and have them posted on a board for examination by the group. If a printer is not available, have the learners draw their graphs and post them.

As a group, examine how changing the parameters in the model change the pattern of the disease.

- As a group, discuss what ecological, social, or management factors could affect the number of cases entering a population, the proportion of the population that is susceptible, the proportion that is immune, and the probability of infection. Have them think about what happened in the "acting out" scenarios. Look again at the Kathmandu case (and preceding diagram).
- Discuss the changing parametres for a human population, a population of farm animals, and a wildlife population.

  i. Where possible, use locally relevant diseases that may be familiar to the learners to facilitate discussion. Instructors are encouraged to find locally relevant and topical cases that can be linked to local areas and priorities.

  ii. Remember, the goal of this is not to identify the true variable affecting the epidemiology and ecology of a specific disease, but rather to show how population and environmental change can affect disease outcomes.

ALTERNATIVE ACTIVITY

The instructor uses Win Episcope (or similar program) undertaking similar calculations as above, projecting the results for the class to see.

The results are summarized as a Powerpoint lecture where the SIR model is defined and principle determinants of demography, susceptibility, transmission, and immunity are explained.

For more advanced audiences, more detailed formulae that introduce the mathematics of vector-borne infections and vaccine effects are also introduced.

Instructors are encouraged to refer to standard papers on this subject if they wish to develop material for more advanced audience. Examples include:

Anderson, R.M and May R.M. (1979). Population biology of infectious diseases: Part I. Nature, 280(5721): 361–7.

May, R.M. and Anderson, R.M. (1979). Population biology of infectious diseases: Part II. Nature, 280(5722): 455–61.

Anderson, R.M. and May, R.M. (1981). The population dynamics of microparasites and their invertebrate hosts. Philosophical Transactions of the Royal Society B: Biological Sciences, 291(1054): 451–524.

Anderson, R.M. and Gordon, D.M. (October 1982). Processes influencing the distribution of parasite numbers within host populations with special emphasis on parasite-induced host mortalities. Parasitology, 85(Part 2) (02): 373–98.

Activity 3

Learning Objective:

- Understand the role of the social and environmental determinants of disease (upstream factors) and the centrality of social and ecological factors in health protection, prevention, health promotion, and action when studying and managing infectious disease. Clearly identify these issues in a case study involving infectious diseases.

Training focus

- Reinforce social and environmental determinants of health in the case of infectious disease.

Examples of ways these can be achieved

- Relate the day's activities to any case studies that are crossing all modules and have the learners start to refine a causal web or systems model for a relevant problem that relates to infectious disease.
- Introduce a unique case study and have learners attempt to hypothesize the core variables affecting the disease and the relationships between those variables.
- Lecture on the successful application of disease ecology theory and history for positive public health outcomes.

INSTRUCTIONS

1. Invite a representative from the local disease control authorities to discuss the management of the zoonotic disease used as an example above. Preferably having representatives from the agencies responsible for public health and for animal (wildlife) health.
   - It is best if these people are familiar with Ecohealth principles and the goals of the module. It would also be useful to have used the case study as an illustrative example in the previous activities in this module.
   - Central and local government agencies, relevant NGOs, community groups, medical and veterinary practitioners, and academics might all be considered.
   - If it is difficult to find such guests, use an example from the instructor's experience.

The Instructor can outline the case scenario and ask the learners to role play key stakeholders that may be involved in the case, such as veterinarians, farmers, physicians, community members, etc.

The goal of this exercise is to use a real-life scenario to expand on the basic formulae and concepts learned above to help learners conceive of how ecological relationships can be affected by changing social and environmental conditions.

2. Based on the results of the preceding exercise, have the learners work as a class or in small groups (depending on class size) to identify ways within the hypothesized ecosystem of the disease where disease prevention or control may be achieved. Circulate among the groups to facilitate the discussion so that learners are assisted in thinking about upstream drivers and determinants.

    1. Reassemble the class and ask them to nominate the three most significant things they think can be done to control the disease.

    2. Ask the invited guests to comment on the learners' thought and explain the current approach to disease control.

    3. Have a group discussion on the advantages, disadvantages, and practical trainers and obstacles to managing upstream variables.

Activity 4

Advanced Learning Objective:

- Be able to sketch out an approach to disease ecology that will serve to reinforce core Ecohealth concepts (participation, knowledge to action, equity and gender, and systems thinking).

Training focus

- To explicitly link this module with core concepts of Ecohealth as a summary to the class.

Examples of ways these can be achieved

- Evaluation/assessment with a case scenario involving an infectious disease, with social, political, and environmental factors in the storyline. Participants can be asked to determine an appropriate intervention.

INSTRUCTIONS

Bring out the class working definition for Ecohealth developed as part of *Module 2: Introduction to Ecohealth* and ask the class to re-examine it to ask (1) does it need to be modified given the day's disease ecology activities, and (2) what are the potential advantages and disadvantages of the Ecohealth approach for infectious disease prevention and control.

This provides an appropriate time to contrast some perspectives in disease ecology (which may follow a more mechanistic, predictive perspective) with complex systems thinking (wherein uncertainty is emphasized and prediction is not a goal, rather learning and adaptation are emphasized).

- One way to do this is to compare and contrast the generic Ecohealth diagram with outputs of Learning Goal 2, above, and consider through open discussion with the class if the set of complex interactions in the emerging zoonotic disease system would allow for reliable prediction and, if it did, could those predictions be generalized beyond a very specific time and place.
- An alternative approach would be to have a short presentation by the instructor that defines complex adaptive systems and illustrates through exploration of the class's output in Learning Goal 2 that zoonotic disease systems are complex socio-ecological systems.

ADDITIONAL READING FOR ADVANCED LEARNERS

If the class is composed of people seeking more in-depth experience with disease ecology, additional learning activities will be required. Only examples are provided below and detailed disease ecology instruction is not a principle goal of the Ecohealth training course.

Some resources available through Google books online include:

- Ostfeld, R.S., Keesing, F., Evine, V.T. (eds). Infectious disease ecology: effects of ecosystems on disease and of disease.
- Mayer, K.H. and Pizer, H. The social ecology of infectious diseases.
- Grenfell, B.T. and Dobson, A.P. Ecology of infectious diseases in natural populations.

Sample Timetable: Module 9

TIME	SHORTER COURSE	TIME	LONGER COURSE
10 min	Introduce the day's goals	**15 min**	Introduce the day's goals
20 min	**Learning goal 1:** Introduce zoonotic disease risk model (lecture/ brainstorm)	**20 min**	**Learning goal 1:** Introduce zoonotic disease risk model (lecture/ brainstorm)
30 min	Work to identify socio-ecological factors affecting the model's variables to develop the disease ecosystem OR Groups identify factors from causal web and develop definition of ecosystem	**30 min**	Work to identify socioecological factors affecting the model's variables to develop the disease ecosystem OR Groups identify factors from causal web and develop definition of ecosystem
BREAK		**BREAK**	
30 min	**Learning goal 2:** Win Episcope scenarios (groups/teacher led)	**30 min**	**Learning goal 2:** Win Episcope scenarios (groups/teacher led)
40 min	Review graphs. Win	**40 min**	Review graphs. Win
1 hr 30 min (with break)	**Learning goal 3:** Discussion about disease control with local representatives OR Lecture about disease control by trainer	**2 hrs 15 min (with break)**	Discussion about disease control with local representatives (for longer sessions, include people with formal and informal responsibilities, including community members, if feasible)
20 min	Class ends with a review of the definition of Ecohealth	**1 hr**	Review of the Ecohealth definition from Introduction to Ecohealth as group discussion. Assign further reading.
4h	**Total time**	**5h30**	**Total time**

Evaluation

1. To determine if learners are seeing the relationships of Ecohealth and disease ecology.
   - Option 1: Learners provide feedback in the form of a reflection on how they see disease ecology influencing Ecohealth and vice versa.
   - Option 2: Review of modifications to the class Ecohealth definition.
   - Option 3: Learners are assigned to critically comment on the disease control plan discussed in class and offer suggestions for alternative targets or means for control that may reflect the Ecohealth approach.
2. In-class assessments, the trainers should ask the class to comment on whether the information given was too basic for them. If it was, then more advanced models than the Reed-Frost model can be used. If the class found it too complex, the trainers may wish to start with an introductory lecture on basic concepts of infectious disease epidemiology. The trainers should ask the learners what they learned from acting out, and what was learned through computer simulations. Did they complement each other?

Terminology

Disease
An impairment of the normal state of the living animal or plant body or one of its parts that interrupts or modifies the performance of the vital functions, is typically manifested by distinguishing signs and symptoms, and is a response to environmental factors (as malnutrition, industrial hazards, or climate), to specific infective agents (as worms, bacteria, or viruses), to inherent defects of the organism (as genetic anomalies), or to combinations of these factors (Merriam-Webster Medical Dictionary).

Disease ecology
The study of the interactions between the behaviour, management, and ecology of hosts with the ecology of pathogens, and how these interactions lead to different disease patterns in populations. It therefore considers factors from the molecular to social to systems level. It is an example of a multi-disciplinary topic, which can be compared and contrasted with Ecohealth. Disease ecology combines information and thinking from biology, microbiology, epidemiology, and ecology to study ecological influences on the abundance and distribution of infectious diseases.

Epidemiology

Centres for Disease Control and Prevention, USA (CDC) defines epidemiology as "the study of the distribution and determinants of health-related states in specified populations, and the application of this study to control health problems." A look at the key words will help illuminate the meaning:

- **Study** – Epidemiology is the basic science of public health. It is a highly quantitative discipline based on principles of statistics and research methodologies.
- **Distribution** – Epidemiologists study the distribution of frequencies and patterns of health events within groups in a population. To do this, they use descriptive epidemiology, which characterizes health events in terms of time, place, and person.
- **Determinants** – Epidemiologists also attempt to search for causes or factors that are associated with increased risk or probability of disease. This type of epidemiology, where we move from questions of who, what, where, and when and start trying to answer how and why, is referred to as analytical epidemiology.
- **Health-related states** – Although infectious diseases were clearly the focus of much of the early epidemiological work, this is no longer true. Epidemiology as it is practised today is applied to the whole spectrum of health-related events, which includes chronic disease, environmental problems, behavioural problems, and injuries in addition to infectious disease.
- **Populations** – One of the most important distinguishing characteristics of epidemiology is that it deals with groups of people rather than with individual patients.
- **Control** – Finally, although epidemiology can be used simply as an analytical tool for studying diseases and their determinants, it serves a more active role. Epidemiological data steers public health decision-making and aids in developing and evaluating interventions to control and prevent health problems. This is the primary function of applied, or field epidemiology.

Ecosystem

A bio-physical environment consisting of all the organisms living in a particular area, as well as all the non-living (abiotic), physical components of the environment with which the organisms interact, such as air, soil, water, and sunlight (Wikipedia).

Infectious disease

A disease caused by the entrance into the body of organisms (as bacteria, protozoans, fungi, or viruses) which grow and multiply there. (Merriam-Webster Medical Dictionary)

Reed-Frost model
A mathematical model of infectious disease transmission and herd immunity. The model gives the number of new cases of an infection that can be expected in a specified time in a closed, freely mixing population of immune and susceptible individuals, with varying assumptions about frequency of contact (Stedman's Medical Dictionary. (2006) Lippincott Williams & Wilkins. All rights reserved).

Web of causation
A web of causation, or causal web, is an interrelationship of multiple factors that contribute to the occurrence of a disease (Mosby's Medical Dictionary (2009). 8th edition, Elsevier).

Zoonoses (zoonotic diseases)
Diseases that can be passed from animals to humans. These are infectious diseases, caused by bacteria, viruses, or other disease-causing organisms, that can live as well in humans as in other animals. They can be transmitted in different ways.

SUPPORTING DOCUMENTS

Win Episcope 2.0 can be downloaded at:
http://www.clive.ed.ac.uk/cliveCatalogueItem.asp?id=B6BC9009-C10F-4393-A22D-48F436516AC
Introductions to epidemic models on Wikipedia
http://en.wikipedia.org/wiki/Epidemic_model

Key References

References are provided throughout the text as examples of information sources that can inform teaching and provide additional details. These three highlight some key concepts relevant to the module.

Kilpatrick, A.M. and Altizer, S. (2010). Disease ecology. Nature Education Knowledge, 2(12): 13. http://www.nature.com/scitable/knowledge/library/disease-ecology-15947677

Roizman B. and Highes J.M. (1994). Effects of changes in human ecology and behaviour on infectious diseases: an introduction. Proceedings of the National Academy of Sciences of the United States of America. 91(7): 2377.

Wilcox B. and Gubler D. (2005). Disease ecology and the global emergence of zoonotic pathogens. Environmental Health and Preventive Medicine, 10: 263-275. http://www.hawaii.edu/publichealth/ecohealth/si/course-ecohealth/readings/Wilcox_Gubler-2005.pdf

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Anderson, R.M., Gordon, D.M. (1982). Processes influencing the distribution of parasite numbers within host populations with special emphasis on parasite-induced host mortalities. Parasitology, 85(Part 2) (02): 373–98.

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Waltner-Toews, D., Kay, J.J., Lister, N.M. (eds) (2008). The Ecosystem Approach: Complexity, Uncertainty, and Managing for Sustainability. New York: Columbia University Press.

Some resources available through Google books include:

- Grenfell, B.T. and Dobson, A.P. (eds) (1995). Ecology of Infectious Diseases in Natural Populations. Cambridge University Press.
- Mayer, Kenneth H. and Pizer, Hank (2008). The social ecology of infectious diseases. Elsevier Academic Press.
- Ostfeld, Richard S., Keesing, Felicia and Evine, Valerie T. (eds) (2008). Infectious Disease Ecology: Effects of Ecosystems on Disease and of Disease. Princeton University Press.

FIELD BUILDING LEADERSHIP INITIATIVE

MODULE 10

Agriculture and health

Jing Fang PhD, Lead Author and Edi Basuno PhD, Co-Author

FÈVRE, S, HORWITZ, P, WALTNER-TOEWS, D (2013). (EDITORS). ECOHEALTH TRAINER MANUAL.
FIELD BUILDING LEADERSHIP INITIATIVE. VWB/VSF: CANADA

MODULE 10 – AGRICULTURE AND HEALTH

Overview

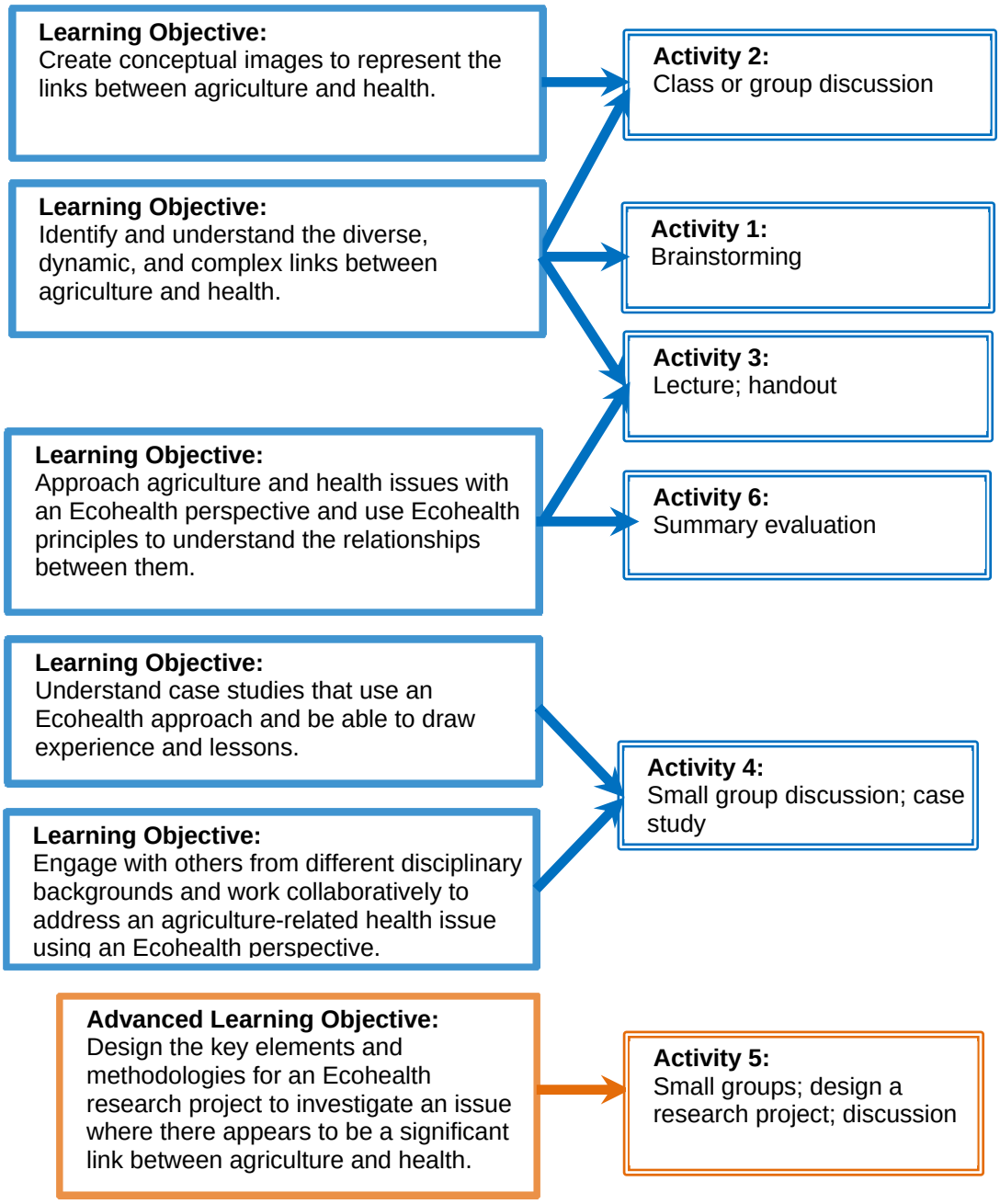
Agriculture is the cultivation of animals, plants, fungi, and other life forms for food, fibre, and other products used to sustain life. Agriculture and health have intrinsically close and complex links; on the one hand, agriculture provides the nutritonal basis for good health. On the other hand, in a heavily populated and globalized world, the way agriculture is practised has become a source of environmental degradation and ill-health. Health is a goal and also precondition of human development, which is well reflected by the Millennium Development Goals (MDGs), of which almost all development goals are health or health-related.

This module is about developing an Ecohealth-based understanding and strong analytical and action capacity to address the links between agriculture and health, with a focus on an Asian context. The module is designed in a way that allows participants to apply what they have learned about Ecohealth approaches in other modules of this training course to a specific area, namely agriculture and health.

The complex and diverse patterns of agriculture practices – which range from subsistence farming to intensive modern agriculture, and their multiple, dynamic, and complex interactions with the health of humans, animals, and ecosystems – provide a rich field for the application of Ecohealth approaches that include systems thinking, transdisciplinarity, participation, and social and gender equity, etc. Agricultural activities are so diverse that it is impossible to cover every issue in a training course in a limited time. Thus, selection is essential and a few key agriculture and associated health issues should be selected as examples or case studies to help participants gain knowledge and develop capacity.

This module will first give participants a broad overview of the connections between agriculture and health and then select some key issues in Asia for in-depth case studies.

Conceptual Map: Module 10



Module Aims

This module provides an opportunity for the participants to apply what they have learned about Ecohealth approaches in a specific arena: agriculture and health. The aims and goals of this module are to expose participants to the many complex, diverse, and dynamic links between agriculture and health. This is accomplished by introducing a few key conceptual frameworks and practical examples, conducting in-depth case studies and group discussion to equip participants with new insights about the connections between agriculture and health and to help learners develop capacity of conducting research in this important area from an Ecohealth perspective.

Why is this topic important?

At present, agriculture still employs around 50% of the world population. In developing countries in Asia, where agriculture is the main livelihood for many people, the percentage is higher. Links between agriculture and health in Asia have been manifested by the endemics of several emerging infectious diseases such as Avian Influenza, SARS, and the Nippah virus.

Agricultural intensification, defined as an increase in the productivity of crops and livestock per unit of input, was selected as the focus of a 5-year project to build the field of Ecohealth in Asia (the Field Building Leadership Initiative: Advancing Ecohealth in Southeast Asia), which supports the development of this manual. This topic was identified as important because agricultural intensification can bring many benefits to society, such as improved food security and nutrition, adaptation to urban or peri-urban environments, improved livelihoods, and export-oriented production. At the same time, it can negatively affect the natural resource base that supports productive capacity in farming areas, and is often a causal factor in human and animal health problems. Moreover, agricultural intensification imposes external costs on society, such as biodiversity loss, pesticide and chemical fertilizer use, nutrient runoff, excessive water usage, and (re)emergence and spread of infectious diseases. The impacts of agricultural intensification, coupled with climate change, pose critical problems for ecosystems and human health at local, regional, and global levels.

There are many issues of relevance to Ecohealth in an agricultural setting, including livelihoods, rural-urban connections, poverty, host-parasite relationships, and human and animal health.

There is a need for human resource development to improve knowledge and skills in the links between agriculture and health and better manage associated health risks. At the time of writing, curricula of both medical or public health universities and agricultural universities in Southeast Asia contain limited content on this important topic. It is hoped that a module on agriculture and

health in the context of Ecohealth in Southeast Asia will help fill this gap in current teaching in universities in the region.

Key Concepts

Agriculture is a very broad field that covers many different practices, patterns, and technologies. The concept of health embodies a wide range of issues that are affected by many biological, ecological, and social determinants, which have been discussed at length in this course.

Some key concepts for this module include, but are not limited to subsistence farming, green revolution, agricultural intensification, animal husbandry, zoonotic diseases, sustainable agriculture, nutrition, food safety and security, and the health of environment and ecosystem.

An understanding of the interactions between agriculture and health should be one of the major learning objectives for the participants of this module.

Several key themes are selected for in-depth case studies for participants to develop needed knowledge and capacity:

- Crops and health: will cover important and relevant issues such as pesticide and fertilizer use and overuse, and food safety.
- Livestock rearing and health: will cover issues such as zoonotic diseases, emerging infectious diseases, and food safety.
- Agricultural water development and health: will cover water-related and water-borne diseases such as malaria and schistosomiasis.
- Agroforestry, agro-biodiversity, nutrition and health: will cover food security, food safety, and nutrition.

Several other topics could be included, such as antimicrobial resistance, and the resistance of pests to pesticides, but the module cannot attempt to address all topics related to agriculture and health.

This module refers to Ecohealth research and the design of research frameworks. In discussing research design, learners should be encouraged to think through the whole process, including the following steps:

1. Determining the problem statement
2. Determining the research objective
3. Defining the research question or hypothesis
4. Establishing the methodology, sampling strategy, data collection, and analysis process
5. Determining the dissemination of research findings and the integration of knowledge to action.

Guiding Questions

These questions can be provided to the learners at different stages of the module. They can also be listed in table form, and learners encouraged to write down their thoughts as they proceed through the module.

1. What are the conceptual frameworks that can help us to better understand the links between agricultural practices and the health of humans, animals, and ecosystems?
2. What are the practical and theoretical connections between agriculture and human health?
3. What are some of the skill sets required to approach agricultural issues using an Ecohealth approach?
4. What are the major agricultural practices in the place where you live?
5. What kind of implications, both positive and negative, do these practices have or potentially have for the health of people, animals, and ecosystems?
6. What are the practical solutions to address negative impacts from an Ecohealth perspective?
7. How can we design research about agriculture and health that uses an Ecohealth approach?
8. Who should be involved in designing such a project? Why?

Basic Learning Objectives

After completing this module, learners will be able to:

- Identify and understand the diverse, dynamic, and complex links between agriculture and health
- Create conceptual images to represent the links between agriculture and health
- Approach agriculture and health issues with an Ecohealth perspective and use Ecohealth principles to understand the relationships between them
- Understand case studies that use an Ecohealth approach and be able to draw experience and lessons from them
- Engage with others from different disciplinary backgrounds and work collaboratively to address an agriculture-related health issue using an Ecohealth perspective.

Advanced Learning Objectives

Advanced learners will be able to:

- Design the key elements and methodologies for an Ecohealth research project to investigate an issue where there appears to be a significant link between agriculture and health.

Practical Notes

Because this module covers two very broad fields, namely agriculture and health, it puts high requirements on the trainers. If possible, at least two trainers are needed with complementary expertise in agriculture and health. Ideally, trainers should also have experience in Ecohealth research.

Another option is for course organizers to ensure that the class participants come from a variety of health and agricultural backgrounds. In this case the trainers, who should in any case have good facilitation skills, can draw out the complementary knowledge from the class members themselves. In this case, the trainers should prepare themselves in advance by reading books and papers on agriculture or health to fill in gaps in their knowledge and skills.

In any case, it is desirable that the participants come from diverse disciplinary backgrounds such as agricultural science, public health, ecology, and social science.

This module is not a stand-alone module; it builds on all the modules that have come before it as part of the Ecohealth Trainer Manual. The previous modules lay the foundations for this one, which provides a chance for the learners to apply their learning about Ecohealth to an set of issues. **This module should therefore be delivered after the other modules, at minimum after *Module 2: Introduction to Ecohealth*, and the trainers should be familiar with the overall contents of all modules. As in other modules, participants should reflect on how this work relates to the overall vision and principles of Ecohealth, as described in the manual's Preface.**

This module starts by facilitating a broad overview on the connections between agriculture and health, and then looks at specific case studies. It can be used as a complete one-day class, or it can be tailored to fit a course given over a period of time.

To understand the links between agriculture and health and be able to develop capacities for dealing with health problems associated with agriculture, both the trainers and their learners need to have some basic knowledge about the two fields. Given the fact that current curriculum of medical universities includes little content about agriculture, and the textbooks of agricultural and other universities offer little information about human health, participants may lack basic knowledge about one or other of the fields. In this case, they should be encouraged to read about them in advance.

To teach this module, trainers need to prepare themselves well by reading books and materials on agriculture and health. The two companion texts (Charron 2012; Waltner-Toews 2011) are good references for this purpose. In addition, the essential reading material listed in this module also provides background information and teaching materials.

Trainers will need to provide handouts of case study materials and presentations. This module is designed to be delivered over a 5- to 7-hour period, in one day or over a number of classes.

Notes about Case Studies

Case studies are an important learning activity in this module; they provide real scenarios for participants to learn how Ecohealth approaches can be applied. Initially, a case study should be developed together with class participants, based on their own experiences. This participatory exercise will "prime" the thinking of the participants and enable them to better explore several published case studies, which we provide. The published studies cover key agriculture and health issues in this region, which are the focus of this module, including crops and health; livestock rearing and health; agricultural water development projects and health; agroforestry, agro-biodiversity, nutrition, and health. Some case studies were research projects conducted

using an Ecohealth approach, whereas some were not undertaken from an Ecohealth perspective; both are good learning materials for learners. All case studies or stories are from Asia and trainers can select several cases for this module. Trainers should be familiar with these case studies so they can provide additional information when needed.

One such study was published in the Journal of Ecohealth. The paper introduces an Ecohealth framework and applies the framework in three case studies located respectively in Vietnam, Thailand, and West Africa (Cote d'Ivoire). It may be hard for the learners to read and understand this academic paper. If this is the case, then trainers can simplify the text and tailor it into short and an easily understood account for use in training.

- Nguyen-Viet, H., Zinsstag, J. et al (2009). Improving environmental sanitation, health, and well-being: a conceptual framework for integral interventions, Ecohealth 6(2): 180-191.

  Another study is based on an Ecohealth research project conducted in Yunnan Province, China. The paper used water to link a number of important health issues associated with agriculture intensification.
- Jing Fang, Xinan Wu et al (2011). Water management challenges in the context of agricultural intensification and endemic fluorosis: the case of Yuanmou County. Ecohealth 8(4): 444-455.

  A short story on malaria is provided by Dr. Umar-Fahmi Achmadi from Indonesia. The text is written in simple language and thus it can be used to teach learners who have less experience in research and practice.
- Umar-Fahmi Achmadi. Case study on malaria from Indonesia. University of Indonesia.

  An article published in the journal Lancet more than 20 years ago describes a problem that remains in many parts of Asia. The paper is about pesticide use and its health consequences and was written from the perspective of epidemiology. Although the paper was not written from an Ecohealth perspective, the trainers can use this paper to facilitate the discussion about the possible research if an Ecohealth approach were used.
- Loevinsohn, M.E., (1987). Insecticide use and increased mortality in rural central Luzon, Philippines. Lancet, 13 June, 329(8546): 1359-1362.

Background information

In Southeast Asia, the "Green Revolution," which began in the 1960s, promoted the widespread use of high yielding varieties, requiring high inputs of inorganic fertilizers, pesticides, herbicides, fungicides, and water to boost productivity. Although it has contributed substantially to meeting the growing demand for food over the past half century, it has also led to serious environmental and human health consequences.

Intensified livestock development has also occurred in Southeast Asia for the last three decades, and has improved diets and the nutritional status of populations, but also causes health and environmental problems. With increasing incomes and demand for meat, dairy, and egg products, livestock has become the fastest growing component of the agricultural sector. This in turn has led to structural changes in livestock production – from subsistence systems to intensive, commercial production systems. Livestock intensification is characterized by high-input practices, including the use of industrial feeds, which cause both environmental and public health problems, while also neglecting the needs of poor farmers who still rely on subsistent livestock production.

According to the World Health Organization (WHO), about 75% of new diseases affecting humans over the past decade have been caused by pathogens originating from animals or animal products (WHO 2011). This can be affected by how livestock are managed, which can potentially increase risks for human health. Zoonotic emerging infectious diseases threaten human, animal, and environmental health, representing one-quarter of the overall infectious disease burden in least developed countries (Grace et al 2010). However, the positive effects of livestock intensification also need to be considered, such as reducing the price of protein for urban consumers, and improving biosecurity and disease control measures on well-managed farms, reducing the risk to human health.

Activity 1

Initial brainstorming session on agriculture and health

Learning Objective:

- Identify and understand the diverse, dynamic, and complex links between agriculture and health.

In this exercise, encourage learners to draw from their own life experiences to understand the connections between agriculture and health, and the links between different themes within these areas.

You will help build a recognition amongst learners of why this topic is so important.

Instructions

(20 minutes)

1. Ask participants to list agriculture activities that they know and then group those activities into themes such as crops, animal husbandry, fishery, and aquaculture, etc.

2. Then, ask participants to list the environmental and health impacts (both positive and negative) which those agricultural activities may have.

Activity 2

Participatory creation of a scattergram or rich picture of issues in agriculture and health, and how they are related

Learning Objective:

- Identify and understand the diverse, dynamic, and complex links between agriculture and health
- Create conceptual images to represent the links between agriculture and health.

INSTRUCTIONS

(60 minutes)

Building on the previous brainstorming session, ask learners as a class, or in small groups, to create their own rich understanding of Ecohealth and agriculture.

1. Instruct participants to begin with a particular agricultural "commodity" (e.g. chickens or other livestock, or a particular crop).

   Ask them to write this in the centre of a large piece of paper, then ask them to write, without guidance, all the things that are related to raising, say chickens. We are looking for inputs (feed, water, disease case), outputs (manure, food, other products), and outcomes (human nutrition and health – farmers and non-farming consumers, human disease, farmers' income, etc). Learners could write on a large sheet, unstructured, as a kind of messy scattergram, or it could be created as a "rich picture," as described in *Module 4: Using Systems Concepts in Ecohealth.*

2. Lead a discussion about, or ask learners to draw the links between the various items they have listed, and talk about who is responsible for those things, and what gender and power issues arise. This draws on the expertise and experience of the group, and begins to open up the discussion. The discussion should also include the reasons why people do the things they do (e.g. why do people raise chickens, why do they raise them in certain ways, why do they manage manure in certain ways, etc).

   At this point there is no intention of creating a model or theory. We are simply trying to expand the participants' ideas about issues associated with agriculture and to link this module with the previous core modules.

Activity 3

Conceptual frameworks of agriculture and health (lecture)

Learning Objective:

- Identify and understand the diverse, dynamic, and complex links between agriculture and health
- Approach agriculture and health issues with an Ecohealth perspective and use Ecohealth principles to understand the relationships between them.

INSTRUCTIONS

(30-40 minutes)

Deliver a lecture to introduce some conceptual frameworks on the links between agriculture and health and to provide some real research examples on this topic.

The purpose of this activity is to equip participants with some theoretical frameworks and practical examples. The learners will be reminded to view those frameworks and examples from an Ecohealth perspective and to compare them with ideas they developed in the first two exercises.

Handout

Print out your PowerPoint presentation.

The frameworks on the links between agriculture and health can be taken from the Key References, e.g. "Understanding the links between agriculture and health" (Hawkes and Ruel); and "For sustainable architecture, think bug." (New Scientist).

Activity 4

Small group discussion on local agriculture and health issues

Learning Objective:

- Understand case studies that use an Ecohealth approach and be able to draw experience and lessons from them.
- Engage with others from different disciplinary backgrounds and work collaboratively to address an agriculture-related health issue using an Ecohealth perspective.

INSTRUCTIONS

(2 hours)

1. Divide participants into small groups (about five participants per group). Ideally each group should contain participants from different disciplinary backgrounds. Each group is given a handout of case study materials on specific topics, for example, pesticide use related to a health issue, or animal husbandry related to a zoonotic disease, and some guiding questions.

Each group will be asked to conduct in-depth analysis of those case studies from an Ecohealth perspective and then to share their findings by reporting back to the plenary.

The purpose of this activity is to provide a chance for participants to apply what they have learned about Ecohealth to a real research project and to deepen their understanding about the principles of Ecohealth.

The cases suggested would provide good materials for this exercise. The selected cases should not only provide the results of the study, but also the process of the research, including lessons learned and barriers encountered as well as coping strategies in overcoming the barriers during the process, so as to provide a real sense of how an Ecohealth approach was applied in reality. This activity likely needs 2 hours including group work and plenary feedback.

2. Summarize lessons from the case studies and bring out key learning points that may have been missed in the learners' discussion.

Handout

Case study materials provided by the manual or other case study materials selected by trainers.

Activity 5

Small group discussion on local agriculture and health issues

Advanced Learning Objective:

- Design the key elements and methodologies for an Ecohealth research project to investigate an issue where there appears to be a significant link between agriculture and health.

INSTRUCTIONS

This session will need at least 2 hours including the reporting back session.

1. Participants are divided into small groups. This time participants from the same geographic location will be put in one group. Each group should be given a handout with questions and asked to discuss the questions. Encourage learners to reflect back on the whole course and to integrate tools and ideas from the other modules.

2. Learners are then asked to design a small Ecohealth research project on one of the identified issues. The purpose of this task is to link the knowledge and skills of Ecohealth to the reality participants face in their own contexts, and to encourage them to apply what they have learned.

3. Groups report back to the class.

Handout: Module 10 – Handout 1

See the Handout provided: "Small group work on local agriculture and health issues."

Activity 6

Summary and evaluation of the module

Learning Objective:

- Approach agriculture and health issues with an Ecohealth perspective and use Ecohealth principles to understand the relationships between them.
- Summarize the module activity and evaluate the learning of participants.

INSTRUCTIONS

(30-40 minutes)

An effective evaluation activity would be to use the group work from the previous exercise as a basis for exploring what participants have learned and how they have worked as teams to develop new understandings.

Alternative evaluation methods can be used.

This may also be an opportunity to evaluate the whole course, in which case more comprehensive evaluation tools should be used such as quizzes, evaluation forms, etc.

Sample Timetable: Module 10

TIME	ACTIVITY
20 minutes	1. Initial brainstorming session on agriculture and health.
60 minutes	2. Participatory creation of a scattergram or rich picture of issues in agriculture and health and how they are related to each other.
30 minutes	3. Lecture to introduce conceptual frameworks on the links between agriculture and health.
2 hours	4. Small group work on case studies and report back to the plenary.
30 minutes	5. Plenary discussion facilitated by trainers on how to apply for lesson learned from the case studies to local issues face participants or learners.
2 hours	6. Small group discussion to work on local agriculture and health issues.
40 minutes	7. Summary and evaluation of the module.
Total: 7 hours	

Evaluation

Various methods can be used to evaluate the learning of participants. For example, a simple quiz can be used to test whether participants understand the links between agriculture and health. Open-ended questions can be distributed to participants to obtain their reflection on this module. Other participatory evaluation methods can be used to do the evaluation.

Trainers should select the methods based on their experience and needs.

Refer to *Module 2: Introduction to Ecohealth* and *Module 1: Approaches to Designing and Teaching Ecohealth* courses for more details.

Terminology

Subsistence Farming

Farmers are engaging in subsistence farming when they grow only enough crops for themselves and their families. They face different problems than commercial farmers, (e.g. a rise in fuel costs may not affect them, but problems like droughts and being sick or injured for a few days would). Subsistence farming is usually on a small plot of 1-3 acres. These farms have simple tools (e.g. hoes, machetes, and digging sticks). The work is done by the farmer and family and the produce is eaten by the farmer and family (Wikipedia).

Green revolution

A great increase in production of food grains (especially wheat and rice) that resulted in large part from the introduction into developing countries of new, high-yielding varieties, beginning in the mid-twentieth century. Its early successes were in Mexico and the Indian subcontinent. The new varieties require large amounts of chemical fertilizers and pesticides to produce high yields, raising concerns about cost and potentially harmful environmental effects. Poor farmers, unable to afford the fertilizers and pesticides, have often reaped even lower yields with these new grains than with the older strains, which were better adapted to local conditions and had some resistance to pests and diseases (www.answers.com).

Agricultural intensification or intensive farming

The cultivation of land where there are very high inputs of labour, fertilizers, pesticides, herbicides, and fungicides to obtain the maximum output. Examples include mono cropping (plantations) of coffee, tea, or cattle ranching in Amazonia.

Intensive farming or intensive agriculture is an agricultural production system characterized by high inputs of capital, labour, or heavy use of technologies such as pesticides and chemical fertilizers relative to land area.

Intensive livestock farming can involve large numbers of animals raised on limited land, that require large amounts of food, water, and medical inputs. Confined indoor intensive livestock operations are often referred to as factory farming and present issues related to animal welfare, pollution, and health (Wikipedia).

Animal husbandry

The agricultural practice of breeding and raising livestock.

Zoonotic diseases

Any disease or infection that is naturally transmissible from vertebrate animals to humans and vice versa is classified as a zoonosis, according to the PAHO publication "Zoonoses and communicable diseases common to man and animals." Over 200 zoonoses have been identified and are caused by all types of agents: bacteria, parasites, fungi, viruses, and unconventional agents (http://www.who.int).

Sustainable agriculture

Farming that integrates ecological principles. Defined as "an integrated system of plant and animal production practices having a site-specific application that will last over the long term to: satisfy human food and fibre needs; enhance environmental quality and the natural resource base on which the agricultural economy depends; make the most efficient use of non-renewable resources and on-farm resources and integrate, where appropriate, natural biological cycles and controls; sustain the economic viability of farm operations; and enhance the quality of life for farmers and society as a whole" (Wikipedia).

Food safety

Food safety is the use of various resources and strategies to ensure that foods are properly stored, prepared, and preserved so they are safe for human consumption. One of the most important aspects of practising food safety involves preventing foods from becoming contaminated. Making sure foods are stored properly helps avoid any type of food contamination (http://www.wisegeek.com).

Food security

People are considered food secure when they have all-time "access to sufficient, safe, nutritious food to maintain a healthy and active life" (Definition adopted by the 1996 World Food Summit). Food security includes these three main elements:

Food availability

Food must be available in sufficient quantities and on a consistent basis. It considers stock and production in a given area and the capacity to bring in food from elsewhere, through trade or aid.

Food access: People must be able to regularly acquire adequate quantities of food, through purchase, home production, barter, gifts, borrowing, or food aid.

Food utilization: Consumed food must have a positive nutritional impact on people. It entails cooking, storage, and hygiene practices, individuals' health, water and sanitation, and feeding and sharing practices within the household (World Food Program, http://www.wfp.org/food-security).

Ecological health

Ecological health, ecological integrity, or ecological damage are the symptoms of an ecosystem's loss of carrying capacity, its ability to perform ecological services.

Measures of ecological health, like measures of the more specific principle of biodiversity, tend to be specific to an eco-region or even to an ecosystem. Some general symptoms of ecological damage include:

- The build-up of waste material and the proliferation of simpler life forms (bacteria, insects) that thrive on it – but no consequent population growth in those species that normally prey on them
- The loss of keystone species, often a top predator, causing smaller carnivores to proliferate, very often overstressing herbivore populations
- A higher rate of species mortality due to disease rather than predation, climate, or food scarcity
- The migration of whole species into or out of a region, contrary to established or historical patterns
- The proliferation of a bio-invader or even a monoculture where previously a more bio-diverse species range existed.

Some practices such as organic farming, sustainable forestry, natural landscaping, wild gardening, or precision agriculture, sometimes combined into sustainable agriculture, are thought to improve or at least not to degrade ecological health, while still keeping land usable for human purposes.

Deforestation and the loss of deep-sea coral reef habitat are two issues that prompt deep investigation of what makes for ecological health (Wikipedia).

Key References

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CASE STUDIES

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Fenner-Crisp, P. Keen, C. L. et al (2010). A review of the science on the potential health effects of pesticide residues on food and related statements made by interest groups: http://www.safefruitsandveggies.com/sites/default/files/expert-panel-report.pdf

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MODULE 10 – HANDOUT 1 – ACTIVITY 5

QUESTION	ANSWERS/POINTS FROM DISCUSSION
1. Briefly describe the place you are considering.	
2. What are the main agricultural activities in your place and what are the current and potential consequences of those agricultural activities on the health of humans, animal, and ecosystems?	
3. Is there any action taken by the government, community, or other stakeholders to deal with the adverse health outcomes of those agricultural activities?	
4. To the best of your knowledge, has any research been done to look into those issues? If so, what kind?	

5. This is the most important part of the exercise and should take most of your time. Reflect back on all the tools, ideas, strategies, and principles you have learned about during the Ecohealth course. See if you can apply any of those tools and ideas in this exercise. How could you undertake an Ecohealth research project to fill one of the gaps? How could the research outcomes be best applied to reduce the adverse health outcomes of those agricultural activities on human health, the health of animals and the environment?	
In developing a research idea, consider the following stages of research design: 1) Determine the problem statement 2) Determine the research objective 3) Define the research question or hypothesis 4) Establish the methodology, sampling strategy, data collection, and analysis process 5) Determine the dissemination of research findings and the integration of knowledge to action.	

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