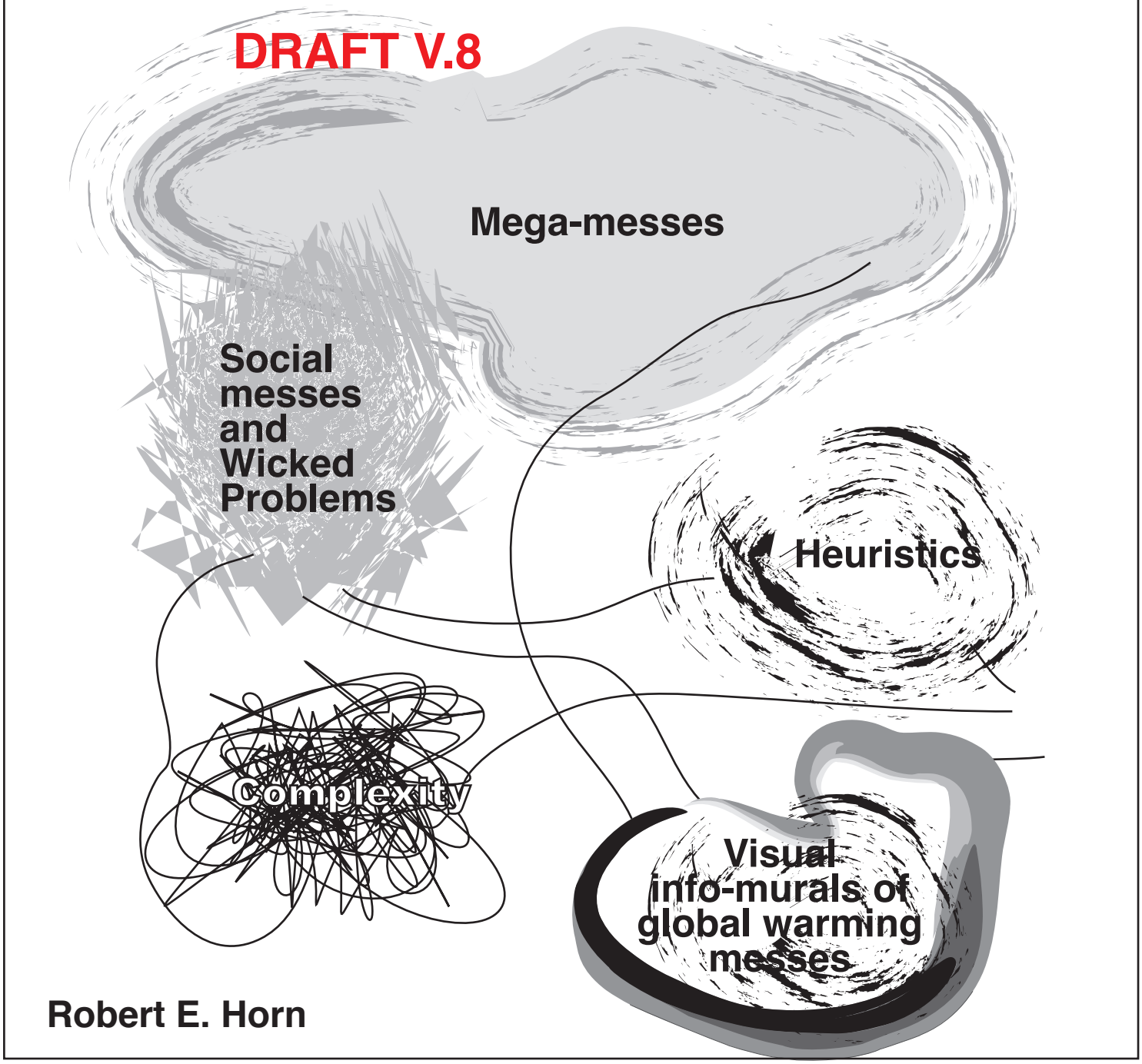
# The Little Book of Wicked Problems and Social Messes




Robert E. Horn

For all of my Mentors , Teachers, Collaborators, and Friends

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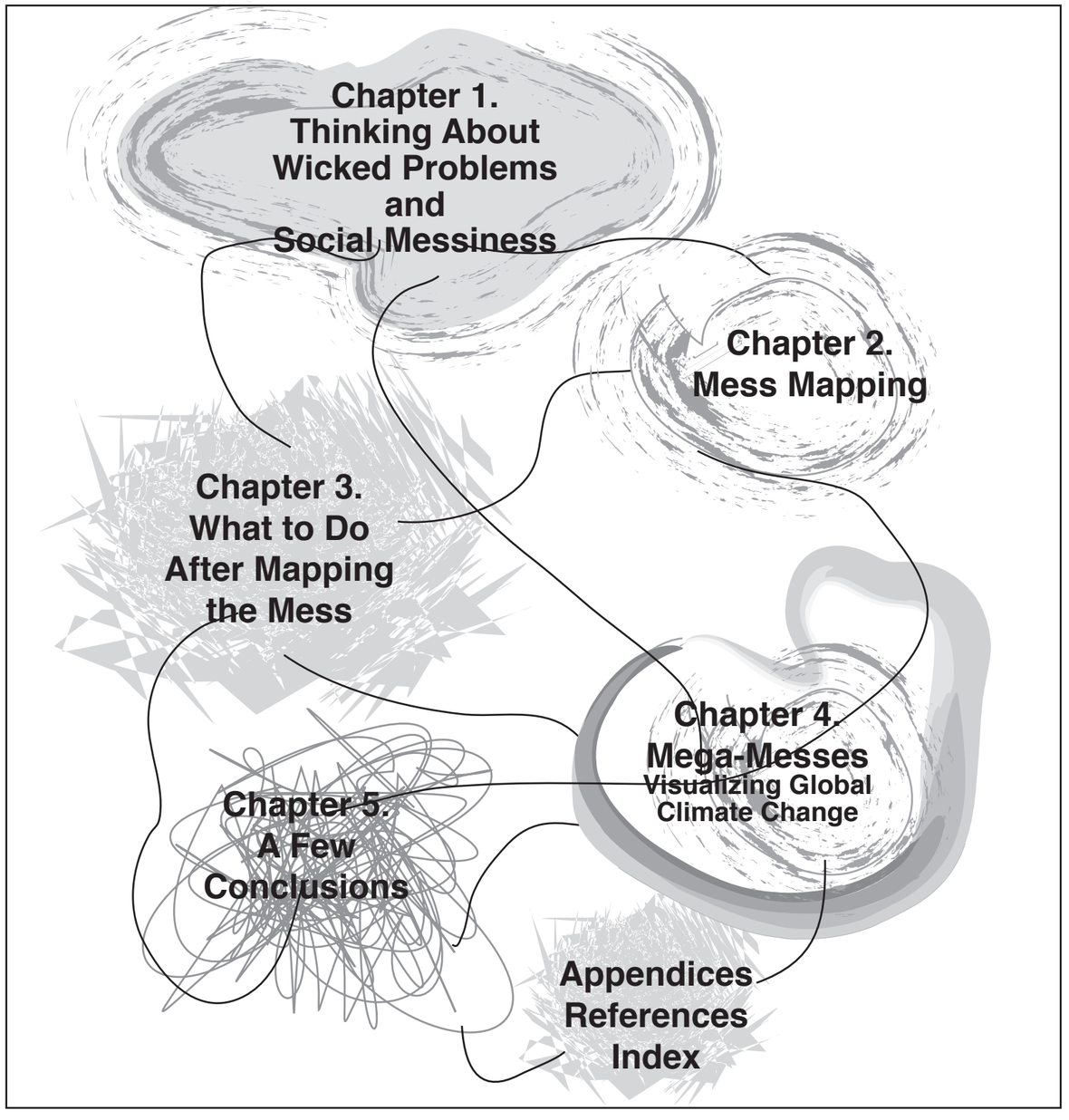


# Preface - Social messes

"We have also come to realize that no problem ever exists in complete isolation. Every problem interacts with other problems and is therefore part of a set of interrelated problems, a system of problems. For example, the race problem, the poverty problem, the urban problem, and the crime problem, to mention but a few, are clearly interrelated. Furthermore, solutions to most problems produce other problems; for example, buying a car may solve a transportation problem but it may also create a need for a garage, a financial problem, a maintenance problem, and conflict among family members for its use.

**Definition - Mess**
English does not contain a suitable word for "system of problems." Therefore, I have had to coin one. I choose to call such a system a mess. This concept is as central in this book as is that of a 'system.' This book is about messes."

Ackoff, Russell L. Redesigning the Future: A Systems Approach to Societal Problems. NY,Wiley, 1974. 20-21

**Wicked problems, social messes, mega-messes**
It doesn't matter what you call them. Too often in our conversations with policy makers, they say in exasperation, "it's a mess!" Ackoff and many others before and since him have struggled with the situation. (see page ___ for an visual list of the characteristics of messes.)

**Cross-boundary causality**
I thought more about the idea in the 1990s, thinking that these kinds of problems were often caused by causes that came from across the boundaries of organizations. That is, the multiple causes of problems came from multiple organizations beyond the boundaries of what I could control In 1998. I called these "cross-boundary causality" issues (see page ___) in my book *Visual Language: Global Communication for the 21st Century.*

A variety of people have made explicit attempts to resolve social messes. (see References) But as far as I know, no one has systematically experimented with the methods described herein with actual task forces. No one has attempted to understand social messes by directly dealing with them as Ackoff defined them as a systemically integrated set of problems.

**My first experiment with social mess mapping**
I did my first experiment with a task force in 1999, in Multnomah County Oregon, where Portland is located. I recount this experiment in Chapter Two. In that case, I created as a group-process-plus-visual method which I have then used with several subsequent task forces. I now call it "mapping social messes" or simply "mess mapping."

**Messes proliferate**
Social messes continue to be of great concern to individuals, organizations, nations, and to international communities. Social messes include issues such inner city poverty and violence in the United States and elsewhere, pandemic influenza and perhaps other emerging diseases, global climate change, international drug trafficking, terrorism, homeland security, and nuclear energy and waste. Each of these social messes is related to, and is composed of other apparently intractable problems. These interconnections — systems of problems — make social messes so resistant to analysis and to resolution.

**The silo effect**
At national, state, and local levels there are social messes that many tasks forces and working groups have addressed without making much progress. In addition to being overwhelmed by complexity, working groups fail to resolve these issues because they often fall victim to the bureaucratic silo effect: decision-makers fail to look beyond the boundaries of their own interest group, organization, department, or they believe that it's the responsibility of someone in another silo to fix the social messes at hand.

**Characteristics of public policy problems**
Much current policy making has these characteristics. They:
- Are reflected in vast, sprawling policy debates requiring understanding both of the big picture and the details
- Depend on data that are changing frequently (often daily in complex, scientific and political areas)
- Have many stakeholders, organizational and personal, each with conflicting goals, values, and pressures
- Involve individuals and organizations with overlapping roles
- Require decision making based on guesses or forecasts that in turn are based on structural constraints of organizations, frameworks of policy in place, differing logics and world views, and distinct organizational or societal cultures.
- Are swamped by a high degree of unknowns and unknowables
- Are wrapped in constant political power struggles
- Involve communication with a wide variety of publics through the filter of the media
- Involve a society or organization becoming involved in an ongoing process of social learning and continuous change.

And the most important characteristic of these problems is that they are multi-stakeholder, multi-organizational, multi-national, multi-cultural, and even multi-generational.

**Why is this happening?**
The most often-mentioned causes of this situation is increasing complexity. When we talk about complexity, we usually mean the presence of tight causal interconnections between the social, political, and economic systems within which we lead our lives, and that we are accustomed to dealing with as discrete arenas.

Problems like these are inherently so complex that we don't understand them well enough to develop reasonable methods for making progress in resolving them. Skepticism may extend to the validity or futility of attempting to gather and interpret data, accept working hypotheses, and taking actions intended to ameliorate the problems at hand.

**Interlinkages ignored**
In problem-solving situations, too often there is only token acknowledgement of such linkages. Rarely is there an attempt to integrate the interconnections into the problem definitions and solutions. Too often, a task force will examine just one sector, ignoring the cross-sector influences. We may look at the economy or at the public policy issues but neglect to keep in mind the long causal loops between sectors. Without a way to simultaneously keep track of all the data from all the sectors, we disregard the linkages, and our discussions suffer as a result.

**Using mess mapping tools**
How do we have informed, sensible, rational, democratic policy making and execution in such a context? That is the problem to which our project attempts to contribute some tools.

My experience in dealing with complex issues suggests that by applying Mess Mapping interactive group processes and collaborative reasoning tools in ways that acknowledge and contain sharp differences of opinion and conflicting data, the complexity of most problems can be managed so that stakeholders may arrive at a common framework for understanding these problems. These tools can be successful where others have failed (or have feared to tread) because they incorporate or address:
- Uncertainty and risk;
- Complexity;
- Systems interacting with other systems;
- Competing points of view and values;
- Different people knowing different parts of the problem (and possible solutions); and
- Inter and inter-organizational politics.

For even bigger social messes – mega-messes – larger-scale visualization can be of use (see Chapter 4 for examples).

**Complex and political**
Messes like these are inherently so complex that we don't understand them nearly well enough to develop reasonable methods for making progress in resolving them. Skepticism may extend to the validity or futility of attempting to gather and interpret data, accept working hypotheses, and taking actions intended to ameliorate the problems at hand. And then there's politics: these messes resist resolution because stakeholders believe that they have rights to not only to strongly held opinions about proposed solutions, but also about the methods, motivation and meaning of any serious effort to address the problems. For instance, NIMBY (Not In My Back Yard) responses frequently arise from attempts to address nuclear waste, clean generation using wind turbines, and many other social messes. Political skepticism may even extend to the desirability or utility of pursuing collaboration among stakeholders.

**New approaches required**
Clearly a new kind of leadership is needed for this multi-dimensional world. This book asks: What kind of leadership? What kinds of new understandings? What kinds of new group processes? What kinds of new tools? And suggests a few hypotheses, a few explorations, and some experiences that may help.

# Preface – The Age of Social Messes

### The new situation

In the last half of the 20th century, we moved from an age of problems to a full-fledged, human-created Age of Social Messes. Messes do not seem to have solutions, and, might be thought of as collections of problems that defy solutions. Messes in their very nature are not even well-characterized. More often than not two or more points of view (or worldviews) are intimately involved in causing them. Messes are those issue-situations about which different people have very different perceptions and values concerning their nature, their causes, their boundaries, and their solutions.

### Predicaments

Some messes involve human predicaments that have a long history. For example, crime goes back to the early city-states and empires at the dawn of civilization. Some level of crime seems to be an ongoing condition of all societies beyond a certain size. Societies have decided that some messes and some predicaments can be contained and even reduced, but not eliminated. While many predicaments can be considered simply as enduring conditions of human life, many messes have been created by human societies.

### Messes and predicaments are not simply "complex problems"

Problems are those challenges that can be thought to have tractable, finite solutions. For many problems, organizations have created best practices. You can draw a boundary around these problems. You can do scientific experiments to determine causal factors and rule out other factors. You can tell if solutions have happened. Solutions have completion points – goal lines. Problems abound—from getting the plumbing fixed to getting enough votes to pass a piece of legislation. But these problems are not social messes.

### From a few to more; from minor to large and complex

I do not mean to indicate that people have never appreciated messes and predicaments as part of the human condition. Security has always been a challenge for human society. Since ancient times we have had bodyguards for individual protection and soldiers for societal protection. Infectious bacteria and viruses have always been a challenge for human beings, although we have been fortunate to be able to treat them merely as a "medical problem" in the last few decades. But that may change. In some periods, such diseases have existed at a low level, at other periods, plagues. And because many messes and predicaments have been kept at a low level of threat, we have had the luxury of treating them as if they were problems for a while.

### Iceberg-social messes

But now, we have entered an Age of Social Messes. Governance has to deal not only with the traditional low-to-moderate level predicaments of crime and disease, but must struggle with a whole host of new and largely human-created messes, including transnational crime syndicates that sometimes control territory like governments. To a considerable degree, we do not acknowledge this explicitly.

Contemplate the following list and ask yourself if they are mere problems or if they fit the definition of messes or long-lasting mega-messes or predicaments: nuclear nonproliferation; disposal of nuclear wastes; preventing the spread and eventual use of biological weapons; controlling AIDS and other emerging diseases; global climate change; international drug and crime organizations; international terrorist threats.

### No theory – not even best practices

Many of the "issues" politicians argue about these days are iceberg-messes. The unseen part of the icebergs are huge dynamically interacting systems, trends, and conditions that can sink or badly damage the Titanic ship of state and badly harm the body politic. Yet these iceberg-messes are often treated as if they are simply problems. The discourse is about solutions, when the solutions offered merely put off symptoms of the mess until next year. We are in denial that these problems are better described as messes. A bigger issue is that we do not have much of a theory or model of messes and predicaments and what to do with them as a society. Hence, we don't have preliminary guidelines for wise governance in an age of multiple messes and predicaments.

### A note on the visual language elements

One of my goals over the past 20 years has been to create a robust group of visual elements, icons, diagrams, and larger platforms for thought to deal with messes. As the reader will see, some the visual elements in this book are finished art pieces of different sizes, while others more resemble sketches done on my computer. At this point in the development of this book, I have not tried to make all of the visual art objects of a similar style, rather wishing to get the ideas out into the world and illustrating how visual language can be useful at many levels from sketching – on a napkin to finished fine art pieces. Perhaps in the future editions of this book I will take the time and effort to bring all visual elements to a higher aesthetic level.

### Organization of this book

You will see in the first half of this book how I focused on a specific group process early on and how it inspired and turned into mess mapping. Then I will describe some experiments on larger messes around the world.

**The first chapter** is a set of reflections on what we might consider the beginning of a theory of understanding and dealing with messes. I will investigate how we might address the complexity that arises out of the modern world. We look at what might be some of the major factors that cause the increasing number of messes and mega-messes we face. What is it in the nature of human nature and human societies that seems to produce messes? What is the nature of stabilities and change in human society that produce messes some places and not in others? What holds messes in place? Later in the chapter, we look into the limits and possibilities of dealing with messes. All of this will take us into a review of human limitations and biases.

**Chapter two** tells the story of my first mess mapping project, how it came into existence, what kind of thinking I went through to create the first mess map.

**Chapter three** describes four different processes that we used to answer the question "OK you've described a mess, so you have a mess map, what do you do after that?" It also suggests other processes you might want to try.

**Chapter four**. Finally, I provide some provisional conclusions that will perhaps equip us to move on to the next phase in our coping with the social messes we have created.

### Exploring of new patterns of thinking

I have used the opportunity of this book to experiment with a great many different visual patterns. I have wanted to explore these without constraint – to push them to the edges of possibility. For some of my readers this will be a bit overwhelming. For others it will enable the discovery of new patterns of thinking.

### Three novel approaches

For those who have studied and worked with messes and wicked problems, this book offers three novel contributions to them.

First, it builds on Ackoff's idea of the mess as an systemically interrelated set of problems by identifying a major form of the stuckness and frustration that form the individual problems. That is discussed in Chapter two, as cross-boundary causality.

The second is a group process incorporating visual "mess mapping" tested in multiple circumstances for addressing these issues.

The third is the extensive use of visualization. It shows up in the group process as task to jointly create a highly visual mess map for small to medium-sized messes that task forces face. And visualization grows in importance when applied to mega-messes (also known as super-messes). (Chapter four) I show how mega-messes require that we address them with significant visualization.

### My hope

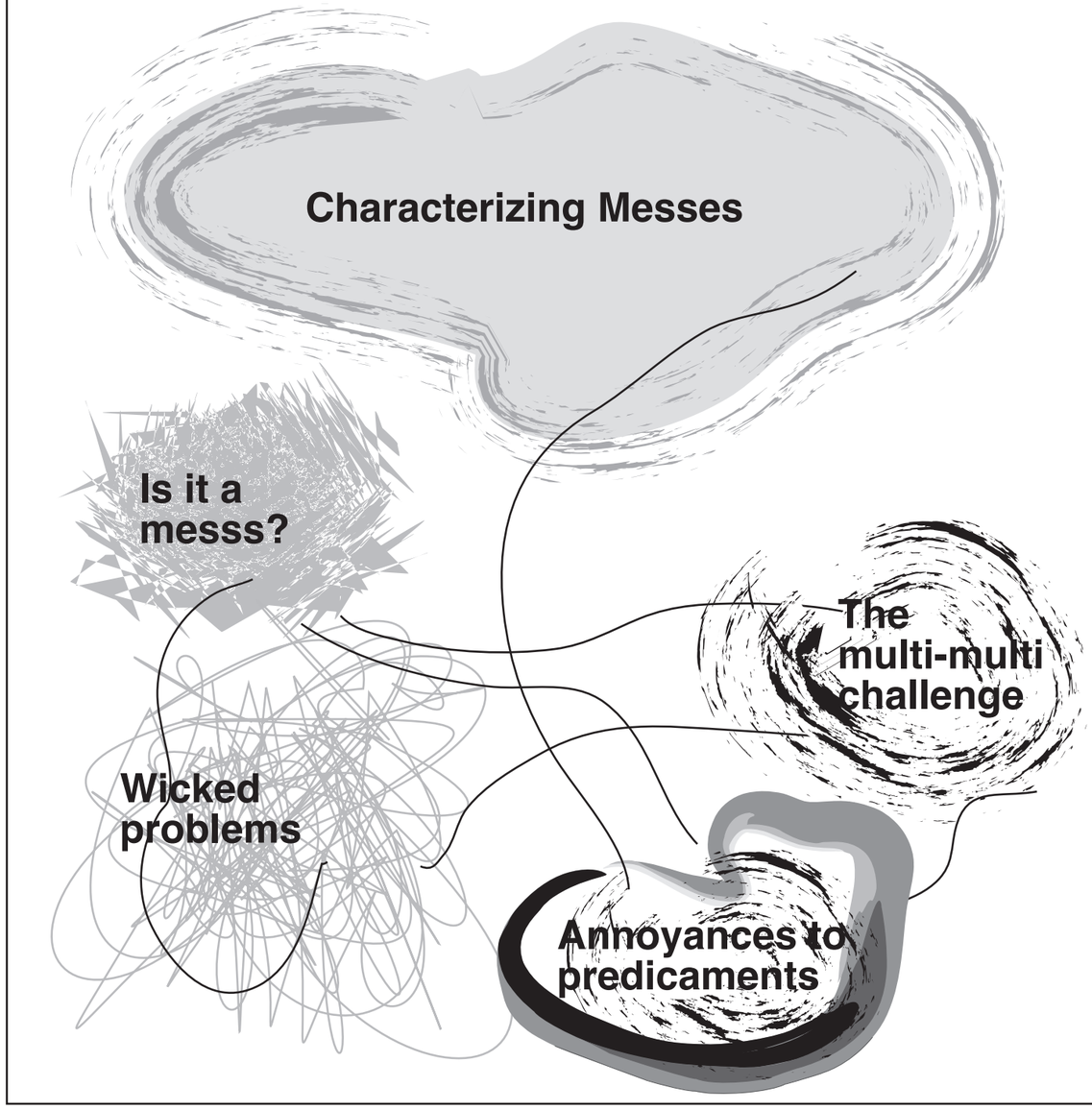
Social messes are daunting challenges to human progress. I hope the modest explorations in the following pages will give us new ways of thinking about social messes and some new capabilities for dealing with social messes.

### Download PDFs of large information murals

Several of the illustrations in this book are large information murals made on the computer. They are often printed at 5 x 15 feet. They are hard to read in printed version in this book, but you can download any of them from our website www.messmap.com.

Chapter 1 - A

# Thinking About Wicked Problems and Social Messiness



*Chapter 1*

# How to think about a world that has a lot of social messes

### Decision-makers extract problems from situations

Ackoff introduces the idea by suggesting: ”In the Machine Age problems were thought of as ‘out there,’ as purely objective states of affairs. But John Dewey, the great American philosopher challenged this notion and argued that decision makers have to extract problems from the situations in which they find themselves. They do so, he said, by the situation. Hence problems are products of thought acting on environments; they are elements of problematic situations that are abstracted from these situations by analysis. What we experience, therefore, are problematic situations, not problems which, like atoms and cells, are conceptual constructs.”

### Focus: practical frames of thought

In this chapter, I will explore :

• How do we get into social messes?

• What are some ways of thinking about social messes?

I do not hope to be exhaustive or conclusive. These are not the only idea that may be helpful. I do hope that some of the ideas I present are helpful in a practical way for you as much as they have been for me. As someone remarked, “there is nothing so practical as a good theory.”

### What I will not deal with in this chapter

I will avoid such questions as "how real are messes?” I will leave it to the reader to answer: “How real do they have to be to be taken seriously? Philosophers talk about this as the "ontological status" of whatever they are discussing. Existence is what the term ontological refers to. Do messes really exist?

And, as this is a short book, I will generally avoid (for now) such questions as: ”Why is it that simply calling messes ‘problems’ is inadequate, misleading, and even dangerous?” “Do those characteristics of messes give them even more "reality?" And the reader will also have to answer: ”Does it matter whether messes are real or not, if they have real consequences?”

And, I will also not dwell on questions such as: “What does the perspective of social messes tell us about modern society?” Rather, I invite my readers to reflect and contemplate.

### Unfinished chapter

Perhaps because of the nature of its subject, this book will always remain unfinished. This chapter is unfinished because there are many ways of thinking about social messes. They belong in social, economic, political theory, but where? They involve the limitations of human thought and capability, but how and with what limits? As we conceive of them today, we can ask what are the possibilities and limits of human action in the face of social messes and mega-messes? This is (and will be) the subject of this chapter and book

### Different names

Different researchers and practitioners have called social messes by different names. Wicked problems, complex problems, mysteries, ill-structured problems, unruly complexity. I simply prefer the terms “social mess.” You can use whatever term you wish.

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- Limits to rationality and satisficing – Herbert Simon
- Limits of system dynamics diagrams – Jay Forrester
- Limits to solutions of different kinds of problems – David Snowden
- Limits of mental models – Richard Levins
- Limits to absolve, resolve, solve, dissolve – Russell Ackoff

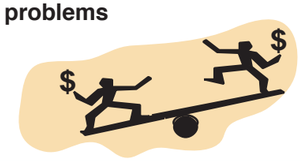
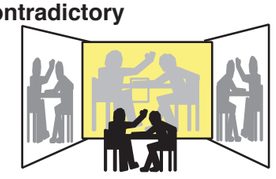
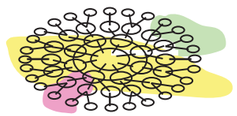
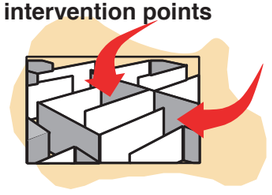
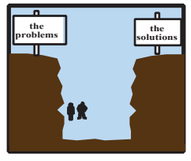
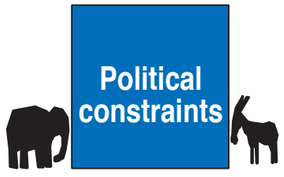
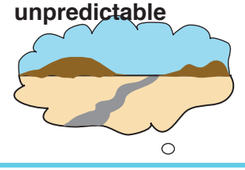
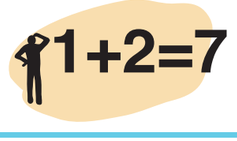
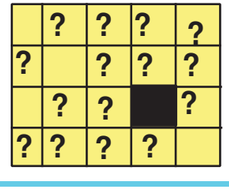
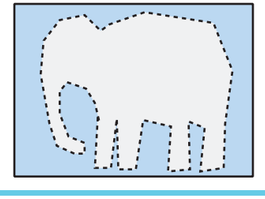
# Is it a social mess?

**Use characteristics to identify elements of messes**
Better than trying to define social messes precisely, which I don't think can be done adequately, we can use a group characteristics, itemized on these two pages, as ways of identifying if we have a social mess or an ordinary problem. And on these pages we begin to use increasing visualization to help us work through the complexity.

**Not all, but groups of characteristics**
We don't have to pinpoint all of these characteristics in a situation to call it a social mess. Various clusters of these will do. That's perhaps the first lesson of social messes: relax about the definitions. Distinctions are important but one must be careful not to be overly insistent on precision in definitions.

**Nuclear waste disposal, for example**
Suppose we take the issue "What should a country do with its nuclear waste?"We can examine the aspects of the issue but running it through the "filter" of our characteristics of social messes. The examples of aspects of nuclear waste shown below are not exhaustive nor complete, but only illustrative.

The table below is not the only way of characterizing social messes. In the following four pages, I present some alternative points of view in beginning to identify social messes.

| Characteristic | Examples Nuclear Waste | Characteristic | Examples Nuclear Waste | Characteristic | Examples Nuclear Waste | Characteristic | Examples Nuclear Waste |
|---|---|---|---|---|---|---|---|
| **No unique "correct" view of the problem** | - Local, state, federal aspects of law and culture | **Multiple conflicts of value, priorities, objectives** | - Long-term vs. short-term thinking<br>- Intergenerational conflict<br>- Rational vs. ethical | **Most problems are interconnected to other problems**   | - Transportation infrastructure<br>- Maintenance over long periods of time<br>- International terrrorism | **Human factors are likely but unpredictable** | - Difficult to know what future citizens and science will require |
| **Ideological constraints** | - Private companies always are better managers<br>- We're just against nuclear energy | **Different views of problem and solutions are contradictory**  | - Department of Energy<br>- Power plant owners<br>- Neighbors | **Risk difficult or impossible to calculate** | - Frequencies of past events not necessarily relevant to one million year futures<br>- Nor are discount rates frequently used in cost-benefit calculations | **Unprecedented interdependence of systems**  | - Climate systems could change radically in the time frame of depositories, changing hydrological conditions |
| **Many possible intervention points**  | - Identify and use multiple depositories<br>- Put off the decision until we have better technology | **Problem solver out of contact with the problems and solutions**   | - Washington DC doesn't know what it's like here<br>- Math models don't represent everything | **Political constraints**  | - All politics is local<br>- Decision making in constitutional framework<br>- Federal law permits state veto | **No one organization 'owns' this mess** | - Responsibility split between many government agencies and private contractors |
| **Great resistance to change** | - Not in my backyard (NIMBY)<br>- Bureaucratic inertia<br>- More pressing issues elsewhere | **Considerable Uncertainty** **Ambiguous** | Our measurements are good for now, but always range of error | **Consequences difficult to imagine, hence unpredictable**  | - One million year time frame for high level waste to get back to background radiation levels | **Knowledge silos** | - Knowledge about waste and its context covers many different knowledge professions |
| **Often a-logical or illogical**   | - Leave nature the way it is...don't interfere | **Economic Constraints $** $$$$$$$$$$ $$$$$$$$$$ | Other budget priorities are more important than starting on nuclear waste this year | **Data are often uncertain or missing**  | - We don't have good data on certain hydrological - geological formations and futures | **Elephants in the room are not spoken of**  | - Political deals<br>- Fears and concerns in the mythosphere not acknowledged |

# The multi-multi challenge of a complex world

### The mult-multi challenge

Seth Lloyd has identified 50 definitions of the concept complexity in the hard sciences. What makes what I call the "difficult sciences" difficult? Complexity, is certainly one of the factors. Most of the situations we have to deal with are multi-stakeholder (hence multi-viewpoint), multi-organizational, multi-government, multi-country, multi-year (even multi-generational), and, with all of this multi-ness, are deeply, and complexly, multi-interconnected. They represent what I call the "multi-multi" challenge. And all of them take place in a nobody-in-charge world.

Looking at the list on the opposite page, we can begin to see what is meant by the multi-multi challenge. I will illustrate most of them with examples of climate change, which will occupy our interest in Chapter 4 on mega-messes.

***Multi-stakeholder*** (hence multi-viewpoint and multi-cultural). With nobody in charge, the multiple worldviews, cultures, interests proliferate. Some have virtual veto power. Others can shape the final outcomes in significant ways.

***Multi-organizational.*** Many of our social messes involve the interests of transnational corporations, major NGOs, and major international governance organizations, such as the UN special agencies. In climate change, for example, these interests have to be negotiated expeditiously to meet the deadlines suggested

***Multi-government***. Many, if not most, of the what needs to happen requires some form of government action. Most of such actions will not require treaties but many will require multi-lateral agreements among 10 or more of the 190 countries in the world.

***Multi-year (even multi-generational).*** Many of these requirements for sustainability and climate change require projects are as large as NASA's going to the moon and returning (that took ten years).

***Multi-interconnected.*** If all this weren't enough, accomplishing many of these required projects often depends on accomplishing other projects. This is an analysis job at a deeper level than many multi-governmental organizations are ready to undertake.

***Multiple gaps, constraints, barriers and paradoxes.*** Some ask, if it is so obvious that these need to be done, why aren't the relevant leaders and organizations doing what needs to be done? Part of the problem there is that we have not identified the specific gaps, constraints, and barriers to moving forward on climate change and sustainability as we only began to do in Chapter 4.

***Multiple Uncertainties.*** A few years ago I participated in the International Future Forum's study of four UK departments on climate change and energy security that revealed a massive collections of uncertainties held by the authorities in the UK (again see Chapter 4).

***Multiple Loopiness.*** Forrester made a major advance in characterizing loopy dynamical systems. There are other kinds of loopiness here as well. Visual language, which we use extensively in this book, offers us some opportunities to characterize special kinds of loopiness.

***Multiple Existential Dilemmas.*** There are many existential dilemmas. I take the tragedy of the commons to be only one of these. The different kinds of fairness described in Chapter 4 is another example.

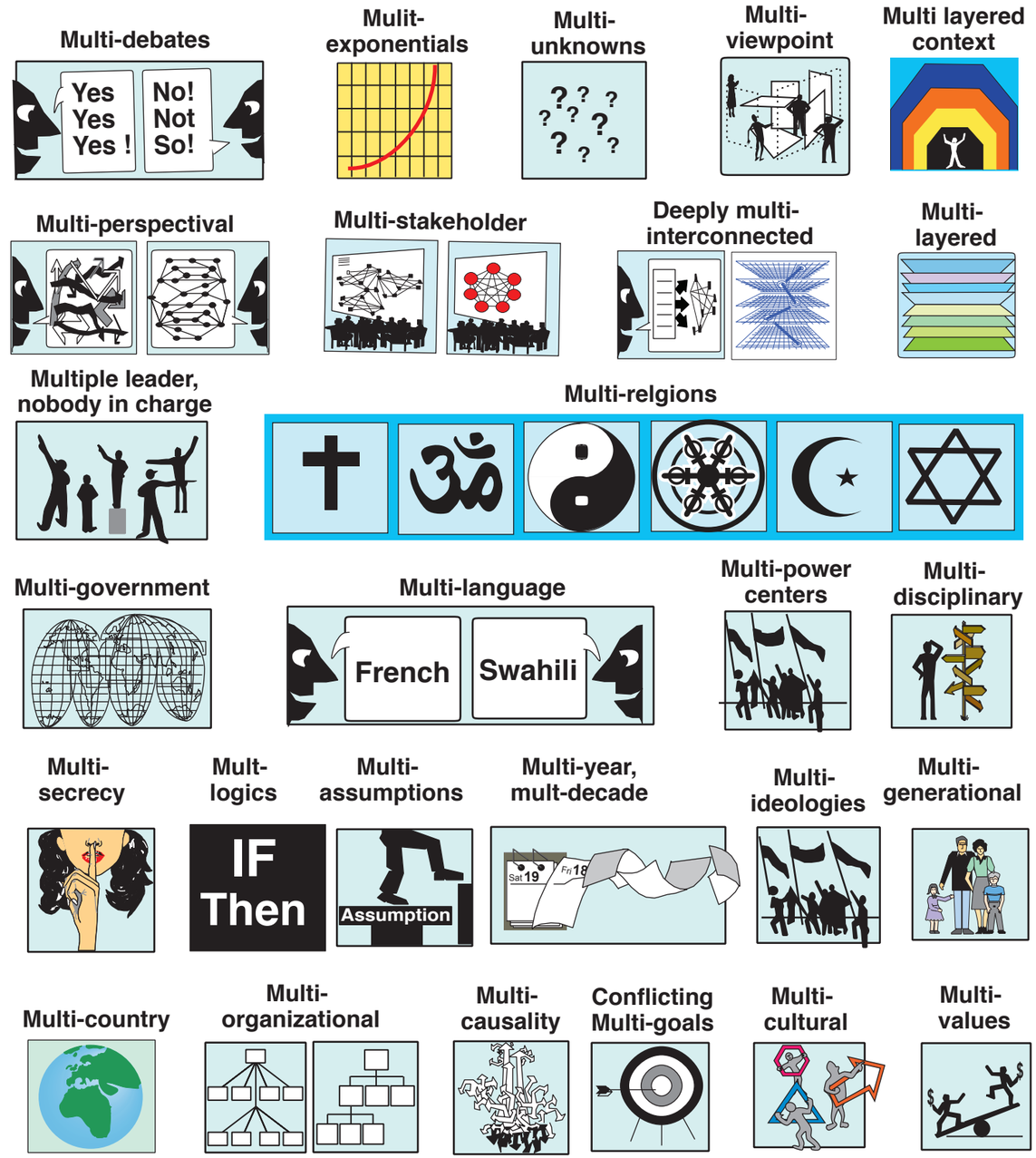
### Multiple Interacting Rule-Governed Systems

All of these produces what I have sometimes been calling Multiple Interacting Rule-Governed Systems (MIRGS) with near veto capability. This institutional feature is perhaps the most common producer of social messes. And it is the potential problem for any relatively normal, human being who happens to be a leader in any of our government, business, or non-governmental organizations. Thus a new breed of leaders will need to appear that has learned to lead in the "multi-multi" world with nobody in charge.

### More multis

The multis I've identified on the facing page are ones that I routinely come across in working with social messes and mega-messes. There are undoubtedly many more, and many more was of classifying them. They do, however, adequately represent the overwhelming complexity that contributes to creating our messes.

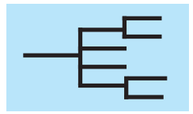
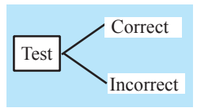
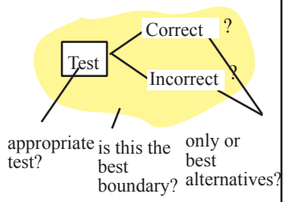
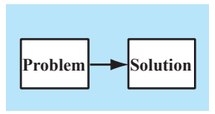
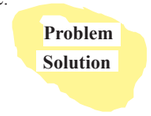
## *Some of the "multi-multi" challenges*

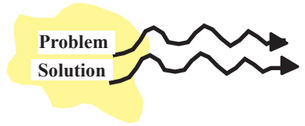
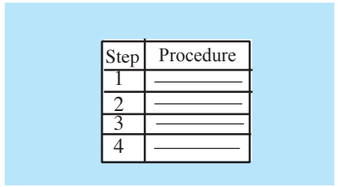
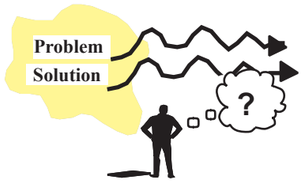
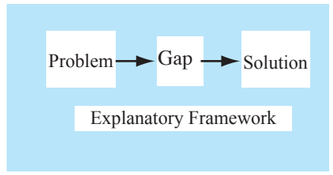
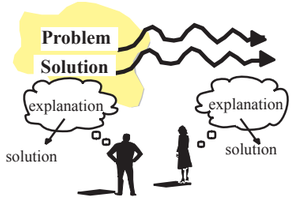


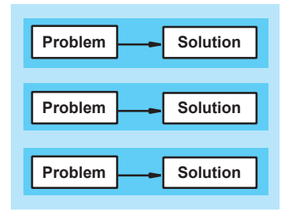
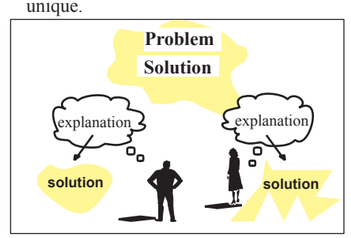
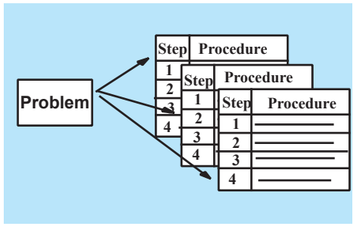
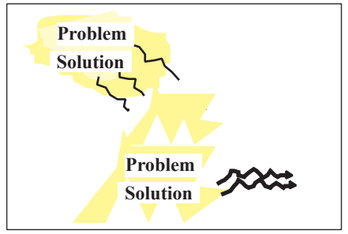
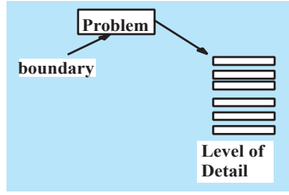
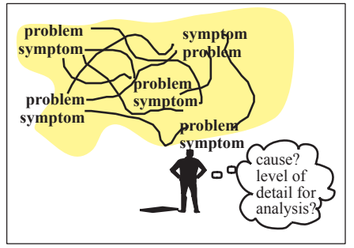
# Wicked Problems (aka Social Messes)

## Introduction

Rittel and Webber introduced the term “wicked problems” in 1973. Most of the time,I find that it is difficult to distinguish his wicked problems from the characterization of social messes I’ve given on the previous pages. Ian Mitroff, one of the most innovative of social scientists of the 20th Century, has reconceptualized Rittel’s characteristics of wicked problems by contrasting them with “tame” problems (i.e. problems that have “known or knowable solutions” to use Snowden’s description, page ___) I think this is another helpful way of seeing the important distinctions between the two domains.

| Characteristics | Tame Problems | Wicked Problems (aka Social Messes) |
|---|---|---|
| **Ability to formulate the problem** | Can be formulated exhaustively and written down definitively.  | No definitive formulation |
| **Ability to devise and conduct definitive tests** | Can be tested. Mistakes and errors can be identified.   | No single criterion to determine correctness. Difficult to determine when a solution is a solution or even whether a test is applicable.   |
| **Relationship between problem and solution** | Problems can be formulated separately from solutions.   | Solving the problem is synonymous with understanding it in the first place.   Each formulation of an ill-structured problem contains a definition of the solution. |

| Characteristics | Tame Problems | Wicked Problems (aka Social Messes) |
|---|---|---|
| **Ability to determine whether problem has been solved** | Have a clear ending point and a determinable solution. A clear rule or test can be stated to determine completion. | No stopping criteria...the problem may be ongoing and continuously changing, so there is no way of determining completion.   |
| **Tractability** | Exhaustive list of operations used to solve problem exists.   | No list of operations exists for solving ill-structured problems.   |
| **Relationship between explanation and solution** | Can be stated as a discrepancy between what is and what could or ought to be, and an explanation exists for every gap.   | Many possible explanations and each one "contains" or "implies" a different solution.   |

| Characteristics | Tame Problems | Wicked Problems (aka Social Messes) |
|---|---|---|
| **Uniqueness or reproducibility of problem** | Problems can be abstracted from the real world and similar solutions can be found.   | Each problem and each solution is unique.   |
| **Repeatability of solutions** | Attempts to solve can be made repeatedly until one works.   | You cannot undo what you have tried, so that each solution is unique and changes the nature of the problem.   |
| **Level of analysis** | Identifiable, "natural" form with high degree of certainty...level of detail for solving the problem can be found...and boundaries for the problem are reasonably easy to agree upon.   | Every "symptom" is a problem and vice versa...level of detail and approach are not easy to define...little agreement on setting boundaries of the problem.   |

# A rough continuum of problems

## Introduction

When we think about any one of our personal "problems" we usually don't have a neat hierarchy in mind although we certainly have feelings about how much they are affecting us. This is often the case with more complex problems and systems of problems -- messes. It is sometimes useful to try to lay out some rough criteria for different levels of difficulty of resolution and or possible temporary solution along a rough continuum.

All messes are not created equal. I think they coalesce roughly in a continuum illustrated below. Of course, you may disagree with my criteria and my placement of the examples. You may even convince me to change my mind. But I hope you will agree with me that something like this continuum is a useful way of thinking about our lives and our problems and our messes.

## Chaos or Crisis

This classification omits situations of extreme immediate crisis (e.g. floods, earthquakes, tsunamis, social collapse in war, etc.) as I regard these situations as a separate domain. Thus I basically agree with David Snowden (20__) on this.

### Irritations & Annoyances

**Criteria**
- bother us
- idiosyncratic behavior of others
- cultural faux pas

**Examples**
- itch inside your boot
- persons talking loudly on a cell phone nearby
- windows program crashes
- surly waitperson / customer
- cultural faux pas
- housemate squeezing the toothpaste
- flat tires

### Moderately Complex Problems

**Criteria**
- Fixable to a considerable extent

**Examples**
- Traffic Jams
- Computer Failures
- Spam, viruses
- Various engineering faults
- Business strategy and planning
- Calculate distances
- Noisy neighbors and neighborhoods
- Finding a parking place
- Cockroaches
- Mice
- Driving without a license
- Drunk driving
- Deaths from accidents
- Production deficiencies

### Social messes (small to medium size and the domain of our Mess Mapping)

**Criteria**
- Highly complex
- Often socio-technical in nature
- Often cross-boundary causality
-often bureaucratic (silo) factors
- Can't control
- Can't often even represent very well
- Many conflicting political and economic interests

**Examples we've worked with**
- Delivery of public mental health
- Health care delivery
- Social safety net issues
- Suicide prevention
- Flu pandemic preparation
- Job training

**Other examples**
- Ideological differences (e.g. conservative - liberal; religious theology)
- Some addictions
- Some arms races
- Loss of biodiversity
- Technological progress confronting human feelings of need for continuity (i.e. how fast for change vs. need for stability)
- Bureaucratic boundary disputes

### Seemingly intractable problems (mega-messes, or super messes)

**Criteria**

Social and natural problems we have difficult describing and can't understand or control
- Can't even represent easily or well
- Even when technological solutions have been suggested, the governance problems seem impossible to deal with
- Great uncertainty the further into the future we go

**Examples**
- Global climate change and growing economy
- Delivery of public mental health services globally
- Health care delivery globally
- Ideological differences (e.g. conservative - liberal; religious theology)
- Immigration and integration of foreigners into society
- Big conglomerate financial organizations detached from productivity of the economic system
- Gaming of social systems
- Independent international financial capital flows destroying individual countries
- Consumerism and advertising
- Overuse of resources (e.g. water)

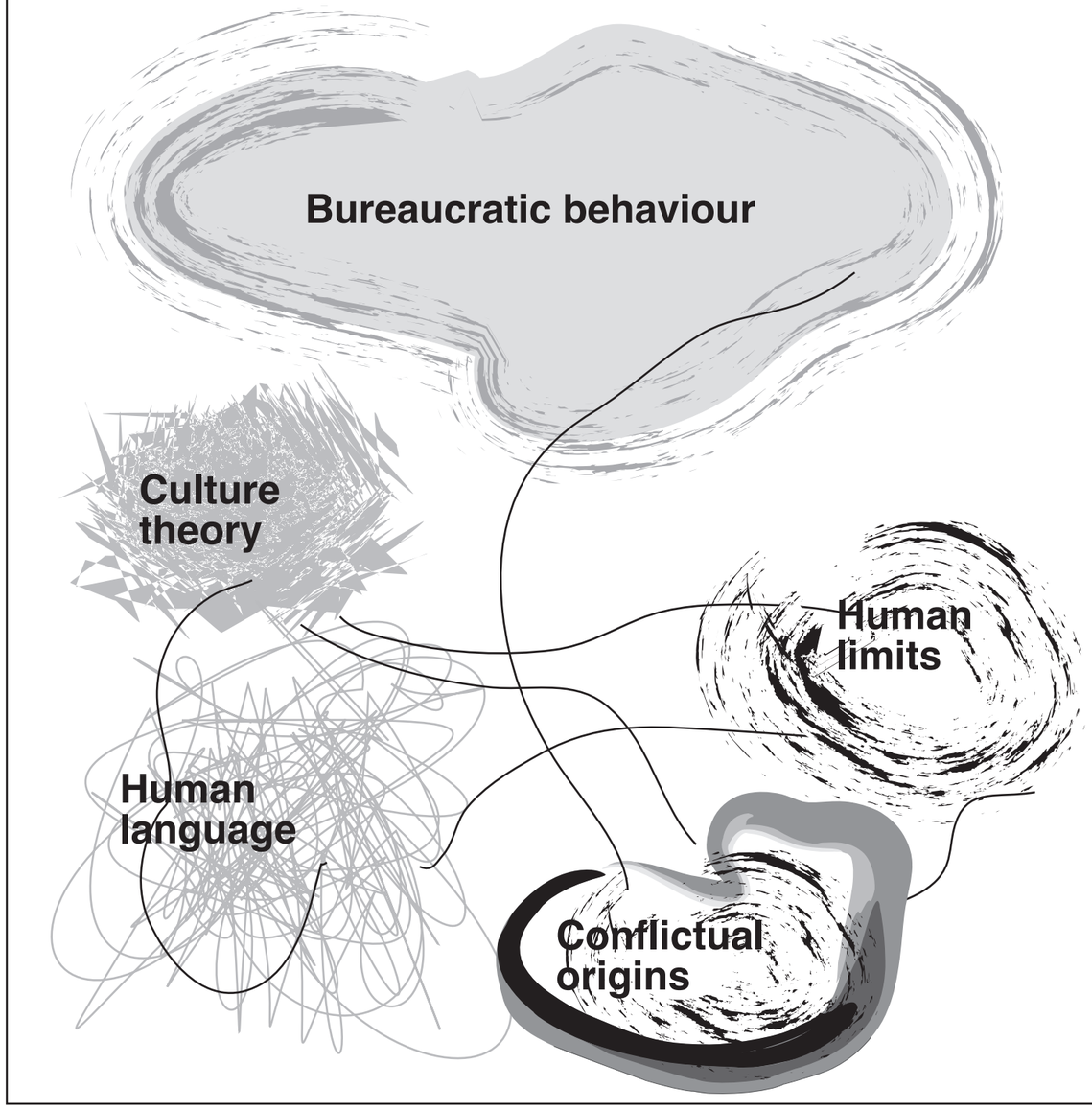
### Human predicaments (extreme messes)

**Criteria**
- Arise from human nature in society or from nature.
- Consequences can be channeled and minimized and rarely even reduced (eventually) to annoyances or medium level social messes

**Examples**
- International security
- Crime
- Infectious agents
- Nuclear proliferation
- Biological weapons
- International drug & crime
- Terrorism
- Global struggle of narratives (e.g. religious differences, cultural practices such as abortion)
- Nuclear bomb making knowledge
- Disposal of nuclear waste
- Population growth
- Use of drugs to relieve mental and physical pain and to transform consciousness
- Corruptions and the payment to relatives
- Greed
- Unconscious motivations (e.g. fear of abandonment, fear of the unknown
addict ability of the human reward system)

Chapter 1 - B

# Getting Into Social Messes



*Part B. How do we get into social messes?*

# Limits of bureaucratic behavior in organizations

## Introduction

A premise of this book is that it is easy for humans to get themselves into social messes these days. We begin in this section an exploration of some of the ways various researchers and observers have characterized this tendency.

## Organizational behavior

We have plenty of stereotypes of how people behave in bureaucratic organizations, not only in government, but also in business and NGOs. Many of the these stereotypes are over-simplifications of what is required of executives and managers in all kinds of organizations. I will not try to provide a comprehensive theory of such bureaucratic behavior in this small book. Rather, I will use these two pages to remind you of the constraints under which executives who run agencies operate. Rhetorically, this picture uses the second person singular as if reminding them of the social constraints under which they operate. Thus, I am speaking directly to government bureaucrats, but with slight modifications could be addressing those in other private sector organizations.

You are "under the watchful and critical eyes of countless subcommittees, interest groups, and journalists.

You can't implement a new regulation or policy without public notice ahead of time and hearings to hear evidence pro and con.

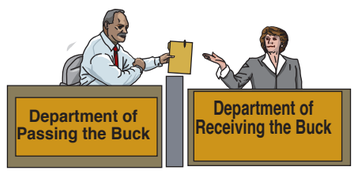
Your outcomes are often "uncertain, delayed, and controversial" and your "procedures are known, immediate, and defined by law or rule." This means you focus on these constraints rather than tasks, goals, or outcomes.

One major difficulty you will always face is " Uncertainty is power. If one party needs something from another and cannot predict how that second party will behave, the second party has power over the first."

You do not get to control revenues of your agency

Remember, that you are a representative of and agency as Max Weber has said that is " an institutional method for applying general rules to specific cases, thereby making the actions of government fair and predictable."

You cannot change production of outcomes with your preferences nor that of the organization (legislatures, courts politicians, and interest groups get to control that)




You serve goals that your organization doesn't always get to choose (because the legislature gets to do that)

You focus on constraints rather than on outcomes or goals

Often the legislative committee has informal customary ways of doing things that are unwritten and not public that contain goals for your agency

You have to defend your turf, not take on extraneous activities, protect yourself from repeating previous mistakes, avoid having to coordinate with other agencies (as much as possible).

It is difficult for governments to say "yes." " There is nobody in government that can do that. There are fifteen or twenty people who have to agree. Government has to be slower it has to safeguard the process."

If you have to cooperate with other agencies "(or at least appear to cooperate)", you must try to "enter into agreements designed to protect each other from any loss of autonomy."

You do not create most of the "red tape" about budgeting, purchasing, contracting. Most of those rules and control is in the hands of the legislature and interest groups.

You can not benefit from the earnings of the organization (at least not legally)

Your main job is to keep things going the way they are. Stability, not rocking the boat, is your job. Standard operating procedures (SOPs) is your major tool.

You are often conducting activities that are "unpopular (e.g., collecting taxes) or difficult (e.g., managing foreign affairs) and that a half dozen other agencies are doing (e.g., gathering intelligence or catching drug dealers),

You must resist innovation. Your agency is" created is in large part to replace the uncertain expectations and haphazard activities of voluntary endeavors with the stability and routine of organized relationships. The standard operating procedure (SOP) is not the enemy of organization; it is the essence of organization. Stability and routine are especially important in government agencies where demands for equity (or at least the appearance of equity) are easily enforced."

*Part B. How do we get into social messes?*

# Culture theory - ways of life create inevitable disagreement

### Introduction
As we look for patterns in the climate change arguments, a group of mainly British researchers has drawn on the anthropologist Mary Douglas's theories to characterise how different clusters of beliefs or perhaps one could say worldview polarize climate disagreement.

### Social solidarities (ways of life)
They "argue that the various ways in which people understand a phenomenon like global warming are derived from a strictly limited number of alternative perceptions of reality. These alternative ways of perceiving the world justify, represent and emerge from alternative ways of organizing social relations."

They then define "four primary ways of organizing, perceiving, and justifying social relations (usually called 'ways of life'. or 'social solidarities'); egalitarianism, hierarchy, individualism, and fatalism."

### Policy implications of social solidarities
They say that these ways of life are "timeless components in he ever-changing positions that are the destinations and points of departure" and "will continuously change, yet whatever policies are fought over, they will continue to represent a small number of competing ways of organizing and perceiving social relations."

### Example: climate change
On the diagram at the right, we portray a simplified four by four matrix of their theory and provide typical moves in the debates from the four points of view.

While our example shows quotes about climate change, it is quite easy to see how these four positions can be applied to many of the public policy issues in the Western world.

### Mythological story telling
They conclude that "Each policy story provides a setting (the basic assumptions), a villain (the policy problem), heroes (policy protagonists) and, of course, a moral (the policy solution)."

Thus, their approach lends itself to mythological references to heroes and villains and particularly to story telling that has different themes. For example the hierarchical story has the theme of planning, while the egalitarian story suggest profligacy of use of natural resources as its chief focus. Their approach suggest that these are deeper affiliations and the story themes help humans construct their view of the world.

### Connection to clumsy solutions
The culture theory group has extended these ideas into a method of analyzing and proposing solutions to the climate change issues that are different from the ones that come from the polarized solutions on this chart. They call their approach "clumsy solutions" (see later in this chapter for an exposition).

***Explicit, public, social roles and rules***

*high*

***Group cohesiveness***

*low*

Accountability to the group or community

*high*

*low*

## Fatalistic way of life

Why bother to do anything?

We're doomed.

Nobody can do anything about it.

I can't do anything that will make a difference.

It's all based on fate

There is nothing anybody can do about global warming

Nobody's in control. Not the governments, not the corporations, not the people!

Nobody can really make sense out of what's going on in human affairs or the planet

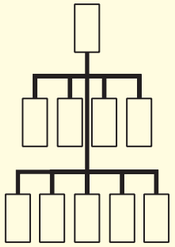
## Hierarchical way of life

We need at global system to fund transition to renewable energy

We need to plan

Nature is controllable by humans within limits

There's no coordination...we need a global treaty on limiting greenhouse gases



Humans need to be kept in check by institutions such as government, family, and religion

The real heroes of this are the diplomats and scientists who have been trying for more than 20 years to get an adequate treaty

Economic distribution is fair if everybody gets what they deserve by the amount of their contribution

The really evil villains in this are the US, China, and Australia who haven't ratified the Kyoto Protocol

The problem is we can't get governments to agree.

The real solution to this is a binding international agreement with tough implementation

Experts are needed to run the environment and the economy

## Individualistic way of life

We need to be sceptical about the forecasts

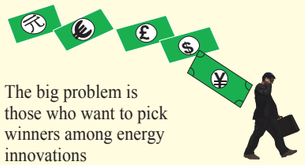
There is too much uncertainty in the science

Nature is resilient and will recover if there are problems

The real heroes are the corporations, the innovators, and the suppliers of capital

Humans are mostly self-interested and individualistic

People are basically competitive

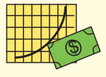


The big problem is those who want to pick winners among energy innovations

If there is a problem with climate change, technology and markets can solve it

The evil villains are big government planners and wimpy environmentalists

Those who invest and risk the most should get the most out of the economy



## Egalitarian way of life

Over-consumption! That's the real problem!

People are basically social and communitarian...they share and care, trusting and basically equal

Nature's ecosystems are deeply interconnects and fragile

Yeh! That's what produces destruction of the environment !

The IPCC should be treated as heroes! I'm glad they got the Nobel Prize.

Greenpeace and Friends of the Earth are heroes too!

All people want is economic growth and more profits.

It's up to people to change their behavior.

There must be more equality of result as well as equality of opportunity

We're not connected with nature any more.

If we were to consume less and use renewable energy we'd actually be wealthier...and it won't cost that much...only 1 to 2 percent of global GDP

The evil villains in all of this are the big corporations...90 companies have produced nearly two-thirds of the greenhouse gas emissions since the beginning of the industrial age

We should be using the precautionary principle that the 1992 UN Convention on Climate Change requires

It's really urgent...we have less than ten years to change things around..i.e. to reduce emissions

*Part B. How do we get into social messes?*

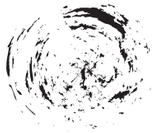
# Influence of biological legacy on human organizations

## Introduction

The human sciences have not been very productive a synthesizing the potential similarities and parallels between human institutions and behavior and that of the primate world.

Below I invite you to think about what some of those similarities and parallels might be in the context of our exploration of social messes.

**Social messes and mega-messes**



**Stuckness**

Social messes including mega-messes arise with multiple rule-governed organizations and groups interacting with each other, often in conflict, and each with near-veto power on change or progress.

**KEY**

— Connecting lines suggest interesting parallels and possible causal relationships

**Human constitutional arrangements**

**Rule of Law**

Constitutions, laws, regulations routinize the methods, schedules, and limits of dominance in governance of human societies

**Coalitions**

Political parties and voting blocks are frequent in human political institutions

**Departments**

Organizing the cabinet into departments whose boundaries delimit authority

**Law Enforcement**

Police as legitimate use of force to maintain order and peace

**Voting**

Resolution of differences by elections

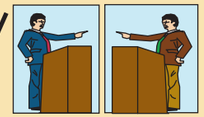
**Human political behavior**

**Coalitions**

Legitimacy in the use of power is based on large coalitions of voters

**Special interest groups**

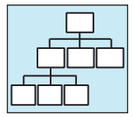
Special interest groups form to represent the interests and coalitions



**Political Process**

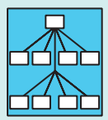
Organized conflict resolution through rights of free speech, assembly,

**Human bureaucratic behavior**



**Formal hierarchies**

Many human organizations have formal hierarchies with status, roles, & rules



**Informal hierarchies**

Human organizations nearly always have informal hierarchies in addition to formal ones.

Agency executives defend the autonomy of their agency from incursions of requirements on to their "turf" from legislatures and other stakeholders

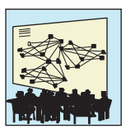
**Organizational Turf**

Cooperating with other agencies always contains the threat of loss of autonomy

**Conflict resolution**

Preventing and solving disputes is one of the major tasks for organizational leaders

**Human group & organizational behavior**



**Reorganizations**

Informal organizational power networks often resist effects of reorganization

Reorganizations change alpha status (lower, upward, no change)

**Silos**

Getting silos to "talk to each other" and to cooperate is very difficult

**Human social psychological**

**Dominance**

Change in alpha status increases uncertainty for a period of time

Uncertainty often increases anxiety about "what effect will it have on me?"

**Coalitions**

Humans form coalitions rapidly when one male becomes threatening.

Exercise of power is maintained by coalitions of the alpha and collaborators

Human males form coalitions rapidly when one male becomes threatening.

**My House**

My space, my things, my house is my castle

**Us vs. Them**

Humans form into small groups and readily establish "us versus them" distinctions based on tiny to large differences

**Biological Primate behavior**

**Hierarchies**

Dominance hierarchies are a standard pattern for all primates. In chimps males struggle and fight for top of the hierarchy.

**Dominance**

Anxiety appears when "who is in charge" is uncertain. In chimps great turbulence is present while dominance struggles are underway.

**Threatening Bluffing**

Chimps threaten - often in a bluffing manner - to test dominant chimps

**Coalitions**

Among chimps, alpha status is obtained and maintained by coalitions of the alpha and one or more collaborators.

Frequent if not continuous power and status testing. In chimps there may be periods in between alpha struggles, but the testing from those out of power is frequent

Among chimps, new alpha status is not achieved until previous alpha openly concedes defeat

Chimps troops may "gang up on alphas" to curtail their power

**Territories/Boundaries**

Chimp troops occupy exclusive feeding territories.

Chimps defend boundaries vigorously and attack intruders

Chimps conduct aggressive raids that can lead to killing every chimp in the nearby tribe

**In-group/out-group**

"The gulf between in-group and out-group is so huge that aggression falls into two categories: one contained and ritualized within the group, the other all-out, gratuitous, and lethal between groups."

**Peacemaking**

Alpha chimps perform the task of peacemaking between others, usually males, who are in possibly violent conflict, by separating them

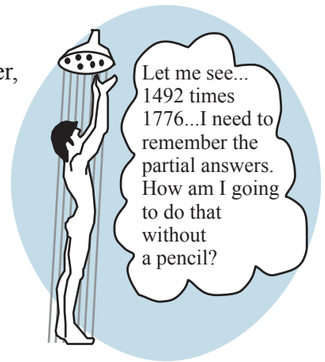
# Limits of Human Memory

## Introduction

The limitations in human short term memory are limitations which every human being has. We introduce the problem with an example (first used by Herbert Simon).

### Example One

While in the shower, multiply 1776 by 1492. Next remember the answer long enough to check it.




This situation highlights the limitations of human short term memory. It will probably take you a half minute or more to do the multiplication task by hand if you don't have a calculator handy.

### Limits of short-term memory

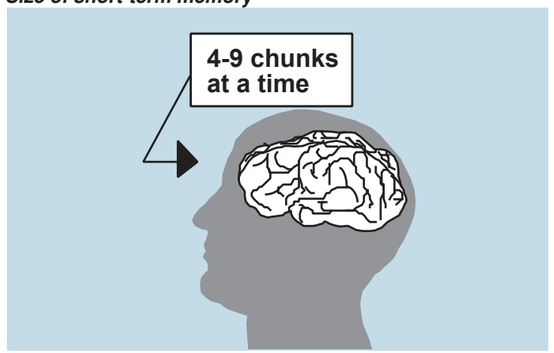
George Miller's work on humans' short-term memory capacity helps us understand its limits. Miller's work also illustrates how the limits of short-term memory are pervasively influential in our learning and thinking life. By extension, then, these problems must also be in our policy decision making situations.

### Two estimates of the size of short-term memory

Every thought process that requires what we call "attention" has to be held in short-term memory, and human beings can hold only a small number of "chunks" of information in short-term memory. Miller, an outstanding communications psychologist, suggested in 1956 that the number of chunks that can be held in short-term memory is 7 (plus or minus 2).

Research by Herbert Simon, the Nobel prize–winning economist and information scientist, suggests the number is smaller—around 4 to possibly 6 chunks. Whatever the size, all agree that the number of chunks is very small.

***Size of short-term memory***




### Definition -The Chunk

A chunk for Miller and Simon is any familiar pattern. Chunk size itself depends on your prior learning.

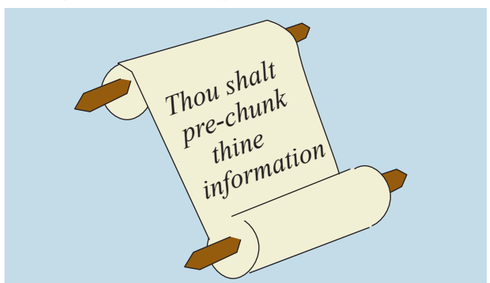
### Examples

For one person for one subject matter, a chunk may be one sentence, while in another subject it may be several sentences.

For younger children, a chunk might be reading a single word; for still younger ones, simply recognizing a single letter would constitute a chunk or as large as a whole discipline, as in such thoughts as "physics requires..."

### Principle: Organize thought so as to stay within memory limits

"We must," Herbert Simon says, "organize our thought processes so they do not require us to hold more information than 4 to 7 chunks in short-term memory simultaneously."




### Long Term Memory

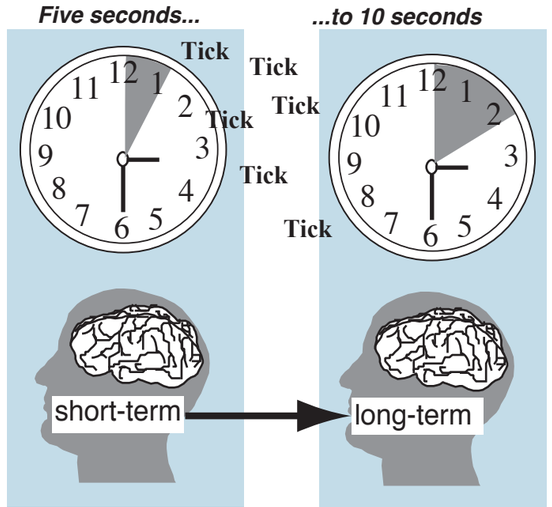
In order to do the "1776 x 1492 in the shower" problem, you would have had to transfer some of the information to long-term memory (i.e., some of the intermediate products of the multiplication).

### How does transfer to long term memory take place?

What does our brain do with the contents of our short term memory in order to turn it into long term memory? We don't know exactly, but somehow we have to gather these 5 to 9 chunks of information, add some sort of identifier and link them in with other previous experience. All this takes place on an unconscious or partially conscious level in every human being every day. Miller is saying that all human beings everywhere chunk information in order to transfer it to long term memory and this process has severe limits in its capacity.

### How does transfer to long term memory take place?

To store 5-9 chunks of information in long term memory takes, according to Herbert Simon, 5 to 10 seconds per chunk.




### Recoding process

Miller suggests that the process of grouping many chunks of information into larger chunks by conscious and unconscious processes could be called re-coding.

### Example

How do we recode our experience? Miller suggests, "Probably the simplest is to group the input events, apply a new name to the group and then remember the new name rather than the individual input events."

### Importance

And he says, " . . .I am convinced that this process is a very general and important one for psychology . . ." He says, "The point is that re-coding is an extremely powerful weapon for increasing the amount of information that we can deal with. In one form or another, we use re-coding constantly in our daily behavior."

### Highly selective long-term memory access

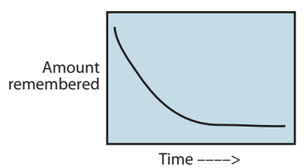
We store limited perceptions in long-term memory especially guided by what is emotionally important to us and are unable to retrieve much detail that we did not store.

### Considerable deletion, distortion of recall

Memory appears to be reconstructed, not simply retrieved, thus much distortion and wrong recall, even of eye-witnesses and significant differences in recall not only between individuals but also within the same individual at different times. We even change our memories based on the questions we are asked.

Forgetting curves

Psychologists who study learning and memory often summarize their data in forgetting curves that look like this:




All of these processes are amplified in our dealing with social messes. So, human society and its governance will need better tools. Visualization is one such tool.

*Part B. How do we get into social messes?*

# The fuzziness and ambiguity in human thought

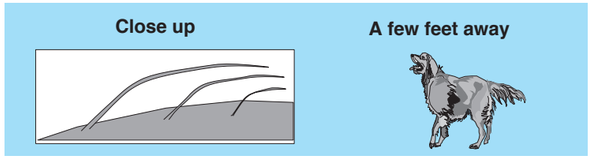
## Ambiguity is the normal situation

Human beings as communicators are always dealing with ambiguity. Ambiguity is the normal situation, not unusual and not unnormal. Moreover, human cognition and communication is a direct consequence of our sensory capacity and limitations and how we think and about the life situation we are in. We choose different levels of detail, different levels of comprehensiveness, and different levels of abstraction to fit our existential communication situation. We actually perceive and intuitively pull together the right level of fuzziness/crispness, that we need. (I use fuzziness / crispness all the way through this chapter to suggest that it is always a continuum.) The reason that we have such a fuzzy / crisp information management facility is that we need the flexibility to change our focus of attention depending on our needs and the needs of the situation. We often need to look first with fuzziness on the conceptual level and then on the language level. This capability is quire remarkable, giving us great advantages and also introducing considerable difficulty. Here I explore the some of the kinds of fuzziness that we deal with on the conceptual level.

## Indistinguishability

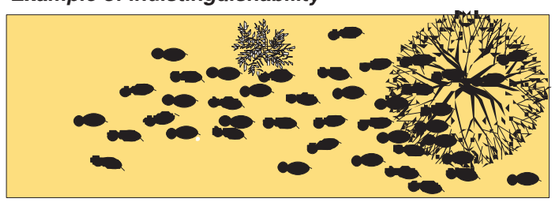
One source of fuzziness is indistinguishability. At particular distances, human perception has a specific capacity to resolve detail. Close up we can see the hair on an animal.

***Example of indistinguishability***




From a longer distance, we can only see shape and color and perhaps a detail or two. Up close we can easily tell the difference between two animals. From a distance we can't even tell how many animals there are beyond a certain number.

***Example of indistinguishability***



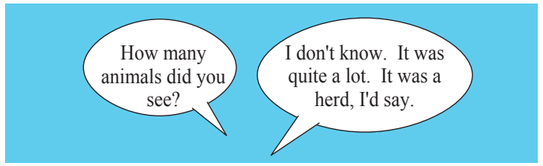
## Short-term memory capacity

A second property of human cognition is the very limited capacity of working (or "short-term") memory. Governed by our attention, we seem to have evolved the ability to hold in focus only a relatively few chunks of information at a time (somewhere between four and nine). This means that much detail that exists in the world is literally not held long enough in our memory to be transferred to long-term memory. (see following pages.)

## Long-term memory

This leads to another way of producing fuzziness. When we see all the animals in our example of a herd as a group, we store that "groupiness" in long-term memory. Afterwards we are unable to retrieve detail that we did not store. Moreover, our access to long-term memory is through associative pathways that are laid down at time to transfer from short-term memory. Seeing things as groups undoubtedly has survival value in not cluttering up the finite capacity and particular structure of our long-term memory with needless detail and thus overburdening our capacities to retrieve information. In addition, recent psychological research suggest that we reconstruct rather than retrieve many long term memories.

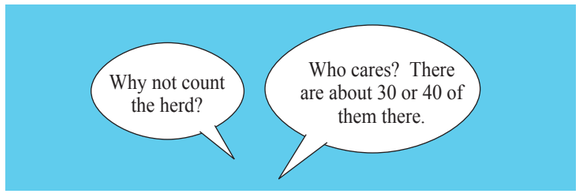
***Example of long-term memory simplification***




## Ignore detail

Humans also have the capacity to ignore differences of detail, which is different from the limited capacity to perceive differences. We will regard the herd of animals, say, as not important enough to count, which may only mean that we don't want to take the time to observe. In such cases we may estimate.

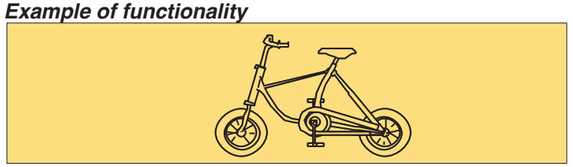
***Example of ignore detail***




## Functionality

We pay attention only to those phenomena in our environment that have importance to us. We often do not want to take the time to observe and discriminate differences. After we have passed through that stage of categorizing as similar ("all members of the herd are the same form my point of view") we have produced another basis for fuzziness. This means that we treat much of our environment in a functional manner, i.e. we see a bicycle not as a large number of parts, but as a functional whole–as a vehicle for getting from one place to another. This functional approach to many different objects and concepts enables us to treat the concept "bicycle" as a distinct, yet fuzzy concept. Functionality often governs fuzziness of concept.

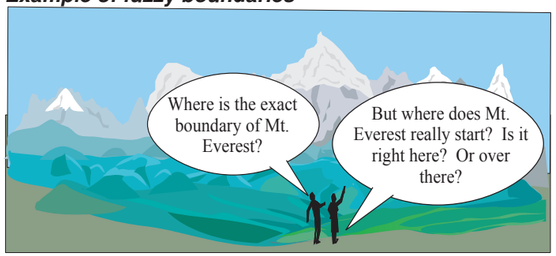
***Example of functionality***



## Fuzzy boundaries

There is yet be another kind of fuzziness of concept, the deliberately fuzzy concept. My favorite example has to do with the question:

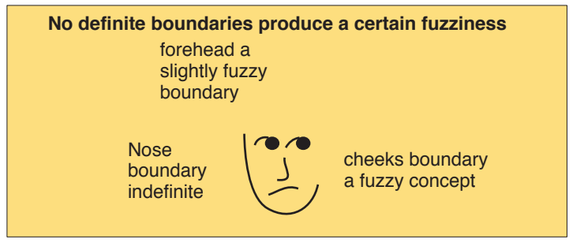
***Example of fuzzy boundaries***




We have not question that Mt. Everest is there. I have seen it. Many have climbed it. But all of us would have a hard time saying exactly where its boundaries are. And we don't care. There is no need to have a boundary on the ground for the mountain in the way that countries have very precisely delineated their boundaries, and even frequently gone to war over them.

Generalizing from this, we can say that there are many concepts that have fuzzy boundaries. Lotfi Zadeh, the founder of the study of fuzzy logic, notes that the nose, forehead, cheeks of the human head are all fuzzy concepts from the standpoint that we can only vaguely agree when one stops and the next starts.

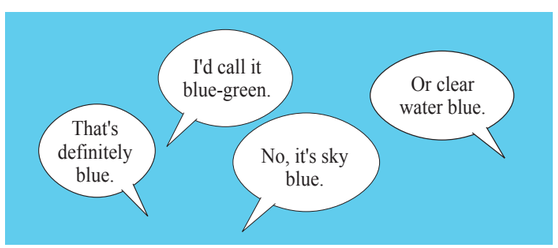
***Example of fuzzy boundaries***




## Fuzzy continuum

Adjectives also have fuzziness in their basic concepts. The idea of a long or short nose, for example, is a fuzzy concept. Blueness is actually a range of distinct colors. Many, if not most, adjectives come in pairs, which a fuzzy continuum in between polarities.

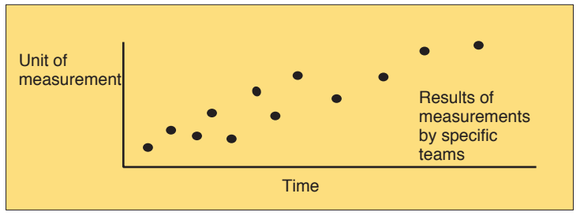
***Example of fuzzy continuum***




## Measurement limitations

In science classes, I always thought that a metal had a specific melting point. I was astounded to find in one engineering journal a graph of the various actual measurements made by various scientists that looked something like the example below.

***Schematic example of measurement limitations***

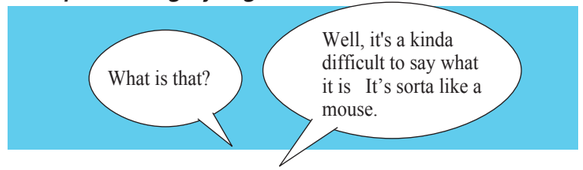



Each one was an actual measurement made by a specific scientist or team of scientists. They obviously used different instruments with different precision. They may have read the dials differently. What is the real melting point? There was no "real" melting point. The melting point used in standard reference books is the result of an agreement of the various scientists to use a particular number.

## Category vagueness

We automatically form categories and sort our observations and experience into categories. Often they are incomplete and/or vaguely formed until further identification and classification methods are used.

***Example of category vagueness***




## Pluses and minuses of ambiguity

Ambiguity in human languages enables us to think abstractly. It facilitates thinking of big ideas with scope and scale. But the very practice of such thinking also hides vital details. Perhaps the use of more visual language will help us combine thinking comprehensively as well as in effective detail.

*Part B. How do we get into social messes?*

# Limits of spoken and visual language

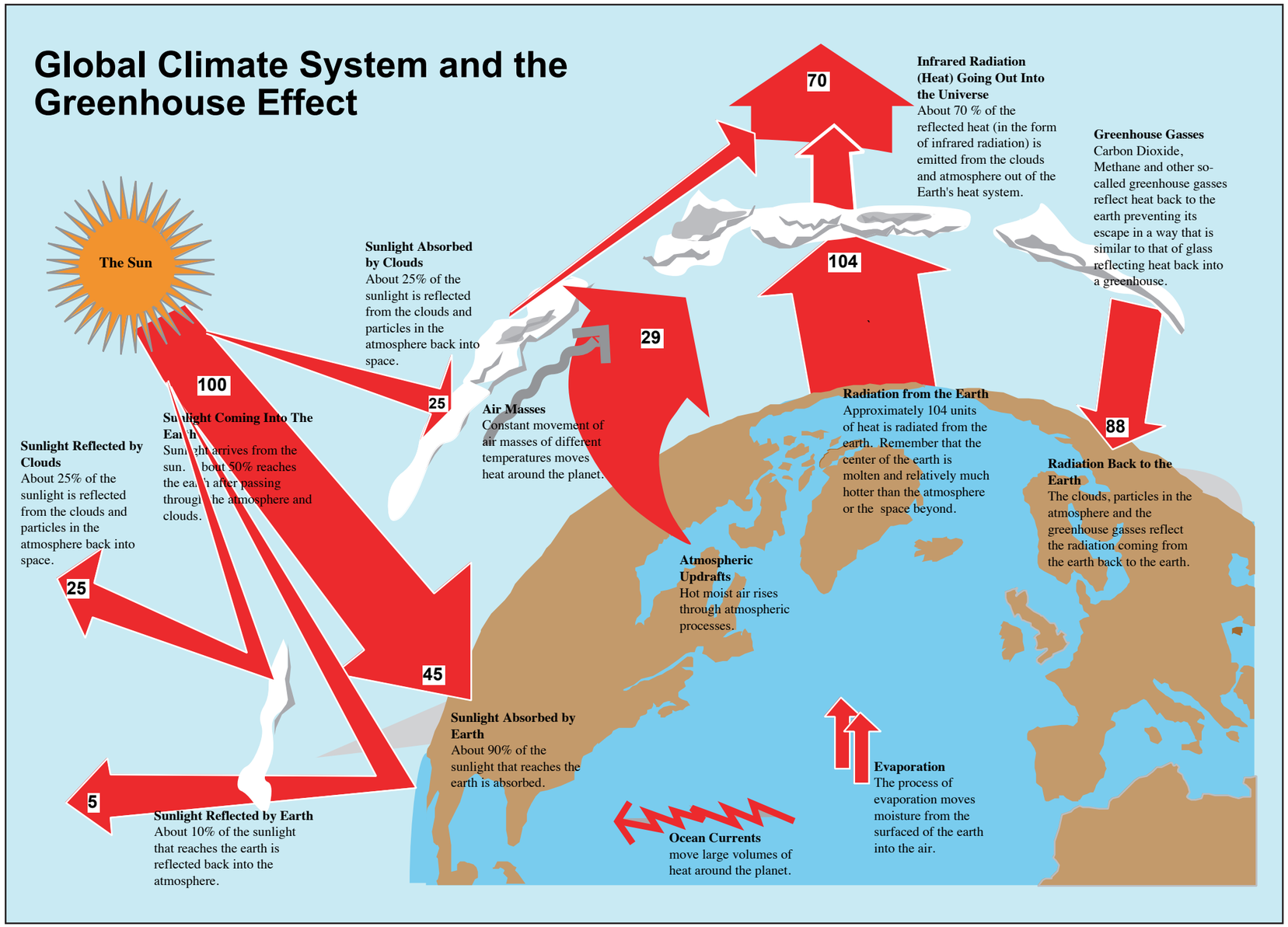
The futurists, Don Michael has written, "Our spoken language, the language we hear, cannot adequately map the complexity that I'm talking about. Our language, because we hear it or we read it, is linear. So, one thought follows another. Our language cannot adequately engage multiple interacting factors simultaneously. (Some poetry can, but we haven't yet figured out how to use poetry for policy making or for resolving issues of context, value priorities, or the like.

And, perhaps some forms of visual language can help because it can be simultaneously presented in three dimensions.) Our noun/verb structure emphasizes items, events, and stasis... Nor can our language adequately map, in our ongoing minds, the circularity of cause and effect producing causes, producing effects... In other words, our spoken/written language doesn't allow us to talk about these complexities in ways that are inherently informative about the complexities. In fact, it compounds these complexities because it unavoidably distorts our efforts to perceive a world of simultaneous, multiple, circular processes."

I agree, and have provided in much of this book examples for you to judge for yourselves. And in the experiment on these pages, you can make a direct comparison of the "same" information in two forms.

Consider a simple model of the global climate system and the greenhouse effect. Because of the heat that it traps, the earth is about 33 degrees Celsius warmer than it would have been without the trapping. Here we show the basic processes involved. The Sun is the source of 100 per cent of the energy that comes to the earth. Sunlight arrives from the sun. About 50% reaches the earth after passing through the atmosphere and clouds. About 25% of the sunlight is reflected from the clouds and particles in the atmosphere back into space or absorbed by clouds. About 10% of the sunlight that reaches the earth is reflected back into the atmosphere. About 90% of the sunlight that reaches the earth is absorbed. About 70 % of the reflected heat (in the form of infrared radiation) is emitted from the clouds and atmosphere out of the Earth's heat system. Carbon dioxide, methane and other so-called greenhouse gasses reflect heat back to the earth preventing its escape in a way that is similar to that of glass reflecting heat back into a greenhouse. Approximately 104 units of heat is radiated from the earth. Remember that the center of the earth is molten and relatively much hotter than the atmosphere or the space beyond. The clouds, particles in the atmosphere and the greenhouse gasses reflect the radiation coming from the earth back to the earth. Hot moist air rises through atmospheric processes. The process of evaporation moves moisture from the surfaced of the earth into the air. Ocean currents move large volumes of heat around the planet. Constant movement of air masses of different temperatures moves heat around the planet.

**Compare what you can do with this diagram with the prose paragraph to the left, containing the "same" information**



*Part B. How do we get into social messes?*

# Many voices in the decision space

**Introduction**

With so many interests involved in modern media, it is not surprising that the thinking and decision space is overcrowded with voices. It suggests these questions:

- How are governments to negotiate about the dilemmas of global climate change and energy security (and all the other mega-messes) with so many voices in the decision space?
- How are we going to understand how to pay attention in the decision space?
- How do we deal with the crowded decision space of all the mega-messes we find ourselves involved in.

Our illustration on these pages attempts to show how it might appear to decision makers.

**Elements of the crowded media space**

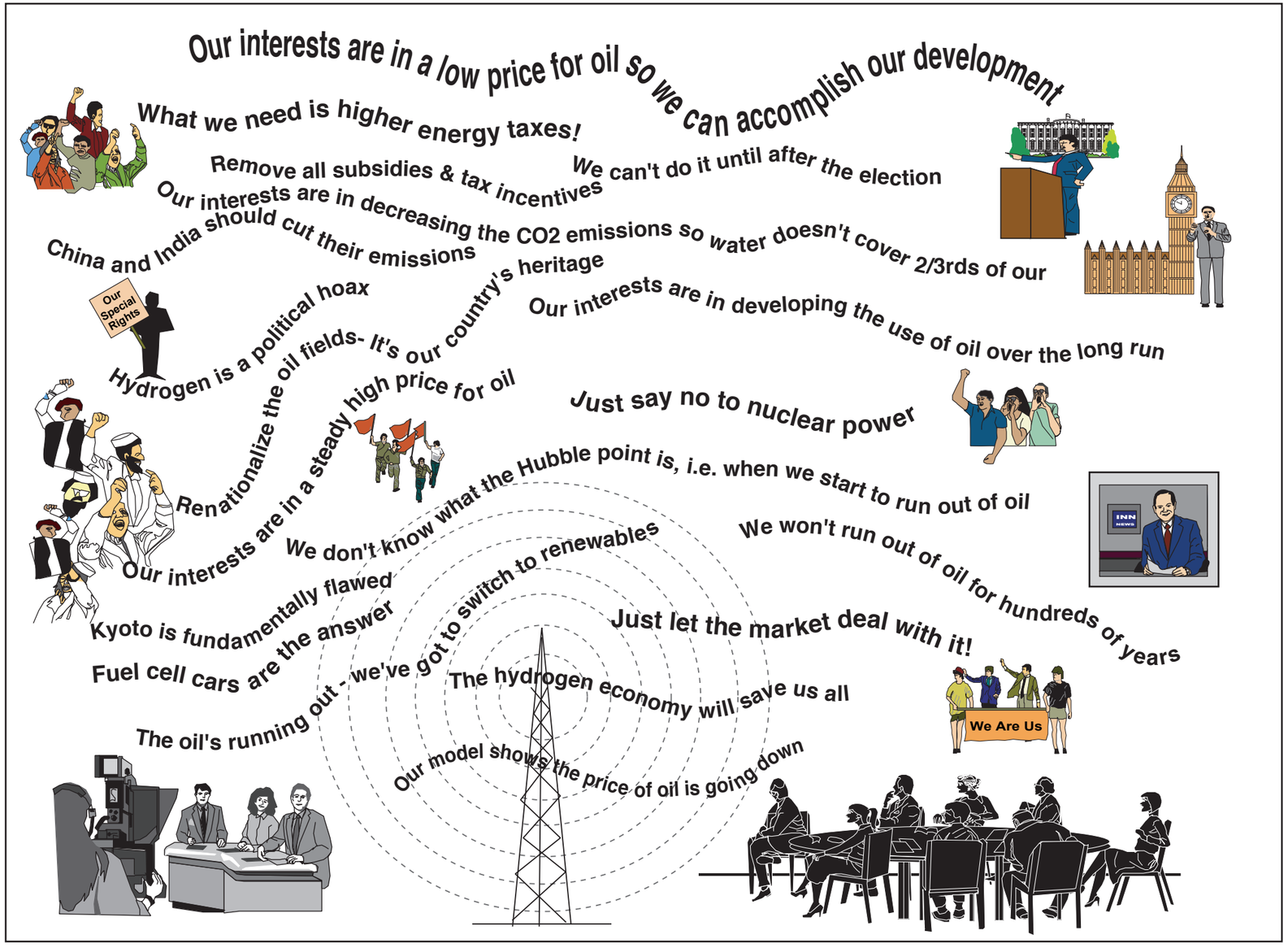
It is easy to identify the major categories of media that crowded the space:

- Twenty-four hour news cycle
- Full global coverage
- Instant knowledge of events everywhere
- Cell phone for every voice
- Computer powered access to almost all knowledge

**Results and ramifications**

We have all heard the complaints of

- Information overload
- Difficulty of relying on sources
- Oversimplifications and misleading or false data



*Part B. How do we get into social messes?*

# Conflictual origins of messes

## Introduction

Russell Ackoff, who initially described messes for organizations such as corporations, says "The mess that a corporation is in consists of the future that it would have if it were to continue behaving as it does and if its environment were not to change or alter its directions in any significant way. In other words: a corporation's mess is the future implied by its and its environment's current behavior. Every system contains the seed of its own deterioration and destruction. Therefore, the purpose of formulating the mess is to identify the nature of these often concealed threats and to suggest changes that can increase the corporations ability to survive and thrive."

## Origins of messes as conflict of desires

Messes originate in the human individual and organization and its interaction with environment. "A mess is a system of external conditions that produces dissatisfaction. It can be conceptualized as a system of problems in the same sense in which a ,physical body can be conceptualized as a system of atoms."

Ackoff then describes the origin of messes: "...the elimination of conflict - the ethical-moral ideal - is necessary for continuous increase in one's ability to satisfy one's own desires and those of others, hence for development. Conflict exists when two or more desires interact in such a way that progress toward one produces retrogression from the other or others. Conflicting desires may lie within an individual or organization or between them."

## Conflict between individuals

Ackoff then elaborates a classification of conflicts which I have illustrated on the opposite page. He says, "Conflicts are likely to arise in any group whose members interact a great deal. Such conflicts may be caused by differences in personalities or to disagreements over objectives and ways to pursue them. Whatever their origin, they can reduce collective as well as individual performance and the ability to improve it. The higher the corporate level of those involved in interpersonal conflict, the more harm they can do and the more they can obstruct corporate development. Conflicts among executives can have paralyzing effect on a corporation and can divide governments into hostile armed camps."

## Conflicts between individuals and the organizations or parts of it

"Both unionized and non-unionized employees often feel they are being treated unfairly by their unit or the corporation as a whole," he says. " Disgruntled employees can be found at all levels of corporations. They often try consciously or unconsciously, to obstruct the corporation's pursuit of its objectives and they frequently succeed."

## Conlicts within the organization as a whole

Ackoff continues by pointing out: "It is not unusual for corporations to have conflicting objectives, even when these are explicitly formulated. For example, most corporations have both growth objectives (e.g., increases in market share, sales volume, or earnings) and a return-on-investment objective. Under many circumstances these objectives are in conflict because growth can only be obtained through investments that cannot yield the desired return."

## Messes have more causes

As we have explained in the first section of this chapter, messes in general have many more causes than Ackoff shows here. But it is important to realize the differences in power and other causes the create conflict in organizations of all levels.

### Conflicts between the organization and groups in its context

with suppliers

with customers

with competitors

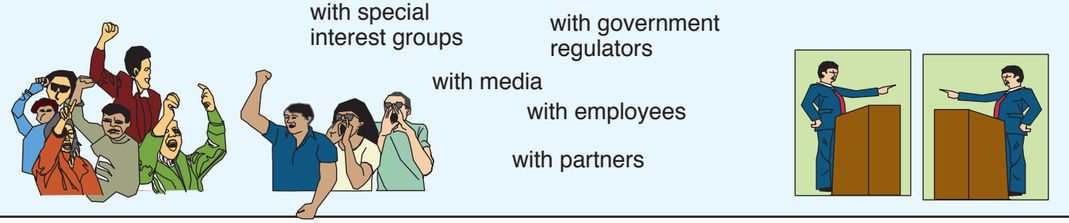
with special interest groups

with government regulators

with media

with employees

with partners



### Conflicts between units of the organization

competing (or conflicting) objectives

over work without compensation

inadequate resources to accomplish tasks

unnecessary administrative, reporting, accounting practices

failure to follow through on commitments

### Conflicts within the organization as a whole

competing (or conflicting) objectives

competing strategies

### Conflicts between individual and the organization (or parts of it)

feelings of being unfairly treated

feelings of being stuck

feelings of not being rewarded properly

feelings of being betrayed by ethics of the organization

### Conflict within individuals

alcoholism

food addictions

house cleaning

financial problems

drug abuse

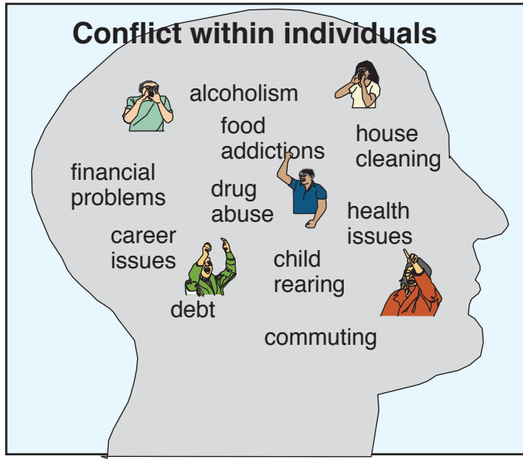
health issues

career issues

child rearing

debt

commuting



### Conflicts between individuals

irritating personalities

competition for promotion, perks, assignments

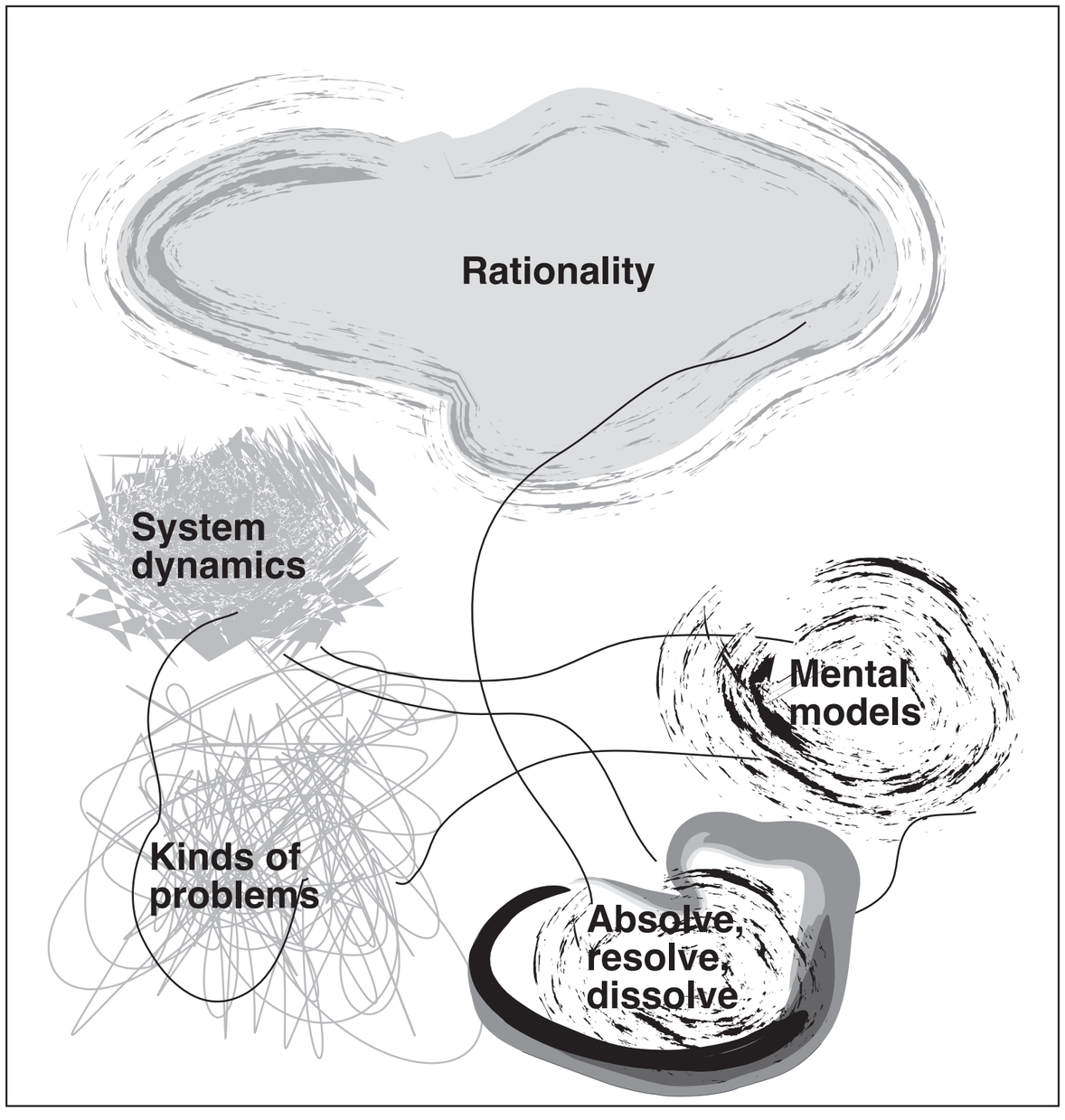
competition for status

competition for equal pay

competition for recognition

Chapter 1 - C

# Ways of Thinking About Messes



*Part C. Some useful ways of thinking about social messes*

# Limits to Rationality - Herbert Simon

**Why we have bounded rationality**

Herbert Simon introduced the concept and terms "bounded rationality" and "satisficing" to address the limitations of human beings making decisions not only in social messes, but also in everyday situations. He pointed out that

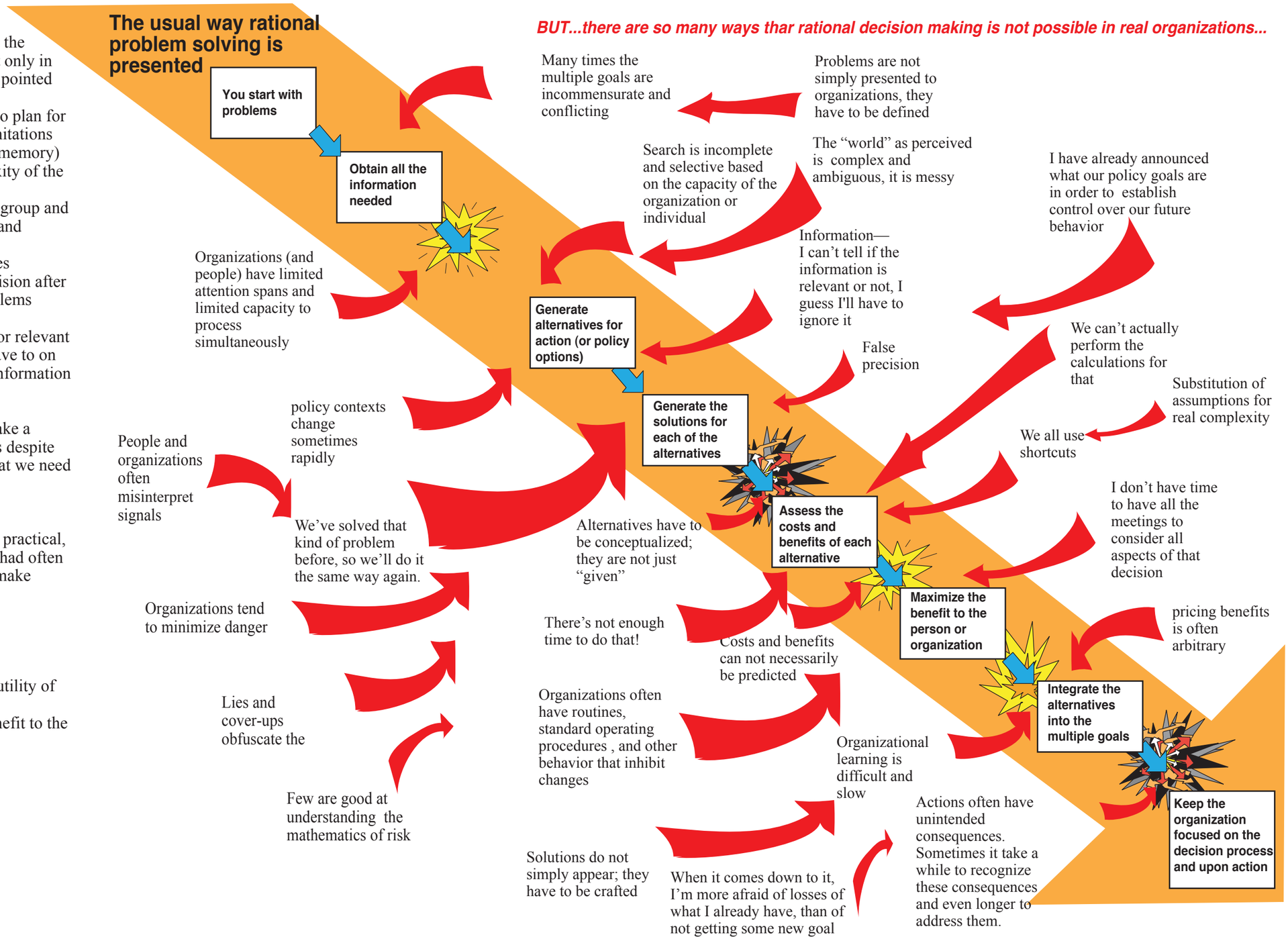
- we have considerable limitations in our ability to plan for the long term, partially based on our cognitive limitations (such as our capacity to hold things in short term memory)
- these limitations are even greater as the complexity of the issues and their context is recognized
- we have in our individual lives as well as in our group and organizational lives multiple goals that compete (and nevertheless face our cognitive limitations)
- our time-bound requirement that we live our lives sequentially (one perception, conception, and decision after another) and thus usually cannot address our problems simultaneously
- the amount of time we can spend on searching for relevant and vital information is also limited, and so we have to on most issues stop when we have enough (partial) information (however we define it.)

Simon calls our "good enough" information to make a decision "satisficing" and the making of decisions despite the mismatch between what we can know and what we need to know "bounded rationality."

**Not objective rationality**

This description of how people make decisions in practical, real world situations is quite different from what had often been described as the ideal or optimizing way to make decisions:

- define the problem
- define the policy or action options
- gather all the information needed to choose (assuming it is available)
- assess the costs and benefits based on expected utility of each option
- make a decision based on the maximizing of benefit to the person or organization.



# Limits of System Dynamics - Jay Forrester

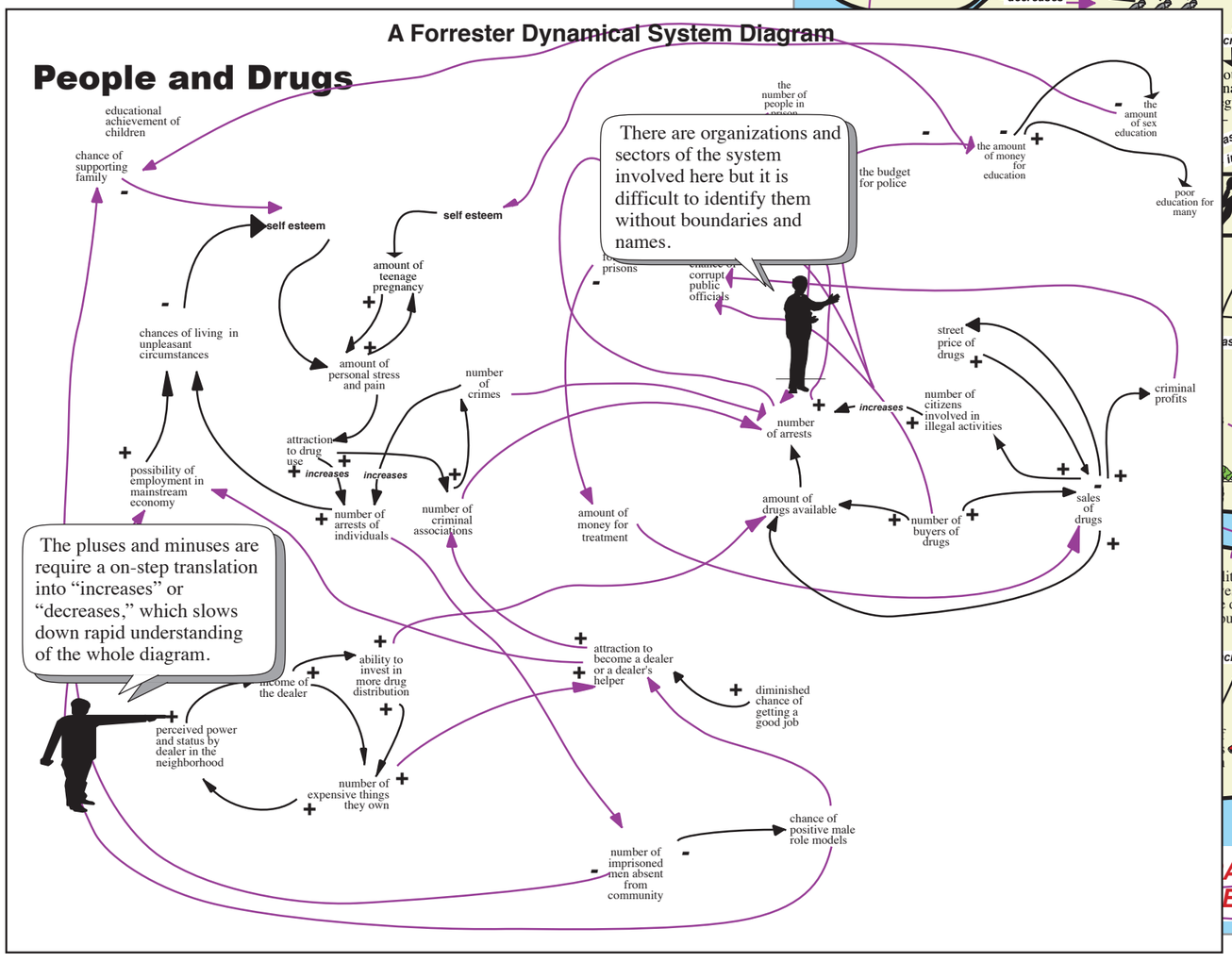
## Introduction

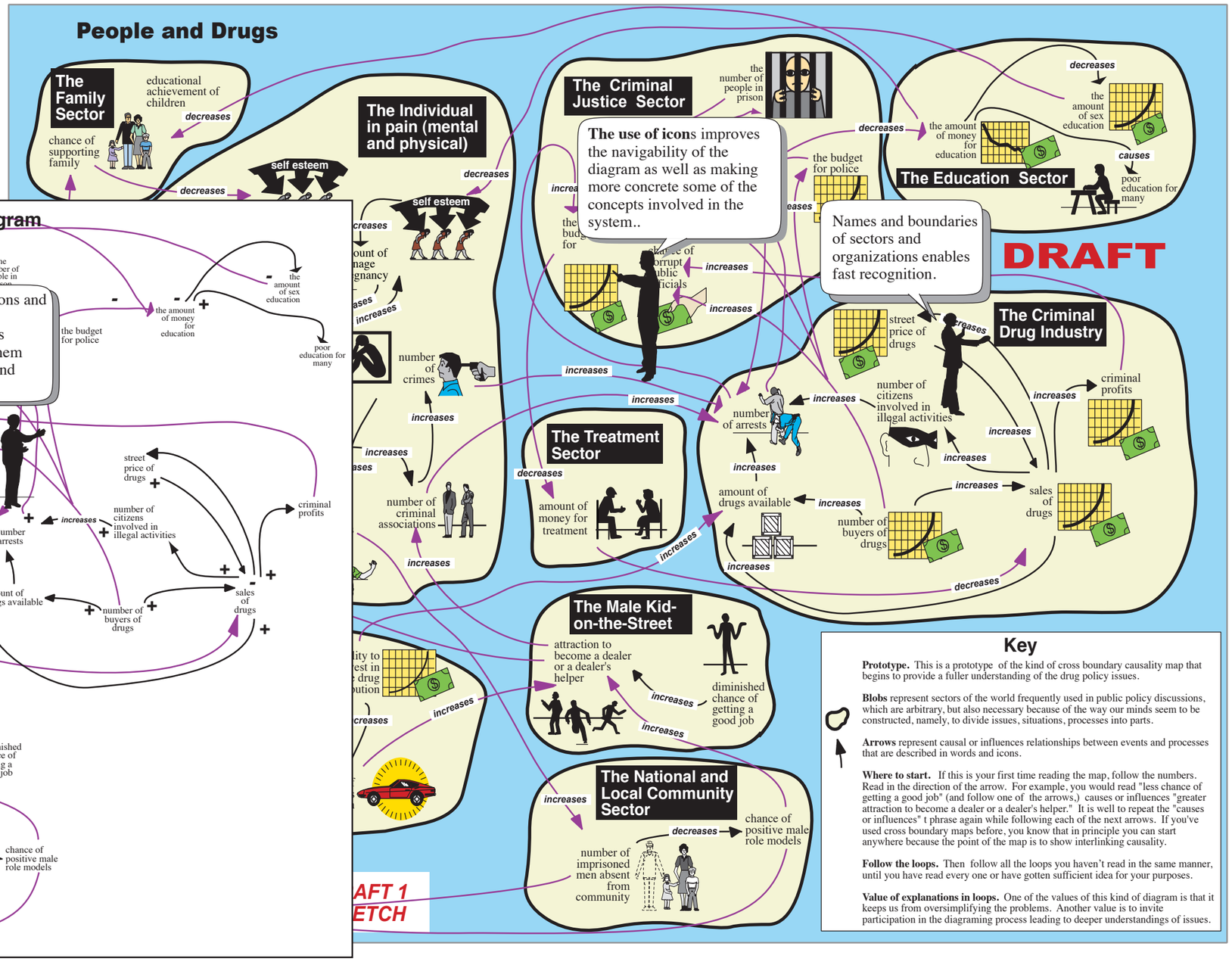
Jay Forrester's systems dynamics made very popular in the Fifth Discipline by Peter Senge. The typical approach results in diagrams as seen below. One of my avenues of creating the mess map was my dissatisfaction and critique of that diagramming approach. While often useful to describe the behavior of large scale dynamical systems (from one set of assumptions), I often found that consultants arriving at a client before me had made Forrester diagrams (also called "causal loop diagrams") and the client had found them baffling and for the most part useless. For example, in the Methodist case (see chapter___) I was shown several gigantic system dynamics diagrams by the client who shrugged their shoulders and said "we couldn't figure out what to do with them."

When I contrasted the components of Forester diagrams with the mess framework of Ackoff, I was able to combine features of both approaches into the mess maps described in Chapter 1. Both approaches can be beneficial, often in the same system and mess.

But, it was also clear to me that Forrester's were badly designed for rapid scanning and critical reading. They just didn't communicate adequately to busy managers and executives. I wondered if I could improve their communication - ability by applying some ides of information design and visual language.

Here I show improvements with an example of a typical Forrester systems dynamics diagram shown at the left. On the right I show added elements to the diagram to make it more understandable.



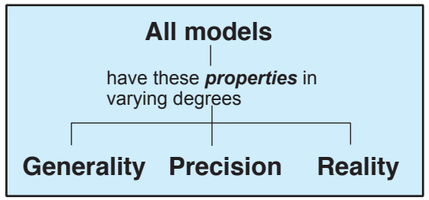



*Part C. Some useful ways of thinking about social messes*

# Limits of mental models – Richard Levins

## Generality, Realism, and Precision

The population biologist Richard Levins in "The Strategy of Model Building in Population Biology" suggests that there are three important dimensions to model building: generality, realism, and precision.




## Impossible to Maximize All Three

He says "it is desirable, of course, to work with manageable models which maximize generality, realism, and precision toward the overlapping but not identical goals of understanding, predicting, and modifying nature. But this cannot be done."

Among the reasons he cites for it being impossible to maximize all three characteristics of modes are:
"(a) too many parameters to measure; some are still only vaguely defined; many would require a lifetime each for their measurement.
(b) Equations are insoluble analytically and exceed the capacity of even good computers,
(c) Even if soluble, the results expressed in the form of quotients of sums of products of parameters would have no meaning for us."

## Strategies for Creation of Models

Levins suggests one of three possible scientific strategies for the creation of models: "1. sacrifice generality to realism and precision . . . 2. sacrifice realism to generality and precision, and 3. sacrifice precision to realism and generality."

Levins suggests ". . .even the most flexible models have artificial assumptions. There is always room to doubt whether a result depends on the essentials of a model or on the details of the simplifying assumption. This problem does not arise in the more familiar models, such as a geographical map, where we all know that contiguity on the map implies contiguity in reality, relative distances on the map correspond to distances in reality, but color is arbitrary and a microscopic view of the map would only show the fibers of the paper on which it is printed. In the mathematical models of population biology, on the other hand, it is not always obvious when we are using too high a magnification."

## Implications for mess mapping

I use these distinctions of Levins from population biology models in thinking about social, economic, and political phenomena, and specifically to models of messes (as described on the opposite page.)

## Truth is the intersection of lies

What should be done then by the working scientist or anybody trying to understand mega-messes? Levins says ". . . we attempt to treat the same problem with several alternative models each with different simplifications but with a common biological assumption. Then, if these models, despite their different assumptions, lead to similar results, we have what we can call a robust theorem that is relatively free of the details of the model. Hence, our truth is the intersection of independent lies." Following Levins, our treatment of mega-messes in Chapter 3 specifically relies on the idea of multiple, imperfect models.

## A Model is Not a Theory Nor an Hypothesis

Finally, Levins goes on to say "A mathematical model is neither an hypothesis not a theory. Unlike scientific hypothesis, a model is not verifiable directly by experiment. Our mental models are rough approximattions at best. For all models are both true and false. Almost any plausible proposed relation among aspects of nature is likely to be true in the sense that it occurs (although rarely and slightly). Yet all models leave out a lot and are in that sense inadequate. The validation of a model is not that it is 'true' but that it generates good testable hypothesis relevant to important problems. A model may be discarded in favor of a more powerful one, but it usually is simply outgrown when the live issues are no longer those for which it was designed." Our approach to models of messes and mega-messes in this book is specifically directed at good. testable action to important problems.

## Richard Levins – The Analysis of Generality, Realism, and Precision in Models

**Models**

have at least three important dimensions

| Generality | Precision | Reality |
|---|---|---|
| which can be defined as | which can be defined as | which can be defined as |
| the scope in space and time to which the model applies | the degree to which the components of the model are well defined, measurable, and measured. | the degree to which the lower level detail within the scope of the model are represented |
| *for example* | *for example* | *for example* |
| cosmological models typically cover the entire universe; biological models cover all or some limited part of the biosphere; behavioral models may be limited to a particular political system or person | cosmological models can have considerable variation in precision in their mathematical variables; many ecological models have considerable variability in the quantitative information about them | there are different cosmological models for galaxy information and composition of the interior core of the moon; population biology models vary in the degree they treat individual organisms and the inclusion of detail about feathers and fur |
| and the generality of models has ***limits*** such as | and the precision of models has ***limits*** such as | and the reality of models has ***limits*** such as |
| - ability to generalize over the scope of cases<br>- ability to generalize over time, and space dimensions<br>- ability to attribute causes and influences<br>- data collection limit of cost, etc. | - measuring instruments and procedures<br>- cost of obtaining data<br>- ability to agree on category systems and definitions<br>- measurement and experimental design errors<br>-time needed to gather data<br>-agreement about non-observable (hence, only inferential) dynamics | - ability to describe individual actions<br>- language to describe in humans behavioral and mental characteristics, patterns, and events |
| and which limits have ***examples*** (in the Multnomah County Mental Health Map – Chapter 2) such as | and which limits have ***examples*** (in the Multnomah County Mental Health Map – Chapter 2) such as | and which limits have ***examples*** (in the Multnomah County Mental Health Map – Chapter 2) such as |
| - generality of model portrayed in the map is limited to only parts of the system (e.g. mental health delivery for children is not included)<br>- The model only applies to geographic area of one county in Oregon (although people familiar with similar situations in other states have said that the model is roughly similar) | - data does not (always) give exact dollar amounts<br>- data does not provide exact number of clients<br>- data about the problems refer to shifting number of jail inmates every day | - does not portray individuals<br>- does not portray legislative history<br>- does not portray deployment of police on specific time shifts<br>- does not portray interaction of case workers with specific clients or group of clients |

Note. For more on these distinctions, see: Levins, Richard, The Strategy of Model Building in Population Biology, in Sober, Elliott (Editor) Conceptual Issues in Evolutionary Biology, Cambridge MA, MIT Press, 1984, 18-27

# Limits to Absolve, Resolve, Dissolve - Russell Ackoff

## Introduction

Russell Ackoff whose ideas of a mess form the provocation for this book forcefully denies us the chance of working through messes the old way (as illustrated by our visual on the bounded rationality pages in this book). He says, "In the Machine Age messy problematic situations were approached analytically. They were broken down into simpler discrete problems that were often believed to be capable of being solved independently of one another. We are learning that such a procedure not only usually fails to solve the individual problems that are involved, but often intensified the mess. The solution to a mess can seldom be obtained by independently solving each of the problems of which it is composed. This appears to be the case, for example, in our current handling of the urban mess. Efforts to deal separately with such aspects of urban life as transportation, health, crime, and education seem to aggravate the total situation."

## Ackoff's concept of what a problem is

Before describing what Russell Ackoff thinks can be done about messes, his philosophy of how problems are conceptualized in the context of messes is important to understand. He says, "In the Machine Age problems were thought of as 'out there,' as purely objective states of affairs. But John Dewey, the great American philosopher, challenged this notion and argued that decision makers have to extract problems from the situation in which they find themselves. They do so, he said, by analyzing the situation. Hence problems are products of thought acting on environments; they are elements of problematic situations that are abstracted from these situations by analysis. What we experience, therefore, are problematic situations, not problems, which, like atoms and cells are conceptual constructs. We have also come to realize that no problem ever exists in complete isolation."

## Four types of possible actions

Russell Ackoff the originator of our approach to messes divided his approach to working through messes into four de-idealized categories.

***Absolve*** - Ackoff defines this as a "means to ignore a problem and hope it will solve itself or go away of its own accord." Elsewhere in this and the previous chapter I have described some of the ways we absolve problems. Mitroff and Alpaslan agree. They call absolving a problem a "means to accept the fact that the problem ... may never fully vanish." They suggest that the problem, "may even grow worse over time. At best, it waxes and wanes.... However, the real essence of absolving is as follows: more often than not, we are committed to a pet solution or a series of pet solutions. In absolving, we work backward from our pet solution(s) to the definitions(s) of a problem compatible with our preferred solution. But we do it in such a way that we make it appear that the definition of the problem came first. In other words, not only do we deny the existence or the messiness of our current problems, we take refuge in our need for solutions for well-defined problems. This form of absolving is dysfunctional because it is a form of 'denial'...and it sends us down the path of solving the problem precisely, which makes the current problems only worse." (Mitroff and Alpaslan, 2011)

***Resolve*** - Ackoff defines his approach as employing "behavior previously used in similar situations, adapted if necessary, so as to obtain an outcome that is good enough.... this approach has little lasting power because it deals with symptoms and short-term effects, not causes." But Mitroff and Alpaslan say that it simply "means to contain (the problem) within acceptable limits." It only appears to resolve.

***Solve*** - Ackoff say that solving a problem"means to discover or create behavior that yield the best, or approximately the best, possible outcome, one that 'optimizes.'...Unfortunately, few problems, once solved, stay that way; changes in the environment, changing societal goals, and new information cause solutions to deteriorate....Moreover, solutions generally do not exist in isolation from other problems. Solutions obtained to problems isolated from the other problems with which they interact generally produce one or more new problems. These are often more serious and difficult to solve than the original problem."

**Dissolve** - Dissolving a problem according to Ackoff "means to redesign either the society that has the problem or its environment in such a way as to eliminate the problem or the conditions that caused it, thus enabling the society involved to do better in the future than the best it can do today...the dissolution of a problem requires redesign of the system that has the problem....

Mitroff and Alpaslan say dissolving "means to lower or redefine (the problem's) importance. When we dissolve a problem, we say that other problems within the system (the mess) in which the problem exists deserve our attention more...The problem can be 'managed properly' only by managing other problems within the mess."

## Ackoff's preferred approach

For many of his books from at least as far back as 1981, Ackoff (1974) has emphasized dissolving problems and hence messes, by "redesigning" the future (1974), society (2003), the corporation (1981), and western economies (1984). In each of these, he and his collaborators have started from scratch (more or less) asking how organizations, democracy, education systems, race issues, criminal justice, health systems, solid waste collection, cities and their transportation infrastructure, underdeveloped countries, and whole Western economies could be redesigned. Redesign is another word for planning, but he is careful to indicate that is his approach is form of "continuous planning" by "interactivist" planners (contrasted with interactivist and reactivist planners).

## Idealized futures

"The interactive planner initiates ends planning by designing an idealized future for the system being planned for. This is a design of the future that begins 'from scratch.' All constraints other than technological feasibility are removed....Therefore, the design is an explicit formulation of the planners' conception of the system they would create if they were free to create any system they wanted." (Ackoff, 1974)

## Planning facing the future, not the past

"Most system planning is retrospective: preoccupied with identifying and removing deficiencies in the past performance of system components. Retrospective planning moves from what one does not want rather than toward what one wants. It is like driving a train from its caboose. One who walks into the future facing the past has no control over where he is going. Idealization rotates planners from a retrospective to a prospective posture." (Ackoff, 1974)

## System analysis and redesign

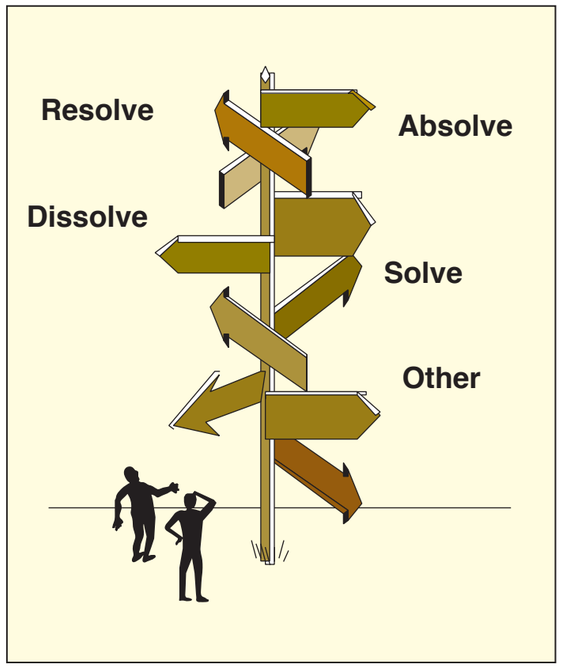
Ackofff was one of the founders of systems analysis. He relies on that larger methodology for the process of dissolving messes. He says, "An idealized redesign of a system is a design of that system its designers would have right now if they could have any system they wanted, subject to three requirements:

1. The design must be technologically feasible.
2. It must be operationally viable.
3. It must be capable of rapid and effective learning and adaptation, of improving itself, and of being improved from without." (Ackoff, and Rovin, 2003)

Mitroff and Alpaslan are not so optimistic as Ackoff that this is possible. They say: "When the system is redesigned, it is hope that the original problem no longer exists. Of course, a complete redesign of the system may create other kinds of messes."

## Continual redesign

For all the reasons given in this chapter, and for the multi-multis involved in them, my own view is that life in organizations is one of continual redesign as systems of problem appear. That is what makes life interesting and difficult.



*Part C. Some useful ways of thinking about social messes*

# Limits to Solutions of Major Kinds of Problems – David Snowden

## Introduction

Here I present David Snowden's four-fold analysis of different kinds of problems (with some linkages to other ways that such problems are delineated by other researchers and intervenors

## Definition - Problem

As part of his Cynefin framework, Snowden uses the notion that something is not going well for one or more human beings . One of his major contributions is to develop a 2 x 2 matrix of large groups of problems with similar characteristics. He divides them into four categories with general advice for what to do about them. In his work on specific situations with specific client organizations, he uses a variety of creative methods for gathering information, interpretation, and action. His methods are in the same spirit as those we describe in this book, although quite different in specific instances.

## Social messes

The idea of mapping social messes in this book falls in the domain of Snowden's Complex Problems (upper right on opposite page).

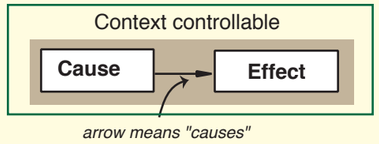
## Puzzles

Problems where the logic and dimensions of the problem patterns is or can be known

**Also known as ORDERED PROBLEMS**

### Known problems

**Definition:** Problems for which the method to solve them is known and for which their next states can be predicted within a range




#### Examples

- Many engineering and business problems
- Many personal problems

**For Representation and communication**

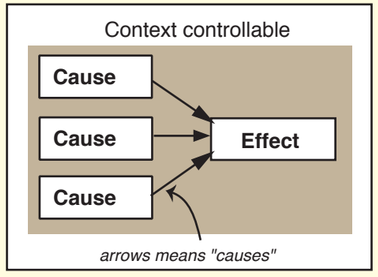
- Various forms of diagraming
- Use Information Mapping®'s Method

#### What to do

- Use best practices
- Get How To Do It videos from the internet
- Apply customary solutions

### Knowable problems

**Definition:** Problems for which a method or series of methods could in principle be devised to solve them, including simulations to get ranges of outcomes, but the community has not either devised the methods at present or has not executed the methods on specific instances.




#### Examples

- Problems in which we can use various reductionist experimental methods of science
- Many business and scientific problems where variables are isolatable
- Many personal problems that take gathering of data and/or using known skills or learning new skills

**For representation and communication**

- Scientific journal articles
- Reports

#### What to do

- Make structured observations
- Do single experiments
- Do a sequence of experiments to rule out causes and variables
- Try simulations (if variables are knowable) to get ranges of outcomes

## Mysteries

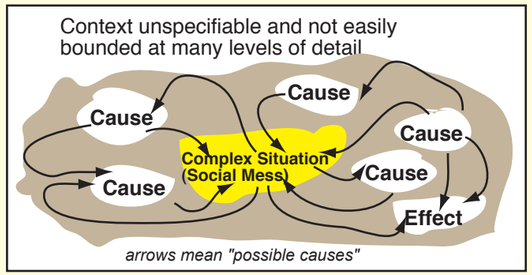
Problems where the logic of the problem patterns is not or is insufficiently known or in principle can not be known sufficiently to make a difference

**DISORDERED PROBLEMS**

### Complex problems

a.k.a. "Mysteries" (Snowden );"messes".(Ackoff) social messes" (Horn); and "wicked problem" Rittle)

**Definition:** Problems for which the method to solve them is unknown in particular those which have an unbounded number of causes and effects interacting often on a relatively fast moving time scale and at various levels of causality. Therefore their next states can not be predicted with very much reliability. Snowden notes that cause and effect are more or less knowable retrospectively .




#### Examples

- Ecosystems
- Highly competitive markets
- Battlefields
- Ideological conflicts
- Social messes
- Wicked problems

#### Best approach to dealing with them

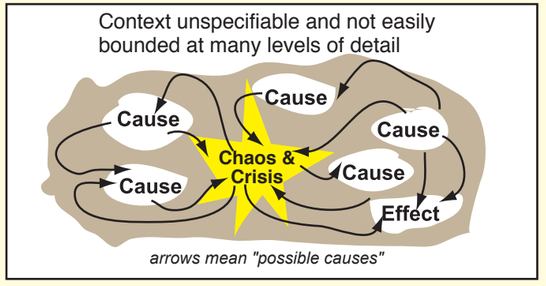
- Sense emerging patterns and reinforce, disrupt, or ride along with problem (according to Snowden)

#### Methods for looking for insights

- Scientific visualization
- Mess mapping
- Visual language, knowledge mapping with thought platforms, and visual analytics

### Chaotic problems

**Definition**. No ability to discern cause-effect relationships of any relevance to the problem and emergency or crisis conditions prevail and no clear options are present as to what is the best thing to do




#### Examples

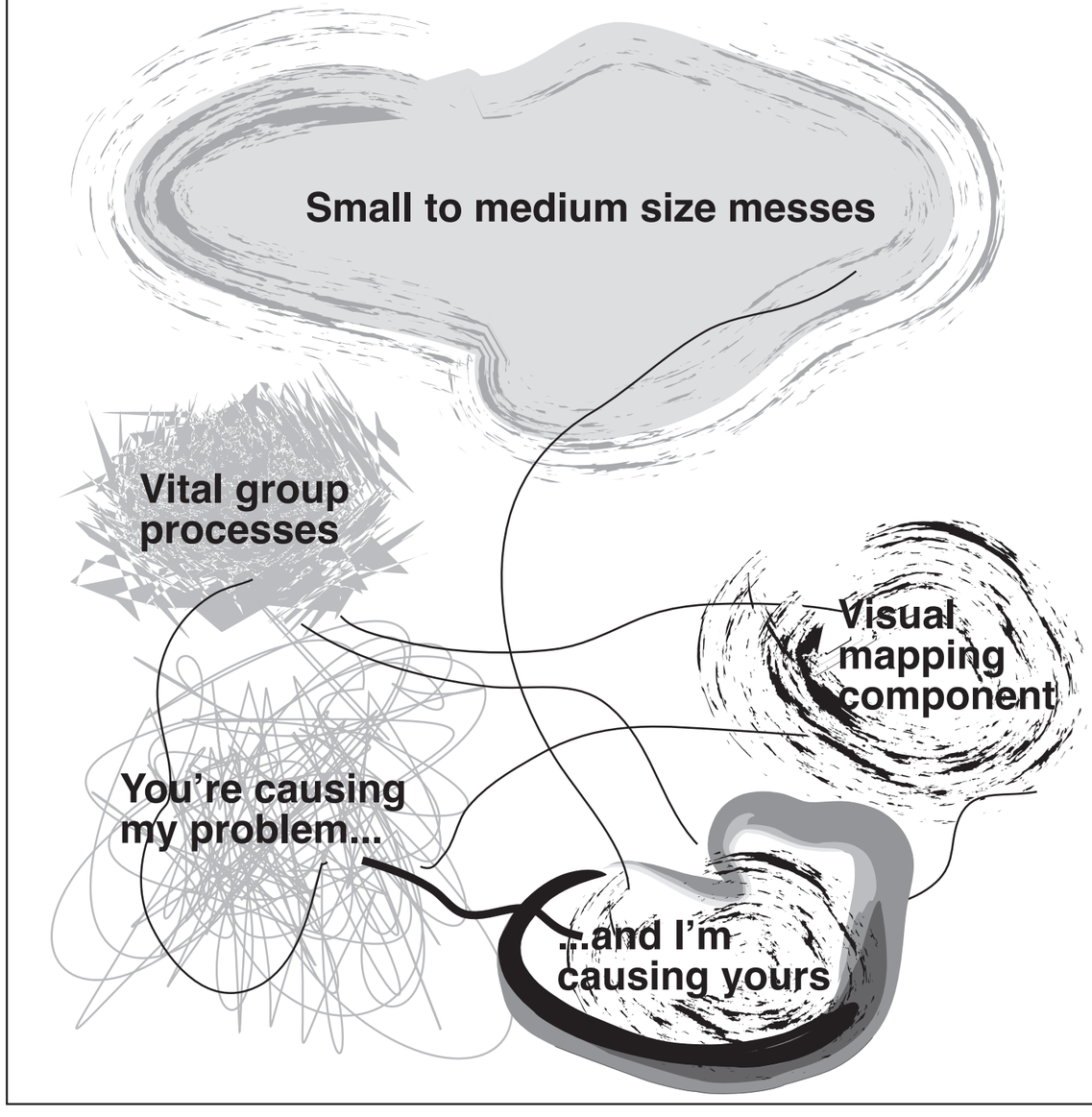
- You are in a building that is one fire
- Sudden unexpected floods, tornados
- Battlefields

#### Best approach

- Act first to bring more ordered process and to gather information the results from acting, i.e. introduce some stability and gauge changes in the situation (according to Snowden)
- Ian Mitroff's crisis management tools (see References)_

Chapter 2

# Mess Mapping



*Chapter 2*
# Mess Mapping

### Introduction
In this chapter I will describe how I got involved in creating a methodology for addressing small to medium size social messes. At the same time I will describe it in a way that you will be able to use the process yourselves on your own messes. I will provide whatever things we had the learn the hard way (i.e. by failure to achieve our objectives in the early cases). And I hope you will build on the methods I describe, creating a more robust field of mess mapping.

I won't provide a table of contents for this chapter because mess mapping is a sequential method (i.e. step one, step two, etc.). It doesn't make much sense to read step three if you don't know what has gone before.

One other thing. To repeat, this is a method that I have only applied to small to medium size messes. I have no idea how it would be helpful in addressing mega-messes such as climate change, as treated in Chapter 4.

### How mess mapping got started
One day in 1999, my friend Elsa Porter, who used to be President Jimmy Carter's Assistant Secretary of Commerce, called me. She had just moved to Portland Oregon and had immediately been appointed the Chairperson of a task force to deal with the problems of mental health delivery in Multnomah County.

### I need one of your diagrams
"This situation is so complex. I just need you to draw one of your diagrams to help us understand what we are up against," she said.

Why me? She knew that I had just finished my book Visual Language: Global Communication for the 21st Century. Many times she had seen me improvise diagrams and drawings in the middle of discussions about public policy and organizational problems.

I agreed and met with Elsa and her chief of staff. As I listened to Elsa's descriptions of the complexity of their situation what stood out for me was that there were a lot of organizations in the county, all involved in some way in delivering public mental health services. Each of them were experiencing problems and the problems in some sectors were getting pretty painful.

### The Presenting problem
Take the jail for example. The population of mentally ill patients had grown from 1,500 to 3,000 in just two years. That was a problem. The county jail was not set up to be the largest delivery organization for dealing with the mentally ill in the county. They had been acting out on the streets. The police were arresting them out and the courts were sentencing them to jail time. And once they were in jail, they were taken off the Oregon Health System roll, which had paid for their health care before incarceration. And many of the prisoners did not take their medications after discharge from jail, so they were acting out again on the streets.

### Out on the street
And out on the street, caseworkers were leaving their jobs "in droves." Nobody quite knew why. Nobody could do much about it. They were stuck. And they didn't understand what was going on that was keeping them stuck.

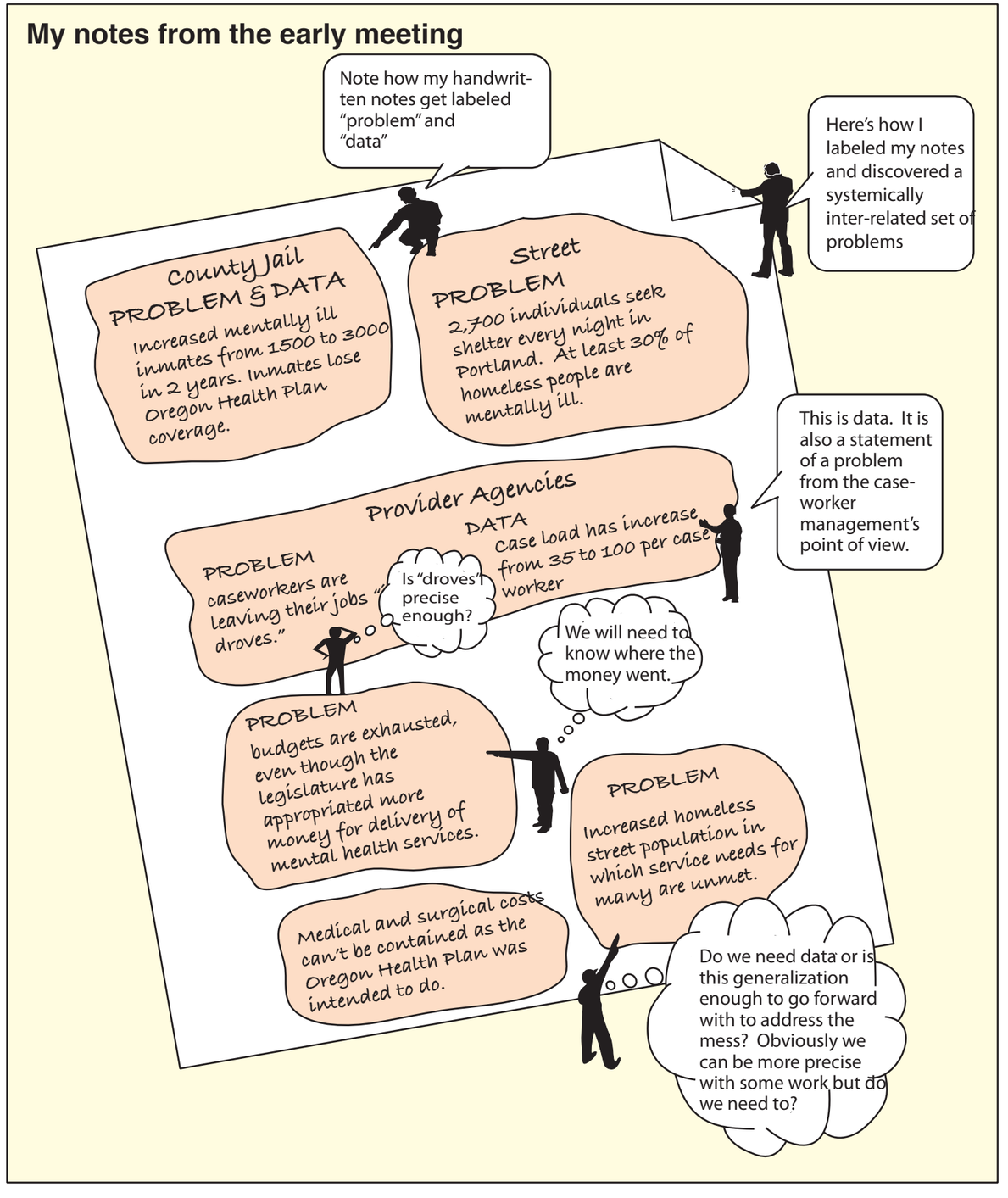
And elsewhere, the budgets were exhausted, even though the legislature had appropriated more money for delivery of mental health services.

### What to do?
I didn't know what kind of diagram I was going to produce for Elsa. As Elsa described the situation, I took notes on a big piece of paper I began to scribble what she was telling me.

### Label every chunk
Many years before that I had developed a form of what has come to be called "structured writing" in which I put an informative label on every chunk of information that I wrote. Before long, I found that I was labeling most of the notes I was writing with the word "Problem." (Opposite page - my handwriting isn't readable so I've used some handy typeface that shows how I wish I could write.) Elsa was describing an inter-related set of problems that existed

### The big AHA! Inter-related set of problems!
"A systemically inter-related set of problems" was systems expert Russell Ackoff's definition of a mess!

I realized he had *described* messes, but he had not given us a way of diagramming a mess. I decided I would apply my skills to creating a "*mess diagram*."



# Cross-boundary causality issues

### Causes and Influences

As I heard Elsa continuing to describe the problems different members of her task force were facing in their organizations, I started to draw some arrows that stood for "causes" or "strongly influences." What was beginning to appear on my big sketch pad was the diagram of a mess (although I was only dimly aware of it at the time).

### Causal arrows

And I began to overlay on it components of another type of diagram I had worked on several years before. It was an improvement on the "causal loop" or "influence diagrams" that the system dynamics field had been using.

### Boundaries

What I had added to that method was routinely inserting the boundaries of the organizations. At the right is an example of such a diagram from my book *Visual Language.*

### Causal arrows connect problems

The causal arrows were similar, only they connected problems instead of names of phenomena (as shown on the right); In my book I had called it a "cross boundary causality" diagram because its prominent feature was that what was happening in one sector or organization on the diagram was being caused by factors across the boundaries of organizations.

### Long causal loops between sectors

The problems we face today seem to be growing more difficult to resolve. The most often-mentioned driver of this phenomenon is increasing complexity. When we talk about complexity, we usually mean the presence of tight interconnections between the social, political, and economic systems within which we lead our lives, and which we are accustomed to thinking of as discrete arenas. In fact, they are deeply intertwined.

In problem-solving situations, too often there is only token acknowledgement of such linkages, as opposed to an attempt to integrate the interconnections into the problem definitions and solutions. Too often, a group will examine just one sector, ignoring the cross-sector influences. We may look at the economy or at the public policy issues but neglect to keep in mind the long causal loops between sectors.

Without a way to simultaneously keep track of all the data from all the sectors, we disregard the linkages, and our discussions suffer as a result.

### Ill-structured problems and messes

I was familiar with the concepts of "ill-structured" and messes problems from the work of Ian Mitroff (see pages ___)

### The mental health issue in the jail

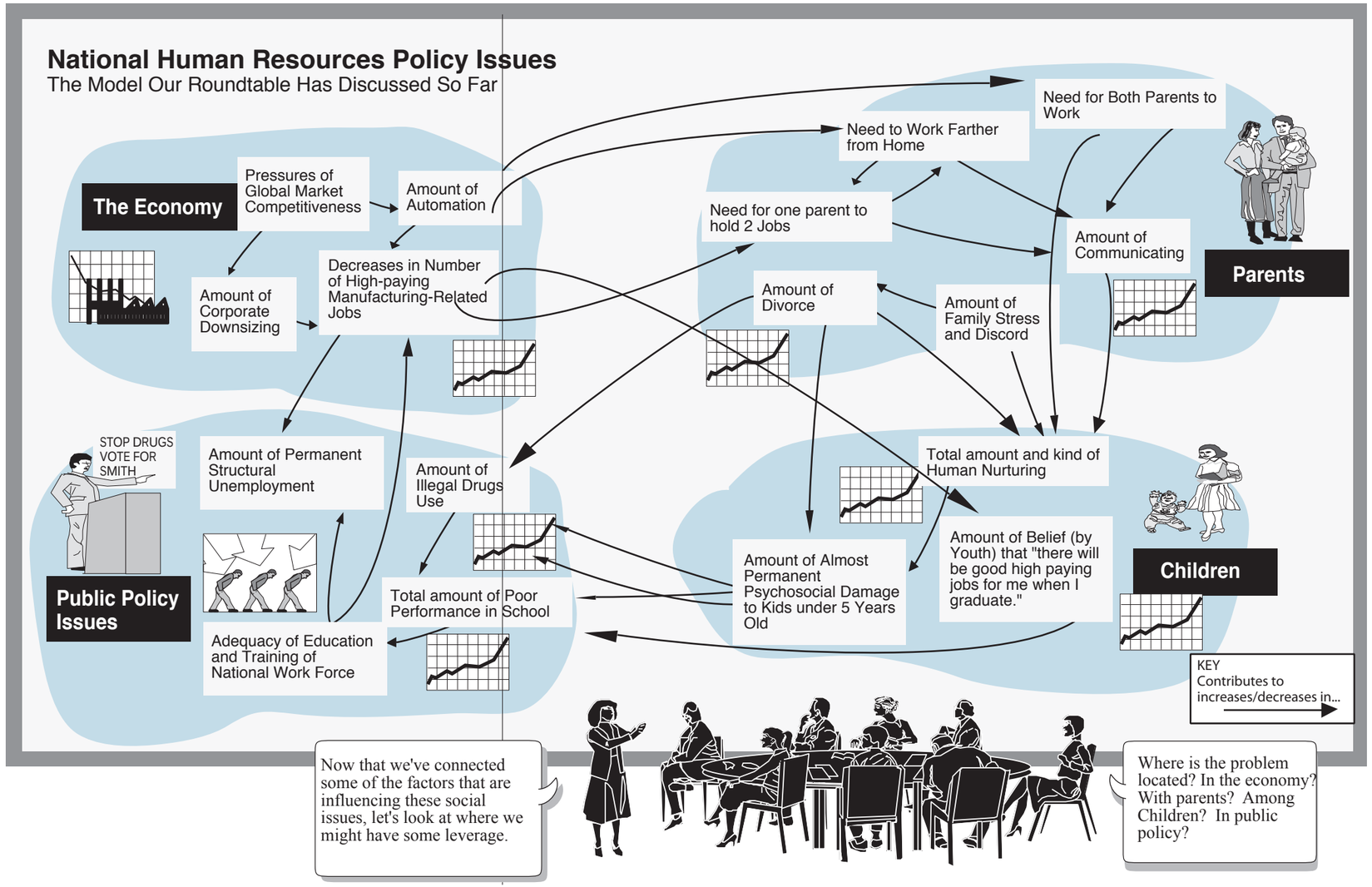
It was clear to me that Elsa was explaining to me a set of problems that had the characteristics that Mitroff had described and I had portrayed in my book.

***Complicated, complex, and ambiguous.*** Her mental health taskforce felt overwhelmed by the amount of detail and the interconnectedness of the issues.

***Uncertainty.*** They were puzzles even as to what the problems are, let alone what any solutions might be

***Constraints.*** They had a limited time to work on the issues, limited budget, conflicting time demands on the high level jobs of their task force members. The had great constraints.

***Points of view.*** Elsa and her chief of staff had already been in contact with the patient advocates who were seeing the issues differently from other members of the taskforce.



# Getting started with mess mapping

### Portland jail story
Different organizations were dealing with the mentally ill in Multnomah county, where Portland OR is the major city. The problems had many of the characteristics of social messes described on the previous page. This was a mess -- a systematically interrelated set of problems.

### What is a social mess?
As far as I can determine, the organizational systems expert, Russell Ackoff originated the concept of a mess.

They've been called "wicked problems." (by Horst Rittle) "ill-structured problems." (by Ian Mitroff) I call them "social messes" What they are *not* is merely problems. Many problems have solutions. Some do not because they involve multiple objectives and require tradeoffs and compromise. Many "solutions" are thus imperfect or partial.

### My hypothesis at that time (1999)
So I conjectured that maybe Elsa's taskforce's overflowing jumble of mental health problems starting with the jail problem was a "mess."

If so, then the next question was how do you best represent a mess? How do you get 20 members of a taskforce to agree what the "problems" were? You can't unless they talk to each other about what their problems were from their points of view.

***Cross boundary causality.*** I conjectured that my adapting my cross boundary map with its blob-like boundaries for organizations would be a start. It would clarify what the organizations involved were and would suggest that there were cross boundary causality factors at work that need to be identified.

***Interrelated set of problems.*** In addition, it was necessary to use Ackoff's idea of a systemically interrelated set of problems. Those problems had to be identified by different members of the taskforce and had to be written down. There were, thus, many problems, not THE problem.

**A group process of mapping the mess.** I decided to help them create a visual representation of their mental models of the problems, what we would eventually call the mess map.

### Step 1. Make a template or skeleton mess map
The next job was to create a sketch (or template) for the group to work with at the first session.

I sketched out something that looks like the diagram to the right. I worked with Elsa to put a couple of "problem boxes" on the template to serve as a model for the group exercise. I suggested that Elsa take a template like the one on the opposite page (created on my computer) to the task force members and ask them to help us further describe the interlinking set of problems and their causes. She did that mostly as individual interviews.

### Composition of task force
The Portland task force was comprised or members of the community, not the key stakeholders who were the responsible directors of the relevant agencies involved in mental health in the community. This became a problem for Elsa.

What we learned from this is to make sure the key stakeholders were involved in the taskforce and to have them in the same room to tell us and each other how they saw the problems from their point of view. In subsequent mess mapping processes, our task force participants were Directors, Vice Presidents, CEOs their key deputies of their organizations.*

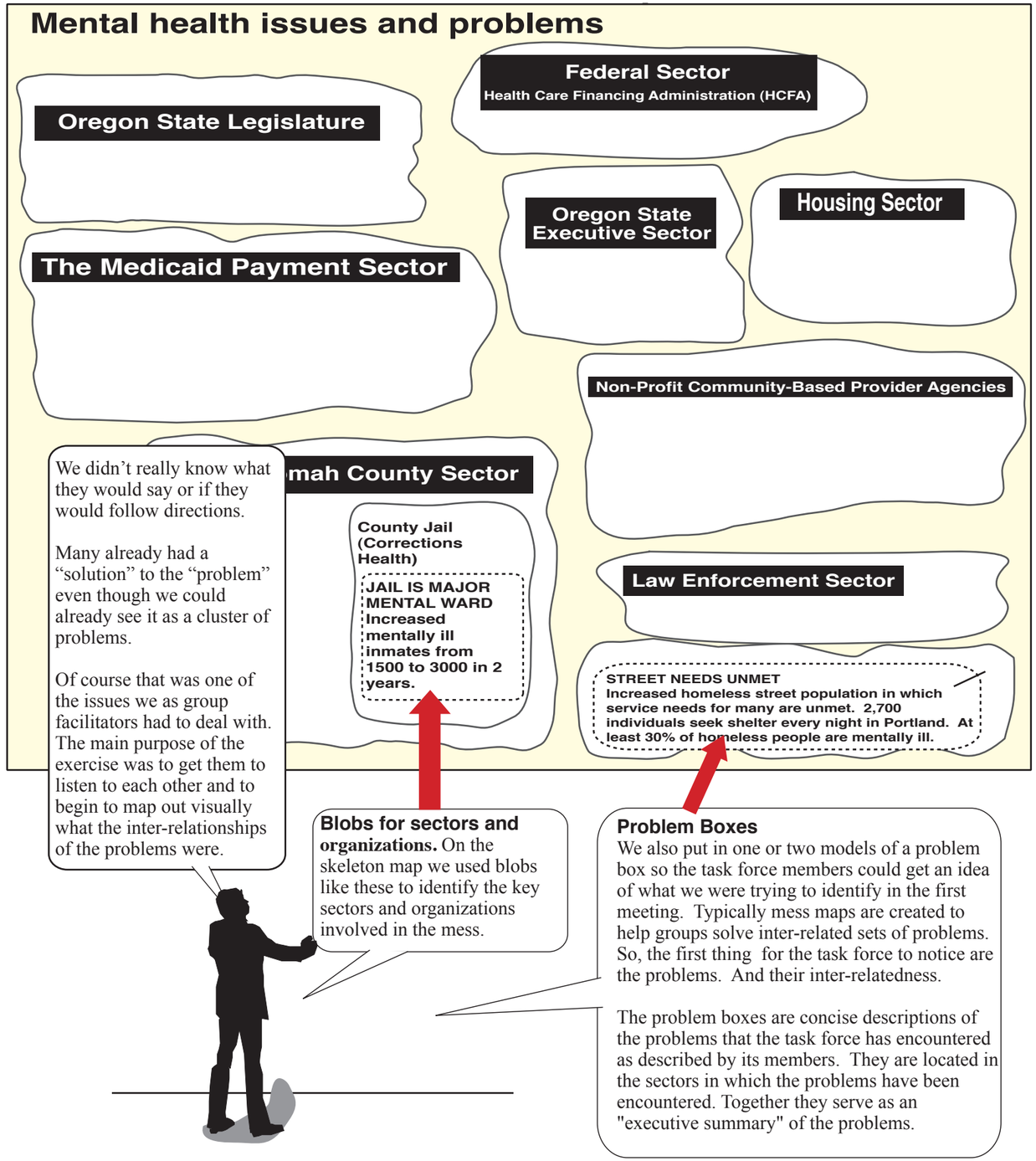
### Divide into small groups
At subsequent mess mapping task forces, the group is divided into small tables of 5 or 6 people.. I pointed out the sectors and organizations on the template were represented as blobs, and point out that it couldn't be all that difficult to fill in some blobs! You know what your problems are. You know where the pain is for your organization.

They spend about 3 hours adding to our template, how the problems were seen from their point of view. We have recorders at each of the five tables write down how they saw their problems. Recorders at each of the tables send their notes to me at the end of the meeting. We then make a composite next version of a mess map on our computer. (Turn the page)

---

*Note. From here on in this chapter I am going to combine the best practices that we have learned in doing mess mapping processes *as if* they had all been done in the best way in Portland, and we had been perfect innovators from the start. I do this because I feel this is the easiest way to convey our learnings over the past 15 years.

***The skeleton map for the Multnomah project***



# Listening to the first descriptions of the systemically inter-related problems

### Purpose of the first meeting

I currently envision the purpose of the first meeting of any taskforce is to:
1. Get the group to engage in helping us analyze the mess by collaboratively creating a first version of the mess as a "map"
2. Help the group to get to know each other as individuals
3. Have a rough, visual product that represented the group's work.
4. Help them begin to form a common ,mental model of the mess

### The first meeting

For the first meeting of a mess mapping task force, I now say only a few things about messes before dividing the task force into smaller subgroups to work immediately on the maps.

### To introduce the process

Thus, in my mini-lecture introducing the process, I say, "You're not working on a problem. You may think you are. But this is a mess. We have a process for getting a better understanding of the mess. It's called mess mapping. All you have to do is fill in these blobs. That doesn't sound too hard, does it?"

I would then continue: "A mess is an inter-related system of many problems. That is, a mess is a tangle of problems all related to each other. We've got to find out what these problems are. You know them because you encounter them every day in your organizations."

Then I point to the templates which were on each of the tables: "We've created some skeleton blobs that represent the different sectors (such as transportation, or housing, and organizations like Mercy Hospital and the County Data Processing Department). There may be other blobs you need to add. Or we may need to divide some in two.

### Goal of the first meeting

"What we want to do in this first meeting is to begin to describe the problems that constitute this mess from the standpoint of people in these various blobs. That's your task for today. We've got recorders in each of the subgroups and they will get down what you're saying about the blobs. In the next meeting of the task force we'll start looking at the causes for these problems. But for today, we're just going to try to get most of the problems identified."

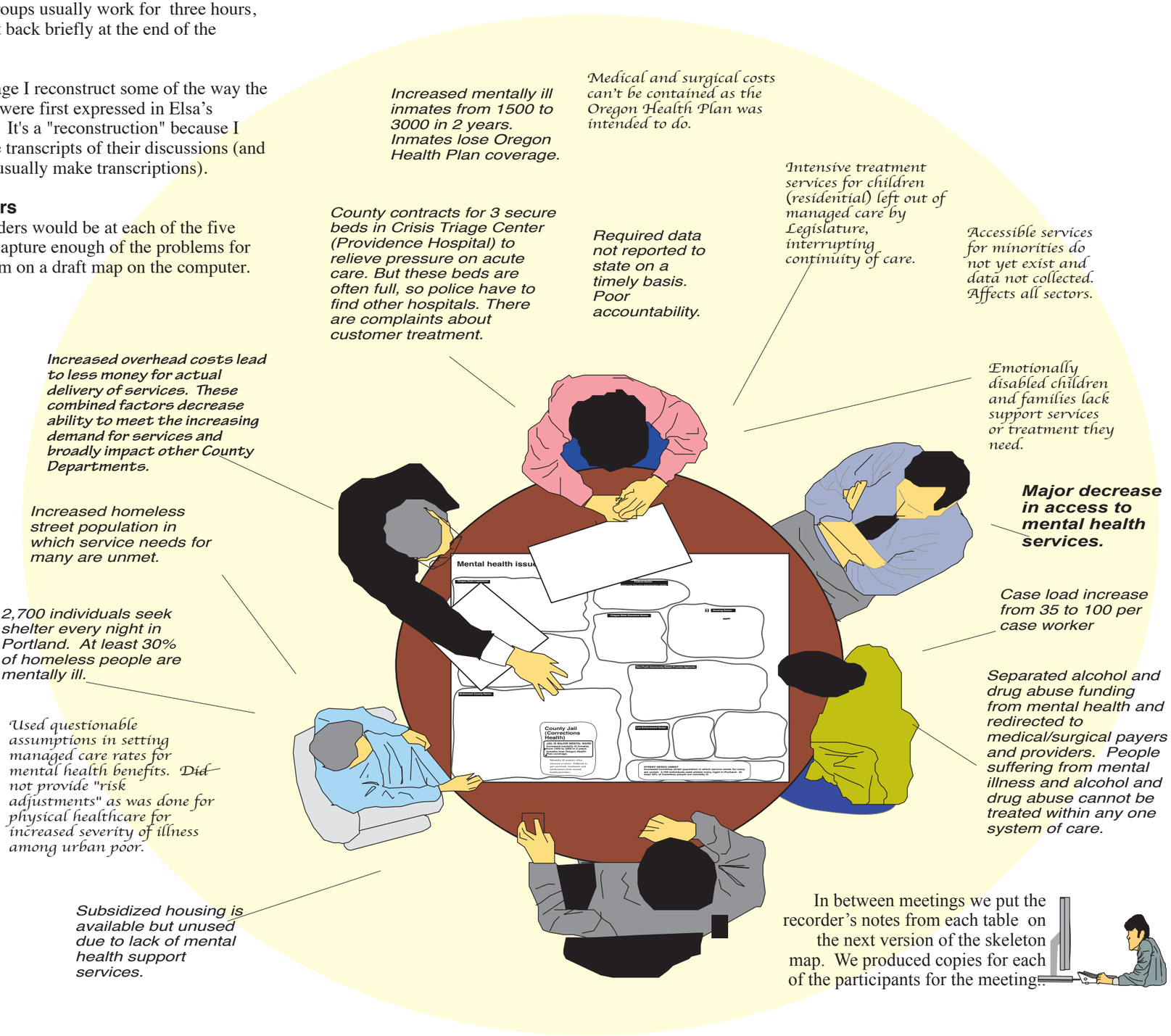
This takes generally a half day.

The subgroups usually work for three hours, and report back briefly at the end of the meeting.

On this page I reconstruct some of the way the problems were first expressed in Elsa's taskforce. It's a "reconstruction" because I don't have transcripts of their discussions (and we don't usually make transcriptions).

### Recorders

Our recorders would be at each of the five tables to capture enough of the problems for us put them on a draft map on the computer.




In between meetings we put the recorder's notes from each table on the next version of the skeleton map. We produced copies for each of the participants for the meeting.

# Edit and correct problem boxes and begin to add perceived causes

**Computerize the new problems reported at the first meeting**
In between meetings of task force, we make a computerized version of the mess map. Each of the recorders put their notes from the subgroups in digital form and send them to us. In our studio we add them to the skeleton map more problem boxes on their respective blobs. We add new sector blobs where needed. We produce new copies of their for each of the participants. In some cases these are printed in color. In low-budget situations these drafts are printed in black and white.

## SECOND TASK FORCE MEETING

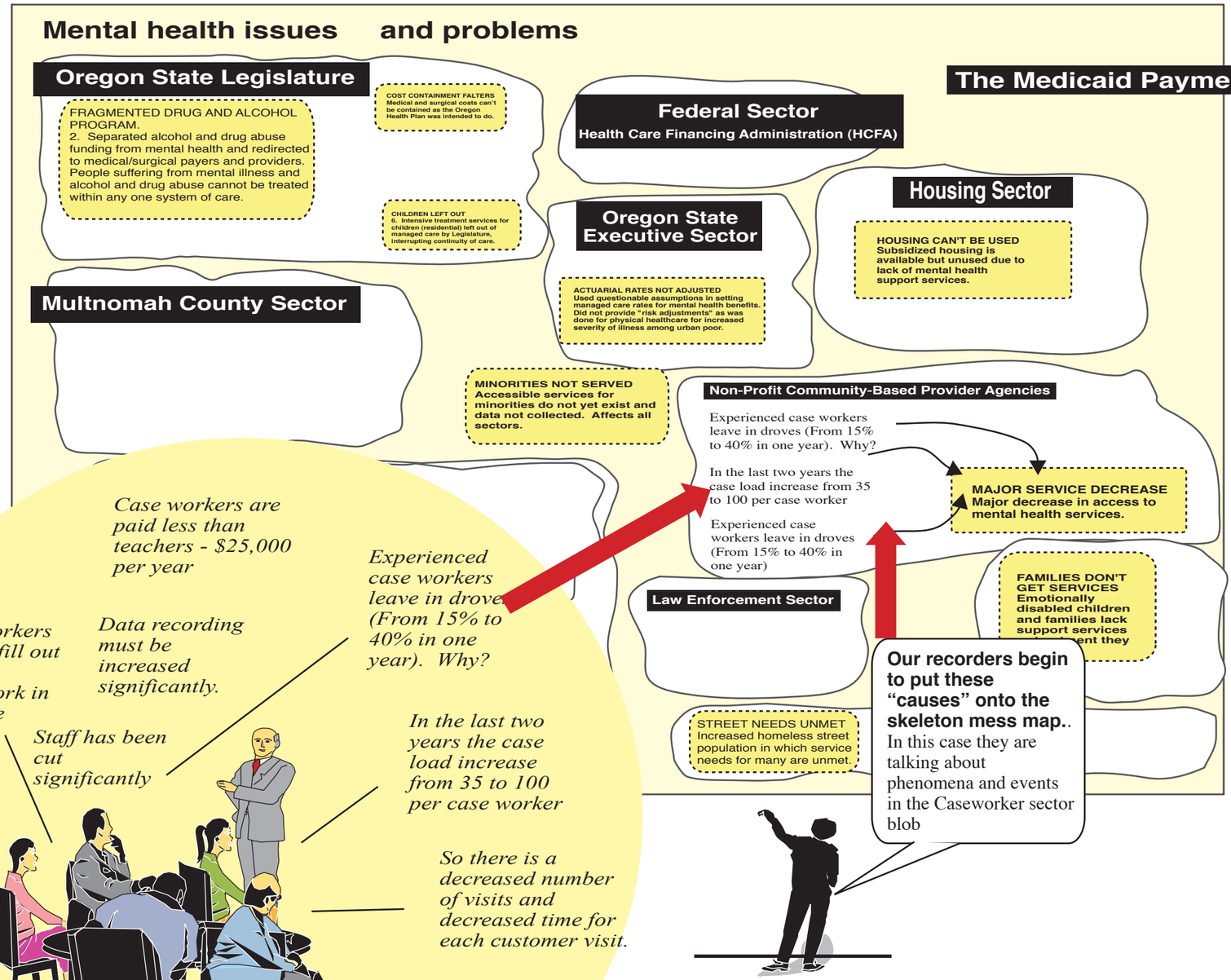
### Edit and refine the problems
In the second meeting we hand out the new versions of the map and divided the task force into table size subgroups again. We ask them to edit and change and correct the problem boxes. We ask: "Did our recorders hear you correctly? Is there anything you want to add?"

### What are the causes of your problems?
Then we ask them to ask themselves: "What is holding this problem in place?" In other words, identify the causes of the problems. The recorders wrote down what causes are mentioned and in which sector or organizational blobs the causes should be placed.

### Use arrows for causes
Our recorders also add arrows meaning "influences or causes" between the problems and the statements of the events and phenomena they have identified as causes. They often recognize causes that come from sectors beyond the boundary of their organization in which the problem is experienced.

### Cross boundary causes
We often find that origin of the pain for a particular organization come from across those boundaries, leading to our sometimes calling the mess map by the more formal name of the "cross-boundary causality map." Our recorders use long colored arrows to connect the problems with what was holding them in place. Many of the arrows, as expect, cross the boundaries of the organizations.

This discussion can take a half day or sometimes more than one meeting.




In between meetings again we take recorder's notes from each table and put them on the skeleton map. We again produce copies for each of the participants.

# Refine the mess map and edit causes

### Update the map with causes

Again ideally in between meetings, each of the recorders input their notes from the subgroups and send them to us via email. In our studio we add the causes to an even more comprehensive skeleton map.

And again, we produce copies of their for each of the participants.

## THIRD MEETING

### Edit the causes

Again, we ask the table groups to edit our work in putting the notes on the evolving mess map. They usually have lots of corrections and additions in this meeting. They are really beginning to see the usefulness of doing the mess mapping work.

### Refine the information-understandable for others

In this meeting, we ask the task force to continue refining the map. We mentioned that the mess map should be understandable to anyone who walks up to it. That is, there shouldn't be any unexplained technical terms. Some of the more obscure organizations will need to be described. What needs to be explained? (e.g. Describe the functions and staffing of some of the organizations) What data needs to be added? What refinements does it need? Where is there too much information?

### Refine the language from bureaucratic to informal

We refine the language so that it is informal, not the formal bureaucratic language of reports. If you read closely in one sector, you will see that the "case workers are leaving in droves." That is a good enough of a mental model for the task force. They don't necessarily need to have a table showing resignations over the last 18 months. That would be too much detail

### Time

Half day meeting again. Recorders record and sent us the results.

### Multiple causes

Not surprisingly, many of the problems were caused by multiple factors. This became obvious when we asked the groups to identify the causes

### Consensus not necessary

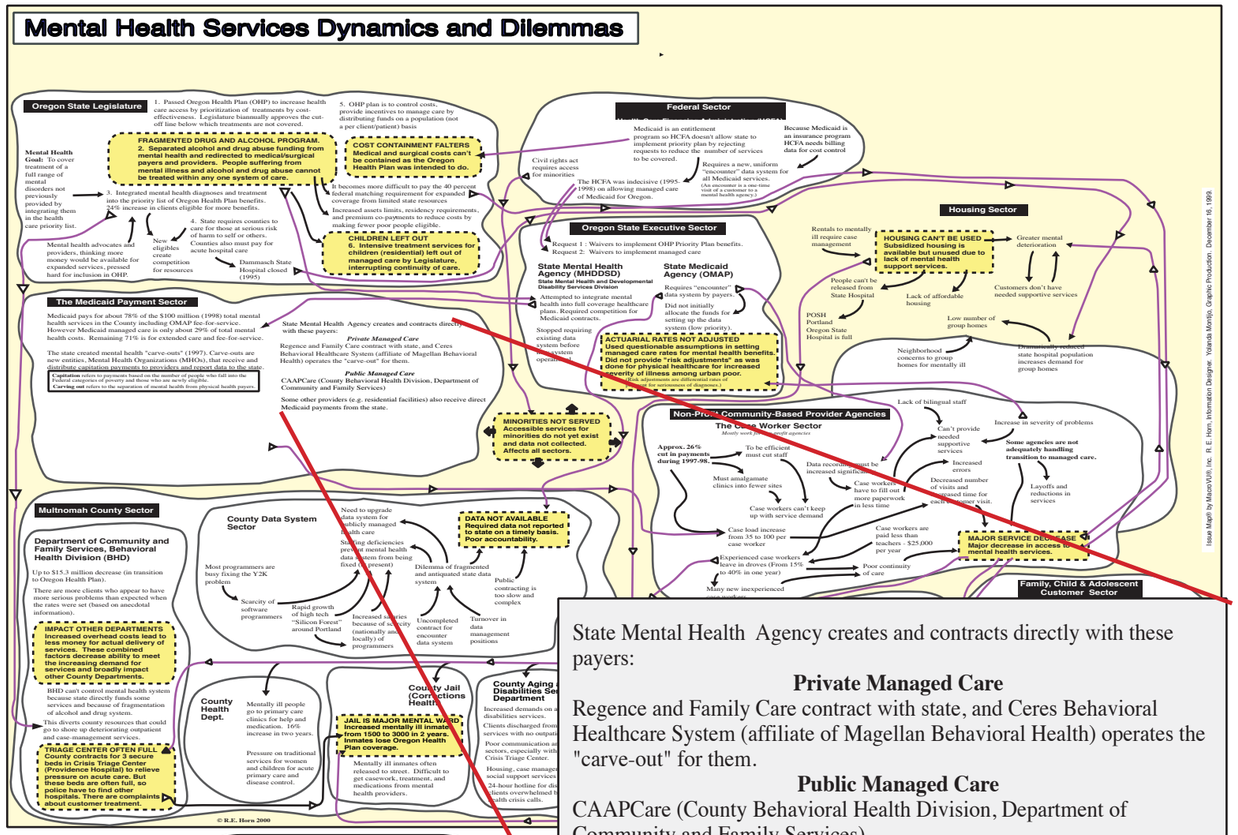
We do not attempt to obtain any kind of consensus on the "major" causes initially. They were often obvious to the participants. But also sometimes it has been necessary to resist the proliferation of causes, while still trying to unravel the tangle of causality in the mess. So, I would sometimes push back on the task force members with questions such as: "Is this really an important cause? Is this what is really keeping that problem in place?"

### Idea of causes as keeping a problem in place

One of the novel ideas that appeared in the creation of the mapping mess process was the idea that problems would disappear if there were not one or more causes keeping them in place. So that was a criterion for problems. Did they cause pain to a person or an organization and were there causes holding them in place?

### Colors of arrows

We used colors in some of the arrows from one blob to another in order to help participants more easily trace the causes. The colors did not have any other significance than that.




State Mental Health Agency creates and contracts directly with these payers:

**Private Managed Care**

Regence and Family Care contract with state, and Ceres Behavioral Healthcare System (affiliate of Magellan Behavioral Health) operates the "carve-out" for them.

**Public Managed Care**

CAAPCare (County Behavioral Health Division, Department of Community and Family Services)

Some other providers (e.g. residential facilities) also receive direct Medicaid payments from the state.

Note that there are multiple causes for problems. There is often a whole swarm of causes! In this way the mess map gives a better way of pragmatically dealing with the elements of the mess.

Here we explain some important quantitative data and how the system works. And we gave definitions to a couple of terms that might not be understandable by the general public, even a relatively informed one.

In between meetings. We usually "finalize" the map, adding icons, rearranging he blobs, etc.

# Make it understandable to people *not* in the room

Meanwhile Elsa was checking with members individually to ensure that they were satisfied that we were getting the information we needed onto the templates.

### Puzzles: Where is the extra money?

In the Portland mess mapping process, task force members were repeatedly puzzled about where the money had gone. They knew that the legislature had appropriated more funds for public mental health but somehow nobody could find it increasing their budges.

I pushed back. I insisted that they get me a list of the funding organizations and their overheads. They didn't much want to do this. But they did it. And it led to the discovery (I should say a re-discovery) that the county had also set up two organizations to deliver mental health services. When we added the overheads from these new organizations to the overheads already in the system, we found where the money had gone.

This then led to our adding what we now call "data boxes" to the mess maps. These present essential data that one needs to understand parts of the mess system. (See ex

### Definitions

We also added definitions of technical terms used on the map

***Example one***

Capitation refers to payments based on the number of people who fall into the Federal categories of poverty and those who are newly eligible.
Carving out refers to the separation of mental health from physical health payers.

.

***Example: Portland data on overhead costs***

**Increased Administrative Overhead Cost**
*(Difficult to allocate to cost centers.)*

| | |
|---|---|
| County (CAAPCare) | 12% (up from 3%) |
| Insurance Carrier (Regence) | 5% (new cost) |
| Ceres Behaviorial Healthcare | 12% (new cost) |
| Networks of provider agencies | 3 - 8% (some new cost) |
| Non-Profit community agencies | est. 10-18% (increased cost) |

***Another Examples of data boxes***

We have been attentive to creating data boxes that quickly portray relevant information for the task forces. We don't want to overload the map with quantitative data, but sometimes it is critical.

**Public Agency Provides**
**75% of Managed Mental Health Care**

**Est. 1998 data**

### Explanations

Few members of the public are familiar with the details of their public institutions. Thus, also important sometimes are descriptions of functions, processes, or structures of particular institutions.

***Example One***

State Legislature passed Oregon Health Plan (OHP) to increase health care access by prioritization of treatments by cost-effectiveness. Legislature biannually approves the cut-off line below which treatments are not covered.

OHP plan is to control costs, provide incentives to manage care by distributing funds on a population (not a per client/patient) basis.

***Example Two***

Medicaid pays for about 78% of the $100 million (1998) total mental health services in the County including OMAP fee-for-service. However Medicaid managed care is only about 29% of total mental health costs. Remaining 71% is for extended care and fee-for-service.

The state created mental health "carve-outs" (1997). Carve-outs are new entities, Mental Health Organizations (MHOs), that receive and distribute capitation payments to providers and report data to the state.

***Example Three***

State Mental Health Agency creates and contracts directly with these payers:

*Private Managed Care*

Regence and Family Care contract with state, and Ceres Behavioral Healthcare System (affiliate of Magellan Behavioral Health) operates the "carve-out" for them.

*Public Managed Care*

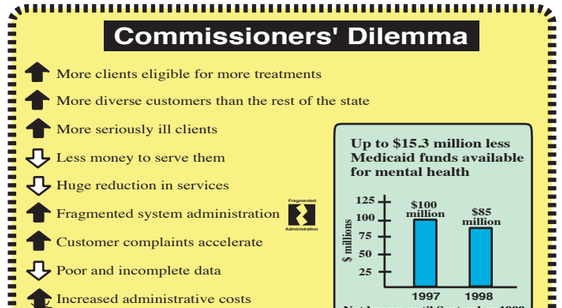
CAAPCare (County Behavioral Health Division, Department of Community and Family Services)
Some other providers (e.g. residential facilities) also receive direct Medicaid payments from the state.

### Important factor: Accessability

We want the final mess maps to be understandable by most anybody who takes the time to read them. That meant they had to be able to stand alone in so far as possible. So we added a variety of other components that help the reader who was not involved in the group process itself to understand what is happening on the mess map.

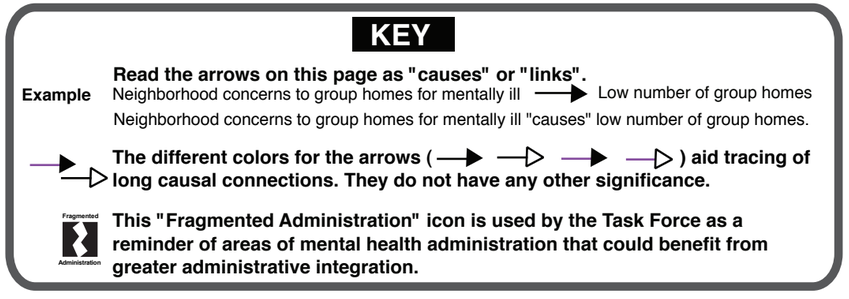
### Example of a summary box

In some cases we provide a summary of the issues.




### Understand how to read

Conventional mapping components such as Key boxes are added to help casual readers understand some of the important aspect. Here is one that explains the meaning of the arrows on a mess map.



# Mess maps can tell many stories-1

### Introduction
One of the things we have found out in doing several mess mapping processes is that they can be important in untangling the hitherto unappreciated causes of some of the interlinked problems and other messes that compose the mess map. The Portland case illustrates this feature. As I've described in this chapter, it focuses on one of the major precipitating problems that triggered the initiation of the Portland task force.

### Initiating problem.
You will recall that one of the problems the county supervisors were worried about was the rapid increase in occupants of the psychiatric unit of the County Jail. But the question was "Why the increase?" was a nagging question. Nobody on the task force including the person from the jail could satisfactorily explain it.

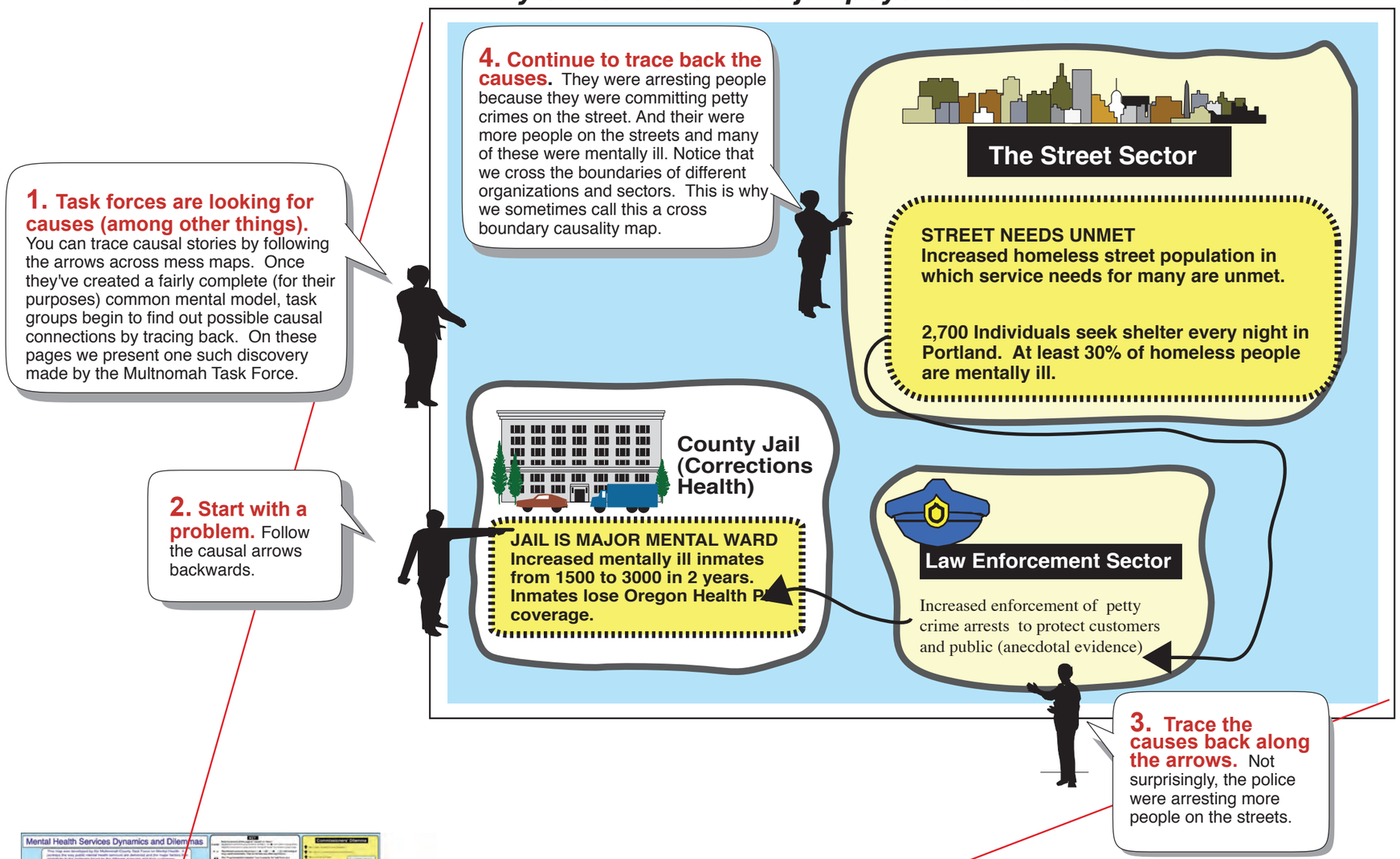
### Procedure - follow the arrows backwards
One of the things that is possible is to do in the mess map is to follow the causal arrows backwards. This enables you to trace multiple, and often long causal connections.

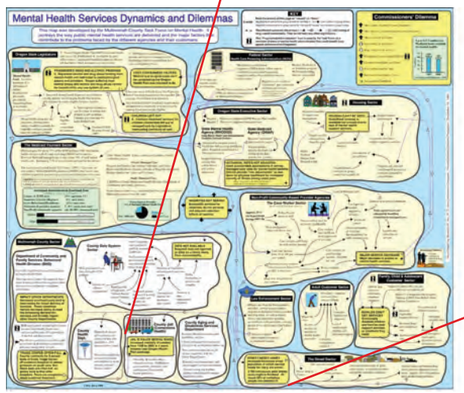
While this does not provide a complete analysis of the causal nexus of the problems, it can provide insights that are otherwise not available.

### Case Study- The Portland jail
In the case study to the right we start with "the jail is full of the mentally ill" problem box and trace the arrows back to the police who have been arresting people that then populate the jail. Then following another arrow back we see that various needs of individuals are unmet and they are acting up on the street in a way that violates the law.

### Cross boundary effect
As we trace the arrows backwards, notice that we cross the boundaries of different organizations and sectors. As I've mentioned, this is one of the reasons we sometimes call this diagram a "cross boundary causality map."

### See new patterns
Throughout this book I claim that various visualization processes enable us to see new patterns As we illustrate in the next few pages, the mess map clearly does this.



# Mess maps can tell stories-2

### Continue following the arrows back

As we keep following the causal arrows backwards, we begin to answer obvious but up to now hidden, questions. We now begin to ask: "Why were the case workers having more paper forms to fill out?"

### Cross more boundaries

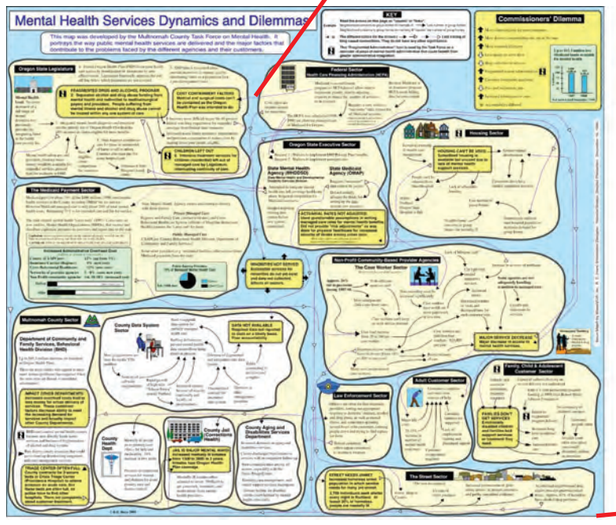
Note we have crossed another boundary. The arrow leads us to The State Medicaid Agency. It had a new data system that changes the old way of doing things. It required a report for each "encounter" with a patient. That had not been the case before. Every new meeting with a client requited another report. And it took 15 or 20 minutes to fill in the paper report.

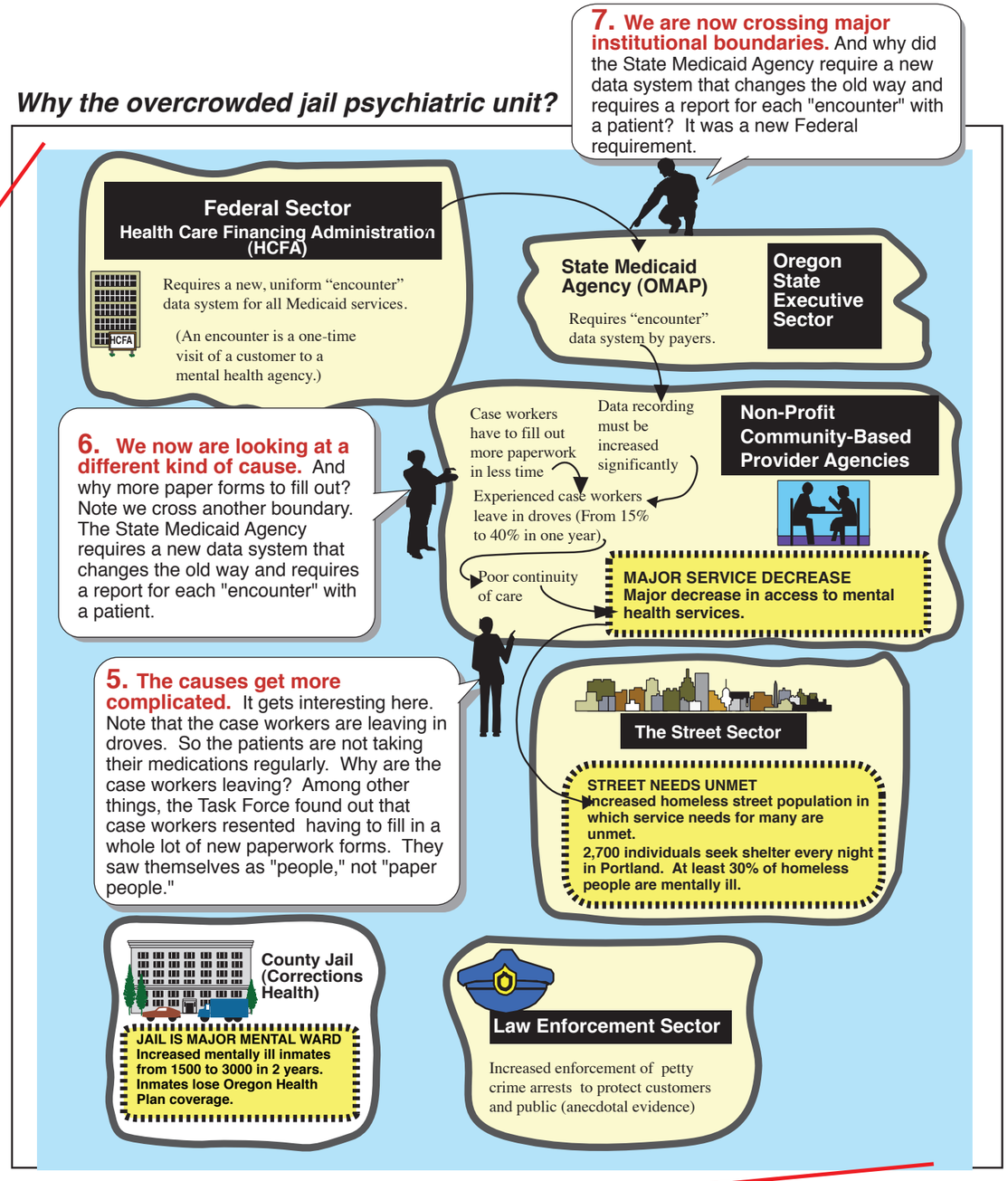
### Keep following the arrows

And why did the State Medicaid Agency require a new data system that changes the old way and requires a report for each "encounter" with a patient? Following the arrow back we see it was a new Federal requirement.

And why did they have to execute the Federal requirement? Because that's where the money was coming from.

But we're not yet finished. There are more arrows to follow backwards.



# Mess maps can tell stories-3

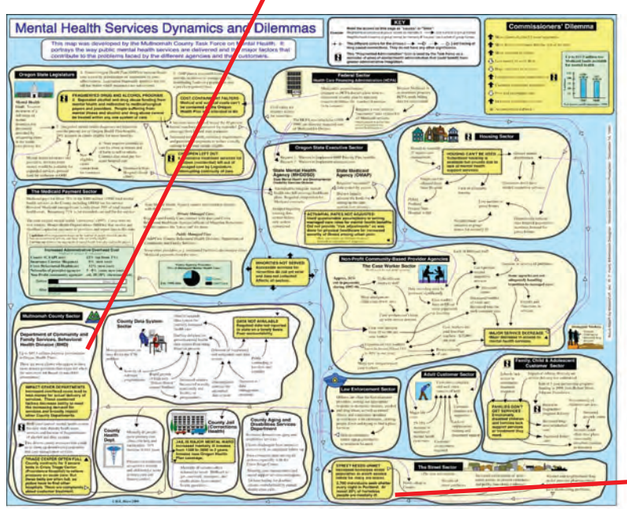
**At the county level**
You would think that the County Data Processing Unit would have just put together a simple form filling out software program. So why didn't the County Data Processing Unit create a piece of software that would make it easy for the caseworkers to fill out the forms?

**Cross another boundary**.
They couldn't afford to hire the programmers to do it because the Y2K problem in industry. Industry had hired everybody available at a very high price that the county couldn't match.

**Beginning to answer the original question**
So, if you want to answer the question we started with in this journey along the backward arrows:"Why is the jail the largest deliverer of public mental health services in the county?" you would have to cross a lot of boundaries with a lot of different kinds of causes to come to the beginning of at least part of an answer.

This is typical of social messes. At least we have improved our understanding of part of the mess. Not all of it, and it opens at least one of the possibilities for some resolution of parts of the mess.

**But NOT the whole story**
In this example we traced only a single set of arrows backwards. It was helpful. But not the whole picture of the complex of causes (the mess) that is producing the problem and holding it in place. Thus the mess mapping practitioner must be extremely careful about jumping to conclusions.




***Why the overcrowded jail psychiatric unit?***

**Multnomah County Sector**

**County Data System Sector**

**DATA NOT AVAILABLE**
**Required data not reported to state on a timely basis.**
**Poor accountability.**

Most programmers are busy fixing the Y2K problem

Rapid growth of high tech "Silicon Forest" around Portland

Staffing deficiencies prevent mental health data system from being fixed (at present)

Increased salaries because of scarcity (nationally and locally) of programmers

**9. So, if you want to answer the question "Why is the jail the largest deliverer of public mental health services in the county?"** You would have to cross a lot of boundaries with a lot of different causes to come to the beginning of an answer.
This is typical of social messes.

**Federal Sector**
**Health Care Financing Administration (HCFA)**

Requires a new, uniform "encounter" data system for all Medicaid services.

(An encounter is a one-time visit of a customer to a mental health agency.)

**State Medicaid Agency (OMAP)**

Requires "encounter" data system by payers.

**Oregon State Executive Sector**

Case workers have to fill out more paperwork in less time

Data recording must be increased significantly

**Non-Profit Community-Based Provider Agencies**

Experienced case workers leave in droves (From 15% to 40% in one year)

Poor continuity of care

**MAJOR SERVICE DECREASE**
**Major decrease in access to mental health services.**

**8. And then we connect with the local economy and a unique phenomenon as a** cause. And why didn't the County Data Processing Unit create a piece of software that would make it easy for the caseworkers to fill out the forms? Cross another boundary. They couldn't afford to hire the programmers to do it because the Y2K problem in industry. Industry had hired everybody available at a very high price that the county couldn't match.

**County Jail (Corrections Health)**

**JAIL IS MAJOR MENTAL WARD**
**Increased mentally ill inmates from 1500 to 3000 in 2 years.**
**Inmates lose Oregon Health Plan coverage.**

**Law Enforcement Sector**

Increased enforcement of petty crime arrests to protect customers and public (anecdotal evidence)

**The Street Sector**

**STREET NEEDS UNMET**
**Increased homeless street population in which service needs for many are unmet.**

**2,700 individuals seek shelter every night in Portland. At least 30% of homeless people are mentally ill.**

# What do we need to do *for* each other

### Introduction
Once the mess map was as complete as it needed to be, the Portland Mental Health Delivery task force could move on to phase two -- what to do about it.

### What to do about the mess
After a mess has been mapped in our process, any number of different organizational change processes or exercises can be used. See next Chapter for several quite different next steps. In this case, we got the task force together with some of the bureaucrats also involved for one more time for an all-day Saturday meeting.

We divided them into groups of 5 or 6 people, and asked them to discuss a single question: What do we need specifically from each other to improve system?

The first half of the day, the groups were focused on different levels, state, agencies, providers, consumers.

Then, we switched the composition of the table groups twice during the day to make sure the ideas were getting around.

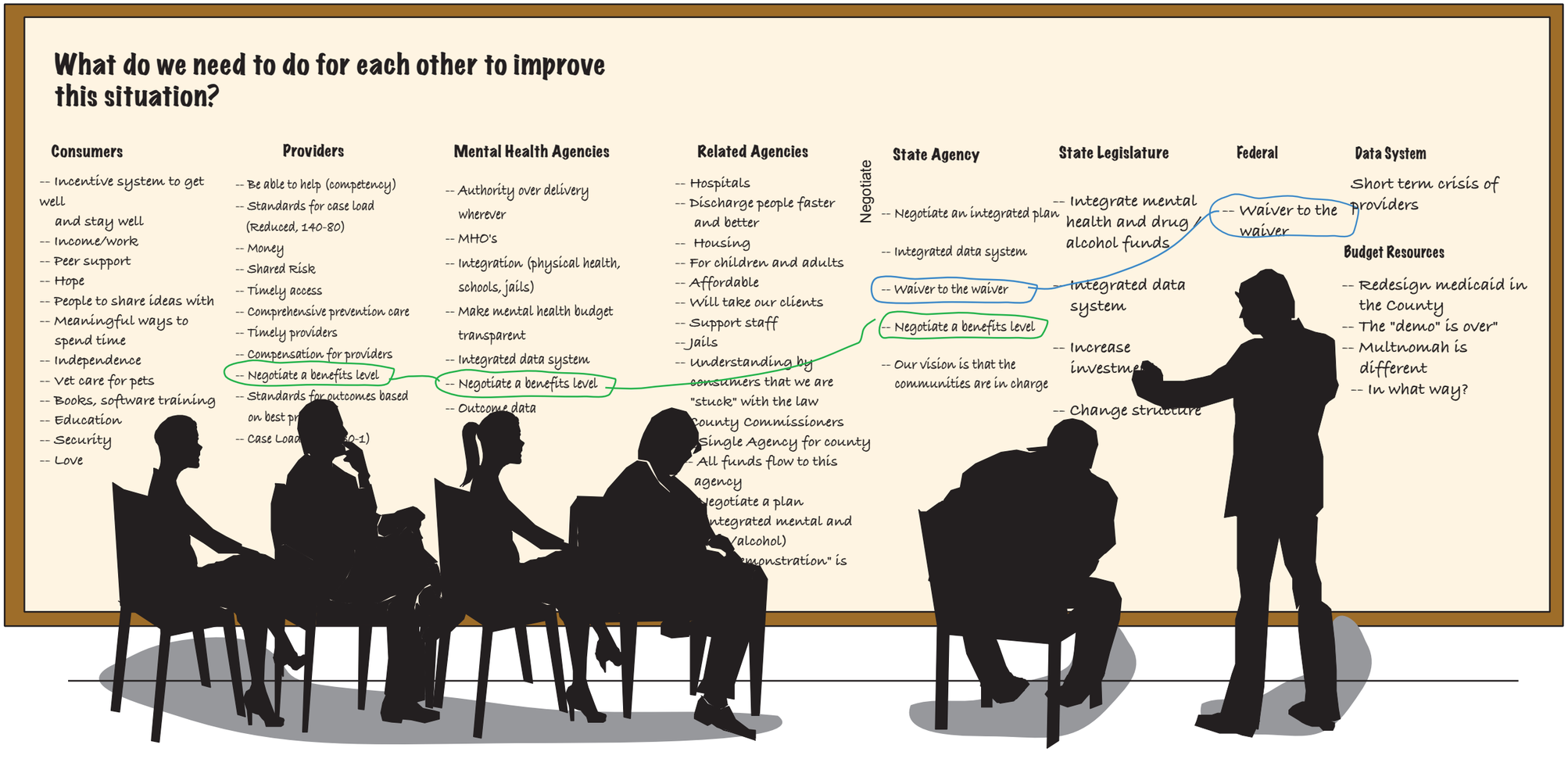
In the last hour of the day, we asked them to report in: What do we need to do for each other to help improve this situation?

### Large list of initiatives
I wrote what they reported out on a large sheet of paper. They had a lot of answers (reconstructed below). Among the discoveries were the need to renegotiate benefits level (shown in green highlight below). Another surprise came from the State Health official who indicated that he could renegotiate a "waiver of a waiver" (too complicated to explain here) that would unlock some of the barriers the task force had uncovered.

### Elsa's caveat about context
When looking at my write-up of this case, the task force leader, Elsa Porter wrote me: "The only thought I have regarding the Multnomah County map is a caveat about its effectiveness in solving the problems it illuminates. It can make them visible but, as we know, that is just the first step. We lacked both the time and the political leadership to follow through on what we learned." She reported that a new group of County Supervisors had been elected and: "This year (several years ago now) there was yet another task force appointed to deal with the same problems. I tried, but failed, to get them to look at what we had done."

She continued, "I came to the conclusion that the new group had to start all over again, to "own" its own analysis and the commitment to action that it might generate. How do you briefly convey the understanding that the mapping is a powerful and compelling first step--but doesn't guarantee action?"

### My conclusions
My own view of this is that it represents the enormous difficulties of working with social messes. You will move some along and you will be stopped in your tracks by elections and other possible discontinuities that would have been difficult to anticipate. The result of this first mess mapping process that we had a new method with some new assumptions and techniques for working with task forces. And, as you will see in later chapters, it was quite useful in many situations.



# The "final" mess map presented to the Supervisors

***No written report to the County Supervisors -- only the map***

### Purpose facilitated group process

The mess map served two purposes. First it facilitated the internal task force process, by helping form a common mental model and by providing the task force chair with a tool for rapidly getting all of its members involved and committed to a "buy-in" to their process.

### Presented in public meeting of supervisors

I might mention that the map you are looking at on the opposite page was used as the report to the County Commissioners.

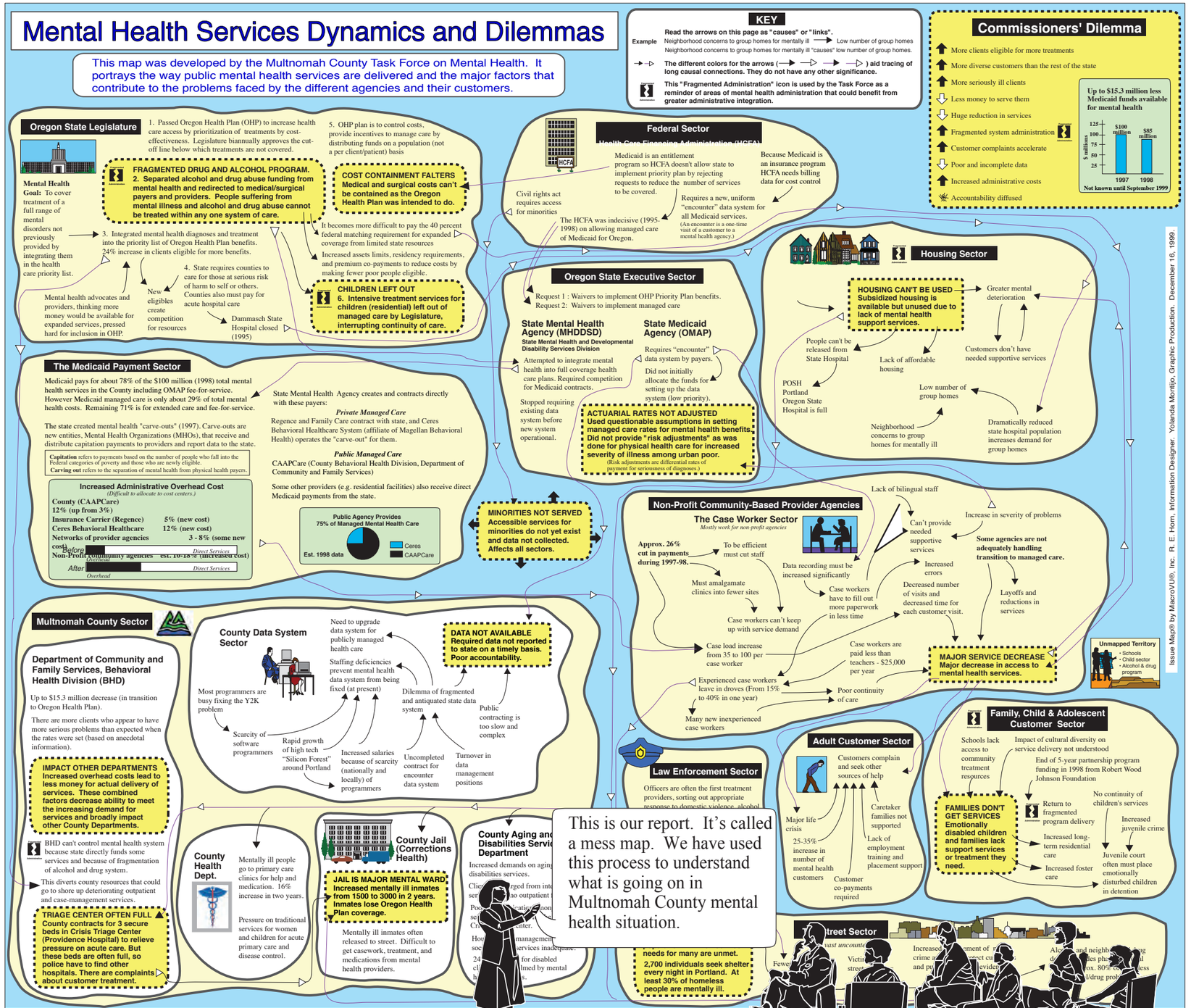
Individual versions of the map (about 4 x 4 feet) was brought to the public meeting at which the report was presented. Elsa led them through the task force process and the mess map with a 2-page description of how to understand the mess map.

The county commissioners were delighted with the map as an interim report. One of them said, "Now I understand the problem."

### Used as replacement for a report

The Task Force members had decided not to write a report. They recognized that the maps were enough.

**To download and examine this mess map in detail**
**Go to messmap.com**



# Reflections on what we have learned so far

## Introduction

First, I want to remind the reader that what we have described in Chapter 1 is an idealization of the best practices that we have used to address small-to-medium social messes. So I didn't have to write the learnings we made over several years, I have described the improvements as if they all took place the first time we did a mess mapping process – as if we had not learned something over the half dozen similar processes conducted in the subsequent decade. Now I turn to a brief summary of what we have learned from this series of mess mapping explorations.

## Summary of new learnings

***A heuristic that is group process.*** We have a new heuristic for addressing some of the multi-multis challenge in small to medium size social messes.

***Common mental model.*** A group process for forming a common mental model, not of how the current process is working but how it is prevented from working in the ways we all would like to work by describing the mess as a systemically interrelated set of problems. What kind of a mental model were they forming? We don't know with any precision. But elements of it, a framework and some details, were being recorded on the mess map template in front of them, and they were reminded of this emerging common mental model the next time the task force met – if not before.

They were also brought into close contact with evidence being said at the table that many of the group heard and all got a chance to see on the visual map. Social messes are systems of problems about which clearly showed to them over and over again that different people have very different perceptions and values concerning the smudgy nature, causes, and boundaries of the mess. The feeling of being "in" the mess together was palpable.

The main reason for beginning the overall process with mess mapping is that there needs to be a common understanding (I call it a common mental model) of the mess to make "real" progress. In this case, you need over time, lots of commitment for several years across the whole community.

***Causality,*** A new way of describing causality, by asking what is holding the problems in place.

***Not history.*** A way of building common mental models that doesn't rely on extensive historical description of causes.

***Visual map as a collaborative project.*** A visualization (the mess map) to create an object of focus and modeling and to have a focus-object to create together with everybody contributing. The mess map describes the social mess in a relatively neutral way such that many different group or organizational (i.e. management) processes can be used to work toward resolution. (See Chapter 2) Throughout this book I claim that various visualization processes enable us to see new patterns The mess map clearly does this.

***Prevent too facile solutions.*** The visualization process also was way of preventing too rapid a movement of the taskforce to "solutions" or "recommendations" before they understand deeply enough the nature of the mess.

***No need for long written reports.*** An way of refraining from writing a long, prose report about the mess.

## Dwelling in the mess for a while – productively

All too often working groups – which are usually composed of well-informed, highly motivated and very capable individuals – hurry through this initial phase.

They often attempt to start on "solving" the individual "problems" before there is a full enough understanding of how highly complex social messes are structured and of the forces and factors that have thus far prevented their resolution.

And it is my belief that task groups need to "dwell in their messes" a while to really absorb the systemic nature of their challenges. The process of making the mess map over a six to eight week period provides the time for this. The "mess" framework (i.e. a network of problems and their causes also contributes to this conception.

## Necessary conditions

Not all situations are ready-made for mess mapping. There are important conditions or constraints that set some boundaries on which kind of group or task force we can work with the mess mapping process.

- The task force has to be convened by an authority giving it the needed legitimacy
- All major sectors and/or organizations are represented by Chiefs or Deputy Chiefs (but also by the bureaucracy, and sometimes, activists-advocates)
- The presenting issues have been identified and named (even though the boundaries of the issues have usually not been clearly described).

.

## Probably not for mess mapping

These characteristics aren't promising for doing mess mapping:

- High conflict
- No comprehensive convening authority
- Public political debate
- Deep polarization
- Thrreat of violence
- When a vision is needed
- When simple data collection or science experiments is adequate

**Currently experiencing messes.** Usually to convene a task force the processes are regarded as stuck and there doe not seem to be a way forward. Typically, lack of understanding prevents adequate discussion among the parties.

## Language of problems confuse

When we think of specific problems and their "solutions", our minds supply entailments. Entailments are aspects of our mental models not expressed in a single sentence. One entailment of the idea of a"problem," fore example, is that any problem can have a "solution." The possibility of thinking, "It is done, finished. We have solved it." We then think: "We can forget about it. We can pay attention to something else. "

When we attempt to treat messes and predicaments as problems, we assume false entailments (e.g. we can fully understand the situation or can construct an adequate solution set). Accompanying these entailments is a built-in distortion of public understanding. We don't have to think then about invisible systemic relationships that are often at the core of social messes.

## Boundaries...proceed in the fog

The idea that we can not identify precisely the boundaries of the mess is misleading. We have to proceed in a partial fog. We come to realize that are not going to be able to ultimately eliminate the all the fog from obscuring parts of the different problem areas that comprise the mess. But we do have to use provisional, fuzzy boundaries to proceed. And we can not deal with the whole world in most mess mapping projects.

## Rational decisions, context and politics

It is easy to think of messes are simply of a technical or analytic nature. That is almost never the case in political contexts or situations. Forces, power, interests, favors, promises, obligations, revenge, emotions, family, etc. almost always come first. Most of these must be somehow incorporated into a mess process. Our first case in Portland was not implemented because of a political election that replaced the board of supervisions who had sponsored our task force. Implementation is often idiosyncratic and a creative opportunity.

## What happens after mess mapping?

Our next chapter will describe some of the ways we've taken next steps for implementation after various mess mapping processes. Will the ideas produced in our mess mapping task forces be implemented? Some will; some won't. The process invites everyone to take responsibility and in many cases they have.

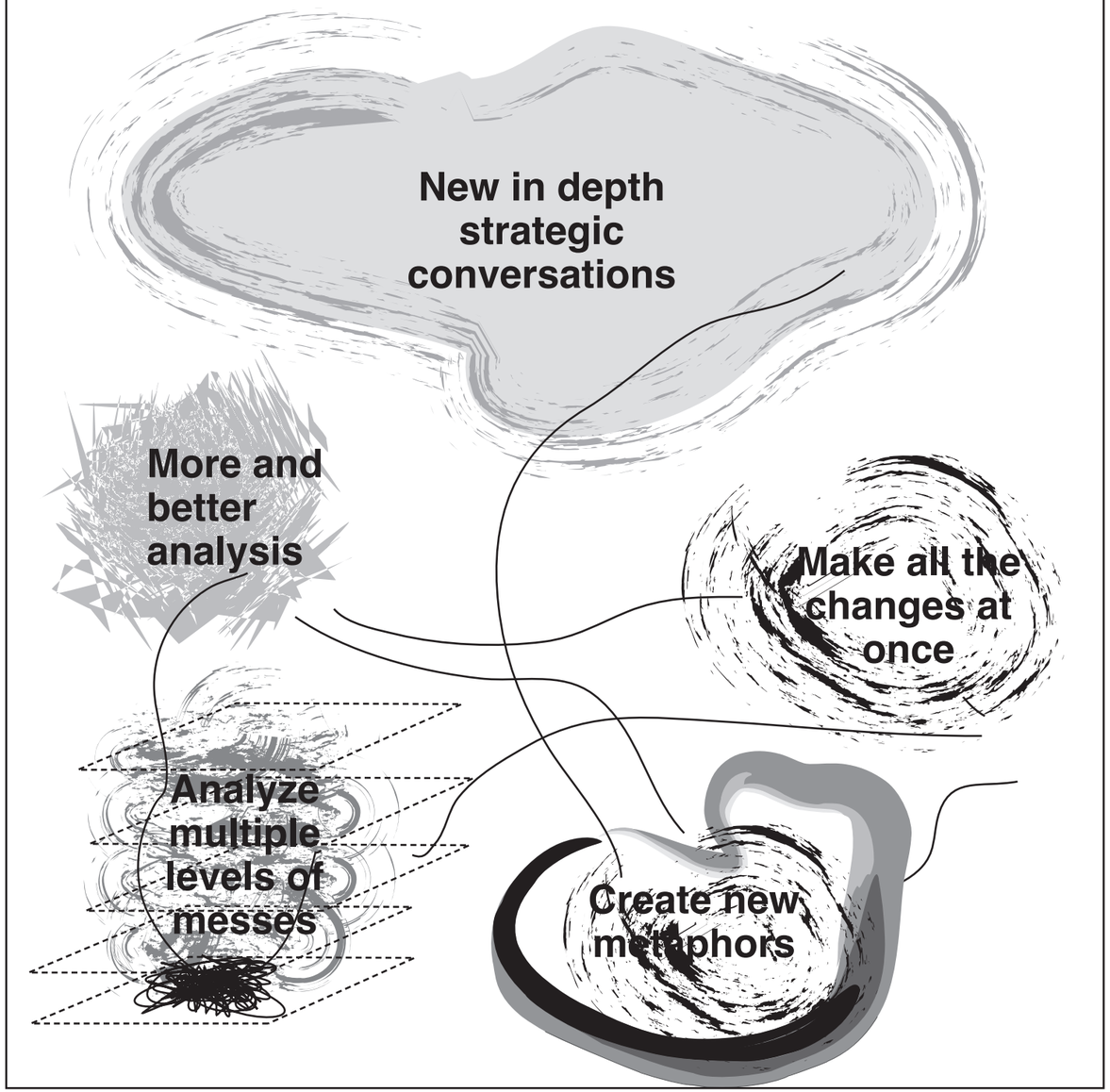
## Specific learnings from the Portland case

The task force was in Portland. I was not. I did most of the mess mapping by phone with Elsa acting as an in between. What I learned was that I had to be in the room.

We also learned that the taskforce needed to be composed of the stakeholders. In Portland the taskforce was made up mostly of representatives from the community. Because the officials with direct responsibilities for mental health only heard about the task force efforts for the most part after the mess maps had been made, some were hurt and one appeared to have resigned as a result of this. In addition, the taskforce worked under extremely tight time pressures (a budget deadline). All of these were learnings from our first attempt to map a mess.

Chapter 3

# What to Do After Mapping the Mess



*Chapter 3*

# What to do after mapping the mess

## Introduction

I've emphasized that Mess Mapping is a way for task forces understand their issues. It is an initial stage process. It enables groups to get started, to form common mental models is the issues, to learn about each other, and to quickly achieve clarity about the interrelated set of problems they face.

Then before the mess mapping is completed, time is spent in the task force discussing the problems and causes and influences. These are then summarized graphically by mess maps as shown in detail in the previous chapter.

## Different missions of different task forces

Is there anything to be done about social messes? Or are we just involved in a fruitless, idealistic enterprise. Are we just wasting our time? The short answer is "It depends." Different theories have different answers to these questions (see Chapter 4) Different task groups with different missions make progress using quite different next steps. And, of course, partial solutions may be better than none. In fact, given enought time,all solutions are partial.

The diagram to the right suggests some of these that we have found helpful. It is suggestive, because the analysis and portrayal of the social messes using visual analytic methods such as mess mapping process can lead to creative approaches to resolution of the messes. I'll describe each of them in subsequent pages. Please note that any or all of these next steps can be combined in a single project.

## Five actions we've used

***Four of the examples*** we describe here focus on quite distinct ***next-phase approaches:***

1. Change important causal factors in approximately 90 issues simultaneously (Alameda Long Term Care of the Elderly and Disabled)
2. Conduct as different strategic conversation (Methodist church case)
3. Perform more analysis on what appear to be crucial factors ( UK National Health Service and Alameda projects)
4. Analyze different governmental levels of messes (Alameda)
5. Create metaphors and new myths (UK National Health Service project)

## Not the only possible next steps

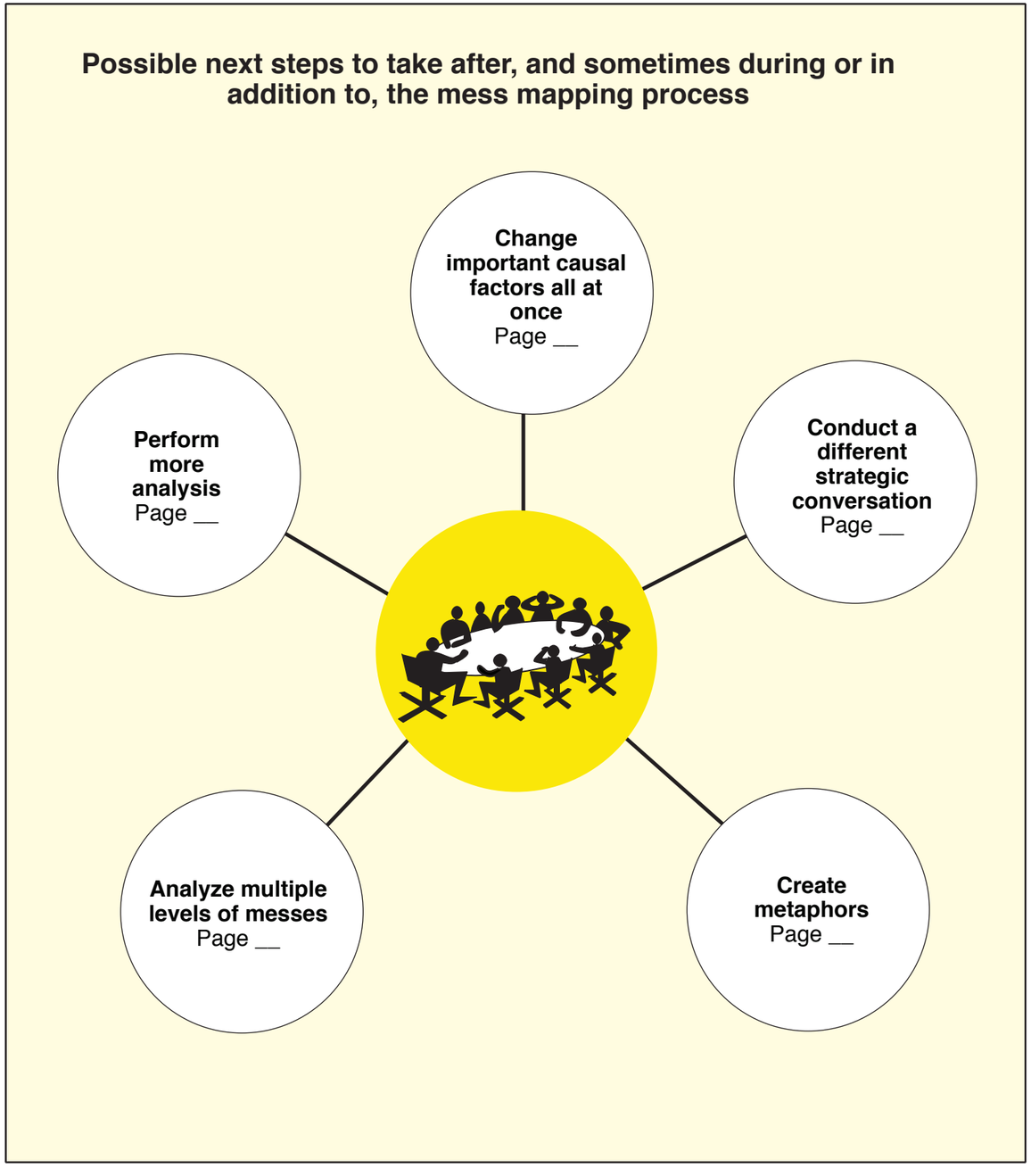
These are not the only actions that can be taken once a task force has increased its understanding of the mess they are dealing with.

A variety of other processes that organizational development practitioners have created and built into useful and successful group actions. Some of these include:

1. Create and vote on recommendations
2. Appreciative inquiry processes
3. Issue-based inquiry systems (IBIS)

and many more.

I suggest reading David Sibbet's work on visual group process for more ideas. (See References)



# Create resolutions to the multiple problems identified -- all of them and all at once!

### Introduction
These pages about the Alameda case do not have to be read in detail for you to get the point that I'm making, that is that many of the problems can and should be solved all at once. You don't have to read all of the problem boxes to get the point and use the method if it applies to your case. I include the detail only for those who want to examine the method we used in detail. Your may wish to skip some of it.

### One-cause solutions don't usually work
Russell Ackoff and other organizational development practitioners, suggest that messes are not usually "solved."

Moreover, if single solutions to just one of the systemically inter-related set of problems is focused on and a "solution" implemented, the overall system adjusts and, frequently, not much actually changes. Highly inter-related systems with many feedback loops and much cross-boundary causality behave that way.

Multiple changes at the same time can make significant change in the mess. So, a task group can provide various partial resolutions to whole clusters of issues if implemented at roughly the same time.

### The Alameda next phase
In our Mess Mapping project in Alameda County, California, on Long Term Care for the Elderly and Disabled, the task force consultants decided to implement this multiple-change approach. In phase two, we took all of the yellow problem boxes and put them on several sheets. (Shown below):

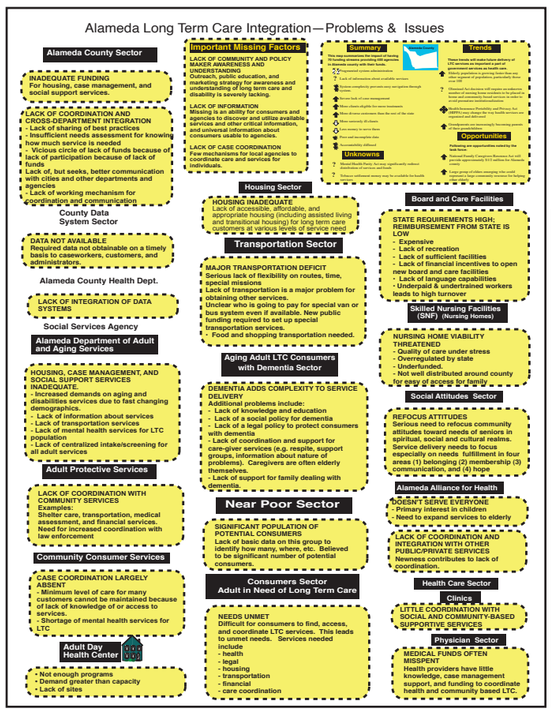
At the end of the project, the whole task force was quite familiar with the mess and the mess mapping process, having spent several weeks building and improving on their mess map.

### All the "recommendations" in one afternoon
The consultants decided to try to get the best solutions that were possible at that time from the group all at once in a single afternoon!

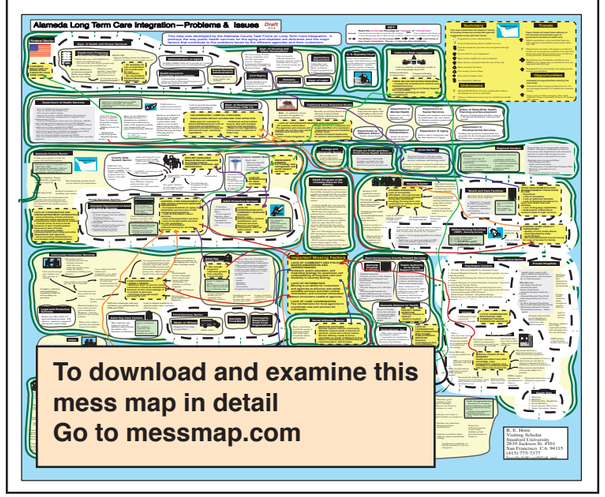
There were 21 problem boxes with approx. 90 issues. We asked the task force to look at each of the issues in each of the domains and brainstorm solutions. In order to get the best current solutions in one afternoon., We set a time limit of 5 minutes or less per problem-solution brainstorm. The issues were summarized as shown on the opposite page.

And the task force did come up with a set of recommendations to the county supervisors. Every 2 or 3 minutes a new problem box was shown and the task force would voice their best solutions. The members looked around the room and saw (usually) nods of agreement or at least no disagreement with the ideas offered. That was taken as agreement or at least consensus (i.e. no disagreement). And we moved on to the next issue.

## *21 Problem Boxes & 90 Issues*




## *Alameda Mess Map*




Five of the issues were found to require more study and were packaged separately from all the rest of the recommendations.

### Recommendations
I then made a recommendations maps (shown on the two pages beyond). We found that most of the recommendations could be implemented without further legislation on the part of the supervisors and without further budget increases.

### Supervisor meeting
A large scale (approx. 5 x 5 feet) version of the mess map and the recommendations map were printed. And on the morning of the next County Supervisor's meeting, the task force marched in with their mess map and recommendations. Of course, the supervisors had been given hand-held size version of the maps to the supervisors the day before so there would be no surprises.

### Five minute discussion and vote
The supervisors were delighted and commented on the thoroughness of the study and the ease with which it was possible to understand the mess and the corresponding recommendations.

It took just five minutes of their meeting time!

### Not a final resolution
We can expect that much will change and complicate the life of those who help the elderly and disabled in Alameda County (and everywhere else), so that new messes will emerge and probably mess mapping or its functional equivalent will need to be applied again in a few years.

## *Summaries of the issues and problems*

**Housing Sector**

**Summary of Problems**

Housing Inadequate
- Lack of access to affordable, and appropriate housing.
- Lack of assisted living.
- Lack of options to skilled nursing facilities.
- Lack of flexibility in use of Medicaid funds.

**Consumer**

**Summary of Problems**

From all sectors, serious issues have been raised about
- Inadequate information regarding:
• Awareness of available services
• How to navigate the system
• Legal and financial assistance
• Knowledge of caregiving
• Communication between agencies and others

**Transportation Sector**

**Summary of Problems**

Major Transportation Deficit
- Serious lack of flexibility on routes, time, special missions
- Lack of transportation is a major problem for obtaining other services.
- Payer of service is unclear.
- New public funding required to set up special transportation services.
- Food and shopping transportation needed.

**Community Services Sector**

**Summary of Problems**

CASE COORDINATION LARGELY ABSENT
- Lack of knowledge of or access to services.
- Shortage of mental health services for LTC.

COMMUNITY CONSUMER SERVICES PROBLEM
The quality of services/care in some sectors are problematic.

DAYCARE
• Day care center's may not meet the needs of younger clients.
• Disabled population does not want to mix with the elderly.

**Education & Training**
for general public, front line workers and policy makers

**Summary of Problems**

1. Lack of understanding within the general public of LTC issues.
2. Lack of understanding and awareness among policy makers of LTC issues.
3. Special educational needs for frontline workers in their training
4. Need of uniform protocols for handling critical LTC cases.
5. Better education and training of legal and medical professionals.

**Alameda County Sector**

**Summary of Problems**

Lack Of Coordination And Cross-department Integration
- Lack of sharing of best practices
- Insufficient needs and service assessment.
- Lack of funds.
- Lack of effective communication with cities and other departments and agencies.
- Lack of working mechanism for coordination and communication.

# Recommendations on one page! (and *no* 80-page prose report)

## Introduction

The Alameda Task Force decided not to write a report to the County Supervisors. Rather they decided to use the suite of knowledge maps that had been created to brief the Supervisors. Included in the suite was this recommendations map that provided a succinct summary of what they thought should be done.

## Format of the recommendations

Note that
- the recommendations are clustered into different areas of long term care, and
- clustered their recommendations into those that could be immediately implemented and those which required further study.

The recommendations that require further study are found in the upper right hand corner.

**To download and examine this mess map in detail**
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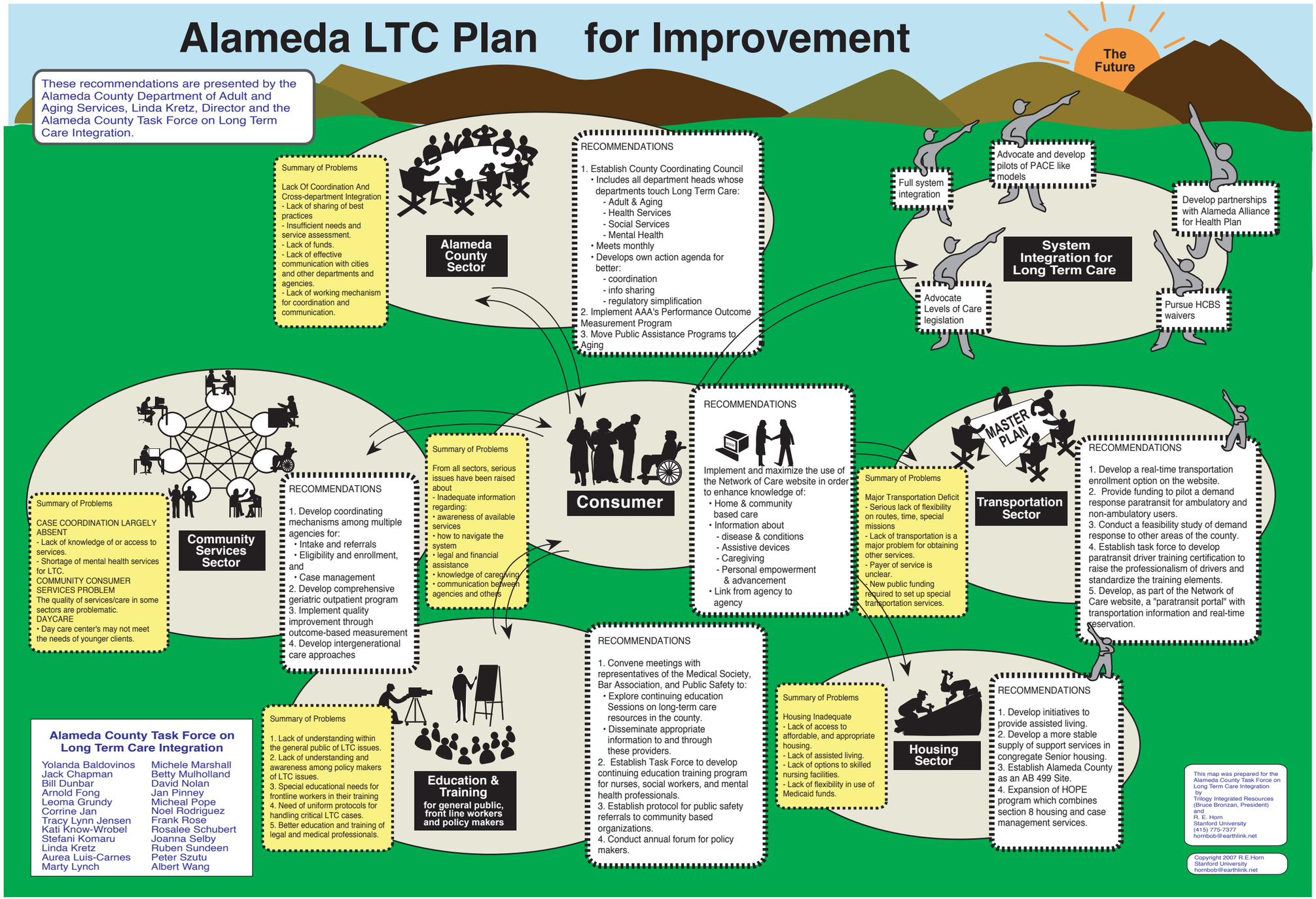


# Perform additional visual analysis on crucial factors

### Introduction

Sometimes, after the process is well underway, we find that additional processes within the mess need to be understood. This requires additional analysis either before the initial Mess Mapping process is completed, or immediately upon completion of it and before any attempt at crafting a response to the mess.

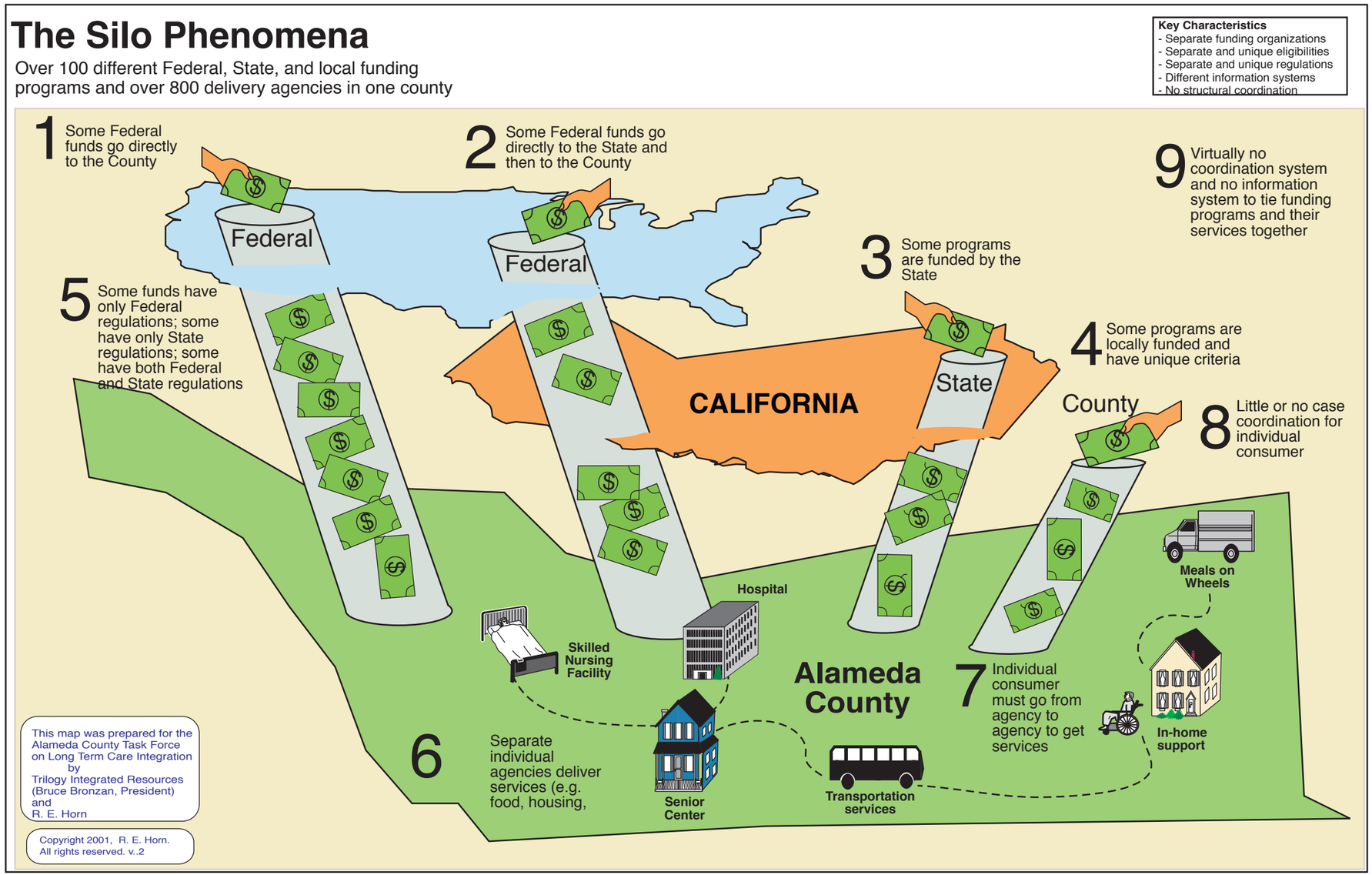
### Alameda analysis

Toward end of the mess mapping process in Alameda County, it became clear that part of the set of problems the task force had uncovered was that there were multiple funding sources, federal, state, county and sometimes local. And each had its own bureaucratic institutions to provide the funds further to the ultimate recipients of their aid.

We, then, conducted further analyses to identify these structural features that appeared to be major factors in producing the Mess. We produced a separate info-mural describing the complexity of the funding sources (shown at the right called The Silo Phenomenon).

The task force focused on the effect of the different silos through which aid money was funneled to the county agencies. Imagine the complexity that was creating the mess just from this single factor.

Such structural analyses and their illustrations enabled the Task Force to focus their efforts on specific subissues, and refine its recommendations.

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# Visualize levels of messes & their maps

**Different levels of governance**
The mess mapping process unlocked a chance to see different "levels" of issues as well as different points of view.
- How to show different levels of system problems and messes
- How to show different points of view of system problems and messes
- How to represent big picture and detail simultaneously

Here, we illustrate how we can do that from a project we did for Alameda County, California. The first mess map was at the county level. On that map the skilled nursing facility (SNF) was described briefly in so far as it was needed for the county-level mental map. But there are different problems and different dynamics at the level of the single facility (lowest level) and at the national level. These and any other sector or organization can be portrayed to any level of detail by separate mess maps. Details of two levels – national and local – are provided in the following pages.

**Task Force Process**

The maps are used in the social learning process of a community task force who are charged with understanding and recommending solutions to the problems

Identifying the problems the causal factors

1 The task force created a map, thus building a common mental model of the situation. It is important not to rush through this phase. Key elements are understanding the cross-sector causal factors.

Analyzing and discussing the problems.

*Lots of feedback and changes at this stage*

2 The task force created another map of the structural factors underlying the major problems and issues initially described the the first map.

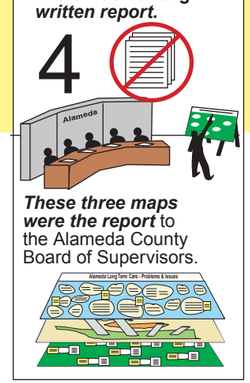
Brainstorming and priority-setting.

3 After brainstorming and priority-setting sessions, the task force created a third map outlining its short-term and long-term recommendations.

There was ***no long written report.***

4

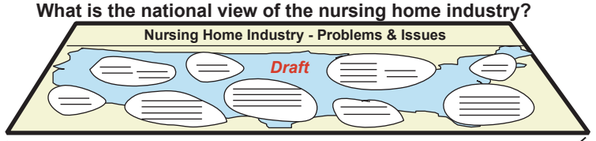
***These three maps were the report*** to the Alameda County Board of Supervisors.



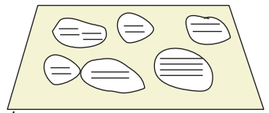

## *The levels*

**National**

**What is the national view of the nursing home industry?**

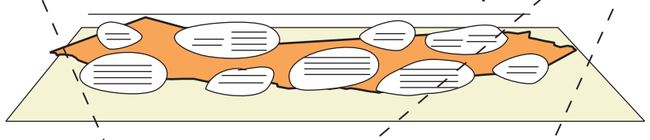



**National level maps of of other sectors.**



**California**

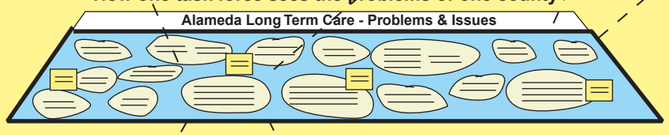
**What is the state level view of the issues and problems?**



**County**

*Alameda*

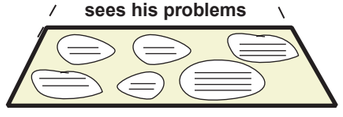
**How one task force sees the problems of one county**




**Problems addressed by the knowledge mapping process**
- how to represent common mental models of social messes, especially cross-organizational causality
- How to get task forces with diverse background on to the same page rapidly

**One Delivery Organization -- Skilled Nursing Facility (SNF)**

**How one one SNF owner sees his problems**



**Current issues and problems - Federal aging and disabilities programs**



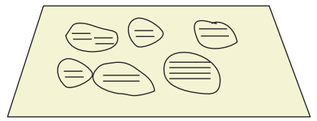
**History of Federal aging and disabilities policies**



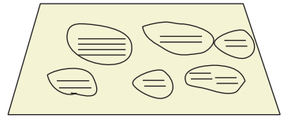
**Future scenarios - Federal aging and disabilities policies**



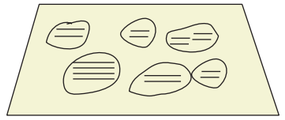
**Current issues and problems - California aging and disabilities programs**



**Political history of long term care in California**

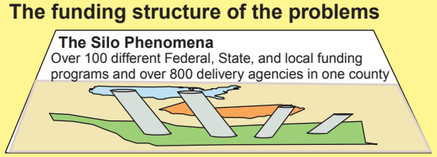


**Future scenarios - California aging and disabilities policies**

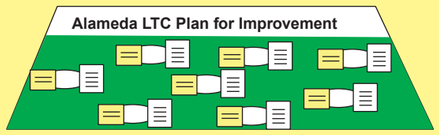


**The funding structure of the problems**

**The Silo Phenomena**
Over 100 different Federal, State, and local funding programs and over 800 delivery agencies in one county



**The Task Force Recommendations**

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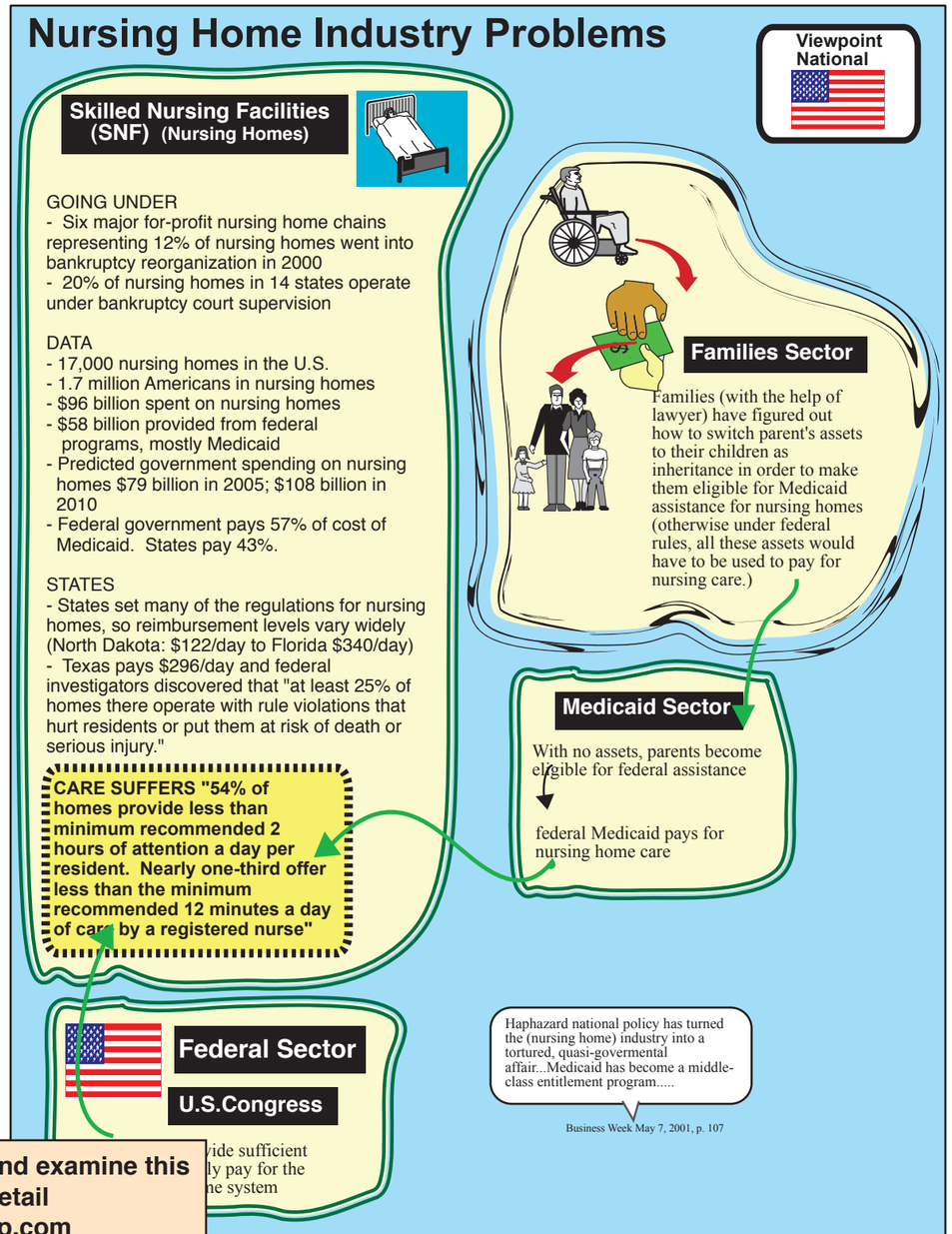
**Key**

In the diagram above, the mess maps we actually made are surrounded by darker lines. The other maps on this diagram are ones that could be made if the task force saw a need for that level of detail.

# Examine viewpoints from local to national

**Introduction**

In the Alameda task force situation described in the previous pages, there were problems that had to be identified about the nursing home industry on a national level as well as problems as seen from the standpoint of individual companies who delivered care. On these two pages we show how we address these in mess maps at different levels of action.

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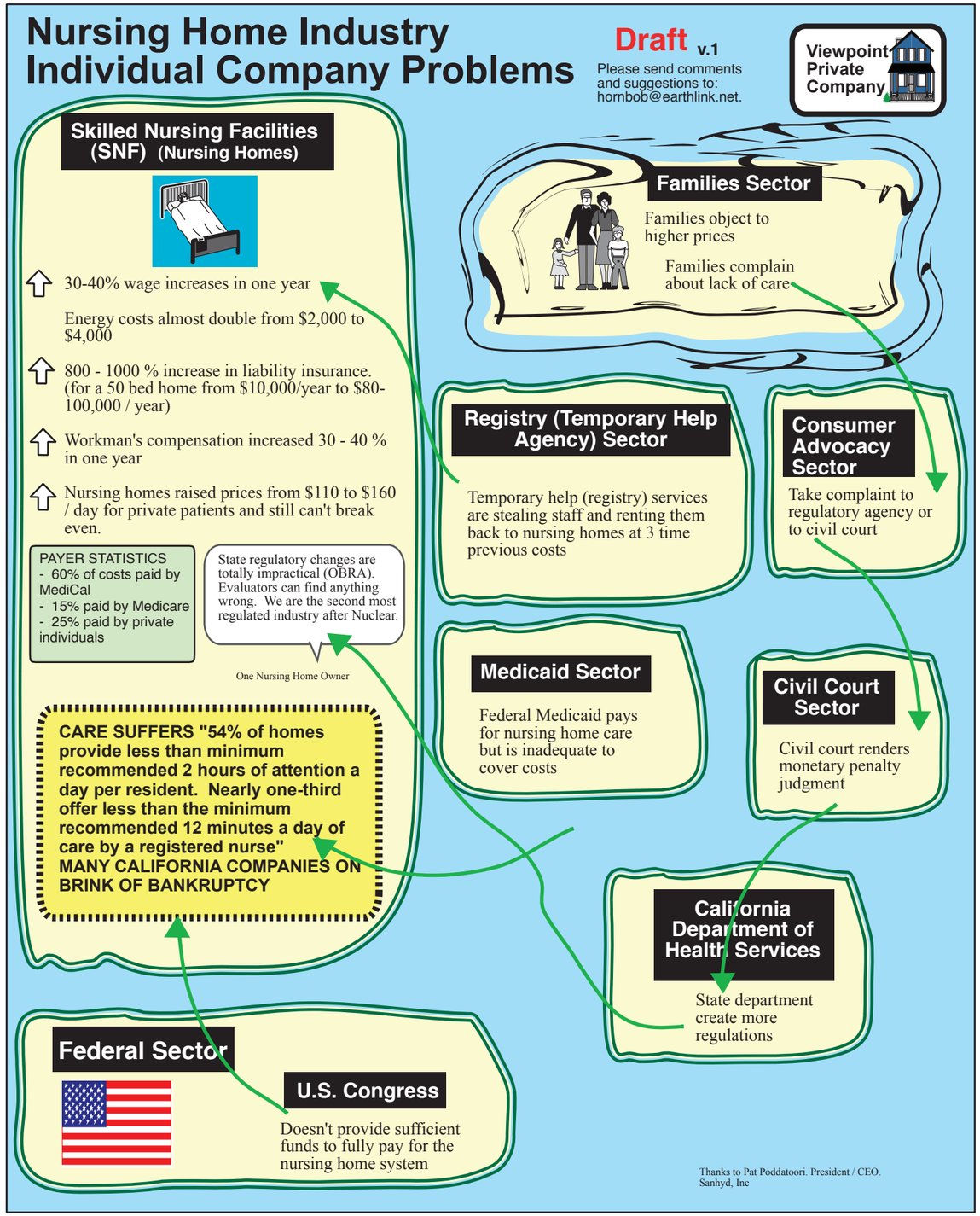


# Conduct an organization-wide dialog for two years

### Introduction
The Methodist church in the U.S. is a big, country-wide organization of approx. 10 million members. It does not change its social processes and organizational procedures and beliefs about them, over night. Nor does it do it from the top-down. We conducted a mess mapping process that was triggered by this problem: methodist clergy are sicker than other professions of similar age groups. In the past 20 years, clergy have gone from being one of the most healthy groups, by age, to one of the most unhealthy groups, by age, in comparison to the U.S. insured population.

At the end of the mess mapping process, their nation-wide task force decided to use the mess map as a tool around which dialogs about the mess could be conducted in congregations around the country. This would lay the groundwork for a wider organizational discussion about changes that needed to be made in the church's structure and organization.

### Centerpiece of an organization-wide dialog
For this phase another task force was formed and worked for two years – deepening their understanding of the issues and taking the Mess Map back to their home congregations and organizations to ponder the meaning of the mess before coming up with recommendations. In addition to many discussions with individual churches, discussions centered around their mess map were held in seminaries and in meetings of the church bishops. They said by way of invitation on the map: “What's next? These are the patterns that can be seen in the data from these focus groups. You may see other patterns. What should we as a church do about them?”

### Reframing the strategic dialog
This very large dialog throughout multiple levels of the church has produced a set of recommendations for organizational change. What was important about the Mess Mapping process was the reframing of the mess as not one about insurance or the clergy but about organizational and systemic issues that needed restructuring. They said frankly in a central part of the map:
“UMC Decline. Over the last 30 years, the UMC has been in a state of decline. Membership is down, churches have been closed. Revenues has been directed to administration, not mission. And clergy health is deteriorating”

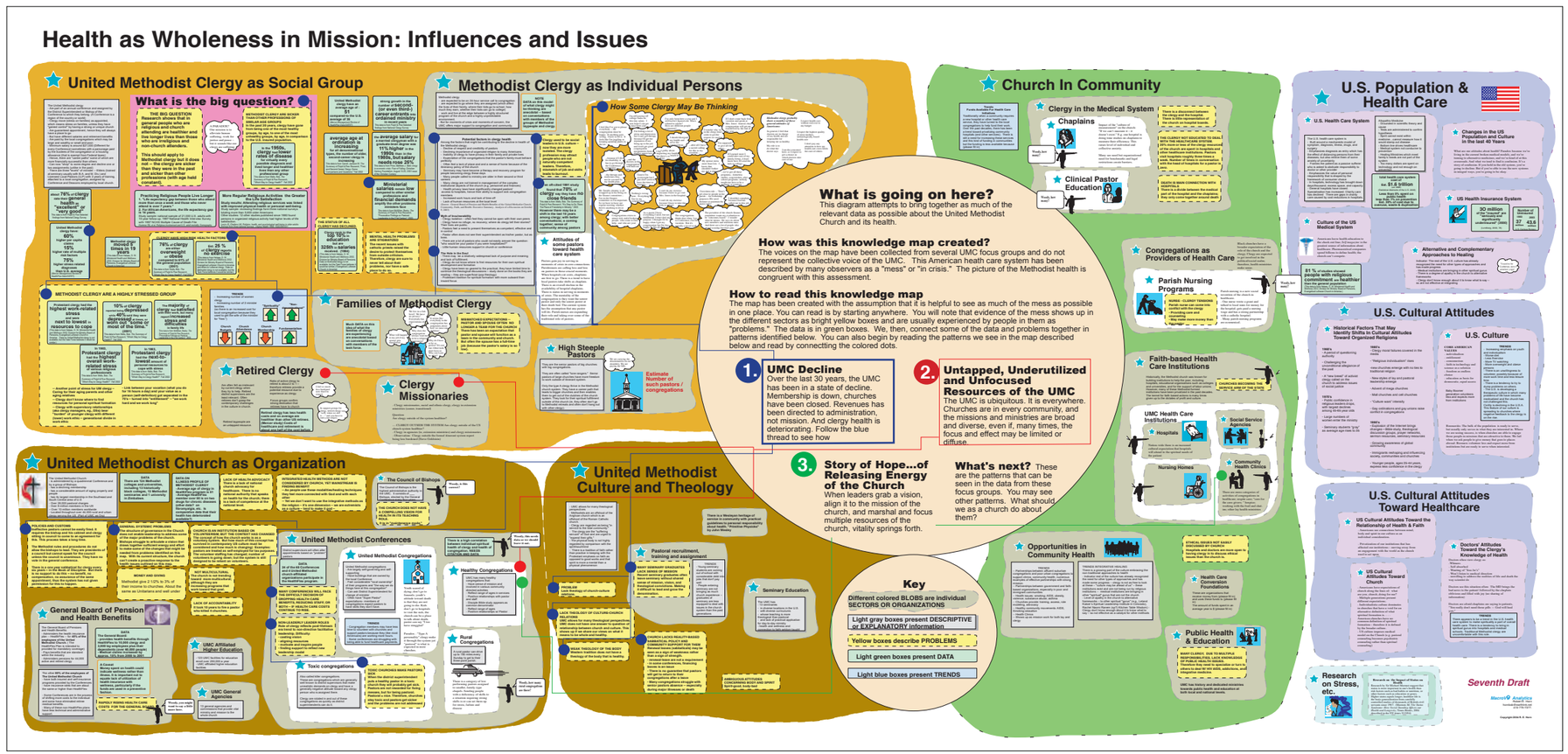
### Health resources recognized
In part this resulted from the inclusion of a section of the mess map that we had not previously included. It was called “Church in Community” and is pictured in the large green blob. They recognized that Methodists were major components of the US healthcare system. In fact, they estimated that one of every ten members of the church had something to do with healthcare. They were physicians, nurses, social workers, etc.

Moreover the church had been, and continued to be. An institutional resource for health. It had created literally over one hundred hospitals for the nation. And it had clergy in the medical system and chaplains in the military healthcare system. There were parish nursing programs and health care institutions such as nursing homes, social service agencies, and community health clinics.

Many of these Methodists were experts that could be drawn upon to address the health aspects of the mess. They expressed it this way on the final map:
“Untapped, Underutilized and Unfocused Resources of the UMC. The UMC is ubiquitous. It is everywhere. Churches are in every community, and the missions and ministries are broad and diverse, even if, many times, the focus and effect may be limited or diffuse.”

### Enabled people to see a picture of hope
Another part of the reframe that was an outcome of the nation-wide discussion was a story of hopeful change. On the map, they invited participants in the nation wide dialog this way:
“Story of Hope...of Releasing Energy of the Church. When leaders grab a vision, align it to the mission of the church, and marshal and focus multiple resources of the church, vitality springs forth.”

**To download and examine this mess map in detail**
**Go to messmap.com**



# Create metaphors based on issues developed in the mess mapping

## Introduction

Another more visceral analysis of the dynamics of what happened to mental health patients in the public mental health system arose out of a metaphor of a vortex swallowing up mental patients into a downward spiral. I turned this powerful verbal metaphor into this diagram.

## The vortex metaphor

As we were finishing the standard mess mapping process, I had a meeting with Dr. Ken Laurie, Director of Strategic Change, National Health Service, Fife, Scotland. I gratefully acknowledge his help and guidance. In our discussion, he mentioned that many people with suicide tendencies found themselves in a downward vortex. The metaphor was a powerful one and could lend itself to an even more powerful visual metaphor.

## Exploring the metaphor

I asked him to describe what he meant by this. And these were the elements of his reply: The "system," his bureaucracy, has a "do to" orientation not a "do with" one. It is filled with stop-start, fragmented movements. The system is oriented toward managing people in the system instead of helping people grow back to wellbeing.

Moreover, the system is risk averse oriented toward deficits and illness. The system has rules and procedures that fragment a person it is trying to help. It is these laws, regulations, and rules that produce bureaucratic red tape. Nevertheless, people working within the system try to do a good job but are prevented from being really effective by the bureaucratic structures within and between organizations, the mess that we had partially described in the mess mapping process.

The system is coping continually with crisis, long hours, too many meetings, having to justify everything, cutting of budgets, high case loads, and quality audits on top of more quality measurements, and requirements for more new programs without more funding.

Finally, the "helpers" thus become frustrated, angry, demoralized, and eventually depressed. Some end up having the same symptoms of those they are trying to help.

## How did we express the metaphor?

1.At the top of the map, we started with the person and wellbeing, well adjusted with family, friends, mentors, a job, hobbies, etc.

2 We conceptualized these friends, family, relationships, etc. as islands of resilience and support and called them “resting points.”

3.When these resting points break down, a downward spiral and being trapped by the system begins – a spiral that is "helping you," but is actually spending a great deal of its energy to keep itself in business. The system runs for the health, convenience, etc of the professionals, but not for the clients. They do ‘manage’ the problem cases – passing them from one agency to another. The aim is to manage, to mend, not to heal or to grow the individual. Hence the system is a point of resilience for staff, but not for clients.

4. The vortex of gray downward arrows is a visual, metaphorical attempt to express the feeling of being inside the condition of mental illness and a system that is trying to help you, but actually is only holding them temporarily from falling further.

5. In the "system" there are fewer “resting points” - and these tend to be state agencies.

The "social safety net system" offers support. They prop you up. But by the time you get to these support systems you are unlikely to get back upstream to health. These agencies “park” them at this level in the system. They become beached. They are not there to grow, only to be looked after.

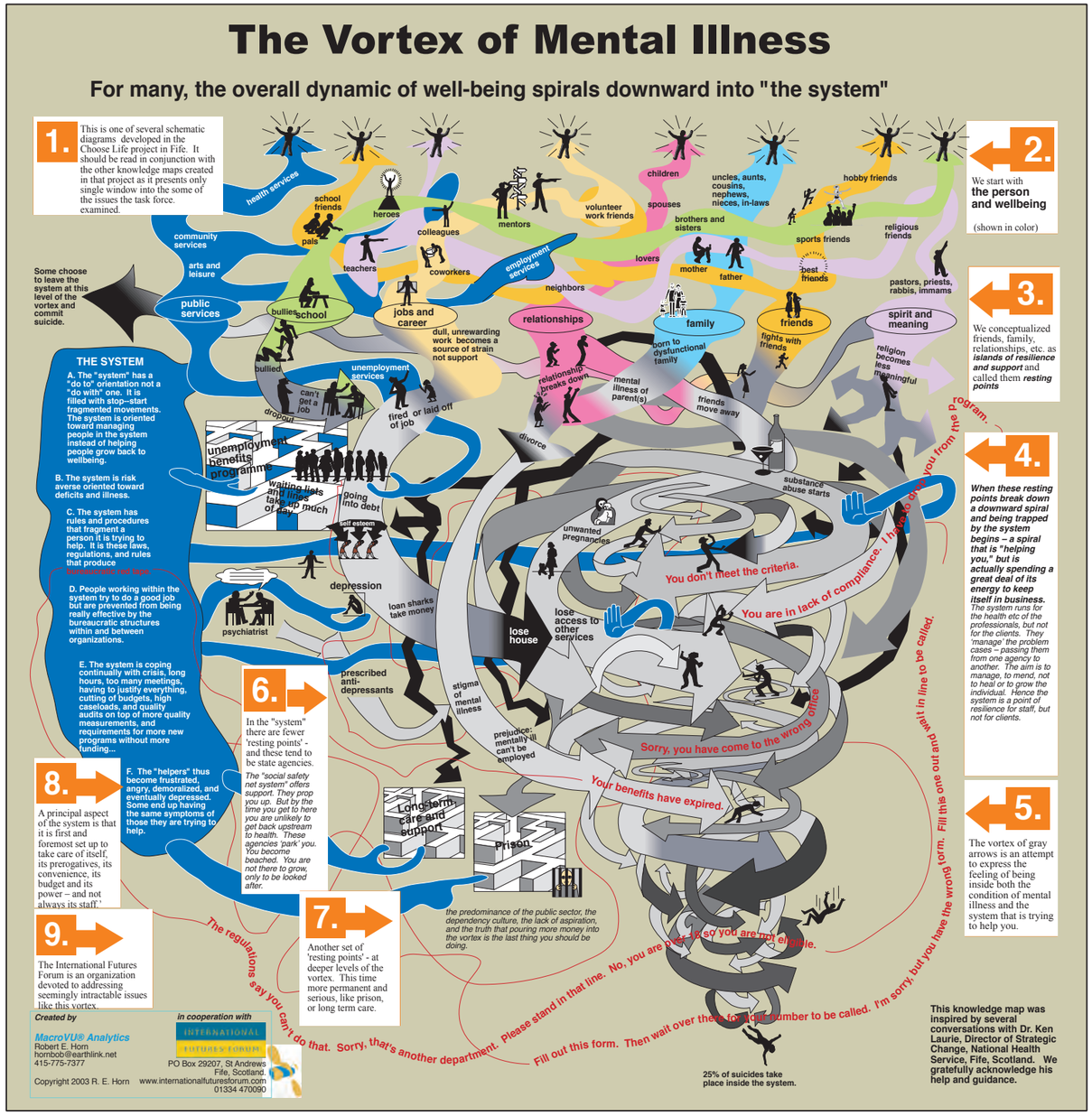
6 Long term care and prisons are another set of resting points - at deeper levels down in the vortex. This time they are more permanent and serious, like prison, or long term care.

7. A principal aspect of the system is that it is first and foremost set up to take care of itself, its prerogatives, its convenience, its budget and its power – and not always its staff.

**To download and examine this mess map in detail**
**Go to messmap.com**

## Result--metaphor becomes a myth

The vortex map has become an almost mythical portrayal of bureaucracy at work. There are places in Scotland where people say to each other, "I'm heading into the Vortex today." And “I’m heading off to a meeting with a master vortexologist.”



# Reflections - Chapter 3

### Introduction
We've looked in this chapter at several different post-mess-mapping approaches to "what to do next." We've seen that transition phase may last five minutes (Alameda County) to two years (Methodist Church).

### Mess mapping can't work by itself
And we have seen additional organizational methods as well as visual methods can be helpful in moving the process along. Certainly creativity and innovative bricolage of methods are important as each mess is unique. Not all social messes are the same. But the same basic approach but level, scale, scope has been different as well as the handoff to the next phase.

### Reframing as a social mess
It appears that the simple initial act of calling this a mess reframes the attitudes of participants. Suddenly they are in a mess, and so is everybody else. For some, maybe many or even most, it changes their identity slightly into a being a part of a community that is dependent on each other.

### Feelings of ownership
An product of the group process of building a mess map together over several weeks. is the growing sense of personal ownership of the outcome.. Working together enables the task group over time to take considerable ownership in the product. Working together also gives the experience of shared expertise of group mind, especially since the facilitator continually emphasizes that what we are after here is a "common mental model" of the mess People begin to talk about what "we" know.

### Sharing the process with their home organizations
We provided the task group members with copies of the progressive versions of the mess map each time the group met. They were, thus, able to take what they were doing in the task force to their home organizations and share the successive phases of the analysis with their colleagues. Many were able to gain new insight from these discussions and bring these insights back to the task group at its next meeting.

### Preparation for implementation
It is important to note that this ongoing sharing with home organizations also began to prepare these groups for the kinds of changes that might be needed, as their appreciation for the depth of the network of problems and causes increased.

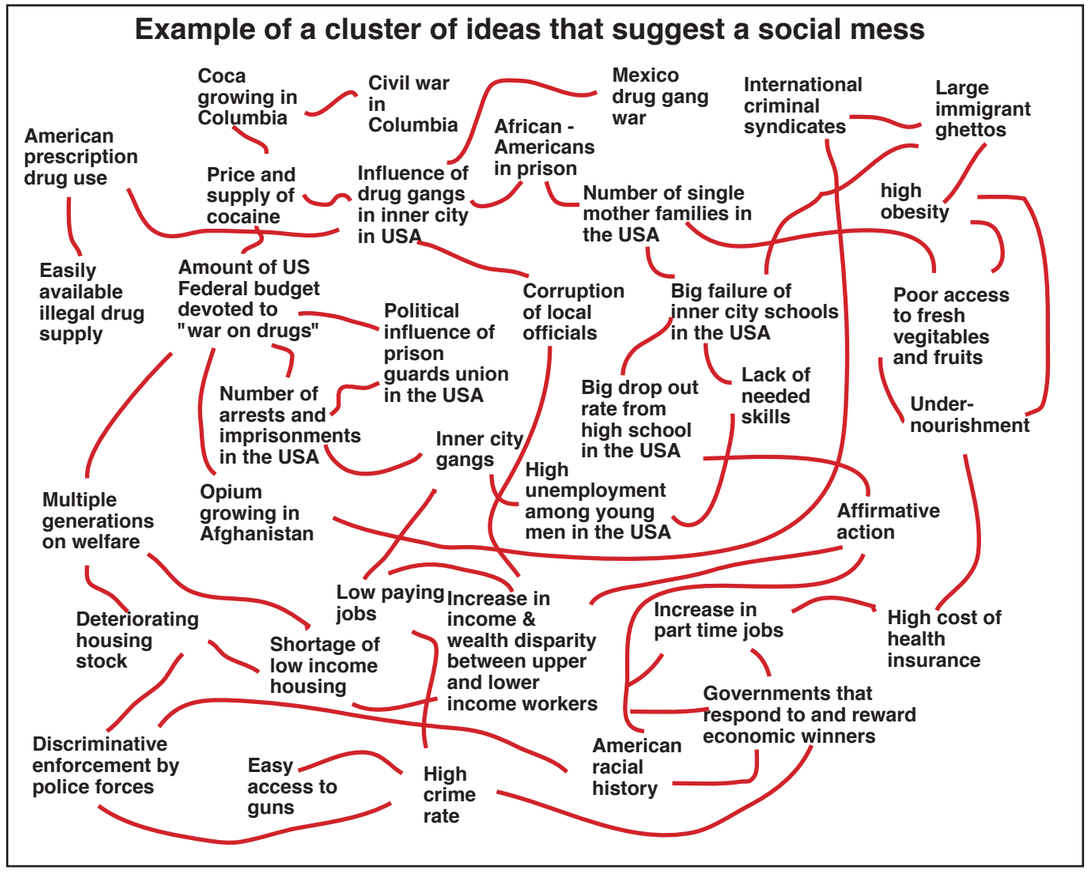
### Modify the group process
I have found it's important to stay tuned to the client process enough to creatively modify the process and its product. (e.g. more facts? more unmentioned problems?).

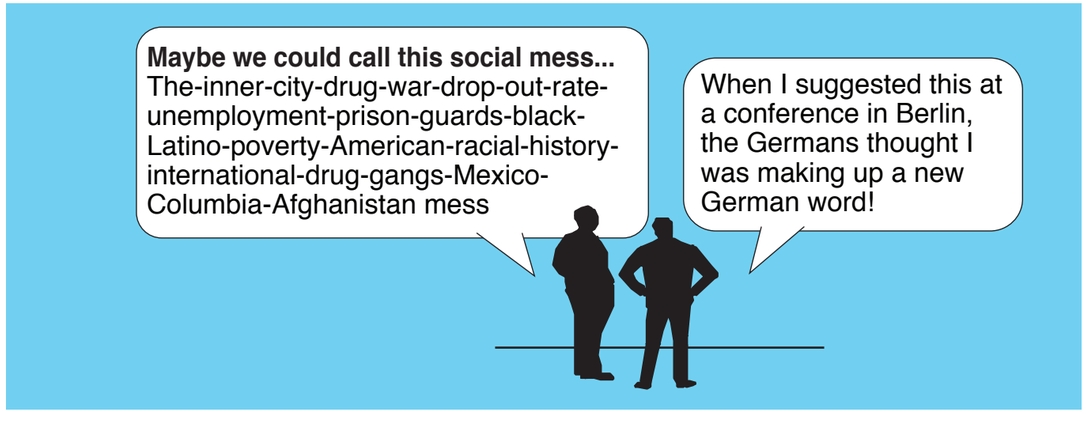
**For example, we usually use causality arrows to connect** problems. But in the PanDefense 1.0 conference, we did not include them so as to involve the conference participants who had not been familiar with the pandemic.

Similarly in the second phase of the Methodist Church case we left of the arrows to encourage wider involvement and wider discussions.

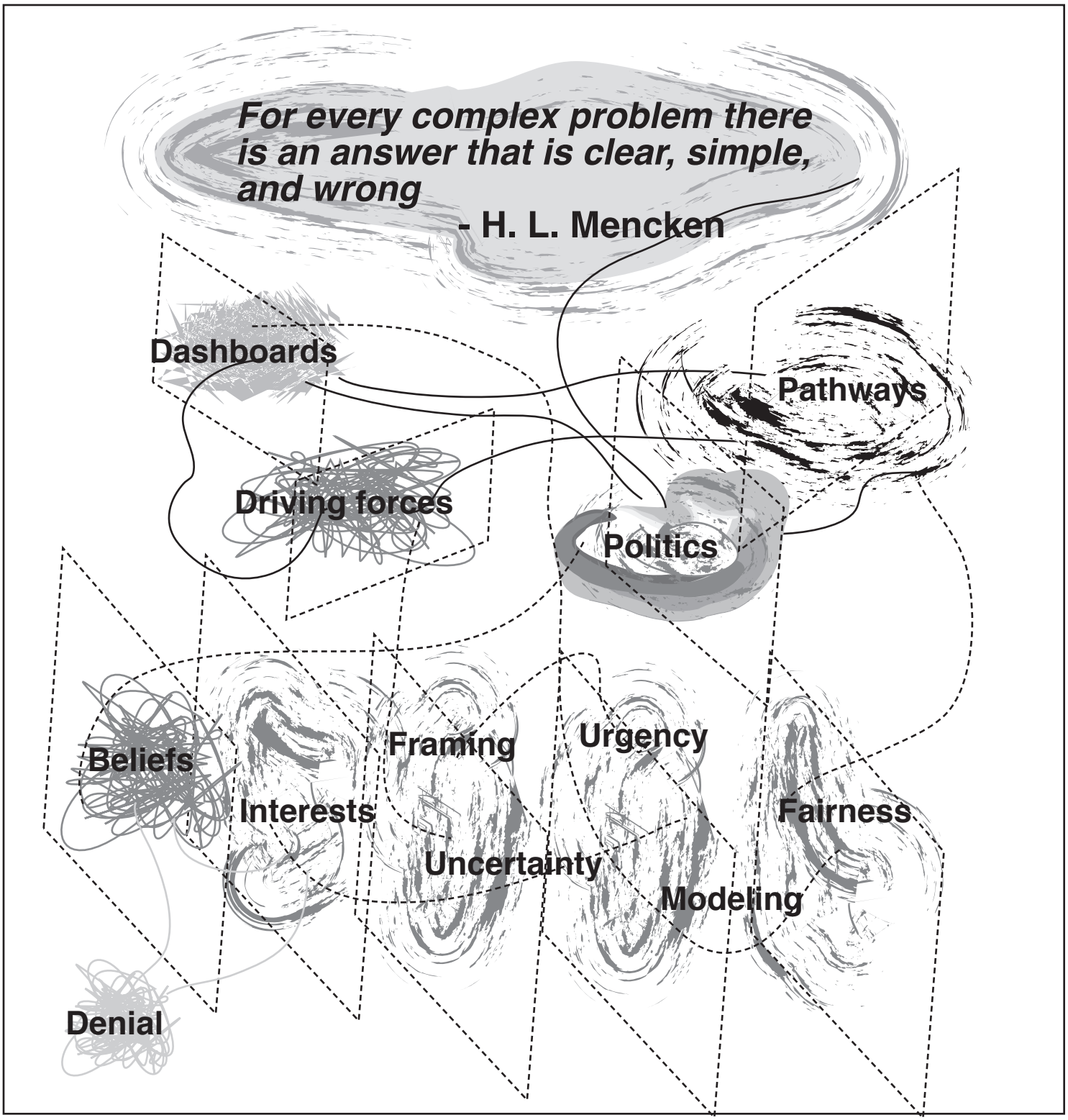
### Naming an uncomfortable problem
One of the delicate questions for choosing to use mess mapping process is whether the client and its community are ready for issues to come out into the open. For example, in my Methodist Church mess mapping project, someone casually mentioned that there were "toxic congregations" where new preachers always had difficulty and were eager to leave almost as soon as they got there. Whether or not to mention "toxic congregations" became an issue of readiness to mention and dig into "hot button" issues in the middle of the project. They nearly always come up in mess mapping

**It's hard to name messes.** There's a real difficulty in naming messes. Below is a diagram of the mess often named the "drug war." It could also be called the "inner city problem." it is sometimes called the "inner city education problem." Or the "poverty problem."



# Chapter 4
# Mega-Messes
## Visualizing Global Climate Change



*Chapter 4*

# Exploring mega-messes

## Introduction

Some of the biggest problems in the world are misnamed. Our politicians and even our scientists, researchers, and scholars continue to call them "problems." I even did so in the first sentence of this paragraph!

Take a moment and think about the characteristics, dimensions, dynamics and boundaries of any of the following:

- global warming
- sustainable global agriculture
- international criminal gangs
- international terrorist organizations
- conversion of the global energy system to renewables

These are not only messes. They are *mega-messes*. How do we wrap our minds around them? How do we make sense of them? How do we communicate that sense to each other?

## Simpler, local problems can have solutions

Even before we humans developed our written and spoken languages, we dealt with much simpler problems, that often had "solutions." We got used to thinking that way. Those are textbook problems. They are described in a single, standard way and once analyzed, we simply alter the causes and the problems go away. I don't think that happens with these mega-messes. (See more theoretical thoughts on this in Chapter 4)

## Characteristics of multi-mulis

Another set of causes for the mega-messes is "muli-multis." They are bigger in scope, larger in scale, exist on multiple levels, with wider boundaries, and overlap sovereignty. These characteristics produce the need for a different kind of treatment of these mega-messes. (See Chapter 1)

I am not suggesting that we have developed "solutions" to these mega-messes. But I am suggesting in this chapter that multiple visual views can help. They need to be seen from different points of view. With these multi-views, we can perhaps achieve ongoing re-solutions.

## Short term memory limitations

When we are dealing with mega-messes, we face the limitation of seven plus or minus two chunks our short term memory can contain. We need something to help us be able see and examine the multiple provisional characteristics, dimensions dynamics and boundaries of the multi-views of the multi-multis.

## Major claims of visual mega-mess approaches

You will not be surprised that I have proposed and we explore visual language information murals to begin to address this issue.

The principles are these:

- Mega-messes (aka "super-meses") require multiple views (i.e.info-murals and diagrams).
- Long, prose reports are helpful but often inadequate.
- Each view we create facilitates an examination of some partial aspects of the mega-mess.
- No one view or information mural can incorporate all aspects of the mega-mess.
- Every view will be partially incomplete in detail or maybe even thus partially wrong in overall concept.

At present, this is the best we can do with mega-meses. Nevertheless humanity must work to avoid the worst consequences and risks that we have produced in creating mega-messes for humanity.

## This chapter - a visual exploration

In this chapter, I will illustrate one of the mega-messes with which I have been exploring visually over the past decade and a half. In order to see the big picture, you have to have a picture, a friend of mine, Jim Strahorn, says. And, if the mega-mess is complex enough you have to have *many* big pictures. That is the reason we embarked on this preliminary exploration.

This work is incomplete. I hope that in some sense this work has produced some clarity and perhaps even some progress in humanity's dealing with mega-messes. And I hope that it will inspire others to build on our work.

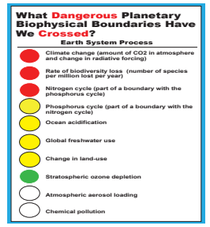
We need a fully visual and fully detailed set of information murals for humanity to deal with the global warming mega-mess. I present this chapter as a start.

## Platforms for thought

The outline at the right shows some of the different aspects of climate change that we have addressed, many with clients in governments and NGOs and some as explorations with colleagues and students at Stanford University.

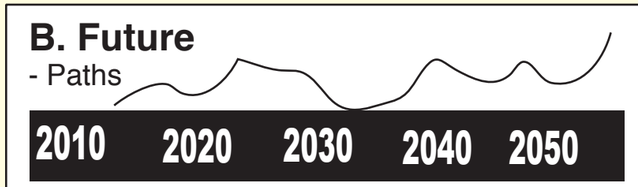
## Outline of this chapter

### A. Dashboards




### B. Future

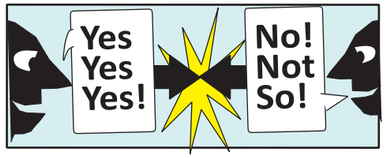
- Paths




### C. Dynamics

- Driving Forces-
- Political Interests of countries
- Political - US is stuck

### D. Differences of people




- Belief structures of global middle class
- US public doesn't agree
- US environmentalists don't agree
- Economists as a profession don't agree

### E. Decision-making

- Framing and Ethics
- Uncertainty
- Denial

### F. Urgency

- Tipping point and urgency
- Tipping points and dynamics
- Modeling

### G. Dilemmas

- Fairness

# Three dangerous planet boundaries have been crossed and humanity is rapidly approaching four more

### Introduction
The work of Rockstrom, et. al. (2009) has become one of the standards for measuring and representing what science estimates are the dangerous planetary boundaries that humanity has already crossed and other that it is approaching**.**

### Holocene standard
"To meet the challenge of maintaining the Holocene state, we propose a framework based on 'planetary boundaries'. These boundaries define the safe operating space for humanity with respect to the Earth system and are associated with the planet's biophysical subsystems or processes. Although Earth's complex systems sometimes respond smoothly to changing pressures, it seems that this will prove to be the exception rather than the rule ... "

### Thresholds defined
"Most of these thresholds can be defined by a critical value for one or more control variables, such as carbon dioxide concentration. Not all processes or subsystems on Earth have well-defined thresholds, although human actions that undermine the resilience of such processes or subsystems — for example, land and water degradation — can increase the risk that thresholds will also be crossed in other processes, such as the climate system.... We have tried to identify the Earth-system processes and associated thresholds which, if crossed, could generate unacceptable environmental change."

### Nine processes help to define boundaries
"We have found nine such processes for which we believe it is necessary to define planetary boundaries: climate change; rate of biodiversity loss (terrestrial and marine); interference with the nitrogen and phosphorus cycles; stratospheric ozone depletion; ocean acidification; global freshwater use; change in land use; chemical pollution; and atmospheric aerosol loading...In general, planetary boundaries are values for control variables that are either at a 'safe' distance from thresholds — for processes with evidence of threshold behavior — or at dangerous levels — for processes without evidence of thresholds."

**To download and examine this in detail**
**Go to messmap.com**

### Safe distances
"Determining a safe distance involves normative judgements of how societies choose to deal with risk and uncertainty. We have taken a conservative, risk-averse approach to quantifying our planetary boundaries, taking into account the large uncertainties that surround the true position of many thresholds."
Rockström, J., et. al, Nature, Vol 461, 24 September 2009, 472-475

**Key**
- Boundary exceeded
- Approaching limit
- Boundary not exceeded
- To be determined

## What Dangerous Planetary Biophysical Boundaries Have We Crossed?

**Earth System Process**

- Climate change (amount of $CO_2$ in atmosphere and change in radiative forcing)
- Rate of biodiversity loss (number of species per million lost per year)
- Nitrogen cycle (part of a boundary with the phosphorus cycle)
- Phosphorus cycle (part of a boundary with the nitrogen cycle)
- Ocean acidification
- Global freshwater use
- Change in land-use
- Stratospheric ozone depletion
- Atmospheric aerosol loading
- Chemical pollution

Source:
Rockström, J., et. al, Nature, Vol 461, 24 September 2009, 472-475

### A single overall dashboard for humanity
Is it possible to show on one small page or screen how well we as a global humanity are currently doing? Below is our attempt at a first draft to answer that question. It is obvious that each of the "ratings" require detail as well as regular updating. Our project did not take us much beyond a single prototype example of detail and the framework for updating.

## How Well is Humanity Doing?

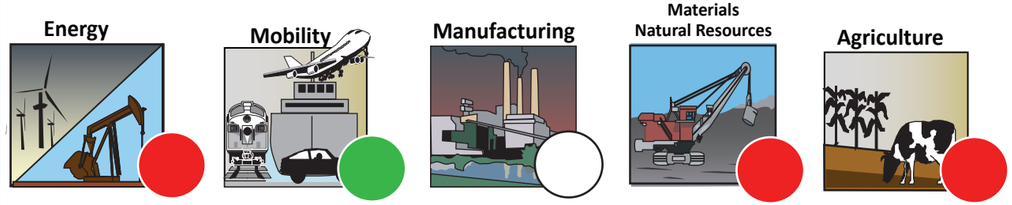
***The Global Sustainability Dashboard***

Home
Goals
About Us
Board
Staff
Advisors

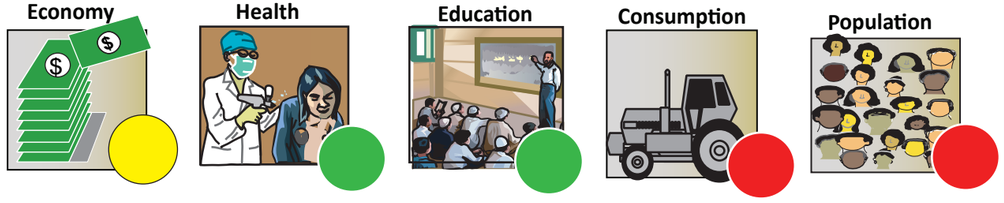
Supporters
Funding

Method
Data Sources
Etc.

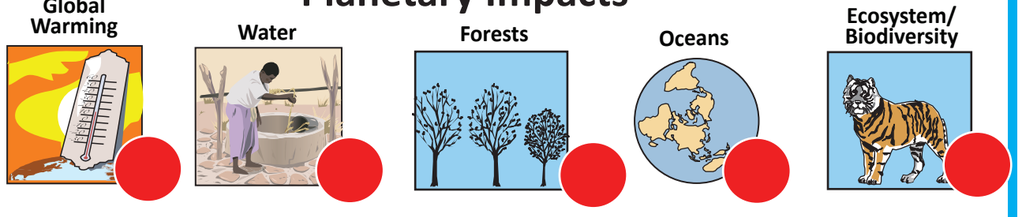
### Global Economic Development




### Human Welfare




### Planetary Impacts

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415-775-7377
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**Key to judgements about progress**

- Getting worse
- Mixed picture. Some positive progress and some degree of stuckness and lack of progress
- Getting better
- Not enough information to make a judgement at this time

# Dashboards - How Is The Planet Doing?

*We'll need two planets by the early 2020s*

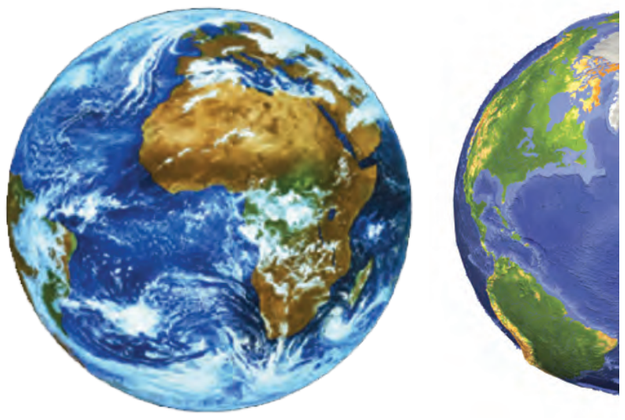
### Introduction

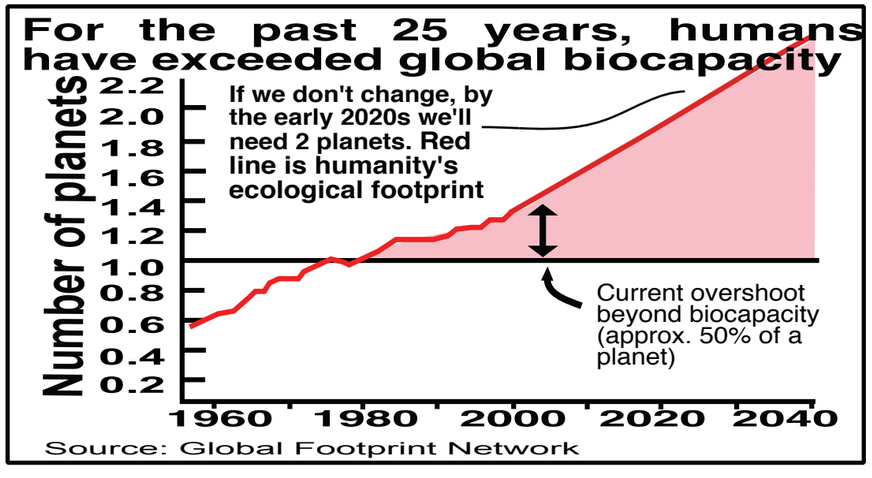
How do we register how well we are doing as a civilization? It has become customary in organizations (both business and government) to lay out a set of metrics and display them as dashboards. In these two pages (and the following two) we show what it might be like to have a set of dashboards not only for the planet, but also for civilization. Like our approach to understanding mega-messes by representing them from different view points, our dashboards look at different angles of our situation.

### What is needed

Clearly it would be very useful for humanity to be able to check in on how we are doing on the internet. It's a big job with many more parameters than we are able to show here.

## Global Footprint Network calculates we are using more than 1-1/2 planets of biocapacity






Source: footprintnetwork.org © 2010 R.E.Horn

**To download and examine this in detail Go to messmap.com**

## How Is The Biosphere Doing?

*The Millennium Ecosystem Assessment*

### Example page

The illustration to the right is our interpretation using the red-yellow-green traffic lights convention to illustrate how parts of the Global Sustainability Dashboard might convey evaluations of the Millennium Ecosystem Assessment easily and concisely.

### What is the Millennium Ecosystem Assessment (MA)?

"The Millennium Ecosystem Assessment (MA) was called for by United Nations Secretary-General Kofi Annan in 2000. Initiated in 2001, the objective of the MA was to assess the consequences of ecosystem change for human well-being and the scientific basis for action needed to enhance the conservation and sustainable use of those systems and their contribution to human well-being. The MA has involved the work of more than 1,360 experts worldwide. Their findings, contained in five technical volumes and six synthesis reports, provide a state-of-the-art scientific appraisal of the condition and trends in the world's ecosystems and the services they provide (such as clean water, food, forest products, flood control, and natural resources) and the options to restore, conserve or enhance the sustainable use of ecosystems.

"The bottom line of the MA findings is that human actions are depleting Earth's natural capital, putting such strain on the environment that the ability of the planet's ecosystems to sustain future generations can no longer be taken for granted. At the same time, the assessment shows that with appropriate actions it is possible to reverse the degradation of many ecosystem services over the next 50 years, but the changes in policy and practice required are substantial and not currently underway."

### Global Status of Ecosystem Services

#### *Trends in* Provisioning Services

**Food**

- ↑ **Crops** substantial production increase
- ↑ **Livestock** substantial production increase
- ↓ **Capture Fisheries** declining production due to overharvest
- ↑ **Aquaculture** substantial production increase
- ↓ **Wild Foods** declining production

**Fiber**

- +/– **Timber** forest loss in some regions, growth in others
- +/– **Cotton, Hemp, Silk** declining production of some fibers, growth in others
- ↓ **Wood Fuel** declining production

**Genetic resources**

- ↓ lost through extinction and crop genetic resource loss

**Biochemicals, natural medicines, pharmaceuticals**

- ↓ lost through extinction, overharvest

**Fresh water**

- ↓ unsustainable use for drinking, industry, and irrigation; amount of hydro energy unchanged, but dams increase ability to use that energy

#### *Trends in* Regulating Services

**Air quality regulation**

- ↓ decline in ability of atmosphere to cleanse itself

**Climate regulation**

- ↓ **Global** carbon sequestration in atmosphere since mid-century
- ↓ **Regional and local** preponderance of negative impacts
- +/– **Water regulation** varies depending on ecosystem change and location
- ↓ **Erosion regulation** increased soil degradation
- ↓ **Water purification and waste treatment** declining water quality
- +/– **Disease regulation** varies depending on ecosystem change
- ↓ **Pest regulation** natural control degraded through pesticide use
- ↓ **Pollination** (low to medium certainty on this trend) apparent global decline in abundance of pollinators
- ↓ **Natural hazard regulation** loss of natural buffers (wetlands, mangroves)

#### *Trends in* Cultural Services

- ↓ **Spiritual and religious values** rapid decline in sacred groves and species
- ↓ **Aesthetic values** decline in quantity and quality of natural lands
- +/– **Recreation and ecotourism** more areas accessible but many degraded

#### Key to judgments about trends

- ↑ Favorable. More of services and generally better services
- ↓ Declining. Less of services or decreasing quality of services
- +/– Mixed picture. Better some places; worse in others

Source: www.millenniumassessment.org

Source: http://www.maweb.org/en/About.aspx

# Main climate pathways

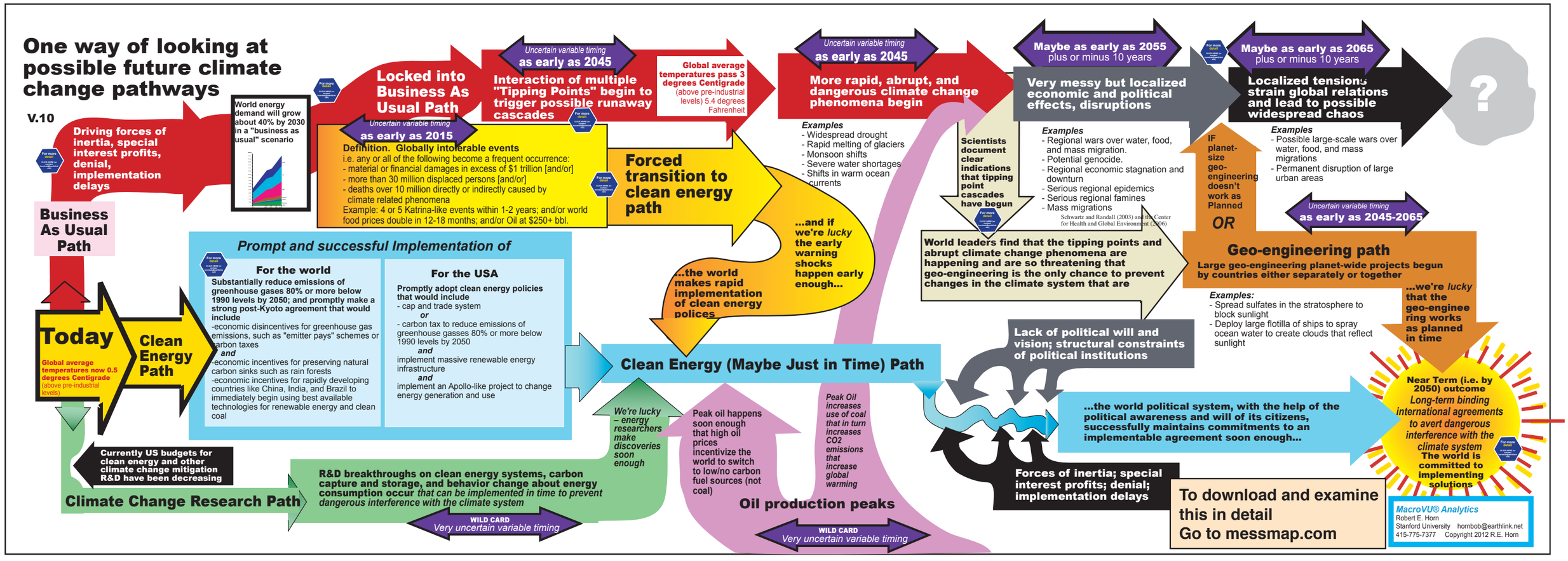
### Introduction
Even One of the ways we can imagine the future is to create scenarios. These are frequently thought in metaphor as "pathways" into the future.

### Carnegie Mellon project
In 200_ Carnegie Mellon mounted a campus-wide discussion of climate change. In the preparation for that project, the director of the project Robert Cavalier, asked me to modify a set of idealized climate pathways that would capture the expected major directions and turning points of the approach of global civilization to this looming issue. They provided me with expert advice, especially from Vanessa Schweitzer, to refine the pathways.

.

### Aim of the info-mural
Our goal was to provide a one page overview that would enable discussion of different possibilities, without loosing the context of the overall possible futures. This info-mural was included in the booklet that was handed out to each student participating

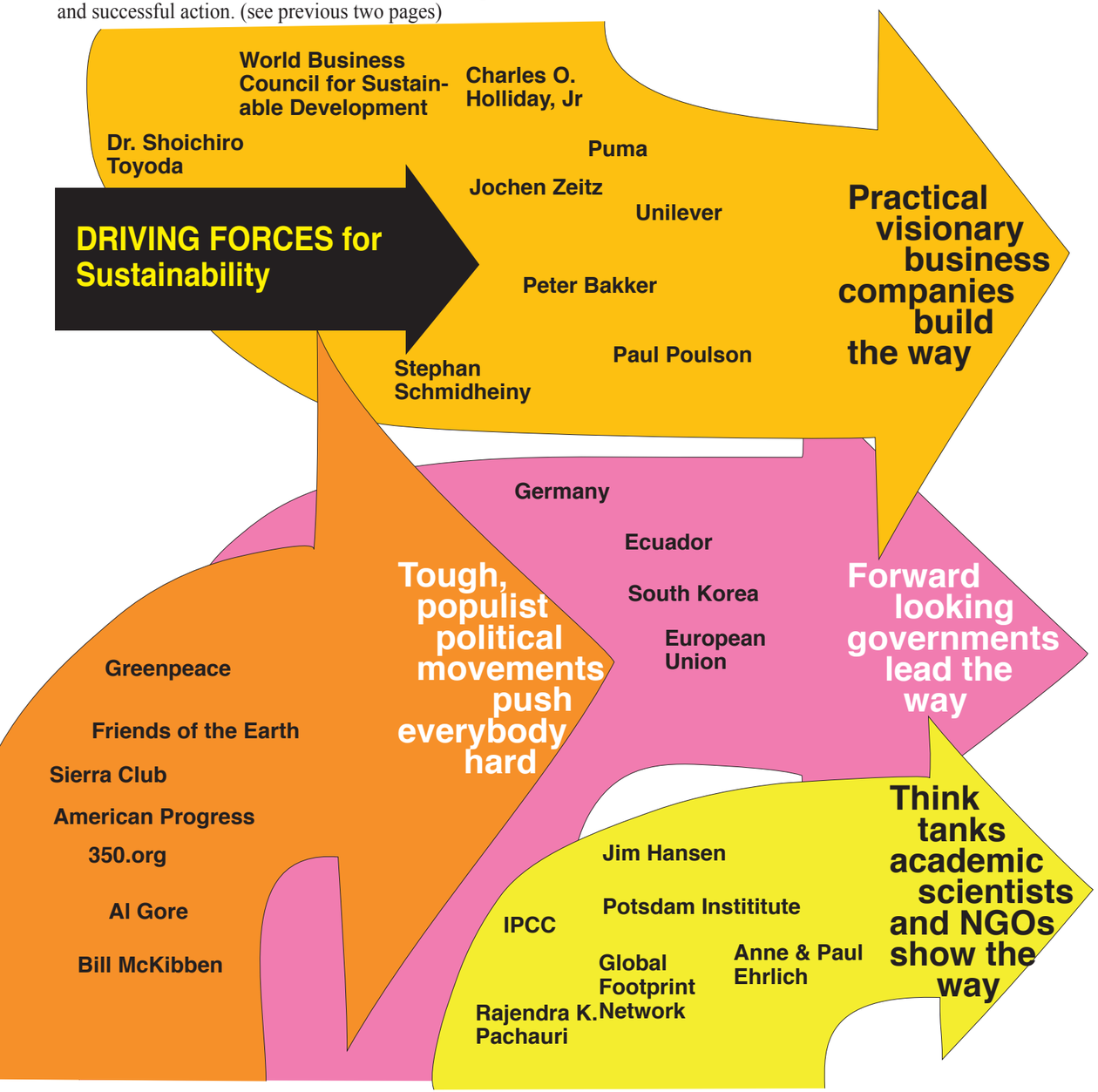
### Importance of context
Context is important in providing multiple views of very complex and messy issues. Diagrams of this type are one way of providing larger context. Note how context in this case means something different from other info-murals I exhibit in this chapter. When we have looked at enough different murals, we see that only with enough context can we have useful discussions.

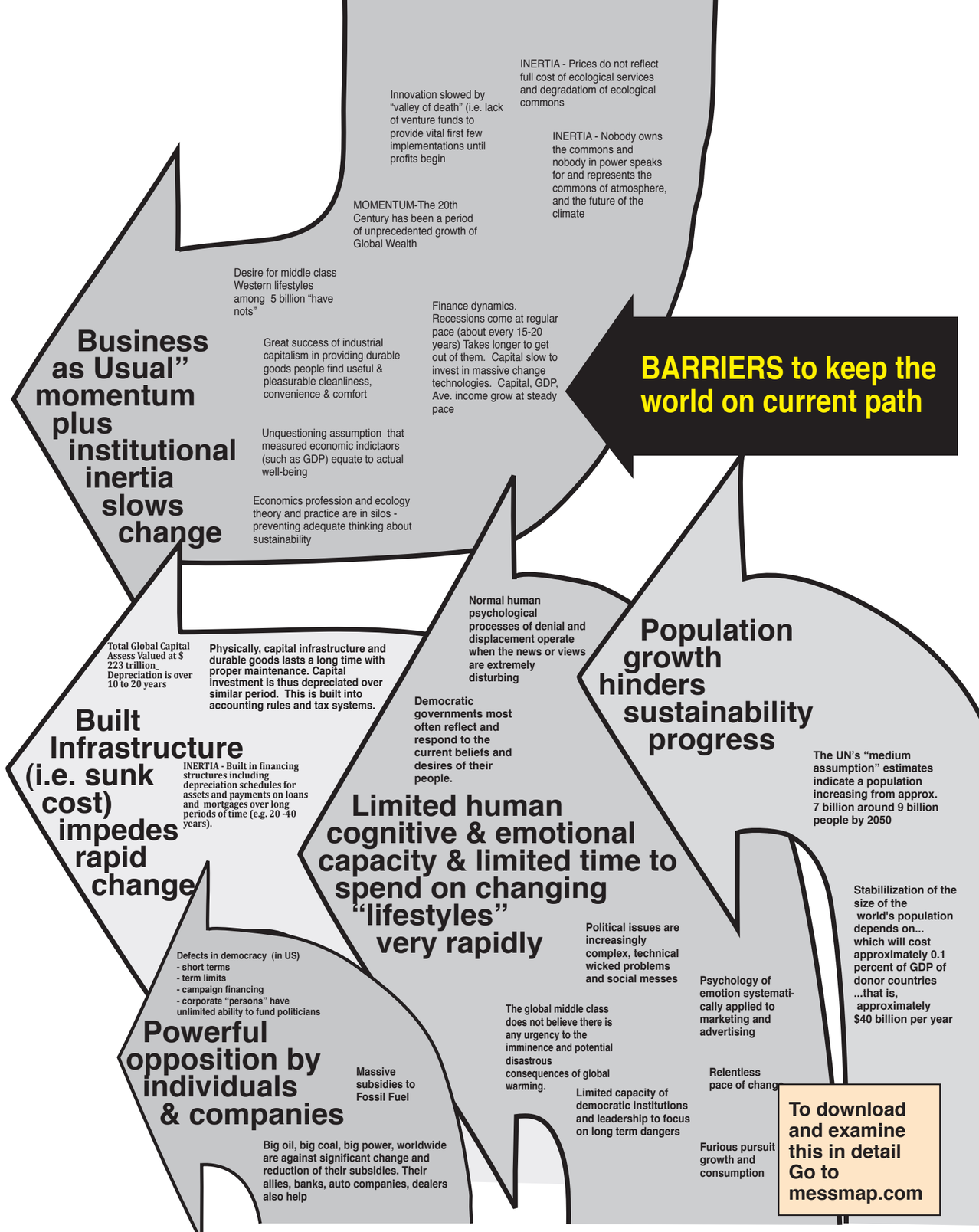


# Driving forces for sustainability and barriers to progress

## Introduction

How to portray some of the dynamical "forces' at work in the world that are driving toward sustainability? I imagine a large mural that shows elements of these forces as large abstract arrows as shown below. This would be the left-hand side of a full scale mural on which the right-hand side would be a similar set of arrows of driving forces acting as social, political, and economic barriers to civilization taking relevant and successful action. (see previous two pages)



# Starting with what exists - The Kyoto Protocol and its troubles

## Introduction

A relatively complete description of the climate change issue would include a then-curent situation and any critiques that have been made. These two visuals were created in or project in 2007.

## Why the Kyoto Protocol may collapse

### *Basic assumption of Kyoto is flawed*

"The Kyoto framework is based on a fundamentally wrong assumption that it is best to slow global warming by setting strict targets and timetables for regulating the quantity of greenhouse gases emitted."Victor, 2001, 11

### Emissions determined by technology and economic growth

Democratic governments can not control economic growth or invention of better technology, therefore they can not predict or control the amount of emissions arising from within their country's borders.

*There are four available ways for a country to meet the Kyoto goals in the time period allowed (2008-2012)*

**1. Cut emissions within the country by more efficient technology**

*Practically no country will be able to meet its Kyoto target goals for emissions reductions within its own borders*

***...BUT...*** (because their economies are grow in faster than their reductions in emissions)….

***...so they must use one or more of the other three methods for reducing their country's emissions ...***

**2. Create an accounting system for creation of sinks.** (e.g. The US could offset est. 14% of emissions for carbon sinks from "land use and forestry" )

***...BUT...*** *There are four problems with emission accounting systems:*

**A. Accounting standards won't work.** Agreement on accounting standards are very difficult to be negotiated

**B. Cooking the books.** Huge potential for rigging the accounting system and "cooking the books" on emissions

**C. Intrusive monitoring.** Enormous, intrusive monitoring system needed. ("only a monitoring program larger and more intrusive than anything ever attempted under international law could settle the inevitable disputes" Victor,2001,9)

**D. Long term monitoring.** Decades of monitoring needed for some kinds of sinks, but commitment period of Kyoto is only 5 years (2008-2012)

**3. Earn credits with Clean Development Mechanism (CDM)**

***...BUT...*** *Companies and other investors are reluctant to invest in CDM projects because:*

**A. Clear rule not in place.** Rules for the CDM system have not been negotiated

**B. Complicated and uncertain rules.** Rules will be so complicated and uncertain that investors are reluctant to put up money

**C. Insufficient time for investment payoff.** The time required for many large projects is insufficient to received a return on investment within the Kyoto period (2008-2012) and if it is uncertain that the Kyoto agreement will endure or collapse, investors are unlikely to make sizable investments.

**4. Earn credits with emissions trading**

***...BUT...*** *Russia and Ukraine have so many credits that they will either:*

**A.Decrease the price of credits**

Their huge amount of credits make the price of credits so small as to permit an purchasing country to effectively keep on emitting GHG and hence achieve no real reduction in global warming

...OR...

**B. Get an unfair windfall.** Some countries (e.g. Russia & Ukraine) would get a huge transfer of funds from purchasing countries (from the US it might be $100 billion), and no industrialized country legislature will permit such huge transfers of wealth to Russia and Ukraine and do nothing to slow global

***...AND...*** *...the biggest difficulty of all...*

**the US Congress will not ratify the Kyoto Protocol**

...because.. The Kyoto Protocol requires 7% reduction below 1990 levels, but by the end of 1999 the US emissions had risen about 12% above the 1990 levels. And with the steady economic growth they would rise another 10% by the time the Kyoto agreement is scheduled to go into effect in 2008. That's a total of about 30% reductions. That will cost to the US citizens: approx $1000 per household per year..

The critique of the Kyoto Protocol was developed by David Victor long before the failure of the treaty to be fully implemented. We did the visual diagramming.

## The Kyoto Protocol is the main way the global community tried to address global warming

### Kyoto Protocol

**Where negotiated:** UN Conference on Climate Change in Kyoto, Japan
**Signed:** Dec 1997 by 160 Nations
Goal: reduce greenhouse gas emissions by average 5:2 percent below 1990 levels.
**Countries agreed to:** specific target levels ("caps") for greenhouse gas (GHG) emission to apply to "budget period" of 2008-2012.
Specific target reductions (below 1990) levels.

**Kyoto agreed "caps" on CGH emissions**

| | |
|---|---|
| Reductions | US - 7%<br>Japan - 6%<br>EU - 8% |
| Return to the 1990 levels | Russia<br>Ukraine<br>New Zealand |
| Stabilize emissions above 1990 levels | Australia 8% +<br>Iceland 10% + |

121 nations have no reduction including China & India

**Greenhouse gases covered:**
- Carbon dioxide
- Methane
- Nitrous oxide
- Hydrofluorocarbons
- Perflourocarbons
- Sulfur hexafluoride

**Future agreements envisioned:** Kyoto acknowledges these caps only as first step and envisions more stringent caps to be negotiated in the future. (this is because the scientists in the IPCC suggest maximum levels of emissions should be capped at about 50% above present-day levels. If fulfilled, the Kyoto agreements would get much less than that.

**Three Kyoto mechanisms**
The treaty sets up three ways that countries can meet their obligations:
1. Joint implementation (JI)
2. Clean development mechanism (CDM)
3. Emissions trading. (see descriptions at right)

### Joint Implementation -- How it works

The Clean Development Mechanism is one of the three major mechanisms that the Kyoto Protocol allows to assist in emissions reductions

**Purpose:** to make it easier for industrialized and developing countries to meet their emissions targets

**1.** industrialized countries have amounts of reductions that they have agreed to achieve during the Kyoto Protocol period (see table at left)

**2.** With Joint Implementation

**Industrialized countries**

...can implement projects to reduce emissions in other industrialized countries
**EG. by replacing a coal fired power plant with a more efficient co-generation plant**

...and receive certified emissions reductions that are credited toward its meeting its Kyoto targets.

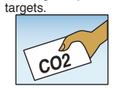
**...OR...**

**3.** using Joint Implementation

**Industrialized countries**

...can implement projects that increase removals by "sinks" in the territories of other industrialized countries.
**EG. by reforestation of an area of land**

...and receive certified emissions reductions that are credited toward its meeting its Kyoto targets.




### Clean Development Mechanism -- How it works

The Clean Development Mechanism is one of the three major mechanisms that the Kyoto Protocol allows to assist in emissions reductions

**Purpose:** to make it easier for industrialized and developing countries to meet their emissions targets

**1.** industrialized countries have amounts of reductions that they have agreed to achieve during the Kyoto Protocol period (see table at left)

**2.** With the CDM...

**Industrialized countries**

...could (for example) help develop a rural electrification project using solar panels...

...and receive certified emissions reductions that are credited toward its meeting its Kyoto targets.

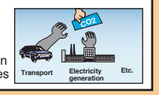
### Emissions trading -- How it works

Emissions Trading is one of the three major mechanisms that the Kyoto Protocol allows to assist in emissions reductions

**Purpose:** to make it easier and less costly for industrialized countries to meet their emissions targets

**1.** all countries are allocated caps on emissions in the Protocol

**2.** all countries allocate a certain amount of emissions permits to the companies operating within their boundaries




**3.** an emissions trading market is set up to buy and sell these emissions permits.

**3.** then...

**Industrialized countries**

...can purchase emission units from...

**other countries which have a surplus of credits and hence don't need them**

# U. S. climate politics is stuck

### Why is climate change stuck?

While the U.S. is acknowledges to be a vital participant and must be a leader in the global climate change effort, climate politics in the United States (as of 2014 when this is written) is stuck. Not only is Congress stuck in the extreme polarization in U.S. History between Republicans and Democrats, a sufficient bipartisan majority in the U.S. Senate among Senators from states where coal, oil, and auto-making are dominant economic factors in the state, but at least for the present, they have been joined by farm-state Senators to form an ethanol coalition. In addition, Senators from states where coal is the largest fuel for electric power plants, often join the coalition. Together with sufficient lobbying and unlimited possibility to supply campaign funds, these industries can completely block effective and timely climate action. See diagram on the opposite page.

### What the President can do

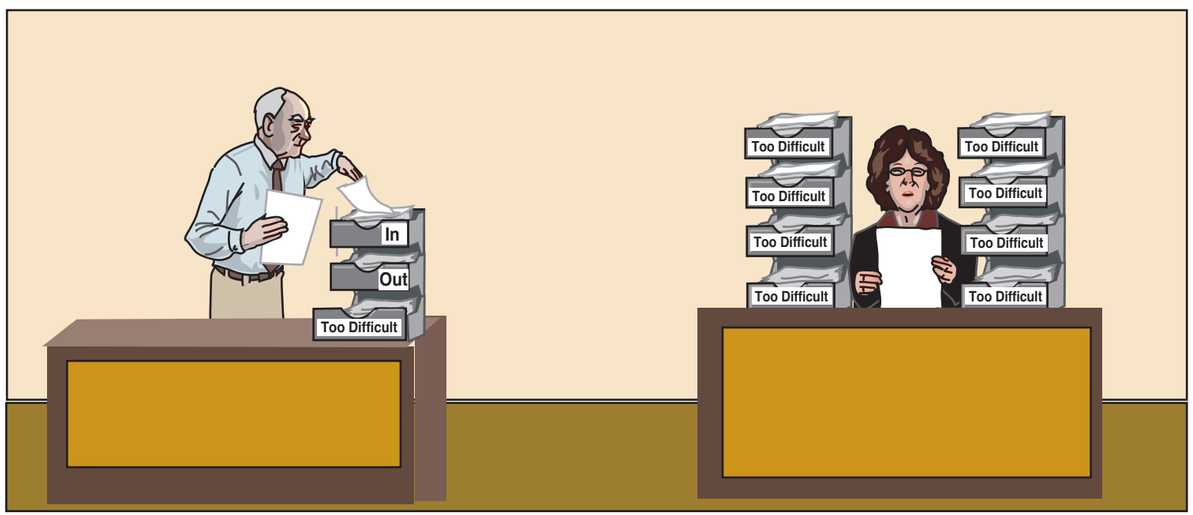
Fortunately during the Nixon Administration, the Environmental Protection Agency was set up, and, fortunately, the U.S. Supreme Court has decided that the EPA can regulate CO2 emissions under that Act. Therefore, the U.S. President can (and must) act to protect the environment and issue science-based regulations on CO2 and other greenhouse gases. Nevertheless, the process is slow and impeded at every step by resistance from the fossil fuel industries and numerous court cases.

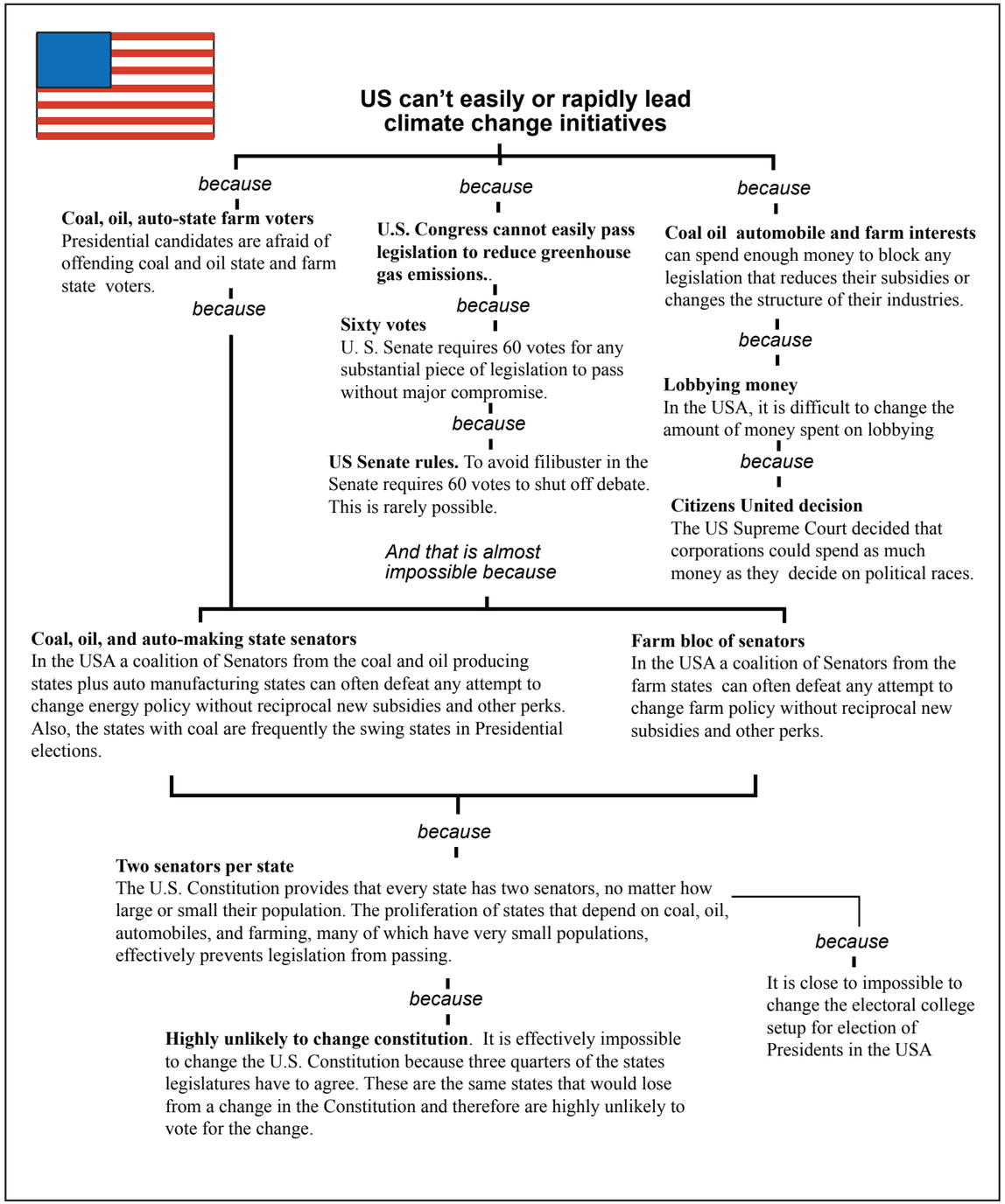
### Parliamentary systems aren't much better

Many critical climate and sustainability issues in countries with parliamentary systems have not fared much better. Sometimes this is influenced by the economic configuration of a country such as Canada and Australia, both of whose economies are presently reliant on fossil fuel exports. (See page __ on differing country interests. Parliamentary governance system are sometimes controlled by interests of minority parties in the coalitions, who can delay and prevent key issues from being on the table.

### Too difficult box

It is worth noting that some issues are regarded as simply too hard to deal with. British bureaucrats and government officials have a place to put those issues. They note that every Minister has an In Box, an Out Box, and a "Too Difficult Box." Climate change fits easily into the latter box, as evidenced by the chapter on climate change in the book by former UK Cabinet Minister Charles Clarke, whose title is "The Too Difficult Box." (The too difficult box is another name for the messes and mega-messes we deal with in this book.



# International Actors (States and Companies) Differ

### Conflicts of interest

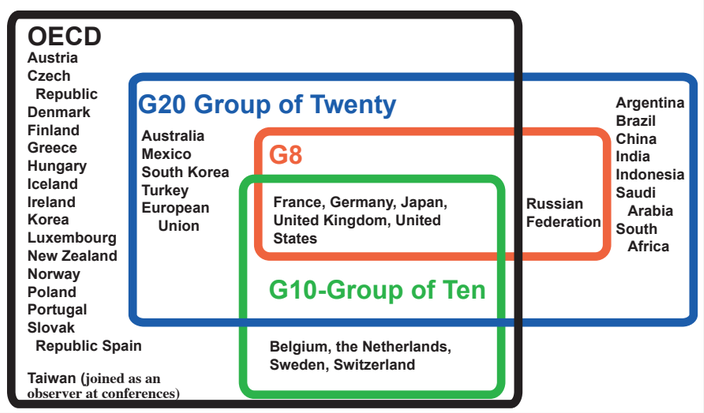
Countries and companies and NGOs have different short-term interests regarding fossil fuels and other contributors to global warming. Several blocs of nations with different interests prevent agreement on international governance of climate change Sound solutions are bent out of shape by special interests affecting government decisions. Companies make large financial contributions influencing elections and regulating agencies. So it is not surprising that negotiations among 190 countries move slowly. In this unfinished mural on these two pages, we present a sketch of a preliminary visual analysis that was done in the early part of the first decade of the 21st century of the organizations, governments, and businesses involved.

### No place for a continuing conversation of world leaders on what to do

One of the ideas for coordinating and negotiating climate change is to have an ongoing infrastructure of the "most important" emitters and users of climate change. As the diagram below shows, it is a very difficult decision to make as to which countries to invite. This is even more complicated when the revenues of some of the biggest fossil fuel companies are larger than many governments.

### UNCOORDINATED AND FRAGMENTED GOVERNANCE

No current institutions are available that cover these interlocking issues adequately. There is a lack of a comprehensive system of oversight. Different aspects of the issues encompass different countries and overlapping world institutions and ad hoc groups of states trying to act as executive or steering committees.




## Who are the actors and what interests and influence do they have?

**OPEC Countries**
Actors: Saudi Arabia, Kuwait, Iran, Iraq

**Other Producing Countries Outside of OPEC**
Method: Increase investment to increase production
Effect: Reduce prices
Limits: 1. Amount of investment
2. Political stability
Actors: Russia

**Militant Mid-East Terrorist Organizations**
Method: Reduce supply
Long term goal: Takeover Mid-East producer governments
Method: civil war; terrorism
Actors: al Quaeda, ISIS, AQIA

**Stable High Demand Countries**
Effect:
1. Supply shortages and higher prices.
2. Reliable supply at affordable prices. i.e. maintain supply and price within affordable range.
3. Reduce dependence on fossil fuels and maintain prices of oil within a range so Mid East producing countries maintain orderly societies
Method:
1. R&D on alternative fuels
2. Investment in alternative fuels
3. Change in fuel mix
4. Better governance in producer countries
5. International multi-layered protections against vulnerability
6. International agreements about emissions
7. Parallel market in emissions trading
8. Military expenditures to ensure access to fossil fuels
Actors: Most OECD countries

**Countries with Voracious Growing Demand**
Current preferred policy: No form of binding international targets.
Developed countries should pay developing countries for renewable energy installation, disseminate the technology Effect: Supply shortages and higher prices.
Method: Long term supply contracts
Actors: China, India

**Financial Speculators**
Method: Bet on rises and falls of futures market

**Goal:** Keep oil supply high but not so high that it makes investment in alternative energy sources attractive.

**Goal:** Control price so as to make a short term profit

**Goal:** Increase revenues

**Goal:** Disrupt supply to destabilize producer governments

**Goal:** Increasing GDP hence larger oil usage.

**Goal:** Increasing GDP rapidly hence larger oil usage

**Goal:** No binding agreements; payments for mitigation and adaptation

**Goal:** Move economies toward sustainability

**Other developing nations**
Current preferred policy: No form of binding international targets. Developed countries should pay developing countries for adaptation in the face of climate change flooding, decertification and other effect. They should also be paid for not cutting their forests.
Actors: almost one hundred countries

**Consumer Countries at High Risk of Supply Disruption**
Method: Make private deals with producer countries for guaranteed supply at a higher than market price
Effect: Increase overall prices (especially in time of shortage of supply)
Actors: China, Japan (?)

**Goal:** Lock in energy supplies at a possibly higher price but secure delivery level.

**Energy Producing Companies**
Method: Delay negotiations
Interests: Maximum wealth from prices on fossil fuels.
Current preferred policy: Uncertain

**Goal:** Make profit. Be involved in the shift to alternative energy sources

**Insurance Companies**
Method: Higher rates & refusal to insure
Actors: Insurance companies and reinsurance (e.g.Munich Re, Swiss Re)

**Goal:** Charge enough in premiums to cover costs. Insure only risks that are profitable.

**Countries With High Emissions Credit**
Method: hold out for continued benefits
Actors: France, Russia

**Goal:** Keep preferred status

**Countries Most at Risk from Climate Change**:
Actors: Bangladesh, many island nations

**Goal:** Stop CO2 emissions as much as possible

**Non-Governmental Organizations (NGOs)**
Effect: Sensitize institutions and organizations to the consequences of their actions on climate and energy
Actors: Greenpeace
Friends of the Earth

**Goal:** Focus attention sustainability and organizations that are not working in that direction

**Agents for Global Stability and Sustainability**
Effect: Increase investments in sustainable energy infrastructure
Actors: World Bank
UN Development Program
Development Departments of Governments

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# Beliefs of the global middle class hold back progress

### Beliefs as habits - Definition

Beliefs are a more or less stable framework of thoughts that humans operate on. For the most part they are unexamined habits, acquired from their cultures through interaction with others of their societies. Habits are largely unconscious. Habits enable us to move through he world most of the time without thinking consciously about what we are doing. Habits are thus very helpful when taken together with the limitations of our short-term memories.

Rarely do single beliefs stand by themselves. They are involved in an integrated framework. More or less single beliefs are connected by a network of other beliefs, metaphors, logics, and experiences (that reinforce them).

### Origin of belief systems

Some beliefs have been around for a long time. They represent the collective understandings of our ancestors. Other beliefs in modern times have originated in various ideologies philosophical, and scientific experiences.

### Beliefs of the global middle class

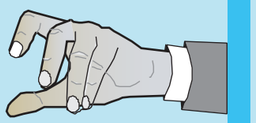
On these pages we suggest that the educated middle class of all countries, highly developed and emerging, and even fragile, developing countries, numbering perhaps one and a half billion people around the world, have a similar set of beliefs about the economy and climate change. And that these beliefs taken together constitute a significant barrier to adequately addressing climate change as a mega-mess.

### Global progress slowed by middle class beliefs

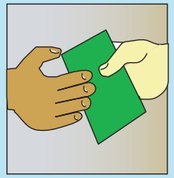
Put all of these ideas together, and we can begin to see how belief systems (often characterized as assumptions) slow, if not stop, progress on remediating climate change.

## The global middle class has this general set of beliefs about climate change and its mitigation

### Invisible hand of the market



**The market is the best way to mitigate consequences**
The global middle class have almost complete "confidence that market forces can be relied upon to make logical and effective allocations of available resources to mitigation and adaptation" and that some minor international assistance may be needed for development assistance, and disaster relief.



### Economic growth

The global middle class believe that all of the "global community should be continuing to pursue maximum economic growth of similar conventional material types."

### No urgency

The global middle class does not believe there is any urgency to the imminence and potential disastrous consequences of global warming. Such probability is "so low that there is as yet no justification or felt need for [them] to abandon any significant advantages gained through unsustainable development so far...or to agree to the raising of fresh public resources, or transfer of these to other countries on other than commercial terms."

### No real danger

The global middle class believes that the level of danger from global warming is not sufficient for them to change their lifestyles. If they've thought about it at all, most of the global middle class believe it will "be possible to go way beyond 450/550 ppm in 2050 using existing approaches and lifestyles before encountering sufficiently dangerous interference with climactic, environmental or socio-politcal systems" that might produce catastrophic futures.

### Private market forces

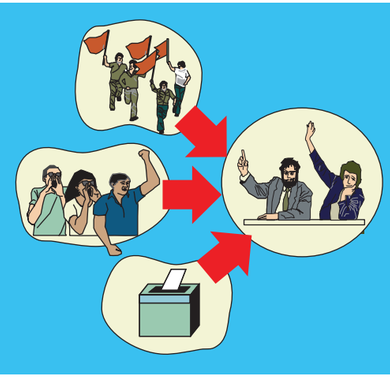
To meet the needs of poverty eradication, the global middle class believe private market forces will provide the means to achieve sustainable development.

### Plenty of time for remedial action

The global middle class believes that even if catastrophic event happen, there will easily be sufficient time for remedial action.

### Who is the global middle class?

The global middle class consists of about 1.2 billion people. About 3/4 are in the Northern developed countries and 1/4 in the underprivileged, mainly Southern, countries.



### Democratic leadership slow

Democratic governments most often reflect and respond to the current beliefs and desires of their people. Leaders rarely back measures that will require major sacrifices on the part of their people and commercial companies. Therefore the nature of decision making within democracies is at best quite slow.

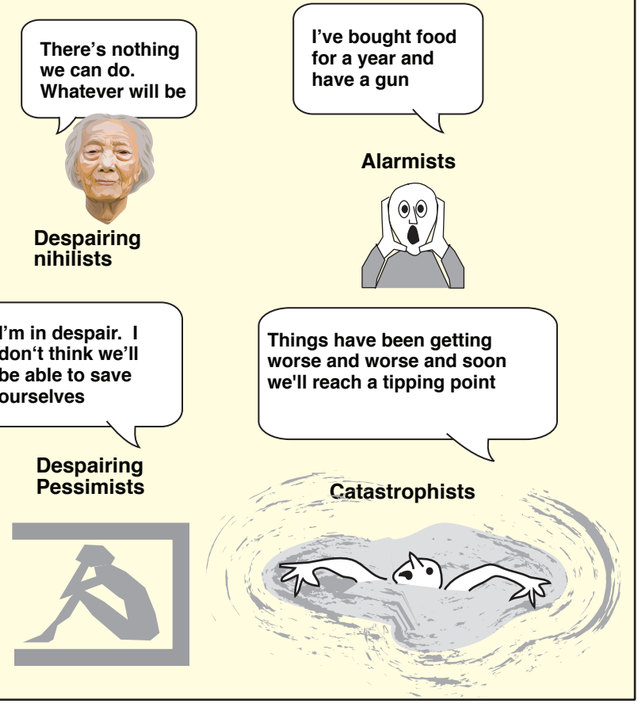
# The public doesn't agree on how to worry about the climate mess

### Introduction

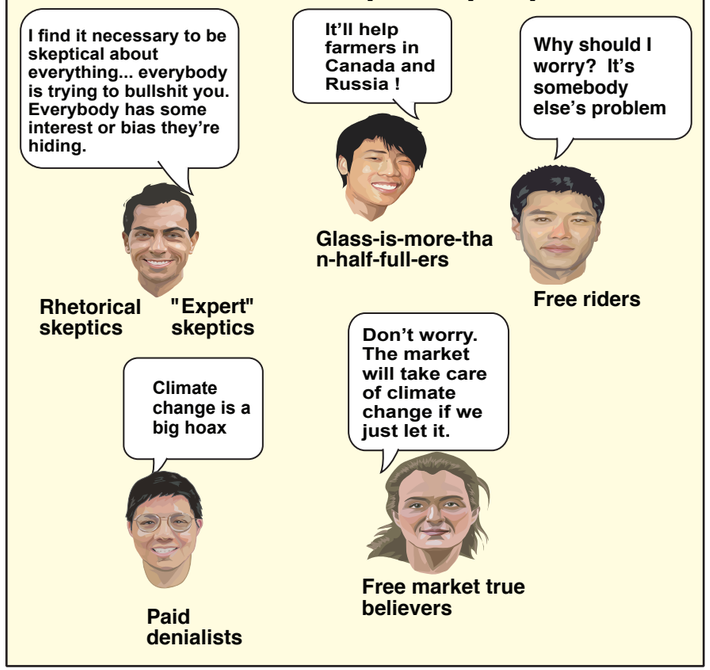
While the scientists debate the various levels of uncertainty, the public responds from their various amounts of
- fear
- general optimism / pessimism
- attitude toward nature
- experience with science
- experience with technological advance
- attitudes of their closest friends
- their economic interests

That produces a whole range of shallow to deep attitudes toward climate and affects the public discussion of the mega-mess.

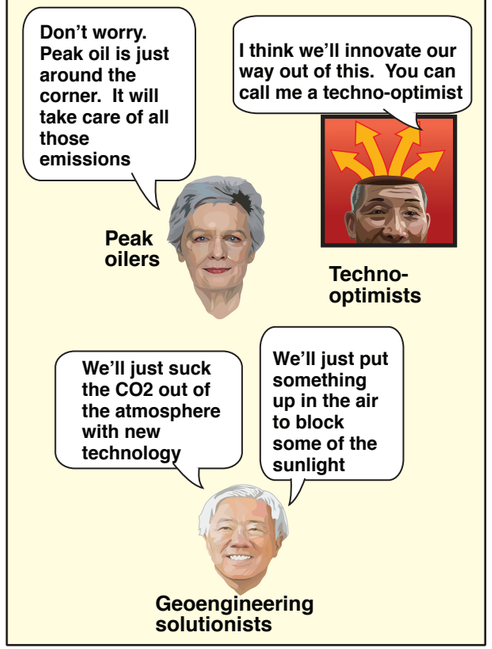
## Pessimistic people




## Varieties of skeptical people

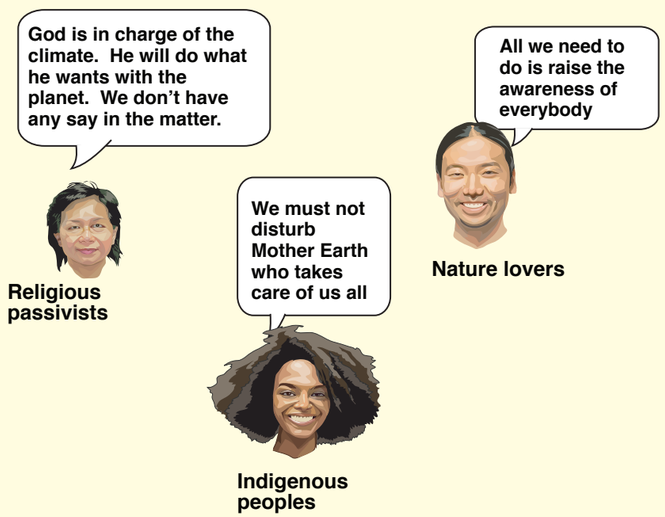



## Technofix people



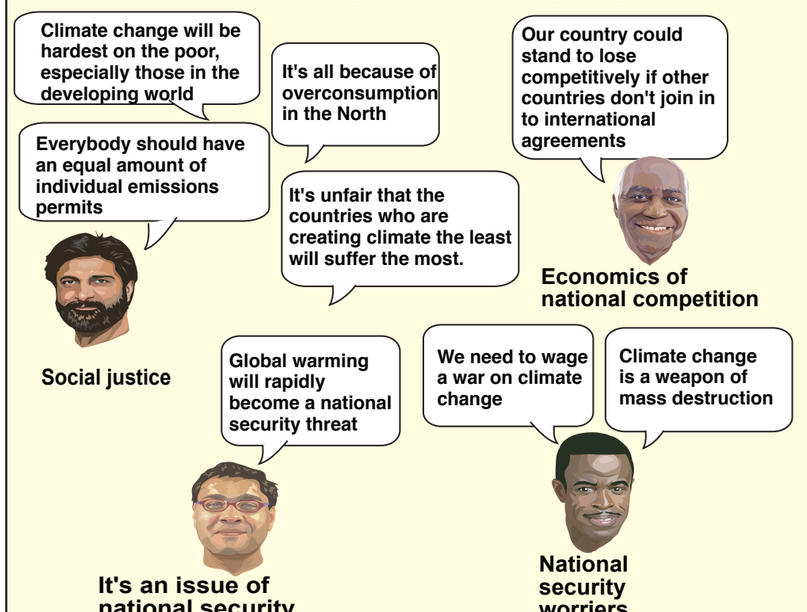

## Marginal uninvolved

## Back to (or in) nature people




## True believers

## Public policy think tank people



# Environmentalists don't agree on how to think about the environment

## Introduction

Environmentalists do not speak with a single voice. Their messages arise out of their assumptions and feelings about nature, wildlife, God's creation, economic unfairness, threats to health, and conservative views that nature should stay the same, and many other factors.

Many of these positions have strong implications as to what kinds of public policy should be pursued, how fast, and by whom.

Robert Brulle, whose world we quote on these pages, has been an important analyst of these different positions and their weight in contributing to environmental change processes. Here we present his analysis of the assumptions of each of the major environmentalist positions.

Natural resources should be technically managed from a utilitarian perspective to realize the greatest good for the greatest number of people over the longest period of time

**Conservation**
- Physical and biological nature is nothing more than a collection of parts that function like a machine.
- Humans need to use the natural resources provided by nature to maintain society.
- Nature can be managed by humans through the application of technical knowledge used by competent professionals.
- The proper management philosophy for natural resources is to realize the greatest good for the greatest number of people over the longest period of time.

Nature is an important component in supporting both the physical and spiritual life of humans. Hence the continued existence of wilderness and wildlife, undisturbed by human action is necessary.

**Preservation**
- Natural systems are self-creating evolutionary wholes that cannot be reduced to the sum of their parts. Hence, nature is not a machine but an intact organism.
- Human actions can impair the ability of natural systems to maintain themselves or to evolve further.
- Wilderness and wildlife are important components in supporting both the physical and spiritual life of humans.
- Human values go beyond those measured by the national income accounts to include the preservation of wild lands and life.
- Continued existence of wilderness and wildlife is critical to the spiritual well-being of humanity.
- Protection of wilderness areas and wildlife for the current and future generations is an essential environmental task.

All species have intrinsic rights to realize their own evolved characteristics, and to live an independent life free from human direction or intervention.

**Animal Rights**
- All of creation is endowed with an ability to define itself and evolve.
- Life thus has a right to be left to develop according to its own character.
- Humanity has no right to infringe on these rights of other animals.

Ecological problems occur because of the structure of society and the imperatives this structure creates for the continued exploitation of nature. Hence, the resolution of environmental problems requires fundamental social change.

Global abuses such as ecological destruction, poverty, war, and oppression – are linked to global capitalism and the political and economic forces that have allowed the development of social inequality and injustices.

**Environmental Justice**
- Domination of humans by other humans leads to domination of nature.
- The economic system and nation-state are the core structures of society that create ecological problems.
- Commoditization and market imperatives force consumption to continually increase in the developed economy.
- Environmental destruction in low-income/racially distinct communities or third-world countries originates in the exploitation of the people who live in these areas by the dominant social institutions.
- Resolution of environmental problems requires fundamental social change based on empowerment of local communities.

Nature is God's creation, and humanity has a moral obligation to keep and tend the Creation. Hence, natural and unpolluted ecosystems and biodiversity needs to be preserved.

**Ecospiritualism**
- Nature is endowed with spiritual value.
- Humanity, as part of nature, has a moral obligation to preserve it intact.
- Religious beliefs need to be developed that embody this ethic.
- Religious beliefs can inform actions to create an ecologically sustainable society.

# Voices in the U.S. Environmental Movement

Human health is linked to ecosystem conditions. To maintain a healthy human society, ecologically responsible actions are necessary. These actions can be developed and implemented through the use of natural sciences.

**Reform Environmentalism**
- Natural systems are the basis of all organic existence, including that of humans.
- Humankind is an element within natural ecosystems, and hence, human survival is linked to ecosystem survival.
- Ethical human actions which promote the good life for humankind) necessarily promote action toward all life on Earth in an ecologically responsible manner.
- Proper use of natural sciences can guide the relationship between humanity and its natural environment.

The richness and diversity of all life on earth has intrinsic value, and so human life is privileged only to the extent of satisfying vital needs. Maintenance the diversity of life on earth mandates a decrease in human impacts on the natural environment, and substantial increases in the wilderness areas of the globe.

**Deep Ecology**
- All life on Earth, in its richness and diversity, has intrinsic value.
- Humankind's relations to the natural world presently endanger the richness and diversity of life.
- Human life is privileged only to the extent of satisfying vital needs.
- Maintenance of the diversity of life on Earth mandates a decrease in the human impacts on the natural environment and substantial increases in the wilderness areas of the globe.
- Changes (consistent with cultural diversity) affecting basic economic, technological, and cultural aspects of society are therefore necessary.

Human health is the outcome of interactions with physical, chemical, biological and social factors in the natural environment, especially toxic substances and pollution. To ensure community health requires a livable and healthy community, with adequate social services, and elimination of exposures to toxic or polluting substances

**Environmental Health**
- Human health is the outcome of interactions with physical, chemical, biological, and social factors in the natural environment, especially toxic substances and pollution.
- To ensure community health requires a livable and healthy community, with adequate social services and elimination of exposures to toxic or polluting substances.
- The precautionary principle (no technology or material can be used unless it is proven environmentally harmless) should guide industrial development.

Ecosystem abuse is rooted in anthropocentric concepts & institutions. Relations of complimentarily rather than superiority between culture/nature, human/nonhuman, and male/female are needed to resolve the conflict between the human and natural worlds.

**Ecofeminism**
- Earth is home for all life and should be revered and nurtured.
- Ecosystem abuse is rooted in androcentric concepts, values, and institutions.
- Relations of complementarity rather than superiority between culture/ nature, human/nonhuman,
- The many problems of human relations and relations between the human and nonhuman worlds will not be resolved until androcentric institutions, values, and ideology are eradicated.

Wildlife should be managed to insure adequate supply to provide for the recreational use of humans in terms of hunting or fishing.

The richness and diversity of all life on earth has intrinsic value, and so human life is privileged only to the extent of satisfying vital needs. Maintenance of the diversity of life on earth mandates a decrease in human impacts on the natural environment, and substantial increases in the wilderness areas of the globe.

**Wildlife Management**
- The scientific management of ecosystems can ensure stable populations of wildlife.
- The wildlife population can be seen as a crop from which excess populations can be sustainably harvested in accordance with the ecological limitations of a given area.
- This excess wildlife population thus can be utilized for human recreation in sport hunting.

# Economists don't agree on the way to price the climate

### Introduction

While a great many of the arguments about climate change take place over economic issues, it is difficult to take for granted that economics is a science that can be relied upon to give us answers for public policy questions about climate as a mega-mess. Economics is pretty good in collecting data about the current and past costs of various phenomena in the global economy. But it is less useful about making forecasts.

### Assumptions often the problem

One of the main problems with using various claims by economists is that they often fail to outline their assumptions, especially critical assumptions about the comparability of different "reasons" supporting various suggested policies. On these pages, we present some of the different issues that economics has failed to resolve, and hence leave us at least as deep in the mess of climate change as we were when we began to consider what to do.

### Discount rate debate

An important and inconclusive debate is outlined on the opposite page between two economists who can't agree on what their science says about what assumptions should be used for calculating a discount rate in cost-benefits analysis.

## Economics as a "science" does not speak with one voice

"Climate change is the greatest market failure the world has ever seen."

**Neoclassical economics** Nicholas Stern

There are great structural injustices in the global economy

**Economics of development**

The poor are "powerless victims of climate change" Hulme, 2009, 113

**Monarchist economics**

We must examine "why climate change has occurred, focusing on transaction costs, organ is at ion al hierarchies, modes of governance, and social capital."

**Institutional economics**

There are "goods and services for which there is currently no market and for which (we need) to find ways of incorporating their value into the analysis." Hulme, 2009, 113

**Ecological economics**

If we run out of some materials or if they become too expensive, we can always use substitutes

**Cornucopists**

## What assumptions shall we use?

**Big disparity in outcomes depending on assumptions made by economic analysts**

Stern Review assumption Sustained annual GDP growth rate: 1.3 % per annum

IPCC scenarios assumption: Sustained annual GDP growth rate: 2.3 to 3.6% annum

So, the "best" economic and scientific thinking (i.e. Stern and IPCC) suggests that in 2050: World GDP will be 70 to 600 % larger than today.
Individual income: 2 - 6 times larger than today

**BUT IF...**

we destroy natural resources at the current rate, either of these assumptions may be completely wrong.

Assumption

**AND note this assumption...**

Assumption: Continued economic growth is best measured by conventional GDP.

## How shall we value future generations?

**What method or principle shall we use to value the welfare of future unborn generations?**

**How much weight shall we give to the welfare of future unborn generations as opposed to the current generation's welfare?**

We should maximize current human welfare over that of future generations.

*supported by*

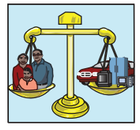
Future generations will be richer than we are and so will be better able to afford the costs of mitigation and adaptation to climate change.

*disputed by*

Future generations will not be richer than we are and so will be worse of and less able to afford the costs of mitigation and adaptation to climate change.

This debate is at present inconclusive from the standpoint of economics.

## Single unit of value - money - debate



**Is it possible / desirable (or able to be agreed upon) to convert all things that matter into a single monetary unit of measure?**

Claim: It is possible to discover "the value of all the things that matter to us and then commensurate them using some universal metric, usually suggested to be monetary value." (Hulme, 2009, 134)

Values differ between cultures and over time and between the values of different religions and classes of people. This debate is too big and unwieldy to be handled in a chapter like this.

## Is cost benefit analysis an adequate or distorting approach to decisions about climate change?

**MAJOR CLAIM - Cost-benefits analysis is the best approach to deciding policy issues about climate change.**

*disputed by*

**Choosing a discount rate is essential for doing any cost-benefits analysis and economists can't agree on what it should be**

*supported by*

**Agreement on discount rate not possible**

*that is to say...*

**It is not possible to chose a discount rate that all (or most) economists would agree on (i.e. there is no "standard discount rate" for the climate situation. There are two kinds of discount rates used by economists in climate change and they lead to very different predictions**

### Empirically observed discount rate

The descriptive approach chooses a climate discount rate based on observed market interest rates in order to ensure that investments are made in the most profitable projects.

Supporters of this approach often argue that using a market-based climate discount rate is the most efficient way to allocate scarce resources used for competing priorities, one of which is mitigating the effects of climate change. Prominent supporters of this method include Yale economist William Nordhaus.

After the cost-benefits climate discount rate frame has been chosen, the next step is identifying the underlying assumptions which will guide the selection process. These are qualitative ideas, that are then given a quantitative measure.

For example, if the descriptive approach is chosen, and past interest rates are assumed to be a good indicator of an average representation of how investments increase in value over time, then that past interest rate, such as 3%, can be used to find the discount rate.

### Prescriptive discount rate

The prescriptive approach emphasizes that the choice of climate discount rate entails a judgement about how the future should be valued.

Proponents of intergenerational equity often argue it is difficult to find an argument supporting the valuing of future generations as less than our own. Why should future people count less just because they don't exist today? Prominent supporters of this method include prominent British economists Sir Nicholas Stern and Sir Partha Dasgupta.

*disputed by*

**Many things do not have market value.** The costs of potential damage and potential benefits caused by climate change "includes many things that do not have a market value, estimating the benefits avoided greenhouse gas emissions and converting them into monetary units is very difficult.

Because we are uncertain about many of the risks that climate change may cause, it is very hard to put numbers on the consequences of these risks, even for monetized assets." (Hulme, 2009, 120)

and

If the risks of future disastrous effects on the planet and costs on civilization appear to be extremely large

and

"if they suggest changes in climate that we believe no future generation can adapt to" (Hulme,2009, 123)

Then

Cost benefits analysis should be considered irrelevant

and thus

we should use some form of the precautionary principle.

*disputed by*

**GDP is an inadequate and distorting view of how to value and compare annual national production**

**The debate over discount rates is fundamentally flawed**
(i.e. it doesn't matter if the discount rate is 1 % or 10% if there is "irreversible and non-substitutable damage to and loss of natural capital" involved in climate change.)

Examples:
- loss of biodiversity
- loss of water supply from glaciers.

It is an error in thinking to conclude that these can be compensated by growth in GDP or by any kind of monetary exchanges.

### Nordhaus Challenge to Stern Review

Perspective: conventional welfare economics
Cost of unmitigated climate change: 0.5 - 2 % of global GDP
Estimate of social cost of carbon: $40 - $120/tC

### Stern Review Analysis of Climate Change

Perspective: conventional welfare economics
Cost of unmitigated climate change: "5-20 % of global GDP each year and forever"
Estimate of social cost of carbon: $300/tC

# Framing Analytic, Ethical, and Religious Principles

**Introduction**
Framing helps us organize ideas around contexts of core narratives, values and assumptions. They  to rapidly identify why an issue matters, who is involved and options that are available to deal with the situation.

**Frame choice is partially unconscious**
Framing involves:
- language (metaphors, symbols)
- visual imagery
- media standard procedures (e.g. "there are two sides to the question.  We have a representative today to argue for each side."
- agendas of specific interests
- source of the communication
- propaganda and marketing methods

**Aspects of the framing**
- perception of likelihood of consequences of global warming (extreme, moderately harmful, beneficial)
- importance of the issue compared to other issues
- who is responsible; who is to blame
- amount and tolerance for fear and anxiety
- personal interest or short term consequences

## Teachings of the great religions

Our relationship with (the) God(s) prescribes that we take care of the environment

***Judeo-Christian***
: "Then God said, 'Let us make man in our image, and let them rule over the fish of the sea and the birds of the air, over the livestock, over all the earth and over all the creatures that move along the ground.' " Genesis 1:26.

“The land is mine and you are but aliens and my tenants. Throughout the country that you hold as a possession, you must provide for the redemption of the land.” Lev. 25:23-24.

“For in respect of the fate of man and the fate of beast, they have one and the same fate: as the one dies so dies the other; all share the same breath of life.
Ecclesiastes, 3:19)

***Judeo-Christian***
"The Earth is the Lord's, and the fullness thereof." Psalm 24:1

"Do to men what you wish men to do to you." Matt. vii.12

"Love thy neighbor as thyself." Leviticus xix.18.

***Ancient Egyptian***
The Gods have created a natural state of plenty: "I have not caused hunger. I have not caused weeping."

***Ancient Chinese:***
The reciprocity principle: "Never do to others what you would not like them to do to you." (Confucius)

***Ancient Chinese:***
"The master said, Respect the young." Confucius

***Ancient Chinese***
Let the states of equilibrium and harmony exist in perfection, and a happy order will prevail throughout heaven and earth, and all things will be nourished and flourish. (Confucius)

***Hinduism***
“Everything in the universe belongs to the Lord. Therefore take only what you need, that is set aside for you. Do not take anything else, for you know to whom it belongs.” (Isa Upanishad)

***Humanist/Spiritual***
The environment is an inherently valuable thing-in-itself; preserving the planet is an enlightened duty.
"I believe in God, only I spell it Nature."
Frank Lloyd Wright

***Buddhism***.
“Because we all share this planet earth, we have to learn to live in harmony and peace with each other and with nature. This is not just a dream, but a necessity.”
– H.H. Dalai Lama

***Islam.***
“The Earth is green and beautiful, and Allah has appointed you his stewards over it. The whole earth has been created a place of worship, pure and clean”
Hadith.

thus

**All major religious traditions know we have  a relgious duty to be stewards of the planet God has given us**

## Decision making  principles

A variety of approaches to choosing principles for grounding decision  -  making  about climate change and sustainability

**Least regrets principle about being wrong about the science**
What to do in the face of considerable risk and inevitable scientific UNCERTAINTY (that will always be there in varying amounts)
1. Make the mistake of assuming the science is right (enough) and proceed to cut the greenhouse gas emissions by moving promptly to a low carbon energy economy and over time find the science was more wrong than right

2. Make the mistake of assuming the science is wrong and do not reduce greenhouse gases or delay taking action to cut emissions-- with the risk that climate science turns out to be right.

**National security imperatives**
Climate change threatens regional and worldwide stability, potentially causing humanitarian disasters and the increased likelihood of military conflicts and failed states. It fundamentally threatens national security in numerous ways.

**The irreversibility principle**
Humans should not do damage to the ecosystems and species of the planet that is not fixable within a generation

**The precautionary principle**
The threat of environmental degradation, even if uncertain, demands that we immediately take the necessary precautions to mitigate its likely effects

**Prudent insurance against risks principle**
We should insure ourselves against climate change by investing in policies that mitigate its effects

**Human rights principle**
we must act to prevent climate change because it will violate fundamental human rights worldwide, like the right to life, liberty, and equal protection under the law.

**The intergenerational principle**
Each generation of humanity should leave the planet in ecologically and biologically productive and sustainable condition as we received it

**A cost-benefit analysis principle**
The economic costs of combating climate change must not be greater than the benefits

**The Kantian Categorical Imperative**
1st Formulation: "Act only according to that maxim whereby you can at the same time will that it should become a universal law." Kant, 30.
2nd Formulation: "Act in such a way that you treat humanity, whether in your own person or in the person of any other, always at the same time as an end and never merely as a means." .

**The "Leave No Trace" Stewardship Imperative** We must at all times act in a way that minimizes human impact on the natural world. We must, whenever possible, "take only photos, and leave only footprints."
Among the 7 principles of Leave No Trace are:
1. Plan Ahead and Prepare
2. Dispose of Waste Properly
3. Leave What You Find
4. Respect Wildlife
5. Be Considerate of Other Visitors

**The Utilitarian /Principle**
We must at all times follow the maxim that: "It is the greatest good to the greatest number of people which is the measure of right and wrong."
Bentham.

# Types of Uncertainty

## Introduction

When we study uncertainty, even briefly, we appreciate how the effort of science, technology, and organizations have reduced the amount of uncertainty that we have today. Thus reduction in error and uncertainty is also known as understanding or knowledge. It has reduced mega-multis to -- sometimes -- the multi-multis, especially in science.

Nevertheless, there remains a great deal of uncertainty. We can not in a short book attempt to describe in detail all the kinds and aspects of uncertainty. It will have to be sufficient to catalog the kinds of uncertainty as simple classification of what anyone dealing with social messes has to consider. At the right and below is one way of laying out the kinds of uncertainty we face.

## Four sources of uncertainty

Gary Klein identifies four sources of uncertainty in policy matters:

"1. **Missing information.** Information is unavailable. It has not been received or has been received but cannot be located when needed.

2. **Unreliable information.** The credibility of the source is low, or is perceived to be low even if the information is highly accurate.

3. **Ambiguous or conflicting information.** There is more than one reasonable way to interrupt the information.

4. **Complex information.** It is difficult to integrate the different facets of the data."

## Definition - Uncertainty

There are many definitions of uncertainty but the one I like is". . . doubt that threatens to block action."

## Levels of uncertainty

Klein suggests: "We can also identify several different levels of uncertainty: the level of data; the level of knowledge, in which inferences are drawn about the data; and the level of understanding, in which the inferences are sythezized into projections of the future, into diagnoses and explanations of events."

## Disjunctive "un" hinders continuum thinking

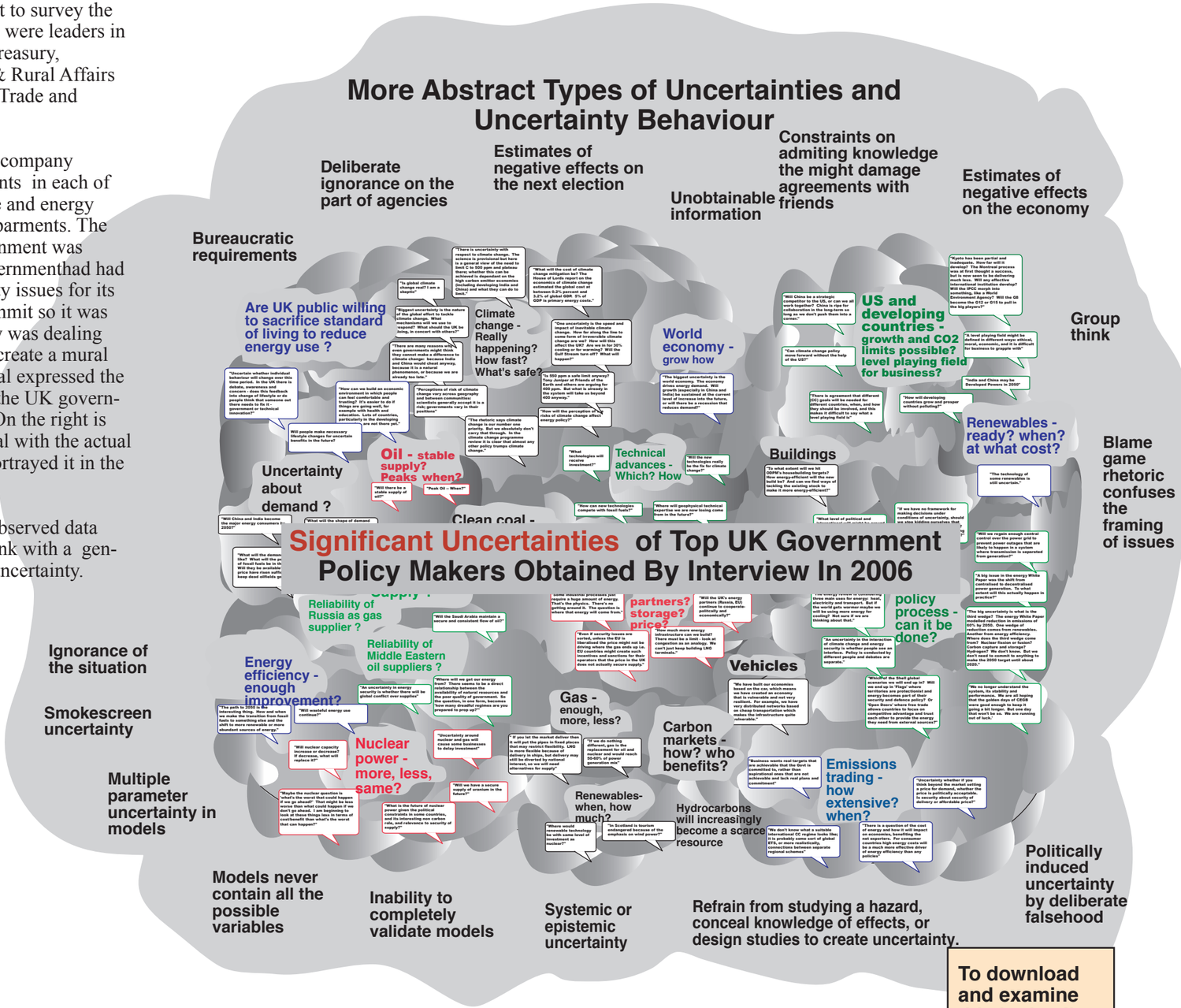
It is important to notice the logical disjunction, the either-orness of the idea of uncertain. Relative uncertainty arises out of the tendency of our minds to crave certainty, to have beliefs that are reliable for safety and growth. Any deficiency in this mental condition becomes "un" meaning in the formal logic sense, not-certainty. This is somewhat unfortunate in that is prevents us from immediately thinking of degrees of uncertainty. Could we somehow come up with a prefix that indicates "degrees of" that could be added most of the time to the word uncertainty.

## Example of climate change uncertainties

In Chapter 3 I described a project in which I was part of a team of the International Futures Forum that had been asked by the British government to survey the four departments of government who were leaders in climate change and energy policy: Treasury, Department for Environment, Food & Rural Affairs (Defra), Foreign Office, and Dept of Trade and Industry. (DTI).

Our job was to interview two energy company executives and the 15 top civil servants in each of the departments who held the climate and energy portfolios of the government four deparments. The interviews focused on how the government was handling these issues. The Blair governmenthad had made climate as one of its two priority issues for its hosting of the Glenneagles Big 8 Summit so it was important to see how the bureaucracy was dealing with this issue. I was then tasked to create a mural (show in Chapter 3). Part of the mural expressed the uncertainties that the top officials in the UK government had of climate change policy. On the right is the Uncertainties portion of that mural with the actual statements of the policy makers. I portrayed it in the metaphor of a large cloud.

I surround the specific, empirically observed data about the what UK policy makers think with a general cloud of more abstract types of uncertainty.

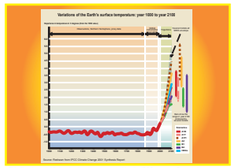



**To download and examine this in detail Go to messmap.com**

# Modeling is the main way to synthesize thought about climate change....

*To be able to...*

**Make a forecast about the future of global climate**




This "hockey stick" drawing has been accepted by the IPCC reports. Recent disputes about the accuracy of the statistics can be seen at www.____

**Source: IPCC Climate Change 2001 Synthesis Report**

**since we can't do experiments with the whole world**

*...we must use....*

**...Computer simulation runs of global climate processes...**

**...on supercomputers**

*...Which have two distinct conceptual parts....*

**1. The simulation model (i.e. the computer code)**

*...Which is...*

**A simplification**

*...Based on...*

**Dividing the atmosphere into a grid of 3-D chunks of atmosphere and parts of the earth (e.g. oceans) into a grid**

*...and...*

simplifying the massive number of atmospheric events

*...because....*

computations for the entire simulation require combining the data from all the different chunks of the grid

*...and...*

large amounts of data cannot be processed for each, individual section of the grid

...because....

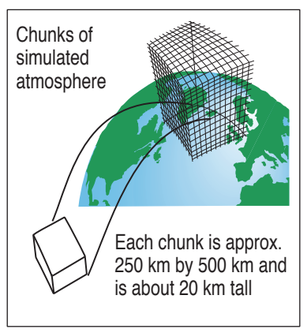
the computers are not capable of such complex computation

*...therefore....*

specific atmospheric occurrences (such as the atmospheric absorption of solar radiation) are approximated, with one number, or parameter, that is calculated by the simulation

*...in other words....*

a simplification of one part of the atmospheric model, reduces the resolution of individual atmospheric activity within each chunk of the grid.




*...which mean that....*

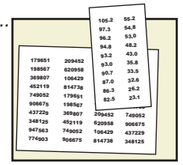
**all processes smaller than the grid of 3-D atmospheric chunks are represented by a single number (a parameter) that is calculated by other parts of the simulation**

*...for example...*

the role of clouds, the roughness and elevation of land surfaces, the atmospheric absorption of solar radiation, the role of the planetary boundary layer of air closest to the Earth's surface

**2. The simulation "runs"**

*...That are initiated with ...*



**The input data**

*...That comes from multiple sources, including, for example...*

*OCEANS...In the past measuring ocean temperature with a plastic bucket off the side of a ship and now with modern thermometers*

*AIR...Temperature is measured in the same spot in every year*

*SATELLITES....Satellites provide data for global cloud cover, temperature, and other data*

# ...and, modeling involves certain kinds of uncertainties...

## Sources and types of uncertainty in climate modeling

There are multiple forms of uncertainty in climate modeling

**Manageable uncertainty (empirical, practical)**

*... including...*

...the kind of uncertainties which are quantifiable and reducible

*...for example...*

...sensor calibration, e.g. different types of thermometers used to measure sea temperature around the world...

*... and ...*

"...limits on existing computer power which constrains the model resolution..." (Edwards, 1999)

*... and ...*

...these uncertainties are manageable...

*...because...*

These uncertainties are measurable, and therefore can be accommodated, and corrected within climate models...

*..so...*

"...Scientists are comfortable with [these uncertainties] and prepared to work with them." (Edwards, 1999)

***Some level of scientific uncertainty exists for the following:***
- sources and sinks of greenhouse gases;
- cloud reflectivity and radiative forcing;
- ocean circulation and interactions with the atmosphere;
- polar ice-sheets and their rate of growth or melt;
- ocean temperatures (most data from the sea is collected near shipping lanes, which ignore large areas of the ocean);
- land temperatures (because most thermometers are located near cities, showing disproportionate rises in temperature due to the 'urban heat island effect');
- atmospheric data is concentrated in certain areas (because it is collected by commercial aircraft, weather balloons, and radar tracked weather balloons which travel in specific areas);
- the quality and quantity of data collection in tropical areas and the global south, is very low.

**Unmanageable uncertainty (epistemological)**

*... including...*

...the kind of uncertainty that scientists cannot quantify or reduce...

*... for example...*

"...the complex model/data relationship in climate science constitutes another unquantifiable and irreducible forms of uncertainty" (Edwards, 1999)....

*...because...*

...global models rely on data that is filtered by other models. This means that no matter what, there will always be some indeterminate amount of human adjustment of the model...

*...so...*

... climate models will always lack some amount of 'hard', empirical data...

*...but...*

...since the only tools we have to forecast global climate are models...

*...and...*

...we must understand how our current actions are affecting the climate, so that we do not adversely affect the future climate...

*...it is necessary that...*

... we acknowledge the inevitability of unmanageable uncertainty...

*...and...*

... treat this uncertainty, not as a fallibility in climate modeling, but as a reality of understanding future climate....

*...because...*

"... uncertainties can never be entirely eliminated, the choice of how much empirical confirmation is enough is ultimately a value choice most appropriately decided in the political arena — ***where decisions are always made under uncertainty..."*** (Edwards, 1999)

# The climate policy debate should be how to act under conditions of uncertainty

**Introduction**
Climate scientists tend to be very careful about identifying the type and amount of uncertainty is their findings. An important element of the public discussion needs to focus on how we make decisions under conditions of inevitable uncertainty (where there will never be unconditional proof.) Public discussion must deal with concepts of risk, damage, liability (including liability for inaction).

**The climate policy debate should be how to act under conditions of uncertainty**

*... and...*

**... the debate should NOT be about**

... whether global climate models present "truth" or "final certainty"

*...and...*

...not about whether global climate predictions should await scientific observation and / or proof

*...because...*

...proof of climate change will never be obtained by the traditional methods of scientific experiment

*...because...*

...there are multiple forms of "uncertainty" in global climate science

*...and because...*

...global climate models will always contain some amount of human adjustment of data...

*...and because...*

"... scientific hypotheses (or models) can be proven false by observations, but cannot be proven true ..." (Edwards, 1999)

...the superiority of data over models, in climate science and forecasting

*...because...*

... data cannot be superior to models, since raw data must be plugged into some sort of computer model to interpret its behavior in the climate system

*...because...*

"...'Raw' data are noisy, shapeless, and uninterpretable. Models are the skeleton that give them a definite form. Like flesh and bone, neither models nor data alone can support a living understanding of physical phenomena. (Edwards, 1999)"

*...and because...*

"...models and data are symbiotic. Models function as analogs to reality. They allow experimental methods to be applied to phenomena which cannot be studied using traditional laboratory techniques. They also allow the creation of coherent global data sets which could not exist without them." (Edwards, 1999)

*...therefore...*

... if data are dependent on models, and models are dependent on data, then there can be no superiority of data over models, especially if the models are based on data and observation

**The debate should be how to operate within conditions of uncertainty ...**

*...by...*

climate scientists who explicitly recognize the multiple forms of uncertainty (Edwards, 1999)

*...and...*

avoid concealing the unresolvable questions surrounding uncertainty

*...and...*

explicitly state the fundamental ambiguities in the model/data relationship (Edwards, 1999)

*...and...*

articulate the reasons why these ambiguities are not flaws, but fundamental features of model-based science at the global scale (Edwards, 1999)

(Edwards, 1999)"

proponents of near-term action arguing that since uncertainties can never be eliminated, to bring the debate into the political arena (Edwards, 1999)

*..because..*

the decision about how to handle uncertainty in our society is a question of values, not science

*... and not...*

Should we place bets at all?

presenting the climate models as general forecasts not as predictions

*..because..*

If climate models provide climate forecasts, "then the political issue becomes what kind of bets to place" (Edwards, 1999)

*..because..*

planning for predicted outcomes requires calculating how much risk a society is willing to take (Edwards, 1999)

*...and...*

...planning for predicted outcomes requires calculating how much a society is willing to pay to limit and protect themselves from those risks.

all parties in climate science and politics taking careful note of how translations occur between scientific and political arenas (Edwards, 1999)

*..because..*

"uncertainty" becomes a rhetorical weapon, employed by different parties, with different interests

*..for example..*

"uncertainty" is used by opponents of immediate near-term action to block funding and stop the advance of climate science (Edwards, 1999)

*... but...*

If all parties have the same basic definition and understanding of "uncertainty", the then rhetoric loses some potency

*...and...*

the debate can move on to determining how the political arena will handle "uncertainty" in policy decisions, and begin asking questions...

*...that is questions like...*

What kind of planning assumptions should we make about the future (i.e. how much risk should we take at what cost? These are basically how much insurance should a society take out on potential dangers?

*...and...*

How should our society plan for low probability, high risk situations (such as abrupt climate change)?

# Social-psychological process of denial protects us from fear, guilt, and a feeling of helplessness

**Denial - definition**

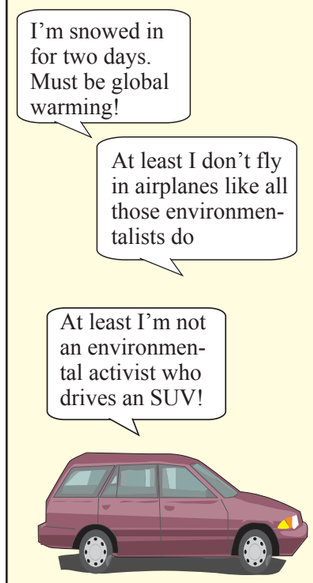
Denial is a collection of social-psychological processes that enables human beings to avoid emotions that are too painful to experience by unconscious processes that do not allow us to consciously experience the painful emotions.

**Examples**

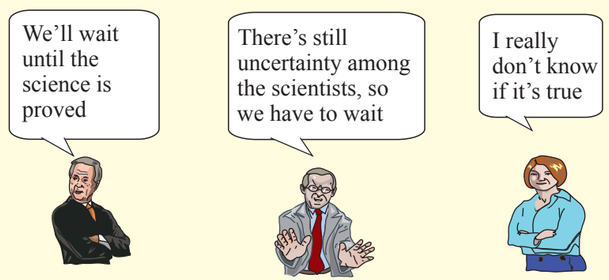
When we have extremely painful and difficult situations, any of the following forms of denial frequently occur:

## Denial by the trust gap trap

## Denial by joking

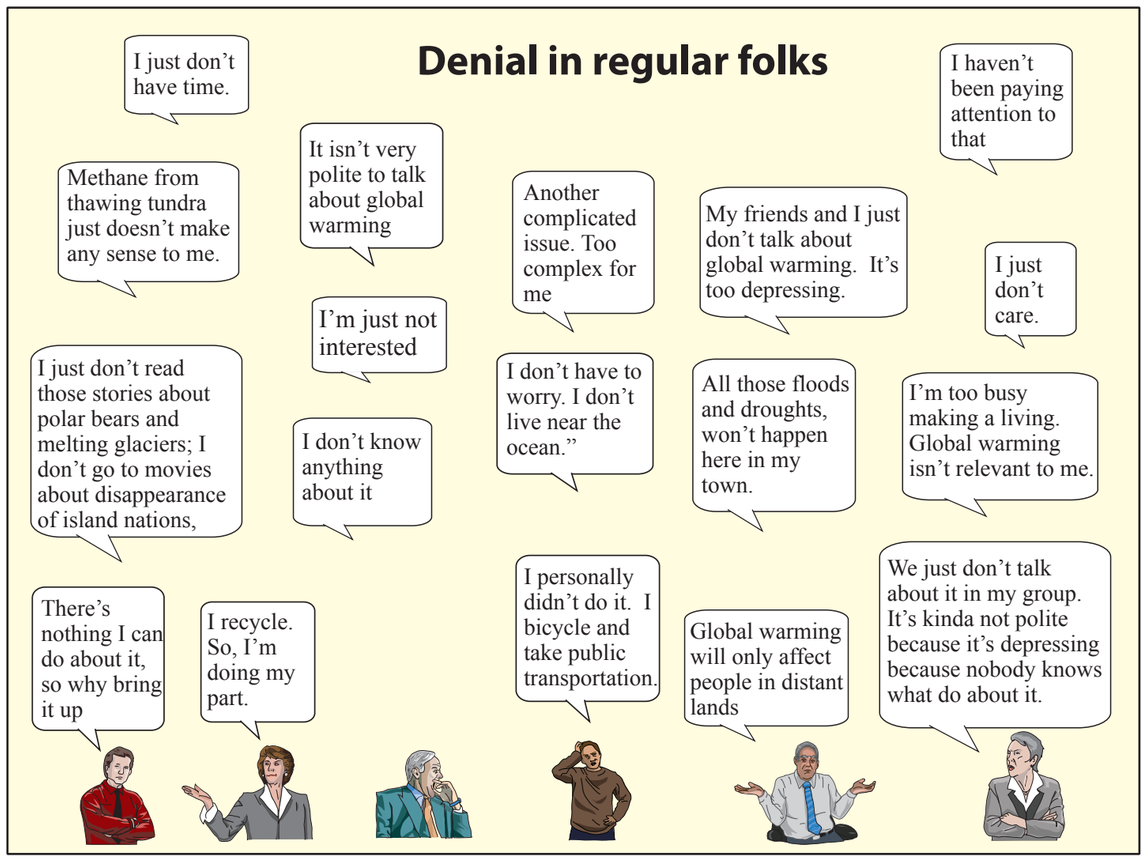



## Denial in the overly skeptic

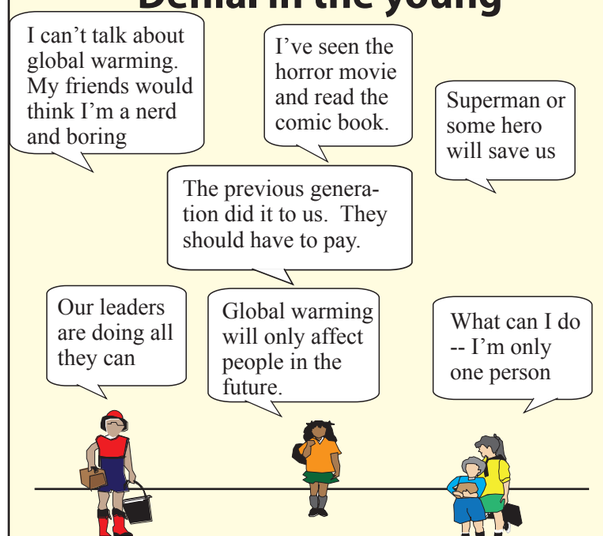



## Denial in the media

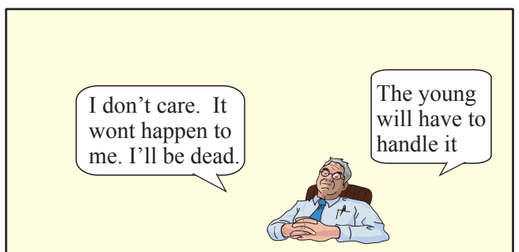
## Denial in regular folks




## Denial in the young




## Denial in scientists



# How do I think about what is causing climate change?

Human societies are very likely causing dangerous climate change

I'm not a climate scientist. Never will be one. Neither are the politicians who have to decide what to do about global warming.

Since I personally can't read the four thousand peer-reviewed research studies on climate change (and take at minimum two or three graduate courses in climate change), as a citizen, how should I make up my mind?

***Should I agree with this claim?***

**Yes,** because major institutions in our society have done the reading and evaluating work for me

The International Panel on Climate Change (IPCC) concludes that humans have been causing climate change is extremely likely (around 95 percent)

**No,** because a few scientists, most of them not climate scientists, have doubts (and some have criticisms of the IPCC report) (For reasoning see next two pages)

## Why should I believe the IPCC?

The following national scientific societies agree that humans are causing global warming.

American Association for the Advancement of Science,
American Chemical Society,
American Geophysical Union,
American Institute of Biological Sciences,
American Meteorological Society,
American Society of Agronomy,
American Society of Plant Biologists,
American Statistical Association,
Association of Ecosystem Research Centers,
Botanical Society of America,
Crop Science Society of America,
Ecological Society of America, the Natural Science Collections Alliance,
Organization of Biological Field Stations,
Society for Industrial and Applied Mathematics, Society of Systematic Biologists,
Soil Science Society of America,
University Corporation for Atmospheric Research.

All 195 member governments of the Intergovernmental Panel on Climate Change (IPCC) signed off on the scientific literature, including this sentence about the temperature increase since 1950: "The best estimate of the human-induced contribution to warming is similar to the observed warming over this period."

The IPCC is composed of several hundred climate scientists selected by their colleagues as the best in their specialties (and OK'd by their country's governments)

and

they must come to a consensus about their conclusions based on the peer-reviewed scientific literature

which is based on a several year process that reviews 4,000 individual peer-reviewed research articles. These reviews have resulted in more than 90,000 comments and suggestions by the scientists for improvements in the review (each one of which must be answered by the authors) My Reasoning - Rely on other experts. I can't read all of the 4,000 articles in climate science used in the IPCC process and make my own personal appraisal of its conclusions so I must rely on the best experts I can find.

including some (and maybe many) climate scientists who think the IPCC report is too conservative in its findings.

There are some climate scientist who conclude that there are approx. 10 - 12 known potential tipping points whose interaction has not been well-studied or modelled and when interacting in a kind of non-linear cascade could produce runaway (i.e. not easily stoppable) climate phenomena

and there are some climate scientists who judge that 350 ppm or less of $CO_2$ should be the maximum amount allowed into the atmosphere and should be the world's immediate target (we are now at approx. 400 ppm and rising at approx. 3 ppm per year)

There is a review process that has had a few goofs, flaws, and errors(like any other human process, including the leaked, so-called climate gate emails and the glaciers 2035 error

Climate science should be characterized as "system science" and one that relies of results from many other subspecialties in other sciences. This means that climate models are formed from many studies - no one of which is definitive, thus relying on a criteria of the "preponderance of the evidence" rather than a science where one set of observations or one experiment can be regarded as conclusive.

Climate science is based on solid science = thousands of systematic observations, and robustly critiqued theories, peer-reviewed articles and models.

Several military and intelligence agencies (the US, the UK, and Germany) and studies by retired Generals and Admirals have begun planning on climate change as a "threat multiplier." My Reasoning - Rely on other experts. Since I can't personally make a definitive appraisal of climate science I must rely on the other experts I find trustworthy and reliable in that they are putting their reputations on the line.

Approx. 19 National Academies of Science (mostly composed of non-climate scientists) had endorsed the IPCC results. Many of these National Academy people are actually competitors with climate scientists for grant money.
My Reasoning - Rely on other experts. Since I can't personally make a definitive appraisal of climate science I must rely on the other experts I find trustworthy and reliable in that they are putting their reputations on the line.

Several hundred major international companies are investing their cash based on their belief in the IPCC conclusions (especially led by the insurance and reinsurance companies who have to bet their insurance payouts on their assessments of what kind of weather events and catastrophes might be caused by climate change) Banks are beginning to base approval of loans in part on the risk associated with global warming) My reasoning - Financial interest. This reasoning is pretty convincing to me, an entrepreneur, when people put their money where their beliefs are.

The 187 ratifying states of the Kyoto Protocol agree that humans are causing climate change.

This includes the 28 member states of the European Union agree with the IPCC report and are putting the money behind the results (i.e. their cap and trade system)
My reasoning - It's really hard to get any country to sign a treaty that doesn't conform with their national interests.

# How do I think about what is causing climate change?

Human societies are very likely causing dangerous climate change

I'm not a climate scientist. Never will be one. Neither are the politicians who have to decide what to do about global warming.

Since I personally can't read the four thousand peer-reviewed research studies on climate change (and take at minimum two or three graduate courses in climate change), as a citizen, how should I make up my mind?

***Should I agree with this claim?***

**Yes,** because major institutions in our society have done the reading and evaluating work for me. (For reasoning see previous two pages)

**No,** because a few scientists, most of them not climate scientists, have doubts (and some have criticisms of the IPCC report)

and because some politicians and think tank scholars and many bloggers have doubts and criticisms of the IPCC report of which these seem to be the main ones, whose main arguments are...

Scientists can't be trusted. All they want is more research money

and governments and university people can't be trusted because they lie to us all the time

just look at the emails in Climategate and the error over glaciers will disappear in 2035

**BUT**

This Climategate claim is just wrong. At least five different National Academy and university committees have reviewed the arguments and have found that the emails were not of any consequence to the outcomes of publications.

The IPCC has admitted an error in the 2035 glacier item.

My reasoning - One mistake in a thousand pages. Having run a company that produced documents of that size. for leading Fortune 500 companies, I have to say "Not a bad record"

**BUT**

My reasoning - Actually, I trust the process of science (and engineering based on it) for the domains for which it is appropriate. Scientists base their careers on this trust, and are extremely fast at make corrections if they have reported wrong data. I don't trust in general bloggers who don't submit theri ideas to the peer review process. If you are going to not trust the climate scientists, then you must explain why it is the climate scientists and not other scientists that you rely upon for building our military weapons, our airplanes, our cars, and power buildings, etc. And you have to explain why other sciences trust the climate scientists.

the consequences of climate change won't be that bad (many countries will have good consequences, e.g. Canada and Russia)

**BUT**

The warming of Canada and Russia will be only be of benefit for about 20- 40 years under current estimates. In the longer run if the average global temperature goes beyond 3 degrees C there will be potentially greater downside consequences.

Climate change is "just a theory"

alternative theories (e.g. sunspots cause the temperature rise) are better explanations

**BUT**

The sunspot theory of global warming has been extensively examined in the peer-reviewed climate journals and rejected.

My reasoning - I haven't read the peer-reviewed journals, and so my acceptance is provisional. I am willing to listen to scientists who have read all the peer-reviewed literature on this.

like evolution so we should teach "both sides"

**BUT**

My reasoning - If consensus science doesn't accept another side, it is a waste of time for teachers to teach it and students to pay attention to it. There's so much to learning about science these days, you can't waste any of your time.

The science is not settled

**BUT**

My reasoning - Different aspects of different sciences, especially at the edges, are always "not settled." It is the nature of science to be provisional. The important point here is the degree to which the science is "agreed" and by whom it is agreed. The degree to which it is settled is worked out in peer-reviewd journals. IPCC scientists claim the basic science for climate is about as settled as any you can find. The physics has been known for many decades.

the facts are unreliable or badly calculated

even the scientists say it's not proved

**BUT**

My reasoning - Scientists in most sciences (except math) don't consider ideas, theories, laws as "proved." They generally look at evaluation of the evidence in terms of "not falsified" or increasingly confirmed. so it is misleading to use the term "proved" in this connection. The IPCC uses terms like "likely," "highly likely," etc.

science (such as Michael Mann's hockey stick) has been disproved

**BUT**

this is wrong. The American National Academy committee has reviewed the arguments and the peer reviewed literature, and have found that the hockey stick data intepretartion of Mann does not have the faults claimed.

the climate scientists are just trying to get more funds from government and other funders

**BUT**

the climate scientists are competing for funds with other branches of science - physics, biology, chemistry, geology, the social sciences. These other branches of science compose the greater number of members of the National Academies of different countries.

Yet, approx. 19 National Academies of Science (mostly composed of non-climate scientists) had endorsed the IPCC results. Many of these National Academy people are actually competitors with climate scientists for grant money.

My reasoning - The money argument doesn't make sense to me when you put it up against the National Academies of Science argument

other problems are worse (e.g. AIDS, micronutrition). We should use cost benefits analysis to decide what money to invest in what problems

**BUT**

Different economists disagree on different aspects of how to apply cost-benefits analysis and especially about what discount rates to use.

That is a policy argument, not a science argument. There are legitimate differences of values about what problems are most pressing, and what methods to choose to evaluate them.

My reasoning - This is the area covered by recent work in "post-normal science" - where science interacts with policy. See Ravitz and Funtowicz. We should be arguing in policy arenas about the risks, urgency, benefits and insurance against risks of competing policies.

# Climate tipping points -- How shall we address a potentially self-reinforcing, runaway system?

### Climate tipping points

Climate tipping points are large, disruptive natural phenomena (usually occurring in a specific region) that could lead to more rapid and abrupt regional and global changes in climate. They are tightly linked by feedback loops that are likely to cause self-reinforcing, accelerating, and potentially irreversible climate changes. The climate tipping points have temperature thresholds (or range of temperatures) beyond which they may become a self-reinforcing, runaway process.

### Purpose of our set of diagrams

The purpose of our series of diagrams is to bring into focus the kinds of decisions that we must make both individually and together as a group of nations. This diagram focuses on the thresholds for the different tipping points and their uncertainties.

### Beyond the IPCC reports

The diagrams go beyond the current IPCC working group reports because the IPCC working groups have to consider only the scientific literature up to a specific date in order to provide a platform on which to build their requirement for consensus. The date is usually about two years before the date of the Assessment Report.

The last Assessment Report completed by the IPCC was released in 2007 when we made this diagram, which means that the most recent scientific literature considered was published in 2005. Since then, climate science has made some progress in beginning to link the tipping points together into an integrated system.

### Business as Usual (BAU) scenario and climate tipping points diagram

The diagram on the following page presents the BAU emissions and temperature data in a table at the bottom. We have then diagrammed the climate tipping point thresholds (in so far as they are known) to align them with the temperature increases predicted by the BAU scenarios. Our purpose is to show how non-linear climate tipping points are likely to begin to occur within the BAU's predicted range of temperature increase. It is important to note that many of these tipping points will emit significant amounts of carbon (either CO2 or methane). As each of these tipping points 'tip,' the temperature forecast for the BAU scenario increases in magnitude more rapidly, taking on the runaway characteristics described above. The diagonal fuzzy red line in the diagram represents a rough range of forecast changes in global average temperature.

Tipping points can be thought of as mechanisms that "push" this global average temperature upward.

### Assumptions for the BAU scenario

- A steady carbon emissions increase, reaching a CO2 concentration of about 550 ppm by 2050.
- The Earth will become steadily warmer by 2050.
- One of the scenarios considered by the IPCC rests on a steady increase of temperature based on assumptions about steady increase of the atmospheric concentration of carbon dioxide to 550 ppm by 2050. (1)
- No significant effort is made to reduce carbon emissions beyond the IPCC's predicted "reasonable adaptation by governments, companies and other organizations."
- Oil remains the preferred source of vehicle fuel, with marginal penetration of biofuels and hybrids into the market.
- Car manufacturers do not produce and consumers do not buy sufficiently large quantities of mileage efficient cars.
- Energy efficiency standards proceed at a normal pace, with no policy advocating a strong energy conservation or energy efficiency agenda.
- The power industry is slow to adopt low emissions technology, e.g. coal plants are slow to adopt carbon capture technology.
- Coal power is the preferred source of energy production, both in the US and internationally, over natural gas, nuclear or renewable energy sources;
- Renewable energy production is minimal, with solar and wind power forming a small part of the global energy portfolio.
- Deforestation continues steadily in the tropics, with little to no reforestation or afforestation taking place;
- No adverse abrupt climate change events are considered. In other words, the tipping points leading to abrupt climate change (described on the diagram at right) were assumed to not occur.

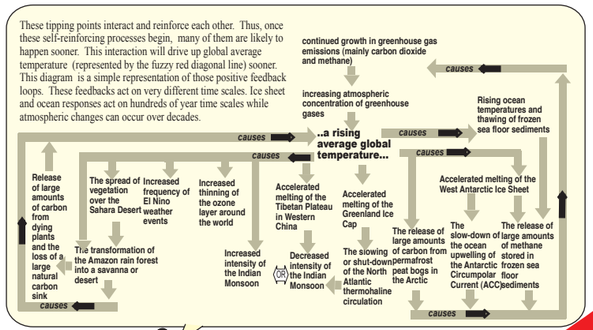
**Note on the assumptions,** 1. This BAU scenario is based on the IPCC's A2 scenario. We chose the A2 scenario for our BAU scenario, because it appears to be the basis for the BAU scenario in Pacala and Socolow's stabilization wedges work, in 2004. Additionally, the International Energy Agency's forecast for carbon emissions growth is quite similar to the A2 scenario.

## Why the self-reinforcing tipping point interactions increase the urgency to stabilize the climate system

**1** The tipping point phenomena illustrated on this diagram have as yet not been completely integrated into climate modeling or assessment. The thresholds suggested here are from individual research papers. Each of these phenomena are likely to cause the global average temperature to warm more quickly than currently projected in IPCC scenarios (we reference IPCC scenario A2 here). Thus, the purpose of this diagram is to point out that the relatively comfortable IPCC projections have more potential risk than is currently indicated in the IPCC reports. Note how these tipping points interact with and reinforce each other.

**2** Note that some of these tipping point phenomena will directly pour greenhouse gases (carbon dioxide or methane) into the atmosphere (i.e. the reversal of the carbon cycle). Other tipping points are engaged in processes that will accelerate heating cycles of the atmosphere. Other tipping points are engaged in processes that will accelerate heating on the planet. For example, the effect of the disappearance of ice from the Tibetan Plateau will decrease the reflectivity of the earth's surface. The reflectivity of the ice and white snow will be lost and replaced with the heat-absorbing dark colors of the mountains.

These tipping points interact and reinforce each other. Thus, once these self-reinforcing processes begin, many of them are likely to happen sooner. This interaction will drive up global average temperature (represented by the fuzzy red diagonal line) sooner. This diagram is a simple representation of those positive feedback loops. These feedbacks act on very different time scales. Ice sheet and ocean responses act on hundreds of year time scales while atmospheric changes can occur over decades.




**3** This is the first of the major tipping points.

**Accelerated Melting of the Tibetan Plateau** in Western China: already underway

**4** The width of these orange bars indicates the range of uncertainty for when the tipping point will begin.

**Accelerated Melting of the Greenland Ice Cap**:1.5-1.6 degrees Celsius (2.7-2.9 degrees Fahrenheit)

Red line represents the increase in average global temperature under rough Business as Usual (BAU) scenarios assumptions

**5** While one concern of the cascade of tipping points is its potential self-reinforcing nature, the irreversability of some of the tipping points themselves is a large reason for concern. For example, if the Greenland ice sheet disintegrates, it will not come back easily and the associated sea level rise is inevitable. If the Amazon rainforest dies, it will be lost forever.

**6** The upshot of understanding the possibility of a cascade of tipping points is that citizens and governments should feel an urgency about not letting these interacting processes get underway because they have a danger of becoming irreversible.

The release of large amounts of methane stored in the **frozen permafrost**: 4 degrees Celsius (7.2 degrees Fahrenheit)

Sea-floor sediments could release as much as 2.85 trillion tons of carbon from methane clathrates, with 3 degrees Celsius of warming.

Arctic soils contain approximately 455 billion tons of carbon that could be released

The release of large amounts of **methane stored in the frozen sea-floor** sediments: 3 - 5 degrees Celsius (9 degrees Fahrenheit)

Increased frequency of **El Nino**: 3 degrees Celsius (5.4 degrees Fahrenheit)

Increased intensity of the **Indian Monsoon**: 3 degrees Celsius (5.4 degrees Fahrenheit)

Reversal of the **terrestrial carbon cycle:** 2-3 degrees Celsius (3.6 - 5.4 degrees Fahrenheit)

By 2100 up to eight billion tons of carbon per year, could be released into the atmosphere.

The collapse of the **Amazon Rainforest** ecosystem: 2-3 degrees Celsius (>3.6 degrees Fahrenheit)

By 2100, The Amazon Rainforest could release 57.5 billion tons of carbon

Accelerated melting of the **West Antarctic Ice Sheet**: 2 - 4.5 degrees Celsius (3.6 - 8.1 degrees Fahrenheit)

The slowing or shut-down of the **North Atlantic thermohaline circulation:** 2 - 4 degrees Celsius (3.6 - 7.2 degrees Fahrenheit)

**7** From our current understanding, each one of the tipping points, once underway, will start self-reinforcing processes that will increase the average global temperature (shown by the fuzzy red line) , likely speeding up the start of the next tipping points, shown by the arrows in comment number 5.

Potential temperature increase in degrees Celsius (at specific CO2 concentrations) compared with the global average temperature in 1990

5 degree Celsius 9 degrees Fahrenheit increase
4 degree Celsius 7.2 degrees Fahrenheit increase
3 degree Celsius 5.4 degrees Fahrenheit increase
2 degree Celsius 3.6 degrees Fahrenheit increase
1 degree Celsius 1.8 degrees Fahrenheit increase (from 1990 levels)

| | Last Ice Age | End of Last Ice Age | Beginning of Industrial Revolution | 1990 | 2000 | 2010 | 2020 | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 | 2090 | 2100 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Parts per million of CO2 in the atmosphere | 210 | 270 | 280 | 365 | 380 | 405 | 437 | 461 | | 501 | 557 | 599 | 645 | 705 | 773 | 856 |
| Annual global carbon emissions from CO2 (billions of tons) | | | | | 7.6 | 9.6 | 12.0 | 14.8 | | 16.0 | 17.3 | 19.0 | 21.0 | 23.0 | 26.2 | 30.0 |
| Potential temperature increase in degrees Celsius relative to 1990 (at specific CO2 concentrations) | | | | | 0.1 | 0.3 | 0.5 | 0.7 | | 1.0 | 1.5 | 1.9 | 2.3 | 2.7 | 3.2 | 4.4 |

To download and examine this in detail Go to messmap.com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Discussion sketch V. 6.9

# Possible Climate Tipping Point Cascades

## Introduction

This diagram outlines the possible inter-related effects that eleven climate tipping points may have on each other causing them to "cascade." The arrows represent (usually) some theoretical or empirically-based causal influence.

## Simplified

This is a simplified diagram that does not represent all of the possible feedback loops in the climate system.

## What is a climate tipping point?

Climate tipping points are large, disruptive natural phenomena (usually occurring in a specific region) that could lead to more rapid and abrupt regional and global changes in climate. They are tightly linked by feedback loops that are likely to cause self-reinforcing, accelerating, and potentially irreversible climate changes. Schellnhuber (2004) has identified eleven major natural phenomena he calls possible tipping points.

## Example

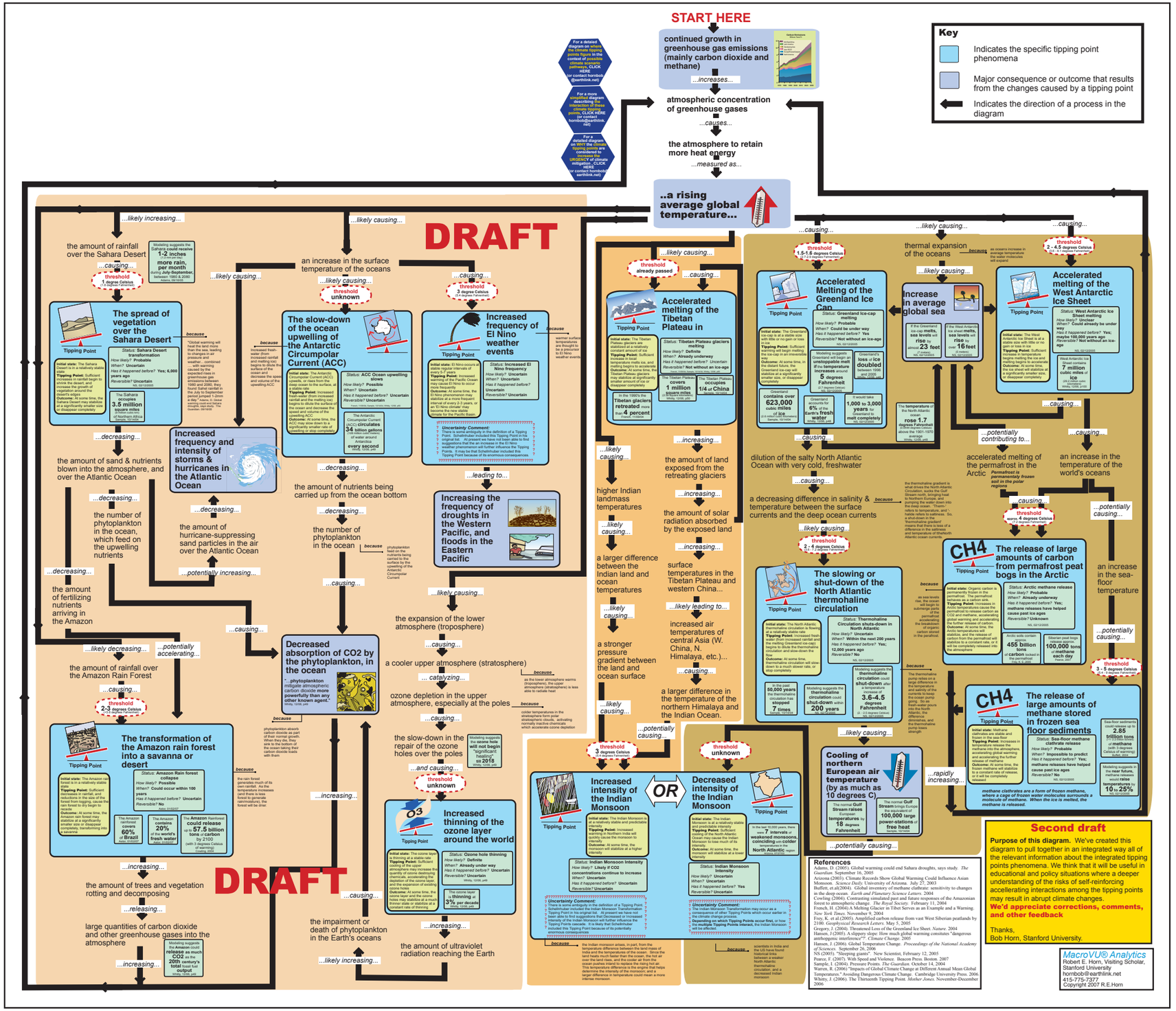
As the concentration of CO2 in the atmosphere increases, the average global temperature has been increasing. Temperature increases in the polar regions will likely accelerate the melting of the huge West Antarctic Ice Sheet (one of the tipping points). This could raise sea levels around the world by up to 5 meters (about 16 feet), which in turn could speed the melting of the Greenland Ice Sheet (another of the tipping points).

Both of these tipping points increase sea level, which could melt the eastern Siberian Permafrost (a third tipping point), causing the release of large amounts of methane gas. The methane gas release would significantly increase the greenhouse effect and further increase average global temperatures. This is just one example of how global warming can bring about a cascade of different climate changing events illustrated in this diagram.

## Uncertainty

There is a considerable degree of uncertainty in the science of interactions of large climate subsystems (which is one way we can think about climate tipping points). This diagram represents what interactions climate scientists believe could happen, and frequently notes the uncertainty. 'Potentially' denotes an event which may occur with a probability greater than zero. 'Likely' denotes an event which may occur with a probability greater than 50%.

**To download and examine this in detail Go to messmap.com**



# Everybody believes in fairness; but not in the same fairness

## Introduction

At the most abstract level, the definition of fairness is the same share for everybody. Almost everybody believes they are right about their ideas of fairness and others are wrong. And, some say, not everybody acts according to fairness principles, even the ones they believe in. In addition, nation states and organizations such as transnational corporations often dispute that fairness principles apply at all to their actions. They base their actions on their perceived interests and obligations to shareholders and citizens. However, when one gets to the details (where the devil is located), Stone (2002 identifies at least 8 distinct meanings to fairness (or equity).

## Fairness = equity in distribution

Fairness mostly has to do with distribution of something. In political science, one of the most important books defining the field is Harold Lass well's Politics: Who Gets What, When, How NY, Mycorrhiza. Clearly it focuses on conflicts over distribution of goods and services, rights and inclusion.

## Three basic questions of fairness

Stone then points us to three major questions of fairness in distribution:

1. Who are the recipients?
2. What is the item being distributed?
3. What kind of process is used to make distribution decisions?

## Eight types of fairness

She then further analyzes these concepts into eight types of fairness:

***Recipients***

*1. Membership.* (How to define the boundaries of the membership of the classification of recipients?)

*2. Rank.* (How to allocate fairness if ranks or status is part of the classification?)

*3. Groups.* (How to determine the identity of groups in society that might receive the distribution?)

***Items being distributed***

*1. Boundaries of item.* (How to define the boundaries or constituents of what is being distributed?)

*2. Value of the item.* (How to define the way(s) of valuing the item being distributed?)

***Process of distribution***

*1. Competition.* (How to provide a fair starting point for distribution, if competition is involved?)

*2. Lottery.* (How to provide equal opportunity defined as a fair chance?)

*3. Voting.* (How to determine who gets to vote on the distribution?)

## Carbon trading permits - Definition

Carbon trading permits are issued by governments to allow companies and other emitters to purchase permissions to emit certain amounts of emissions of greenhouse gases into the atmosphere for certain periods of time.)

## Applying fairness to carbon trading permits

Here I briefly summarize Stone's eight types as they might initially be applied to thinking about issuing carbon trading permits. Some meanings of equity and fairness in this arena

:

***A. Who gets the permits?***

1. Which industries are included in the scheme? What boundary conditions for the recipients?
2. Rank based on internal subdivisions within industry. Are there some industries or companies that are too small to bother with? (Equal ranks / equal permits? Unequal ranks / unequal number of permits?)
3. Group based or individual company based distribution?

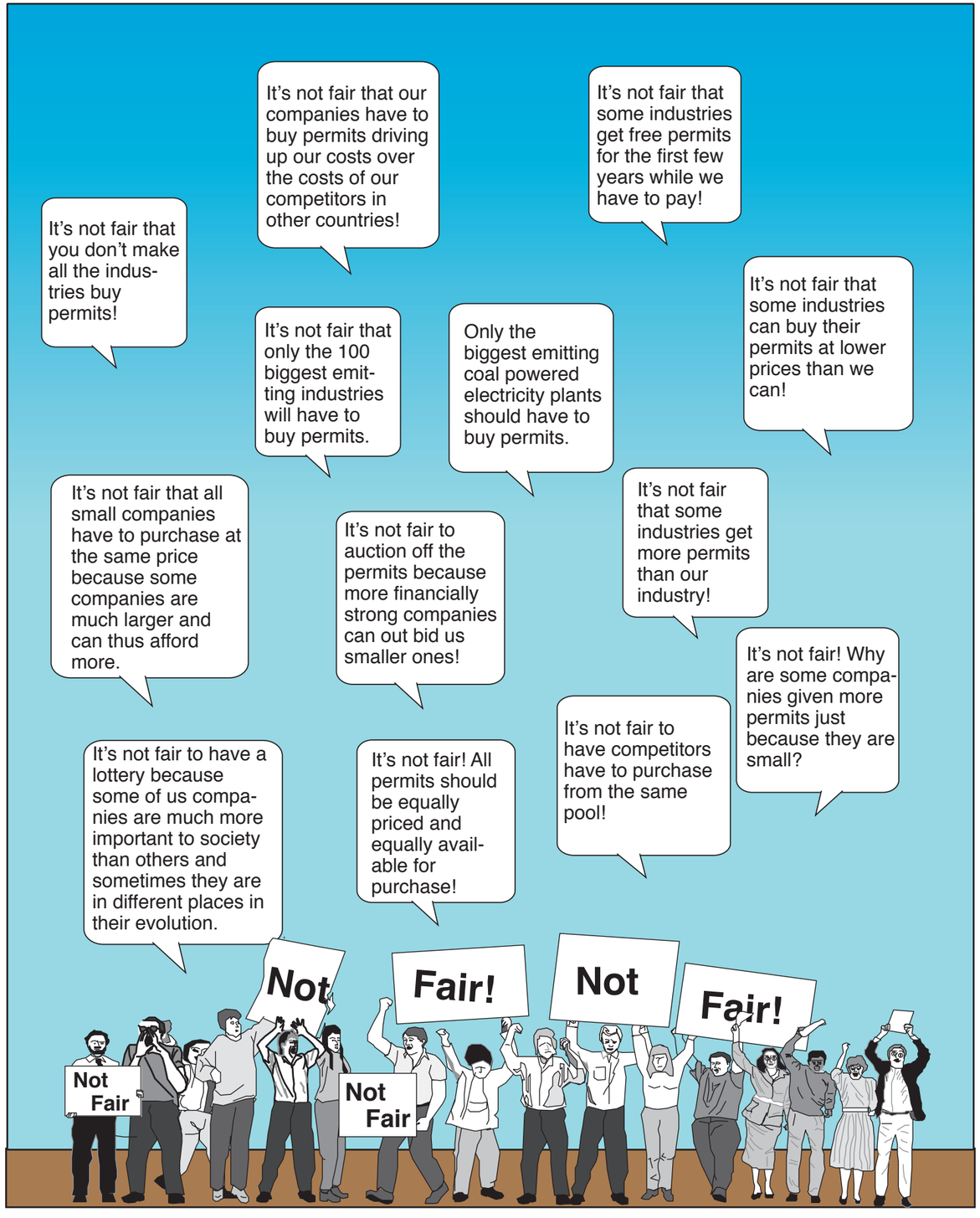
***B. What about the permits themselves?***

4. What are the boundaries of the permits? (equal / unequal numbers?)
5. What is the value of the permits? (equal value ?)

***C. What is the process through which the permits are given?***

6. Competition? (Equality of starting resources?)
7. Auction? Lottery? (Equal access?)
8. Voting? (Equal votes on who gets to decide on which fairness?)

On the next page are some of the fairness positions and arguments that have emerged in the carbon trading permits debate.



# Reflections - Mega-messes & Situation-as-a-whole thinking

**Situation-as-a-whole (SAAW) thinking**
One of my mentors, Harlan Cleveland, introduced the term situation-as-a-whole thinking. He was a futurist as well as a practitioner of policy as U.S. Ambassador to NATO as well as an Assistant Secretary of State. He was one of the great models of keeping in mind a wide current context as well as prudent foresight. For him, the idea of SAAW was a requirement as well as an ideal, hardly ever an accomplishment.

**Multiple info-murals as SAAW**
As illustrated in this chapter, I have explored representing and presenting SAAW with multiple diagrams and info-murals.

I hope that I have intrigued, or even convinced you, that this is a promising approach to aiding in humanity's dealing with mega-messes.

**Platforms for thought**
One of the ways of dealing with this complexity is to understand that these large visualizations and murals are "platforms for thought." These patterns are large visual diagrams that can be used to organize larger clusters of thought visually.

My next book will describe the platforms I think are vital for thought about mega-messes.

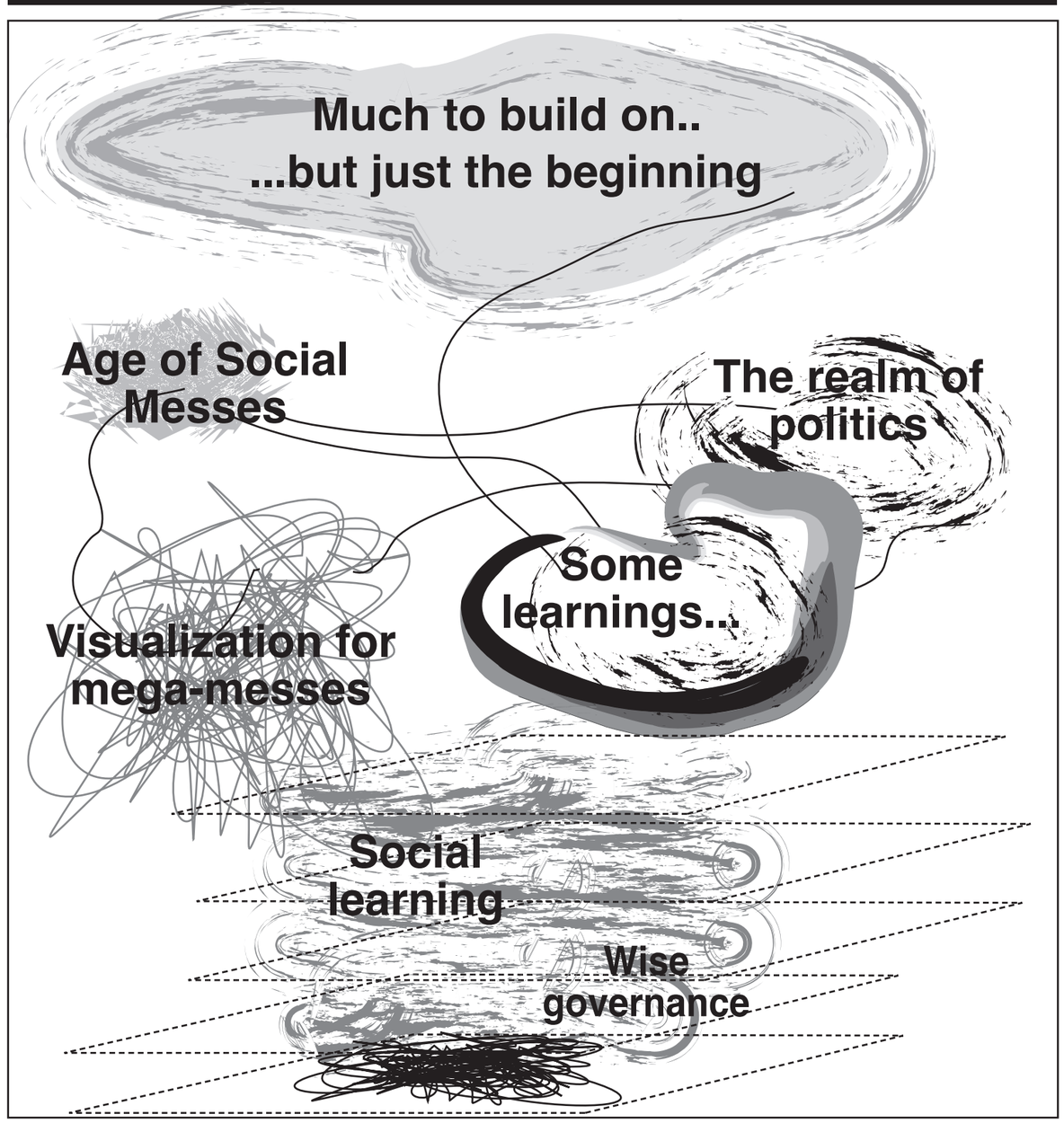
**Kinds of platforms for thought**
I use about 25 such patterns, many of which I had to create to solve particular presentation problems of handling large patterns plus large amounts of detail. Many of them are illustrated on the photo below, which shows me lecturing in front of a 6 by 25 foot interactive computer display screen at the University of Illinois, Chicago. It is one of the first of many now emerging display facilities that will enable us to improve thinking and decision making. One major advantage of such facilities is that they will provide the ability to display multiple large info-murals easily and quickly.

Each individual platform has specific types of chunks of information that should be there and not there as well visual elements that facilitate understanding and navigation. The kinds of platforms shown on the photo below are:

- Problem identification and analysis of context
  - Mess maps
  - Strategy maps
  - Ideology Maps
  - Power clash maps
  - Historical context maps
- Developing explicit theory & context
  - Detailed process analysis and modeling
  - Stages
  - Levels
  - Views
- Detailed Critical thinking
  - Argumentation maps
- Interweaving complex futures
  - Scenarios
  - Backcasting milestones
- Planning and monitoring
- Other analytic situations
  - Maps about what we don't know
  - Maps about status of what we know
  - Where we are today maps
  - Dilemma maps
  - Process diagrams
- Maps, charts and diagrams to organize data
  - Quantitative
  - Qualitative
- Public communication
  - Cartoons
  - Visual essay
  - Big visual metaphors

Chapter 5

# A Few Conclusions



*Chapter 4*

# What we can  do about social messes today

## Introduction

One can not be definitive in a little book.  My biggest hope for this little book is to introduce you to a different way of thinking about the existential situation of human-kind in the 21st Century.

I have described some elements of how we get into social messes.  These are not the only way of looking at this. Others have a different set of lenses.  Indeed, one of the important aspects of social messes and mega-messes is their individual uniqueness.

There are also many more ways of dealing with social messes than those described in Chapter 3 and 4.

I didn't think too much about some of the wider questions about messes until after I had done several mess mapping processes. Using the Ackoff framing seemed to enable groups to dig into messes with refreshed enthusiasm and capacity, without adding any more "theory" about why they were doing.  They intuited and felt the messiness of the situations they were in.

I didn't think about how describing a set of inter-related problems in a diagrammatic way might change not only the process of a task force but also how they thought about what they were doing.  But it did.  At the beginning, I did not think about the implications of what this might mean for a wider, more theoretical, and abstract, way of looking at the world.  With this wider context, I present here a few thoughts – enough for a little book.

## Philosophical questions

"How much can we know?  What is real?"  Which I would rephrase as: "What is real enough and practical enough to go ahead within the context of a mess and within the organizations we're dealing with?"

"Real enough" might by rephrased by the American humorist Stephen Colbert as "realiness."  I take the experience of the "organizational pain" expressed by individual members of the task forces about the pain their specific organizations are experiencing as sufficient "realiness" to proceed with the mess mapping process.  I also accept their descriptions of the "realiness" of the pain. And I might say, their colleagues around the table listening to them, appear to accept this "realiness."

## Some ways to begin

What can we do with the concept of social messes? It is far to early to produce a definitive answer to that question. Indeed, perhaps the most we can do is provide a few starter thoughts, ideas that can begin serious long-term consideration of social messes

## Individual learnings

We all learn different things from experiencing social messes.  Here's what I learned from the past 15 years.

1.  Ackoff nailed a chief characteristic - systemically interrelated set of problems and other messes.
2.  Maybe I nailed it in creating a  visualization imbedded in a group process exercise for working with some small to medium size messes.

## My major learnings

My approach to all of this is to cast our inquiry and explorations as an attempt to learn more about social messes.  Here are some of my tentative conclusions.

1.  Complexity plus limits of human nature cause messes.
2.  Sometimes we can do some things about messes
3.  Our mega-messes seem to be arising -- evolving into humanity's long-term predicaments.
4.  The rising complexity in modern life plus limits of human "e-coging" (i.e. their tight inter-relatedness of emotions and cognition)  triggers reductionism, oversimplification, and silos for thinking.
5. We have always known of our limits, even during the last century of amazing expansion of the human domain.  But our encounter with increasing numbers of messes and our creation of mega-messes in the last 50 years has illustrated the limits of individual human and organizational capacities.
6 Public administration – how to deal with all this complexity –turns out to be one of the most important and integrative of human studies and institutions.

## Learnings about Mess Mapping

Processes like mess mapping are a new framing and a new methodology of what we used to call problem solving and it bumps people (at least sometimes) out of their comfortable stereotypical framing of ordinary problem solving (i.e. identify the problem, set a goal, identify options, do a pros and cons analysis; do a cost benefits analysis, evaluate and choose).  It enables us to behave differently toward each other and our messes. Ordinary problem solving is excellent for some problem sets.  Mess mapping is useful for some messes, and maybe, with more development. be useful for mega-messes.

The way of organizing group  discussions around the co-creation of a Mess Map is a new a potentially useful tool for many small to medium size situations. It takes place within a political context surrounding the organizations involved so is not always successful in changing the dynamics of the issues deliberated on.

Because of the small number of task forces we've dealt with, it is far too early to estimate how useful it may become.  It has smudgy boundaries of application. With attention and creativity, it may very well morph into some new, more robust methodology.

The central components of mess mapping (of blobs representing sectors and organizations, descriptions of the problems from the standpoint of the organizations involved, the revision of the notion of causality to identifying what is "holding the problems in place"; the use for visualization, and, above all, enabling potential adversaries to sit down in a different context to expand their understanding of the larger social mess in which they operate) all contribute to the outcomes. Mess mapping doesn't replace tools such as conflict resolution, mediation, arbitration, negotiation, political struggles within constitutional structures and cultural boundaries, democratic deliberation, deals, and trades.

## Messes in the realm of politics

While I haven't discussed a great deal of political theory and practice in this little book, much of what politicians and leaders in the non-governmental realm is certainly relevant.  Social messes take place within the political realm of societies.  Social messes and mega-messes have now become far more significant. One of the urgent areas for culture creation is to invent ways to enable organizations and nations to frame these messes and learn together how to continuously re-solve them.

## Visualization for mega-messes

Visualization in some cases can be increasingly useful to situation-as-a-whole thinkers.  It, too, has limits. The strongest conclusion I can draw is: maybe multiple visualizations can help mega-messes by showing different views enabling sometimes new pattern recognition and new pattern making. Thus a contribution of this little book cam be to introduce readers to the possibilities contained in the creation of visualization of different sizes, from pages, to posters to info-murals and filling collaboration decision rooms with them.  The claim I make is that they can provide a new environment for thinking about complex issues of mega-messes.

The ability to present them on large wall-size paper or computer screens and to modify and re-combine portions of them give a new set of tools for policy makers and their staffs.  Our case studies are an invitation to pull together many more views of the climate change issue to find new patterns possibilities.

## Social learning

Groups of people who feel some amount of "shared fate" can think together about their problems, messes, and predicaments. They develop new concepts, methods, and approaches. This is what I call "social learning" and mapping messes and large visualizations are steps in social learning. The group process of mess mapping enables us to see the messiness from the inside of the process.  Other processes, such as Forrester's system dynamics modeling, allows us to see messiness from the outside

## Age of Social Messes

Perhaps it is not surprising that we live in what I suggest is the Age of Social Messes.  The population of humanity has increased in my lifetime from two billion to over seven billion.  Humans now use 40 percent or more of the biomass the planet.  We are getting close to connecting everybody on the planet with a cell phone, and advancing rapidly to spreading the internet to all.

What can we do with the concepts of social messes and mess mapping? It is far to early to produce a definitive answer to that question.  Indeed, perhaps the most we can do is what we have done in this book, to provide a few starter thoughts, ideas that can begin serious long-term consideration of social messes and beyond that, human predicaments.

# What is wise governance to do?

### Introduction
Beyond what we have already presented in this book, I offer below a few general suggestions for governance in the Age of Messes and Mega-messes.

### Temptation - trying to do too much
Understanding the world as (in part) a tangle of messes suggests a whole set of different approaches to leadership. For example, it appears that leaders should not try to do too much. Societies can waste great resources in the fruitless pursuit of elimination of some messes while thinking of them as problems. The drug issue around the world is such a mess. Second, wise governance must continually educate. The public needs to be reminded of the character of messes and predicaments. Third, the wise ruler should work to achieve the widest consensus possible on messes and predicaments. Political opponents need to be reminded of the consequences of politicizing messes and predicaments. Political opponents must be must always be invited the governance table, as must all other stakeholders.

### Temptation - politicize messes and predicaments
All this is difficult. The temptation for leaders is, firstly, to pander to certain constituencies thus politicizing all or part of a mess. Sometimes, it seems harmless to cave into or to ignore a certain sector of a mess. But messes have a way of eluding such boundary drawing and attempts at containment. You squeeze them one place, and they pop up in another.

### Temptation - using force instead of containment
Another temptation is to try to use the law and police and force to make the mess go away, as too many countries have tried to do with the drug problem. The consequences have been devastating to the social cohesion of the inner city and to civil rights in the U.S.

### Temptation - put off dealing with them
A third temptation is to put off dealing with the mess until after the next election or leave it as something your successor has to deal with. All of these make it essential for the political process to work on ways to depoliticize messes. How do you do that? You face it as a mess and invite the country and the world to face it as a mess.

### Consequences of treating mess as problems
If we fail to distinguish messes from problems, we run risks of making already dangerous situations worse. A temptation is to overemphasize one aspect of a mess at the expense of the larger situation and processes. This tendency may make things worse by expanding the boundaries of the mess. It will almost certainly distort feedback processes and other information validation processes and so begin to affect other aspects of the social system.

### Acknowledge messes as messes
What approaches do wise governors have at their disposal in an Age of Messes? The first task is to make sure that we do not mislabel them as mere problems. We need to speak as honestly as possible about them—to each other and to our children: we need to, in a sense, honor the mess and predicament in the way that those facing great danger have honored those large forces. Firefighters who face gigantic forest fires are not casual about the dangers. They honor the force of the fire. We need to recognize messes as conditions of our very existence.

### Respect the unknown and uncontrollable
Much of how we characterize messes and is a result of being able to get our minds around only part of the mess. We are not good at managing loose ends. Regular acknowledgement of what we don't know and what we cannot even imagine is an important practice. It should begin early in our families and in our high schools and colleges.

### Communicate as messes
The way governance communicates is also paramount. Wise governors will avoid conflict metaphors in their speech when discussing messes. They will use positive nouns and prosaic adjectives as diplomats have learned to use. They will honestly characterize messes as being with us for a long time. Warn and assure at the same time. They will avoid military metaphors in messes (e.g. "War on drugs," "War on crime," "War on cancer," "War on terrorist," etc.). We must learn over time to properly name messes and predicaments as conditions of our existence.

### Monitor as messes and predicaments
Near the top of the list of wise governance is to carefully monitor the conditions surrounding messes in attempting to anticipate and prevent worsening events and trends. Continuous vigilance is the watchword for governance. Be like the Dutch and the North Sea. This is difficult not only because of the tendency to treat them as problems and think they are "solved" but also because the management of messes is often tenuous and boring.

### Ethic of responsibility
Wise governance will recognize that education for responsibility is essential for management of messes. The mess of nuclear waste has yielded a renewed ethic of responsibility in some countries. It goes like this: the nuclear waste is here. We have made it. It is our responsibility. We must deal with it as responsibly as possible. We cannot play politics with it. We must harness the best thoughts our species is capable of to deal with it. We need to develop a robust ethic of responsibility and the methods of fostering and nurturing it in our global society. This is one of the fundamental conditions of our existence.

### Harm and risk reduction
Also near the top of the agenda has got to be harm/risk reduction as an overall goal. A modified Hippocratic oath should be: first, create no new messes. Develop new thinking-process models (for a society to think dealing with messes). At the same time, we must attempt to model even roughly the entire process over at least 50 to 100 years, if not longer. These models must be a part of the planning and decision making process. Somehow we must learn to take these messes out of the election cycle . (Yes, how to do this is itself a mess).

### Beyond command and control
Higher orders of complexity are not subject to very much command and control governance mechanisms. They may never be controllable. These new order of complexity require new thinking about management and leadership and organization, the management of frameworks, points of view, understandings of how to navigate in an ocean full of icebergs.

### Admit ambiguity, errors, and mistakes
Wise governance will admit the vagueness and limits of our mental models and, yes, our computer models of our messes. The only way we can think in detail about global climate change is with computer models. We can criticize their deficiencies but it does no good to attack the models. Sometimes computer models are the only possible way we can think about some aspects of some messes. Policy questions should address the risk/insurance question directly. Admit that causality is embedded in multiple feedback loops, often too complicated to comprehend, yet our tendency is to think in linear causation. Admit that there is a tendency of humans to lie, cover-up, minimize danger, misinterpret signals, not understand the mathematics of risk, and to deny danger.

### Isolation and downgrading
If messes and predicaments are not going to go away, the usual overall goal of governance is to decrease their impact. We use a lot of different metaphors. One is to isolate them. In the question of nuclear waste, the best approach to management seems to be to devise the best long-term storage methods (but there is not much debate about that among experts). In the case of drugs the Dutch government has isolated part of the mess by allowing low level sale and usage of drugs and, with what can only be described as brilliant mess management, by tending to make the use of drugs dull instead of attractive. It didn't resolve the mess. But it minimized it. (Others have argued that it merely increased other drug-mess related problems. That may be so. It is in the nature of messes not to have precise answers.) Still other solutions are technical, such as the case with the use of methadone to treat heroine addiction. But isolation is never complete. There are always fuzzy boundary areas. We are always connecting smudges not dots.

### Patience and tolerance
Personal attitudes are important, especially patience and tolerance. These are often in short supply, especially in the supercharged world of group-centric politics, where every group is screaming for its "rights" and attacking other groups. But tolerant attitudes and public capacity for patience must be nourished.

### Moderation
Wise governors will be cautious of harming civil rights in the process of dealing with messes. They will try to establish and continue to build norms rather than rely on overregulation. They will try to get messes off the political agenda and frame them as everybody's mess, and perhaps as society's predicaments. It will be difficult to accept messes sometimes as conditions of our existence as limited human beings.

### Symbols, myths, rituals, and monuments
Sometimes unconventional processes will need to be developed and used. Among these I think of are symbolic healing, ritual unification, and the creation of public rituals and myths, perhaps also the creation of public monuments and even sacred spaces. The maintenance work involved in mess management is community work. We can and must build consciously the social norms of stewardship. We can and must honor and celebrate those who are stewards of our messes.

# Reflections and Speculations - Chapter 4

## Introduction

As I wind up this book, many more scholars,practitoners, and decision-makers have beecome interested in social messes and wicked problems. I have given lectures to all levels of goverenment in the Netherlands, for example, on social messes and ilarge info-mural approaches to visualization of complexity.

More governance pratitioners as well as academic scholars have begun to encounter messes small to mega. There are several who have analyzed and written about these matter. Among those that have come to my attention toward the end of writing this little book are several I will summarize briefly. They represent some very serious and creative ways of thinking about social messes and mega-messes. Some of those I will mention here are worthy of considerable attention and encouragement.

## Ecological science and society - Unruly Complexity

Peter J. Taylor has written a suburb book called *Unruly Complexity- Ecoology, Interpretation, Engagement,* I wish I'd thought of that title! He says: "Iam interested in situations that do not have clearly defined boundaries, coherent internal dynamics, or simply mediated relations with their external context. Such unruly complesity...arises whenever there is ongoing change in the structure of situations that have built up over time from heterogeneous components and are embeded or situated within wider dynamics." One of his goals in his book is to "disturb the conceptual boundaries used by researchers when they focus attention (supposedly) well bounded systems and push complicating dynamics or processes out of view." He then looks at practical, on-the-gound cases that show how ecological practices (e.g.from research to conservation of ecosystems) are deeply entangled with philosophy f science, history andsociology of science and critical relfection of experiences of projects.

His challenge to scientists is: "When researchers assume that there are systems with clearly defined boundaries, coherent internal dynamics, and simply mediated relations with their external context, they can locate themselves outside those systems and seek generalizaations and principles affording a natural or economical reduction of complexity. A contrasting image is that well-bounded systems, when they are encountered, require explanation as special case of unruly complexity, in which boundaries and categories are problematic, levels and scales are not clearly separable, structures are subject to restructuring and components undergo ongoing differentiation in relation to one another. Control and generalization are difficult, and no privileged standpoint exists, ongoing assessment requires engagement in the situation." In other words, many, if not most, of the phenomena we study are best considered to be in the realm of unruly complexity."

## What can we know

It is surely useful to understand the limits of our ability to comprehend messes, and hence, phenomena of most any kind. For that we have Ian Mitroff's decription of C. West Churchman's of different kinds of inquiry systems (IS) as a basis for a unique approach to "messy inquiry." They succinctly summarize Churchman's five distinctly different ways of approaching issues and his methods for deciding on the basis of different "guarantors of truth" of assessments of messy situations:

- expert consensus (also known as Leibnizian IS)
- strong theory or modeling (Lockean IS)
- multiple perspectives and multiple formulas (Kantian IS)
- dialectical debate (Hegelian ISs) and
- systems thinking (Sigerian IS)

These systems which encompass much of the history of modern pilosophy are too extensive to summarize in this little book.

## Solve for the whole, not the parts

Mitroff and Alpaslan provide good examples of these systems of thought that lend support to another gem of wisdom (also from Ackoff): "A partial solution to a whole system of problems is better than whole solutions of each of its parts taken separate."

## Analysis of financial crisis of 2008-9

Their two chapters on the financial crisis of 2008-9 is an extended and detailed case of a mega-crisis erupting out of a mega-mess. Few doubt that the financial crisis is a continuing mega-mess.

Finally the two authors give us some suggestions on how to build highrt reliability into social systems and organizations. - how to prepare to live amidst mega-messes and increasing the capability to deal with inevitable crises - also sometimes called "black swans" when they appear from "nowhere."

## Danish wind turbine case

Timo J. Hamalainen, a Finnish analyst, suggests that the key ingredients to dealing with wicked problems are to "develop effective governance solutions to the three key dimensions ofwicked policy problems, i.e. uncertainty, complexity, and path-dependence." He found that in one case studied (the emergence of a Danish wind turbine econsystem) that these "solutions facilitated collective learning, systemic coordination, and resource mobilization processes which supported the industry evoilution. Taken together, they made the emerging wind turbine industry very adaptive and resilient." I have had to wonder about the degree to which the elements of social messes were there at the present and the degree to which the mess will have to be re-solved (and when).

## Establishing requisite variety

In some sense, the wind turbine case addresses what might be called anticipatory governance for social messes. which includes addressing the complexity gaps. Hamalainen, calls on Ashby's Law of Requisite Variety (Ashby, 1958) as as a capability essential to adequate governance. "According to ths Law, the adaptability of a biological or social system requires that the variety of its internal order must match the variety imposed by the externanl environment." That is the variety (read: complexity management) governance must match or exceed that of the social mess. That is a gigantic requirement for most governance systems.

## Stewardship of goverment

For that Hamalainen suggest: "governments should adopt a new stewardship role towards these problems in which they support...:

- close interatction and cooperation among key stakeholders,
- collective learning processes to create shared mental frame,
- coordination by mutual adjustment and clear overall direction,
-increasing diversity and experimentation in the governance arrangement, and
-effective measures to overcome systemic rigidities and bottlenecks."

I don't disagree with Hamalainen, but is it enough?

## Collapse of complex societies

Joseph Tainter, a historian and archeologist, has written an important and well reasoned examination of one aspect of social messes, *The Collapse of Complex Societies*. His four concepts for understanding collapse:

"1. Human societies are problem-solving organizations;
2. sociopolitical systems require energy for their maintenance;
3. increased complexity carries with it increased costs per capita; and
4. investment in sociopolitical complexity ias a problem-solving response often reaches a point of declining marginal returns."

That predicts that even with the approaches to social messes we have suggested in this book that our work on mess mapping and info-murals may not be enough.

## Principles of mega-mess approaches

You will not be surprised that I have proposed and we explore visual language information murals to begin to address mega-messes Some of the principles we have learned are:

- Mega-messes (aka "super-meses") require multiple views (i.e.info-murals and diagrams).
- Long, prose reports are helpful but often inadequate, and these days, too often unread.
- Each view we create facilitates an examination of some partial aspects of the mega-mess.
- No one view or information mural can incorporate all aspects of the mega-mess.
- Every view will be partially incomplete in detail or maybe even thus partially wrong in overall concept.

Hence, info-murals are essential, but insufficient.

At present, this is the best we can do with mega-meses. Nevertheless humanity must work to avoid the worst consequences and risks that we have produced in creating mega-messes for humanity.

## What can we do?

1. Prepare for messes (Avoid denial that they could happen)
2. Learn to live in multiple messes
3. Learn how not to create messiness
4. Learn how to mamage messses.
5. Try to stop or slow down mega-messes from getting started or happening; getting worse; becoming predicaments (e.g. climate change); becoming crises
6. Increasing our capabilities, personal and group skills to deal with 1 throught 5 above.

## Just the beginning

We've hardly begun to deal withy the mega-messes we have and those that our technological, economic, and political systems are together creating. So, there are many loose ends for this little book. I suspect however, that even if I had written the Giant Book of Social Messes, there would have been as many loose ends. If we all work together, perhaps in the future the second edition of this book will be called "The Slightly Larger Book of Social Messes."

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## Chapter 1 - Thinking about social messes

## Part A – Characterizing social messes

**p.___Is it a social mess?** Mitroff, I.I., Mason, R.O., Barabba, V.P. (1983) The 1980 Census: Policymaking Amid Turbulence. Lexiington, MA, Lexington Books

**p.___The multi-multi challenge of a complex world** Multi-multi is a term I made up to help us absorb the idea of complexity in human affairs

**p.___ Wicked problems (aka Social Messes)**. This page is also from *Mapping Hypertext* and based on Rittel, H and Webber, M, (1973),Dilemmas in a General Theory of Planning, Policy Sciences, 4, 155-169 Mitroff, I.I., see also Mason, R.O., Barabba, V.P. (1983) The 1980 Census: Policymaking Amid Turbulence. Lexiington, MA, Lexington Books

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## Part B – How do we get into get into social messes?

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**p.___Limits to Rationality - Herbert Simon** The ideas here are from Simon, H. A. (1956). "Rational Choice and the Structure of the Environment". Psychological Review 63 (2): 129–138.
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## Chapter 2 – Mess Mapping

p. ___ Elsa Porter who was the chair of the Multnomah Public Mental Health Task Force has been an immense help and support in the development of mess mapping.

**p. ___Cross-boundary causality issues.** This page is from my 1089 book. *Mapping Hypertext: Analysis, Linkage, and Display of Knowledge for the Next Generation of On-Line Text and Graphics* which relied on Mitroff, I.I., Mason, R.O., Barabba, V.P. (1983) The 1980 Census: Policymaking Amid Turbulence. Lexiington, MA, Lexington Books

## Chapter Three - What to Do After Mapping the Mess

Many of the individual mess maps shown in this chapter are available as downloadable PDFs from our website www.messmap.com
P.__ Portions of these pages quote from Horn, Robert E. and Weber, Robert P. (2007) New Tools For ResolvingWicked Problems: Mess Mapping and Resolution Mapping Processes, MacroVU®, Inc. and Strategy Kinetics, LLC. http://www.strategykinetics.com/New_Tools_For_Resolving_Wicked_Problems.pdf

## Chapter 4. A few conclusions

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*Appendix*

# Nine Mess Map Cases Addressing Different Challenges

## Introduction

In Chapters 2 and 3 we have explored the use of mess mapping in a variety of different task forces and research situations. Below is a summary of the cases we actually worked on with task forces or other groups. Most of these cases can be downloaded as mess maps on our website www.messmap.com.

I again caution the reader to note that this is only a beginning – an initial exploration of what can be done with the mess mapping method. We could make better generalizations if we had 30 or 50 small to medium-sized messes mapped.

## Case histories available on the web

I have placed most of the mess maps and other visualizations from these cases on the website for this book. www.messmap.com

| Subject | Challenges | Client | Aspects of the Methodology |
|---|---|---|---|
| How to portray **Drug war dynamics**<br>-How to show interrelationships of economics, education, and family dynamics | **Theoretical issues.**<br>- How to portray cross boundary causality as a foundation for messes<br>- How to make systems dynamics diagrams better | Stanford University research project on visual analytics and social policy | - Better portrayal of Forrester systems dynamics diagrams of **cross-boundary causality**<br>- Recognition of process benefits |
| Delivery of **public mental health** services | **Task force level applications**. How to get groups to form common mental model for task force (process) and to portray interrelated set of problems (Ackoff's definition of messes) | Multnomah County, OR Task Force (Portland) | Creation of basic mess mapping (tm) **group process** |
| Delivery of **long term care of elderly and disabled** | **Multiple views of messes.** How to show structural as well as mess dynamics and how to show multi-level context (National, state, county, company) while focused on county level in detail | Alameda County Task Force (Oakland/Berkeley)<br>Stanford University research project on visual analytics and social policy | **Suite of mess maps** that show mess dynamics and different governmental levels<br>- Suite of new maps<br>- Structure of silo funding<br>- Recommendations<br>Next step process: **solve all the problems at once** |
| Why do **terrorists** do what they do? | **Clarify conceptual confusion.** How to use mess maps to clarify concepts from different disciplines | Stanford University Conference on Religion and Violence | **- Application to conceptual analysis** of social process<br>- Ability to show where data is and is missing |

| Subject | Challenges | Client | Aspects of the Methodology |
|---|---|---|---|
| How to understand status of **avian flu pandemic** preparations<br>- international<br>- national<br>- local | **Conference exercise**. How to use mess map in conference exercise setting to "prime" participants for rest of conference<br>Limited time. Short time devoted to mess mapping process | PanDefense 1.0 Interdisciplinary Conference to put avian flu pandemic preparations on the public agenda | **- High data-intensity**<br>- Task for group in short time frame: fill in implied problems and connect with causal arrows |
| How to improve **health/and well-being** of church and church employees | **National scale.** How to use mess map to challenge whole 10 million member organization to examine itself<br>Integrate multiple cultural levels. How to incorporate psychological and cultural issues into mess mapping process | United Methodist Church of USA | - Integrate **multiple "layers":**<br>- Psychological<br>- level of ministers<br>- organizational<br>- theological<br>- US cultural elements |
| How to understand why **climate and energy policy** appears to be going slowly or stalled | **Client formation.** How to find a client for messes that spread across many government departments | - International Futures Forum<br>- Four British government departments<br>- Dept. of Transportation and Industry<br>- Foreign Office<br>- Treasury<br>- Dept. of Environment, Food and Rural Affairs | **Different format (labyrinth)** and metaphors for mess portrayal |
| California's potential crisis in not having sufficiently **trained workforce** in 5 to 15 years | **Emerging mess.** How to show an emerging mess to help prevent it from producing greater harm (just starting) | California Workforce Association | **Use much research on current knowledge -** Display emerging mess as consequences of what we know now |
| How to improve **suicide prevention programs** | **Official view vs. view from the trenches.** Official view vs. view from ground of highly distributed responsibility | National Health Service Scotland and International Futures Forum | **- Show official view vs. view on the ground**<br>- Graphic analysis of how to find potential suicide |

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**How I managed to keep this book little**
One of the ways I have been able to keep this book as little as it is, has been to leave out many aspects of social messes and wicked problems, Those who are looking at human organizataionsa nd behaviour through the lense of messes, have grown into an academic and practitioner field..True, there is no Department of Social Messes in any university that I know of, nor is there a School of New Paradigmology. Nevertheless, there is much to be learned from various folks who have been laboring in these fields for several decades. In this section, I want to point you to good sources that, had I summarized them, this would not be a little book.