Developing Environmental Assessments and Comparing Risks

A Supplement to the Guide to Implementing Local Environmental Action Programmes in Central and Eastern Europe

Prepared by:
KEN JONES

Green Mountain Institute for Environmental Democracy,
Montpelier, Vermont, USA

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PART ONE: Preparing for your assessments

Introduction 7

Exercises 11

Exercise one: The role of assessment in LEAP 11
Exercise two: Using community vision to identify issues 13
Exercise three: Identifying issues 15
Exercise four: Which impacts concern us most? 16
Exercise five: Issue mapping 18

Issue mapping worksheet 20

Sample issue maps 21
Further discussion of issue mapping 22
Sample list of impacts 24
Sample list of stressors 25
Sample list of sources 27

PART TWO: Building your own asssessments

Introduction 31

The concept of risk 32
A caution on developing assesments 32
Using the sample assessments 33

Drinking water 35

Microbiological contaminants in drinking water 35
Chlorinated drinking water 38

Air pollutants 41

Ozone 41
Sulphur dioxide 44
Oxides of nitrogen 47
Carbon monoxide 49
Particulates 51
Volatile organic compounds 53

Radiation 57

Other toxic chemicals 61

Lead 61
Pesticides 64

Solid waste 67

PART ONE:
Preparing for your assessments

Introduction

This manual is a supplement to Chapter 2: Assessing Environmental Issues and Setting Priorities of the *Guide to Implementing Local Environmental Action Programs in Central and Eastern Europe* (included on the CD-ROM). That chapter asks several useful questions to be considered by your stakeholder group as you seek to select, define and characterise your community's environmental issues. This manual provides exercises to help answer those questions and get your assessments started. In addition, the appendix includes sample assessments for use in your projects directly and for use as templates for presenting your own assessments.

The five exercises presented in this manual will help a LEAP stakeholder group work through the key questions of Chapter 2 to arrive at the following outcomes:

- developing a shared understanding among the project participants of how the assessment will benefit the project (Exercise 1: The role of assessment in LEAP);
- making a connection between the vision and the assessment (Exercise 2: Using community vision to identify issues);
- creating an issue list (Exercise 3: Identifying issues);
- deciding which impacts are most important to consider when setting priorities (Exercise 4: Which impacts concern us most?) and;
- organising the issues to simplify the assessment process and help communicate that the community's concerns are being addressed (Exercise 5: Issue mapping) .

The exercises do not need to be completed in any particular sequence. In fact, a project may benefit from carrying out just one or two of them. The exercises help project participants work together to build a common understanding of their LEAP structure and content.

According to the *Guide*, an environmental issue assessment is a profile of current environmental conditions in your community. There are numerous benefits to performing assessments (see Guide, Chapter 2, page 1) , but the greatest benefit may be its central role in your project: assessments provide the information that will determine which actions will help you achieve your vision.

LEAPs are strong when they begin with a commonly held vision for the community and include specific solutions to problems that exist. Assessments help build a bridge between the vision and the solutions. In an assessment, the stakeholder group (or a technical advisor) collects information about the environmental issues that concern the community. Included in this information is a discussion of sources towards which your solutions will be addressed. In addition, the information allows project participants to compare the impacts related to specific issues to determine which of them pose the greatest threat to the community's ability to achieve its vision.

A basic environmental assessment describes environmental problems using certain criteria as the yardstick to measure impact. For example, if the community expresses concern about children's health, then each environmental assessment should measure the problem in terms of the impact on children's health.

The Guide and this manual use the same language for the elements of assessments. An assessment describes a problem or issue in terms of its impacts. This manual breaks issues into two parts: sources and stressors. Included in this part of the manual are examples of sources, stressors and impacts (see pages 15-19).

Sources are the human activities that introduce stressors into the environment. For example, a factory might be a source of toxic chemicals in the air. The action phase of a LEAP should focus on solutions that address sources.

Stressors are the direct causes of an impact. The simplest stressors in community projects are chemical pollutants, but there are important biological and physical stressors as well. Stressors are introduced into the environment by sources, as described above.

Impacts reflect our personal values and lead us to the assessment end points we use to measure each problem. A common impact is the risk of illness resulting from an environmental stressor. Community visions are often presented in terms of reducing impacts. Impacts also represent the criteria against which different problems can be evaluated in a comparative risk project.

EXAMPLE 1:

From vision to solution

Let's examine an example of how an assessment builds the bridge from vision to solutions. Imagine a communitity has determined that illness is resulting from contaminated drinking water.

■ **The community vision is to provide clean, safe drinking water for all citizens.**

It may be known that failing septic tanks are the primary source of the bacteria contaminating local drinking water and harming the community's health.

■ **One possible solution is to repair or replace failing septic tanks.**

An assessment can answer the question: How many cases of waterborne disease could be eliminated by fixing the septic tanks? It will help the community learn whether there are other sources of waterborne disease and whether there are solutions that are more effective than fixing the septic tanks. This information links the vision (reduce the impacts of the problem) to the best solution (address the source of the problem).

An assessment that includes information on all three elements helps participants understand the relationships among them. This understanding is important to ensuring that the actions your project selects will result in the achievement of your community vision.

Let's illustrate the way these elements are connected. After these exercises, you should have completed the worksheets that list sources, stressors and impacts. These tasks will serve as the starting point for conducting your own community environmental assessment, or at least provide instructions to technical experts to conduct it for you.

TABLE 1:

Source, stressor and impact

Source	Stressor	Impact
An activity that is causing contamination of the drinking water supply (e.g., failed septic tanks)	A specific pullutant that is in the drinking water supply (e.g., fecal coliform bacteria)	A waterborne disease among users of the drinking water supply (e.g., gastro-intestinal disease)

Exercises

Exercise one:
The role of assessment in LEAP

Objectives:

1) To clearly establish the role of assessment in a project;
2) To convince participants that assessment is worthwhile.

Present:

the benefits of assessment, as on the first page of Chapter 2 of the *Guide*.

An assessment:

- gives a clear, shared analysis of the key environmental issues facing the community;
- provides information about the environmental impacts of individuals and the activities of public and private institutions, as well as what these institutions and individuals are doing (or not doing) to improve and protect the environment;
- establishes a baseline of environmental conditions from which to measure the effectiveness of actions taken to improve environmental conditions;
- raises public awareness of environmental issues and potentially leads to engaging citizens in improving the environment; and
- helps build relationships and partnerships among stakeholders that can lead to new opportunities for action.

Ask:

1) Who is making decisions about air quality? water quality? toxic releases? solid waste?
2) Do we need to do an assessment?
   a. Are all of the decision-makers in our community aware of the impacts of water pollution on citizens' health?
   b. Are all of the decision-makers in our community aware of the impacts of water pollution on economic development opportunities?
   c. (repeat questions above for other major environmental issues in your community)

d. Has it already been decided which solutions we are going to pursue? Does everyone in our community agree that these are the best solutions to implement first, or the most important problems to solve first? Is there polarised debate in the community over whether to pursue environmental protection? over which problems are most serious? over which solutions are best?

Typical responses may include:

- "The construction of sewer facilities is a political process. Certain neighbourhoods get better facilities because of who they know rather than any environmental need."
- "No one seems to be taking responsibility for our air quality. New roads are getting built without any consideration of the environmental impacts resulting from greater traffic and air pollution."
- "That new factory making plastic parts for cars is a mystery to me. I don't know what comes out of the smokestack or how it may affect our health."

Summarise:

the responses. Are there major themes among them? Examples might include:

- expanding public knowledge; or
- identifying information to influence policy decisions.

Try to identify a small number of themes and record them.

Construct:

a statement that can be used to communicate the intent of the project's assessment, beginning with the phrase, "Our environmental assessment will . . . " You may want to choose from the presentation points found in the Guide, or create your own.

Here are some examples:

- "Our assessment will describe the relative impacts of different sources of pollution so that we can focus local discussions on environmental issues of greatest impact."
- "Our assessment will provide an opportunity to build a common understanding of environmental issues so that we can act in the spirit of cooperation."

Using the results:

The final statement can improve community members' understanding of the project and build their interest in participating.

Exercise two:
Using community vision to identify issues

Objectives:

1) To reinforce participants' understanding of an existing community vision;

2) To explore the impacts that are of concern to the community.

Review community vision:

Example: Excerpts from community vision of Barlinek, Poland

Natural and cultural environment

- Replenishment of green areas in parks and along transportation routes;
- Building recreational paths in the community;
- Organising water supply and wastewater treatment;
- Creating a community without air pollution;
- Having an environment without waste.

Step one:

Identify and record impacts within the vision. Some of the vision statements will focus on stressors, sources or solutions, and it will be necessary to take some steps to result in a statement of impact, as in Example 2.

EXAMPLE 2:

Example based on Barlinek vision

Vision	Impact
Enhance green space	Strong community
Create recreation paths	Healthy people
Organise water supply	Healthy people
Treat wastewater	Healthy river
Ensure clean air	Healthy people
Manage solid waste	Strong economy

Step two:

For each issue, ask the questions: How will we know that we have achieved this? What can we measure to determine whether this issue is improving? Record the answers.

EXAMPLE 3:

Example issues and how to evalute them

If you want to measure ...	then look at ...
the health of residents.	mortality rates, hospital admissions.
the strength of the economy.	employment, wages.

Using the results:

Record the impacts on the Issue mapping worksheet (Table 2, page 20). If you complete exercise 3, 4 or 5 you can use the results from this exercise as a starting point or to check for consistency.

As your project continues, refer back to the impacts list to ensure that you are not inadvertently shifting the focus away from your project vision.

Exercise three:
Identifying issues

Objective:

To list the issues important to the community and begin the assessment process.

Ask:

1) What are the environmental issues that you feel are important to this community?
2) What are some of the environmental problems that this community is facing?

As a follow up ask participants:

- Why is this issue a concern to you?
- How does it affect you or the community?

Record the results:

The responses will probably be in different forms: some will be stressors, some sources and some impacts (see sample issue lists in the *Guide*, p. 14) . You can try to organise them onto separate sheets of paper as people submit them, or you can make one long list to be organised later. Exercise 5: Issue Mapping is a good way to organise a long issue list into stressors, sources and impacts, which will make your assessment easier.

Using the results:

The issue list that results from this exercise may be very long. Using Exercise 5: Issue mapping to organise the issues may reduce the length of the list and make it easier to begin an assessment. If the final list is so long that it is not possible to assess all the issues, then the stakeholder group will have to find a way to prioritise the issues and only assess the most important ones. One way to prioritise the issues might be to focus first on the issues that relate most closely to the project vision. If you have not yet done Exercise 2: Use project vision to structure assessment, it could help narrow the list.

Exercise four:
Which impacts concern us most?

Objective:

To help participants consider the assessment end points for comparative risk analyses.

Opening presentation:

If the project has made an issue list, it may be clear that there are several impacts from the range of environmental issues in a community. Comparative risk analysis compares different environmental issues using a consistent set of impacts. However, it can be difficult to find consistent impacts across issues.

Ask:

1) Are 100 more asthma events worse than ten cases of gastro-intestinal distress?
2) What's worse, a child getting respiratory problems or an adult getting cancer at age 65?

Record key points:

Ask the group to find common themes, which could include:

- duration of health impact;
- severity of short-term effect;
- reversibility of effect; or
- certainty of effect.

Risk-ranking criteria:

If you have already developed an issue list which includes some impacts, you can use these for further discussion. Review the impacts on the list and identify those impacts that result from several of the environmental sources or stressors. One impact that many issues have in common is cancer. Keep in mind that when it comes to ranking risks it is fairly simple to compare two issues that result in the same impact.

There may be other impacts on your list that result from only one or two issues, but which may be important to consider in comparing risks. In many risk-ranking exercises, participants choose death and impacts on child development as two of their primary criteria, although there may be few issues that result in these impacts.

There may be other unique impacts that are less severe than death, but which are important to the community, such as foul odours resulting from improper solid waste management. A question to consider is how your project will compare issues with impacts as diverse as cancer, odour and the impairment of child development.

Return:

to the themes recorded in the initial discussion and identify any that might help you structure a comparison of issues with diverse impacts.

Using the results:

The criteria that generate the most interest should be highlighted on your list of impacts. Whenever possible, the assessments should address those criteria.

EXAMPLE 4:

Sample impacts

Impacts from air pollutants	Impacts from drinking water contamination
• Asthma • Cardiopulmonary problems • Immune system problems • Childhood disease • Death	• Cancer • Gastro-intestinal distress • Immune system problems

Exercise five:
Issue mapping

Objective:

To identify the relationships among human activities (sources) , environmental pollutants (stressors) and their impacts on human health or ecological end points (effects) .

Starting point:

Refer to your project issue list. Issues on the list may be described in different ways, but each one should fit into one of the columns on the worksheet. We do not include a discussion on pathways, but these include drinking water, food and inhalation.

Part one:

1) Begin with one issue from your list.
2) Determine how it is described: Is it a source, stressor or impact? (It might also be a solution, such as "create bicycle paths," or a pathway, such as "contaminated drinking water.")
3) Place the issue, as described, in the appropriate column.
4) Continuing with the same issue, consider what items link to it from the other columns, and fill them in (see the sample issue maps) .
5) Once the source, stressor and impact columns have been filled in for the first issue, move to a new worksheet and do the same for the next issue.
6) You may find that one worksheet includes more than one issue from the list because of the way they were originally described. You can cross these issues off the list, as they are included on your issue maps.

Part two (optional)**:**

Under the column marked Pathway, list the different kinds of routes by which the stressor can result in the impact. Ask the question, "How are people/the environment exposed to harm from the stressor?" Record the answer to this question under Pathway. There may be more than one.

Part three (optional)**:**

Under the column marked Solution, list actions the project or community could take to affect the source of the problem.

Using the results:

Issue maps provide a good starting point for assessments because they clarify the links between sources, stressors and impacts. This is beneficial for structuring assessments, communicating results to the community, developing solutions and building environmental indicators.

The exercise also provides guidance to those individuals doing the assessments. If it is possible to highlight a few connections on a map, then the assessment question can be posed.

For example, in the case of drinking water, the sample map suggests some possible assessment questions:

- How many deaths result from pesticides each year? (either from all sources or the sources that are local to your jurisdiction)
- What is the magnitude of illness resulting from nitrates?
- What is causing the bad taste in our water?

TABLE 2:

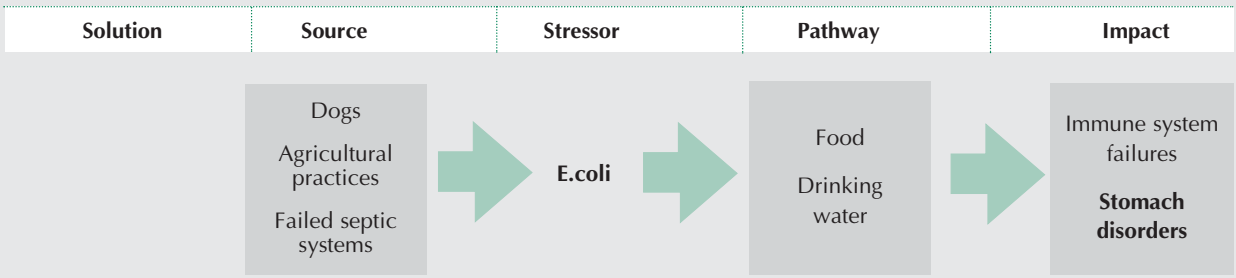
Issue mapping worksheet

Solution	Source	Stressor	Pathway	Impact

Sample issue maps

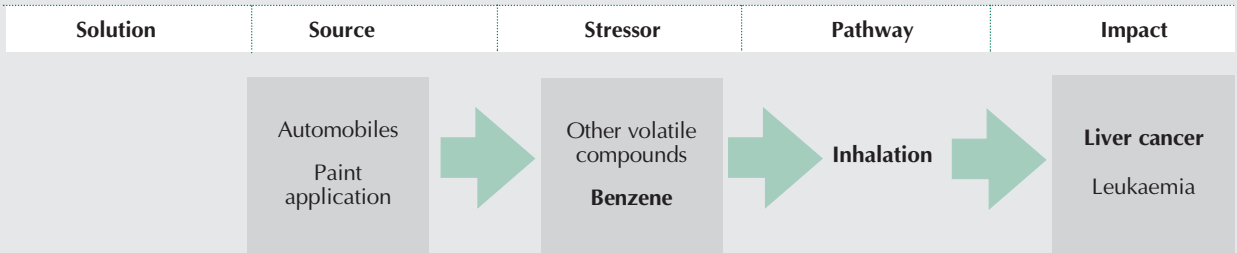
SAMPLE ISSUE MAP #1

"Drinking water is making people sick"



SAMPLE ISSUE MAP #2

"There is benzene in the air"



Further discussion of issue mapping

Sample issue mapping — drinking water

One of the issues that your project will probably address is the quality and safety of drinking water. To structure the assessment for drinking water, you can start by noting that drinking water is a pathway for exposure to many contaminants.

The first question to ask when considering drinking water as a problem is:
"What are some of our concerns about our drinking water?"

Some responses may be:

- "It makes us sick."
- "It tastes bad."
- "It increases the risk of death in vulnerable populations."

The second question to ask is:
"What are some of the contaminants that pose risks to our drinking water quality?"

Responses may include:

- bacteria;
- nitrates;
- lead; or
- pesticides.

And a final question:
"What are some of the sources of those contaminants?"

Responses may include:

- failed septic systems;
- industrial releases;
- upstream contamination; or
- farmland.

The focus can now shift to specific connections and posing assessment questions.

DIAGRAM 1

Drinking water concerns

DIAGRAM 2

Drinking water contaminates

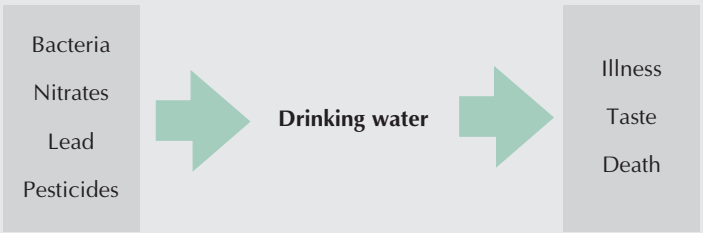
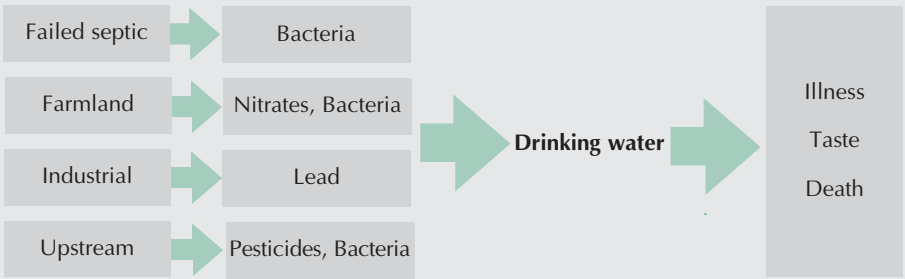


DIAGRAM 3

Tracing the effects of drinking water contaminants



Sample list of impacts

Human health

- Cancer
- Acute poisoning
- Cardiovascular complications
- Birth defects
- Infertility
- Impairment of neurological development
- Gastric distress
- Immunological impairment
- Vision impairment
- Hearing impairment

Ecological

- Attention to populations of popular ("charismatic") species
- Endangered species
- Accumulation of toxins in the food chain
- Disruption of primary productivity
- Exotic species dominating local species
- Disruption of nutrient cycling

Other

- Economic damages
- Unemployment
- Aesthetic damage
- Odours
- Visual degradation
- Loss of cultural/spiritual assets
- Decreased sense of community
- Lost recreational opportunities

Sample list of stressors

Individual toxic chemicals

- Chlorine
- Lead
- Mercury
- Chromium
- Arsenic
- Polychlorinated biphenyls (PCBs)
- Dioxins
- Pesticides
- Carbon monoxide
- Oxides of nitrogen
- Oxides of sulphur

Nutrients

(usually related to water quality)

- Phosphates
- Nitrogen

Bacteria

Other biological contaminants

- Protozoa
- Parasites
- Exotic species

Particulates

- Dust
- Soot
- Smoke

Dirt, trash and litter

Physical alterations

- Sediment fouling lakes and streams
- Stream channel alterations affecting flood regimes
- Loss of habitat
- Filling wetlands

Carriers of disease

- Rats
- Insects
- Birds

Sample list of sources

Activities that result in the generation or release of one or more stressors

- Industrial smokestack emissions
- Agricultural runoff
- Automobile emissions
- Industrial wastewater effluent
- Incinerators
- Automobile traffic
- Solid waste disposal
- Sludge applications
- Nuclear power plants
- Hazardous waste management sites
- Abandoned hazardous wastes
- Loss of open space or wild lands resulting from development
- Leaking chemical or petroleum tanks
- Spills from transportation accidents
- Releases from wastewater treatment plants
- Failed septic system (or straight pipe sewers)
- Topsoil and vegetation disruption
- Conversion of forest to other uses
- Exotic species introduction