PART 3: Considering actions

Which way should I go?

Chapter 13: Working framework for multiple perspectives

Partial outline –

13.1 Introduction

review reasons for needing to hold all these perspectives

13.2 Outline of the method

There are four components of the working framework:

1. observation and direct experience
2. creation of narratives using exploratory and diagnostic tools and information from experts
3. analysis of the overlap and differences between the narratives
4. engage in selected actions that are appropriate given the problem types

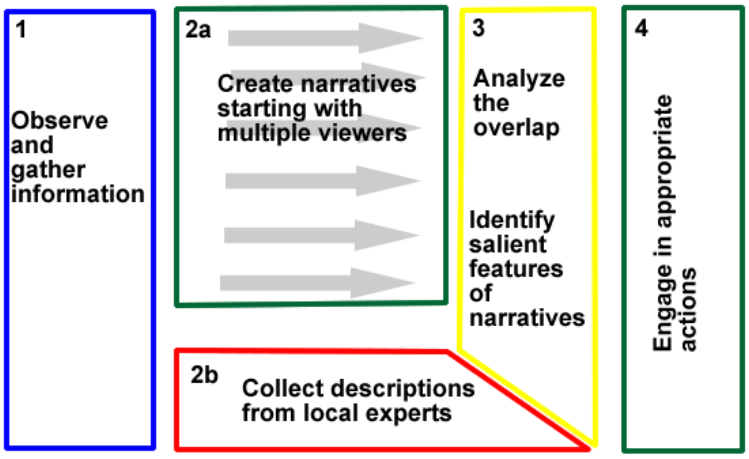

Figure 12.1 A schematic of the “multiple perspectives framework”

13.3 Observe and gather information

Primary data and some direct observations need to be gathered from the location to complement the information that can be obtained from literature maps and other references sources. The group responsible for employing this multiple-perspectives framework must have firsthand and personal experience in the specific location and exposure to the issues. This requirement is essential to the "method of experience" described by Norton (2005). The data, observations and information should encompass the physical location and processes, biological and ecological features, society, values and economy. Familiarity with the first five "viewers" will help the observer understand what information will be needed.

13.4 Create narratives

Independent narratives of the situation will be created (from the information gathered) using as many of the "viewers" as possible. For any environmental situation, it should be straightforward to employ the "systems", "network", "scale", "games", "risk/uncertainty", and "accounting" perspectives. It may also be possible to employ a "values/world views" approach if you have access to discussions with local people. The structure of these viewers force you take a constrained approach to the situation, but by doing so allow you to avoid missing information crucial to that view. Each viewer-specific narrative will provide an internally consistent or coherent description of the problem. The narrative from each viewer will always contain certain salient features (which are important in the next step). Any one view will not capture the richness or even full scope of the problem.

There are also many other approaches that could be useful but that are not mentioned in this book. A few examples are:

- interviews that look for community values and preferences
- maps, geographical information systems, and other spatial approaches
- historical drawings (such as used by Wood (2000, 2003) to study land right movement in El Salvador)
- community network analysis (such as performed by Granovetter (1982))

Local experts can also provide their own narratives. Individuals and representatives of groups already living and working in the location will have likely constructed their own explanations of the problems and described their approaches to dealing with them. After collecting this information, there will be some loss of richness when they are translated into terms that can be compared to the viewers. It might be useful to save the original narrative separate from the translated version. This is not always possible because if you have to construct the original narrative from

conversations, that translation has already been built into your version.

There should be no attempt to force any of these narratives to converge. If one person is creating all the narratives, it is important to be able to approach each view with a clear mind. If a team is used to study the problem, it may be useful to create the narratives in isolation from each other and even have different members of the team create duplicate narratives at the start. Team members who are more experienced with a particular view should be assigned that view. Writing a narrative from one view is a skill that should improve with practice. During this process of collecting information for the narratives, it is important to maintain the "space" that allows any idea from any of the sources to be voiced. It is also important for all these ideas to remain on the table. This is a standard practice in any similar group activity, such as brainstorming.

Addressing these problems from multiple perspectives presents a valuable opportunity to examine or suggest a wide range of problem-analysis techniques or heuristics. These heuristic approaches are not explicitly part of the viewers, but thinking about problems using this framework should trigger some innovation. This opportunity is described by Page (2007) as one of the big benefits to be gained from diverse working groups and one of the values of a deep education for individuals. According to Page (2007), difficult problems that have multiple dimensions are much more likely to be solved by employing a toolbox of heuristics that stem from the multiple disciplines and backgrounds of a diverse team.

13.5 Analyze and compare the narratives

The narratives from the viewers will identify salient features of the problem, such as the mass balance of water or the connectivity of the ecosystem to the local community. See Table 12-1 for a review of some of these salient features of each viewer. A summary of the

characteristics from each view will be compiled and these characteristics compared. Some parts of these descriptions will be expected to overlap because there are different ways of looking at the same phenomena (such as the flow of nutrients from the systems view and some aspects of connectivity from the network view). Again, it is important to remember that other outcomes of viewers should not be expected to overlap and should not be forced to be convergent. Non-convergent components of multiple narratives are a crucial part of the multiple perspectives framework. Without these ambiguities, the whole framework will collapse to a single disciplinary view and defeat the whole effort. This approach is very different from the natural science disciplines, such as biology or chemistry, in which the multiple representations are expected to converge and reinforce each other. But the open-ended descriptions with more latitude in the representations is more in common with social sciences.

Table 12.1: Summary review of several salient features of each viewer. If you see these features in a problem, it may be useful to try using the viewer to elaborate other relationships of characteristics of the system.

Viewer (Chapter)	**List of salient features**
Patterns (4)	• spatial or temporal patterns • direct observations • looking for likelihood of a hypothesis to match the observations
Systems (5)	• reservoirs or stocks • flows • control of flows by some process • closed or open system • positive or negative feedback
Scale (6)	• range of physical sizes, temporal

	durations or rates • key processes of different magnitudes
Network (7)	• nodes and connections • connectivity • spatial grid with connections • resilience
Risk (8)	• risk, exposure • bounded rationality • uncertainty • indeterminacy
Games (9)	• multiple participants • limited cooperation • payoff matrix • precautionary principle
Environmental Accounting (10)	• asset • liability • "completeness"
Values and World views (11)	*to be added later*

The purpose of this chapter is to identify conflicts or ambiguities, not to sweep them away. However, the convergent or redundant information between viewers is useful to stitch the narratives together (See Table 12.2). For example, if you create an accounting view of a particular project and it reinforces some of the institutional and ecological benefits, then this would be similar to the "Triple Bottom Line" approach used in some businesses. The Triple Bottom Line is a good goal for sustainable management, but that approach presents problems if the financial accounting doesn't line up with the social and ecological

accounting. It provides no method for overcoming discordance to meet the goal.

Table 12.2 Several key overlaps between viewers that can be used to stitch the narratives together.

Terms	**Explanation**
Systems -flow vs. Network - link	In the systems view a flow between stocks or source/sing and a stock can only be the units of whatever is in that stock per unit time. In the network view a link can be any relationship between the nodes, material, energetic or informational.
Scale - total extent vs. Systems - boundary	In the Scale view the total extent of the system is a value that represents the largest physical dimension. In the Systems view, the system boundary has to be more exactly drawn and this boundary represents what is being counted or measured (represented by stocks) and what is coming and going outside of the system being studied (using sources and sinks). The Systems view demands a much clearer definition of what's in and what's out.
Risk and Uncertainty -Precautionary principle vs. Games – Game against nature	

Another	

13.6 Engaging in appropriate actions

The narratives can be examined to help establish two key aspects of what actions to take. First, it should be clear from the narratives how important new innovations and/or institutions will be in providing possible paths toward solutions. If technical or social innovations are required, then it will be essential that supportive institutional structures are available or created to manage the implementation and control of such innovations. If sufficient technology or social expertise already exists, then it is still important to assess whether the institutions in the society and economy can handle the processes. A first pass at this assessment should be apparent from the risk/uncertainty, games, and environmental accounting perspectives. These viewers should help determine if there is general agreement in the population about the proposed actions, what types of outcomes they are expecting and whether there is an accounting or budgeting structure that will support the project.

The second evaluation that needs to be performed on the narratives is to rank the problem with regards to the three main dimensions: information, control and socio-economic convergence. These are the dimensions of the main problem approaches that will be presented in Part V. The information dimension is from having a suitable amount of information available to start on a solution to facing high and persistent uncertainty. The control dimension goes from having complete social, engineering and budgetary control to having very little ability to implement any infrastructure or procedures. Finally, the socio-economic convergences is the match between the values of individuals vs. society and the degree of consensus between individuals about what should be done and the nature of the outcomes expected. This ranges from consensus through personal/society mismatch all the way to highly contentious with no coherence at basic philosophical levels. For the purposes of this framework, it will be useful to just rank these as high or low. The choice of which approach to take will be discussed in Chapter 13.

13.7 Summary

Problems that are of crucial interest in environmental science are complex, difficult, and wicked. There are no simple, one-size-fits-all solutions to these problems. For the environmental scientist/practitioner, it is not a task of sorting through a list of current best practices for the correct solution. That may be a good first cut at the literature. The problems will have place and history specific attributes that require additional direct experience. These problems are not only place specific, but by nature they will also change with time, again a characteristic that is addressed by scientific adaptive management and requires constantly updating information and objectives.

Applying the multiple perspective framework requires a person or team to commit time and attention to a problem. Several examples

are presented elsewhere in this text that illustrate the timeline of projects. Working on the multi-faceted aspects of a problem by devoting the time individually or with collaborators can be very rewarding. In order to meet the requirements of MPF, one must personally experience the location, the processes and interact with the people who live and work there. It may not be as efficient as downloading data off Google, but, in the end, it's both more effective and satisfying. When you read some of the examples and case studies, you should think about what it would be like to be talking to experts, collecting data using many types of observation and instruments, as well as combining information from a wide range of resources. You might also want to imagine yourself working alongside many different people, being exposed to all types of weather, and traveling to sites near and far. You should consider the multiple perspective framework as both an integrated set of academic and intellectual tools but also as a general approach to be involved in solving problems as an individual.

Chapter 14: Engaging with different types of problems

14.1 Introduction

In the first chapter of this text, I invoked the active definition of "understanding" to include the requirement that one take action, i.e. engage with the problem. How one choose to engage depends on the type of problem because different methods will be more or less successful with different problem types and contexts. For example, if one were to study a problem and realize that it is a "simple" problem one should be able to help solve this by supporting efforts to implement the solution. For example, litter on the beaches and in parks is a simple problem that is just waiting for more effective collection and disposal. One may be involved professionally through prioritizing one's work effort, or it may be personally by volunteering one's time and financial support, or elements of both. However, we have seen that most problems that persist in the United States are more difficult to solve and may require more information, community agreement, or combinations of information and values considerations.

The issue we are facing is how best to solve environmental problems when there are different types of problems and there are as many methods for solving such problems. For starters, we can apply several of the intellectual tools that were described in Section 2. After we create a narrative of the problem (Chapter 13), we can turn several intellectual tools on our own dilemma. Specifically, we will determine the information requirements and uncertainty (Chapter 8), examine the values match between individuals and society (Chapter 10), and estimate the amount of control that we can expect to be able to impose (addressed in

Chapters 11 and 12). These three dimensions: uncertainty, values and control, will guide us to select appropriate approaches to working on environmental problems.

14.2 Many proponents of many different approaches

As expected, there are many authors and organizations who have proposed different ways to approach solving the Earth's problems. These proposals are at a different scale than presented in this book, i.e. the focus of this book is how an individual can understand and engage in productive activities as opposed to solving all the problems. All of these suggestions should be considered and it is obvious that some actions need to be taken.

These various suggestions reflect underlying worldviews. Some authors present approaches that pretty clearly fit within a particular worldview. Other authors, such as Hawkins, have different works that fit into different worldviews. The point of this analysis is to briefly review many good ideas for engaging in activities that could save the world, but the other purpose is to illuminate the assumptions about control and governance. Each of the four main world-views has its own Achilles' heal: for the individualist it is the threat from unintended consequences of growth, for the hierarchist it is the suppression of creativity from two many rules, and for the egalitarians it is that the public may really need strong rules to stay in line. As a group, fatalists don't have any weaknesses because they have resigned themselves to failure, but as individuals they will be left behind in social, economic and cultural developments that take place. It is instructive to review a summary of proposals to save the world with these ideas in mind about the threats to particular worldviews (Table 14.1).

Table 14.1 Authors and their proposed solutions to save the world or required action not to destroy the world. These have been classified as representing different worldviews: I=individualist, H=hierarchist, E=egalitarian, D=deep ecology/spiritual, TS=technology skeptic, F=fatalist (see Chapter 11).

Author and year **Title**	**Main premise**	**World View**
World Economic Forum	Coordinated world governance	H
Hawkins Ecology	Change in commerce	I, H
Lovins Small is Profitable	Profit from smaller scale energy	I
T.Berry	Change our spiritual relation to the world	E, D
Hawkins Blessed Unrest	Global environmental movements	E
Parrot and Meyer	Landscape level programs	E
Schumacher Small is Beautiful	Employ appropriate economics and technology	E, TS

With all of these good ideas, the question for each of us is how to become involved and engaged in actions that will improve the world (unless you're a fatalist). The theme of this book is that if we, as individuals, recognize that complex problems require thoughtful approaches, that if we approach problems by keeping an open mind and seeking many different types and sources of information, then we can apply these to problems. What isn't explicitly stated above is that, as an individually engaged citizen, you could only really address a small fraction of the issues that face Earth. If you select a particular issue that you think you can

contribute your efforts to, then you want your effort to be meaningful and effective. The first steps in choosing how to engage is to analyze the characteristics of the problem.

14.3 Problem types and dimensions

In Chapter 1 I introduced the types of problems that were categorized by combinations of matches between private and public values and levels of uncertainty. You may recall that there were four general problem types: Simple, Community Values, Complex/Information, and Wicked (see Table 14.2 which is the same as Table 1.1).

Table 14.2 Four types of problems

information demand	alignment between costs and values	
	good	poor
simple	EASY regulations	Community Value community rules
extensive	INFORMATION more research	WICKED political processes

Now let's look at a similar table that examines the types of approaches that are available to us as environmental scientists and managers. In this table, the dimensions are the degree of knowledge vs. uncertainty and the degree of control that can be exercised by managers.

Table 14.3 Approaches determined by the dimensions of control and uncertainty (From DOI – Adaptive Management Handbook)

	Sufficient knowledge	**High uncertainty**
High control	Optimal Project Management	Scientific Adaptive Management
Low control	Hedging: multiple investments	Scenarios

14.4 Approaches that are needed for all problem types

All of the problems that we address in environmental science and management probably need a combination of some innovation and institutional enhancements. Innovation is essential when we are working with complex problems because each situation is different and may be unique in some way. The innovation does not necessarily have to be some extremely creative, out-of-the-box invention. Most of the time the innovation can be supplied by combining current technologies and social institutions in novel ways. Even this relatively simple version of innovation requires support during the problem statement process and continued support through implementation from institutions that are designed to deal with the trials and learning that comes from innovation. This will be addressed in more detail in Chapter 15.

Institutions are also required to manage projects and deal with all levels of public involvement. Some communities that depend on natural resources have highly developed institutional structures that allow for a fair and mutually beneficial allocation of common pool resources. Other areas might have developed strong top-

down, command-and-control type methods to allocate resources. A comparison of these institutions and how and when each may be desirable will be discussed in Chapter 16. Chapter 16 will also address the institutional structures that are necessary for scientific adaptive management (SAM) because this is the proscribed management approach for many large state and federal projects. We will address the interplay between SAM and public decision processes, specifically the many forms of both democracy and consensus.

14.5 Approaches suited to particular dimensions

I have combined Tables 14.2 and 14.3 into one table that uses the three dimensions to indicate which problem solving approach is probably most appropriate. Each of the approaches will be described in a subsequent chapter.

Table 14.4 Problem dimensions and appropriate approaches.

Know-ledge	**Control**	**Values Match**	**Approach (Chapter)**
L	L	L	Scenarios (18)
L	L	H	
L	H	L	Environ-Entrepreneur (20)
L	H	H	Sci. Adapt. Manage. (19)
H	L	L	Multi-Criteria (17)
H	L	H	Hedging/Diversification (17)
H	H	L	CPR institutions (16)
H	H	H	Optimal Proj. Man. (17)

14.6 Summary

Taking action is part of the cycle of understanding. Choosing which approaches to employ when faced with complex environmental problems can be a challenge in itself. We can use the narrative or narratives that were used to pull information together from the multiple exploratory and diagnostic tools. These narratives are evaluated along three dimensions: 1) the degree of knowledge vs. uncertainty, 2) the coherence between individual and social values, and 3) an assessment of our ability to control the environment well enough to implement any particular solution. The outcome of this analysis will guide us to employ one or more of eight general approaches: guided innovation, enhanced institutions, optimal project management, hedging and diversification of approaches, multi-criteria decision analysis, forecasting with scenarios, scientific adaptive management, or environmental entrepreneurism.

