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The Development and Use of Scenarios

Generic Notes prepared by:

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These notes have been developed as part of a number of scenario exercises, including:

- Scenarios for the Future of the Construction Industry in Canada
- Future of Work Scenarios
- National Forecast Service Workshop Scenarios
- Scenarios for the Future of Nuclear Power in Canada
- Biotech Scenarios

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Forecasting

- **What is It?**
- **Keys to success**
- **Lessons learned**
- **Using scenarios**

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Forecasting is the process that provides answers to questions about the future under various assumptions.

The keys to success include:

- **Never forget that you are making conditional forecasts based on specific assumptions about the future.**
- **Be humble when you are lucky enough to be close to the actual value, particularly when you are close for the wrong reasons!**

Look at the parts - disaggregate!

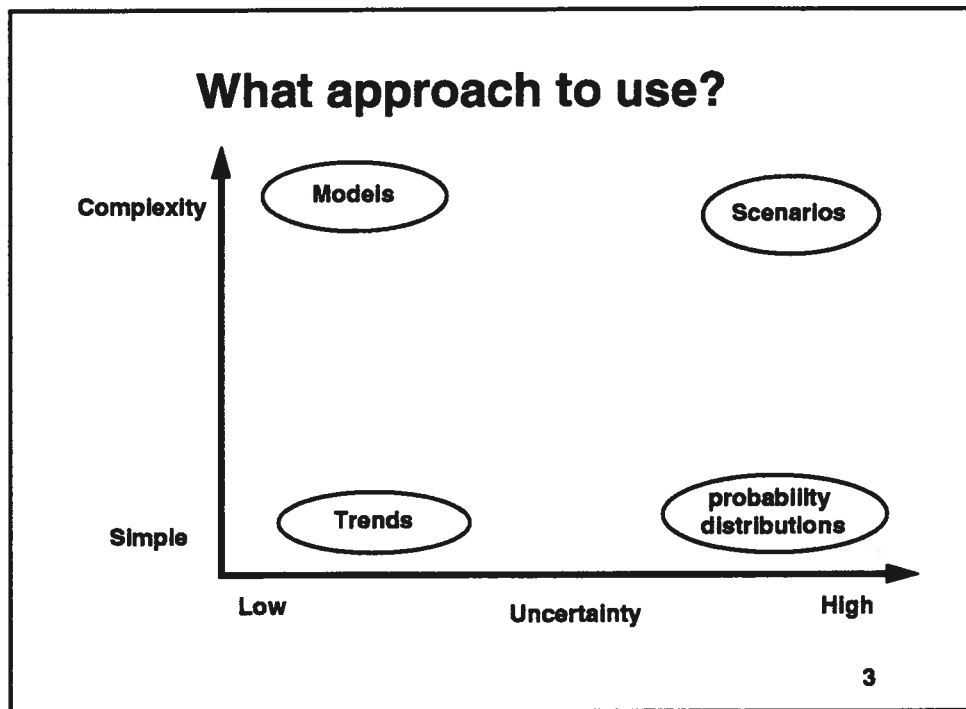
Some of the lessons learned include:

- **It is not possible to forecast the future with any accuracy**
- **There are many paths that the economy can take.**

Forecasts can still help in understanding the “futuraity of present decisions” (Drucker) and can alert decision-makers to potential problems that can be avoided by changes in policies or offsetting investments.

When the factors are **complex** and there is substantial **uncertainty**, then that is a tip-off to use **scenario building** in the forecasting exercise.

Fancier techniques are available, such as stochastic modeling, but for most purposes, scenario building is a good approach.



Two dimensions - **complexity** and **uncertainty** face the forecaster.

What to do about them?

Complexity is the notion that everything is connected to everything else. In economist's jargon it is the notion of interdependence or simultaneity.

The approach is to use a model or a collection of equations to represent these connections and to keep track of them in a forecast.

If there is not much complexity, then a more straight-forward method can be used such as trend extrapolation or other forecasting techniques (e.g., Box-Jenkins, single equation models).

Uncertainty is a different dimension. It describes the notion of a **lack of information** about the nature of the linkage between one variable and another, or a lack of information about future values of a factor or driving force. With uncertainty, the forecasting process becomes more complicated, with the introduction of terms like 'stochastic' modelling.

But for practical purposes, we can make some progress by recognizing in most real-life economic forecasting situations:

- We don't know the future values of a number of different things
- And we know that the linkages between different parts of the economy are not fixed and immutable laws of physics but rather continually evolving and complicated relationships.
- As a result we can resort to scenarios to make some progress.

What is a scenario?

- A perception device
- Not a forecast with probability distributions
- A set of reasonably plausible, but structurally different futures
- Developed through causal, not probabilistic thinking
- Different scenarios are treated as equally likely and should be given equal weight in decision-making

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"Scenario planning is ... a natural thinking tool for use in a strategic conversation." Kees van der Heijden, **Scenarios: The Art of Strategic Conversations** (Wiley, 1996), p.41

The notion of "equally plausible" is important, since it is this property that makes it necessary to consider all of the scenarios while developing organizational strategies.

Writing Scenarios

- **What are the Issues?**
- **Who are the Stakeholders?**
- **What Matters?**
- **What are the Drivers?**
- **Early Trends?**
- **Learning Scenarios**
- **Decision Scenarios**
- **What still needs to be identified?**

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In writing scenarios, it is usually best to start with the major concerns or issues facing the organization or group.

Identification of the Stakeholders can add to the story, including the consideration of varying reactions from different groups.

A certain consistency or thrust is helpful in a scenario, since it is unlikely that only one factor will move in the same direction. For example, rising unemployment is likely to be associated with more social assistance and rising disaffection of some with governments.

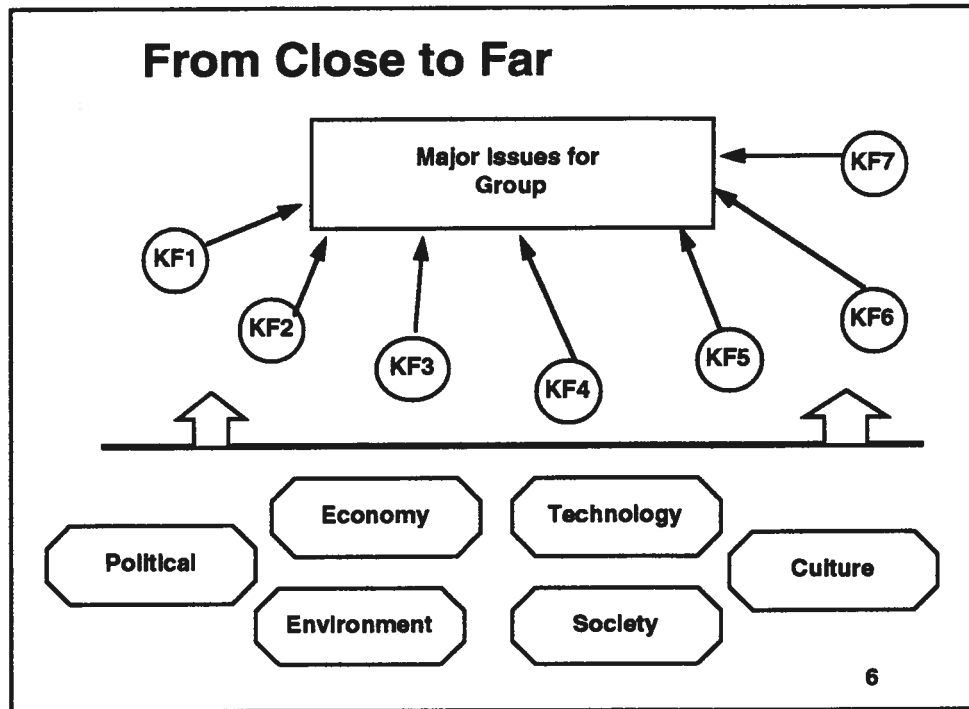
Identification of tension between social groups or highlighting of tradeoffs is also helpful in a scenario.

Early trends - Is there any evidence that suggests that some elements of a scenario are already underway? This is not necessary, but it can be helpful in creating interest and focuses attention on determining whether certain trends are consistent with one or more scenarios.

An iterative process is likely, given the need to refine the scenarios or to tailor them to the needs of a particular group. That is why we mention the notion of learning scenarios followed by decision scenarios that are developed in subsequent iterations.

As well, there will be unknown elements which require further investigation.

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To bring these concepts together, consider the following diagram, and starting with the “major issues” box.

Important issues are for the group to identify. As a starting point we have taken several dimensions of economic performance as the major issues.

Key factors (KF) are those that directly impinge on the major issues. Usually there is some possibility of affecting the way in which the key factor affects the issues, or even in choosing different levels of the key factor.

Driving forces in turn affect one or more of the key factors, either directly or in a more roundabout manner. Some of the obvious groupings of driving forces can be considered under the labels of economic, society, culture, political, environmental, and technology,

Other driving forces could include international agreements, actions outside of Canada by international organizations, globalization of business decisions, financial system shocks, etc.

Driving Forces

- **Society**
- **Culture**
- **Economy**
- **Politics**
- **Environment**
- **Technology**

Distinction between “outside” and “inside” communities

Predetermined versus uncertainties

(Hopes and fears for the future)

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A general set of categories that help to organize the various driving forces are as above.

In some cases these same driving forces may have different influences inside and outside the country, the community, or the corporation.

Not all driving forces are “uncertain”, or at least, for your specific purposes it will be wise to consider some of the driving forces as “relatively” certain, or “predetermined”. But this decision has as much to do with the issues at hand as it does to any fundamental characteristic of the driving force.

One way to elicit a response from a group is to ask them what their hopes and fears about the future are. One often can identify the major uncertainties, with the fears representing the ‘downside’ and the hopes, the “upside”.

Examples of Scenario Exercises

- **Naming scenarios**
- **The Issues Differ**
- **The Significant Driving Forces May Vary**
- **Time Frames are appropriate to the Issue**

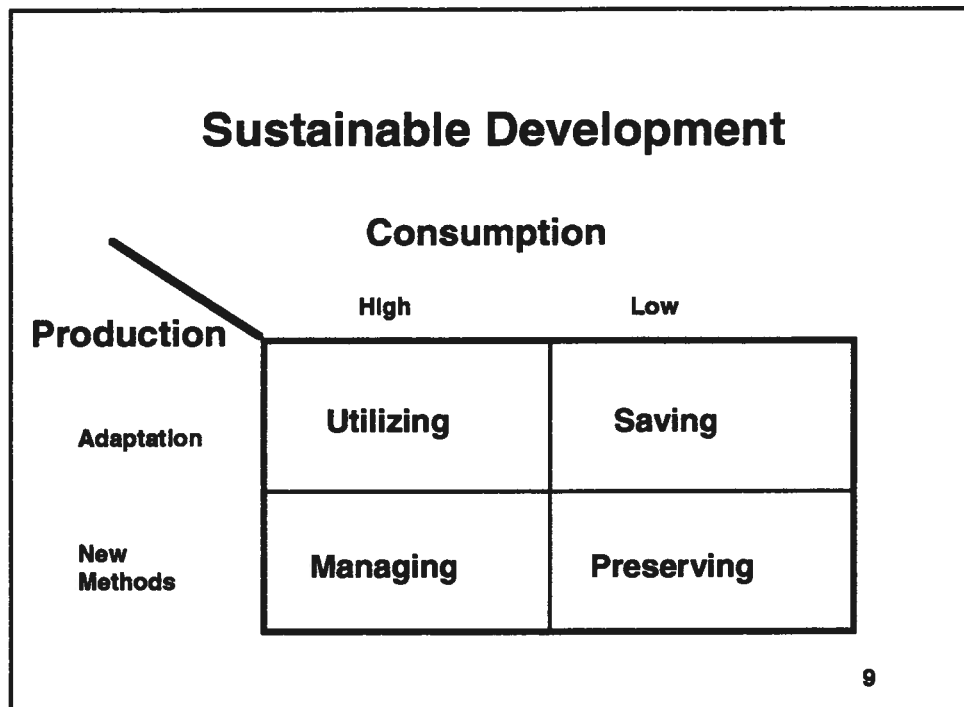
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Naming the scenarios can be quite helpful in developing a short-hand jargon among the users and in labelling new events as they appear.

In the summaries that follow, an issue is identified and the scenarios that emerged from the process are briefly discussed.

Even those with similar driving forces may have different names, different story lines, and address different issues.

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The Issue: "... assumption that sustainability implies that the present environmental risks are regarded as unacceptable and that there is a willingness to make social adjustments." (WRR, p.43)

Nature of adjustments

Utilizing - only minimal adjustments needed; current levels of production and only modest changes to production processes in the longer term are required.

Saving - the solution is to be sought in changing consumption volume or patterns primarily (e.g., reduced energy demand and animal protein)

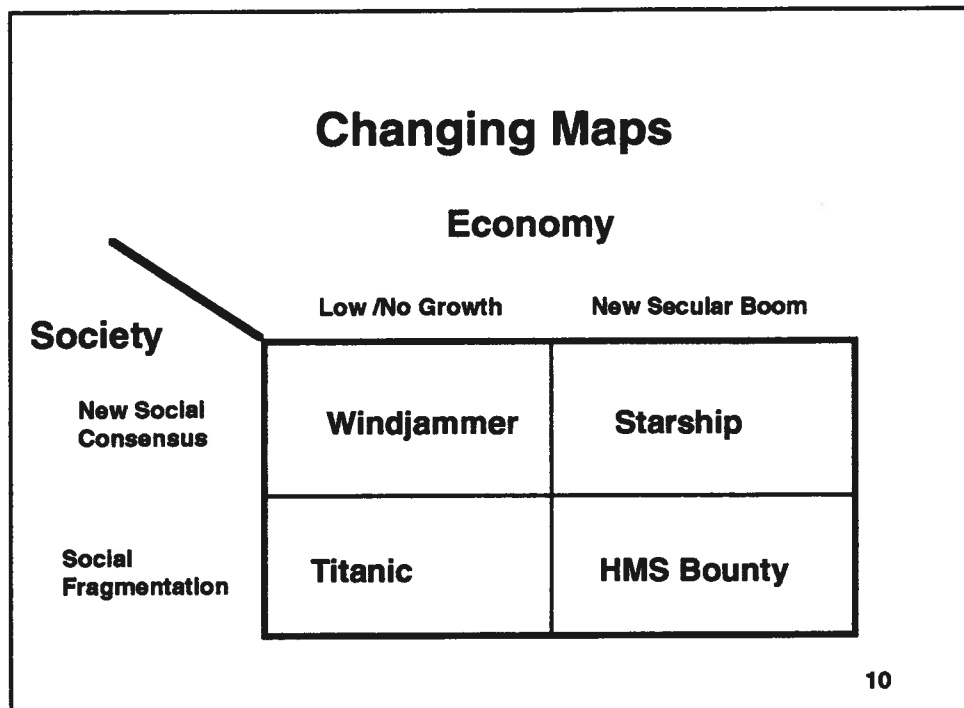
Managing - the response to current high levels of consumption is to be found in a new technology or switching feedstocks (e.g., new energy sources, biotech, R&D)

Preserving - Both consumption reductions and changes to the production processes are needed in order to avoid major environmental problems.

(Adapted from WRR, Table 2.1, p.44)

Scientific Council for Government Policy (WRR), **Sustained Risks: a Lasting Phenomenon**, Report #44 (Hague, Netherlands, 1995), pp.205.

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The Issue: "...how the realities of the information society may reshape the environment for governance over the next decade." (Rosell, ch.6)

Starship - Institutions learn to adapt to IT, fostering strong growth. Following international standards, Canada becomes a globally-attractive location with its stability, quality of life, and outstanding educational system. Ongoing structural changes occur, but gains are shared, with prosperity building consensus.

Titanic - The information economy leads to net job losses and persistent high unemployment and no growth lead to defensive responses from institutions. The education system fails to respond and fewer young people are attracted by it. The wealthy and highly skilled move to other countries in large numbers. Fiscal problems result in further cutbacks on social programs, and an underclass emerges.

HMS Bounty - "One image is Los Angeles: high tech and dynamic, with many people doing very well, but with society very polarized and difficult to govern." Polarization with the wealthy and those with human capital in one group versus the uneducated and poor in another. The mobility of the winners keeps government policy focused on them to the detriment of a growing underclass. Social and regional disparities build, leaving the society in turmoil. A mutiny is afoot ...

Windjammer - A strategy is pursued that keeps Canada internationally competitive while sustaining its communities, social fabric, and environment. The slow growth, coupled with visible environmental impacts, leads to demands for actions by governments to sustain Canada, including a more equitable distribution of incomes and the adoption of sustainable environmental policies.

Steven A. Rosell, **The Art of Governing by Learning: Developing New Maps for Governing in a World of Rapid Change**, (forthcoming, 1997)

| | | Globalization | |
|-------------------|----------------|-------------------|----------------|
| | | Status Quo | High |
| Domestic Policies | Liberalization | ? | New Global Age |
| | Modest | Business-as-Usual | ? |

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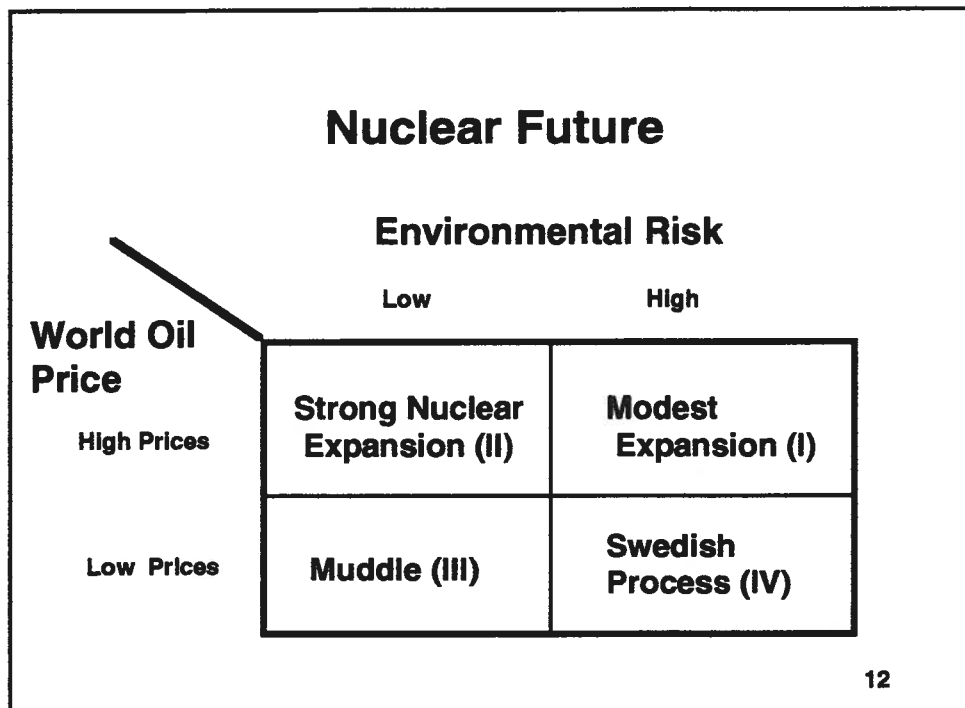
The Issue: Do improved linkages between OECD countries and LDCs foster more rapid and sustained growth for the OECD countries and globally?

“New Global Age” in 2020 - “... a realistic possibility for the world economy, if governments undertake a wide range of necessary policy reforms.” (OECD, p.7) These include cooperative efforts for global free trade and capital movements, coordinated sustainability frameworks, and developing capacity for development in non-OECD countries. Domestic policy changes include fiscal consolidation, structural reforms of labour markets, energy policies for environmental sustainability, and regulatory reform. Growth of about 3% per year for the OECD and much more rapidly (6-7%) for the LDCs results.

Business-As-Usual - No further liberalization leads to growth of about 2% for the OECD, about 1% less than the last twenty-five years and the NGA case. LDCs grow in line with historical norms, and about 2% per year less than the NGA case.

Much worse scenarios can be based on a reversal of globalization or global fragmentation, with adverse effects on prosperity (GDP per capita) and political stability. Similar problems may emerge from failure to deal with environmental issues.

OECD, **Towards a New Global Age**, Policy Report (Paris:1997), pp.37.



The Issue: Will there be any nuclear generation of electricity in North America in 25-50 years?

Two Key Uncertainties

- World Oil Prices (WOP) and other energy prices
- Environmental Risk Assessment (ER) - real and perceived

Expand Nuclear Capacity - High WOP

- For Canadian Needs Only (I) High ER

Replace existing plants and add additional base plants as needed to maintain optimal mix.

- For North American Demand (II) Low ER

Add additional nuclear plants to serve the NA market, or bring on earlier new capacity ultimately slated for the Canadian market.

Muddle - Do Nothing Until? (III) Low WOP, Low ER

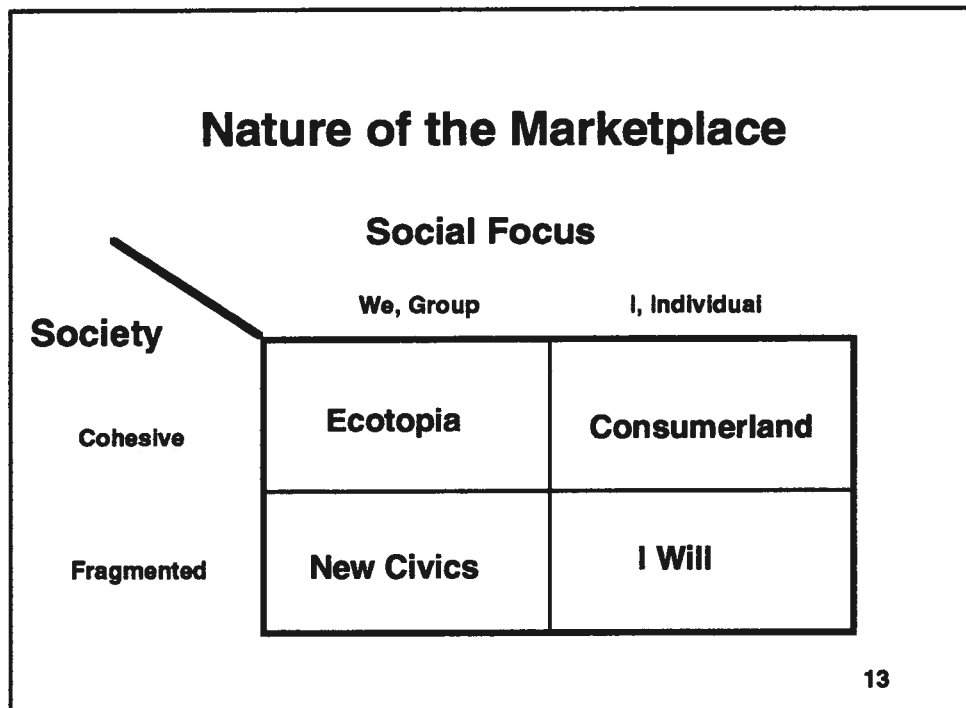
No new nuclear plants, no close-downs until necessary, new supplies from cheapest source at the time (likely NG).

The Swedish Process(IV) Low WOP, High ER

Actively de-commission plants before their useful life has been completed. Substitute with other forms of electricity generation.

M.C. McCracken, **The Emerging Big Picture**, Canadian Nuclear Association, 1997 Annual Conference

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Issue: What will be the general tenor of commercial life on a global scale in the year 2020?

Two key **uncertainties**: the dynamic between the individual and the group, and the social structure - will society be a centre that holds and provides stability, or will it fragment?

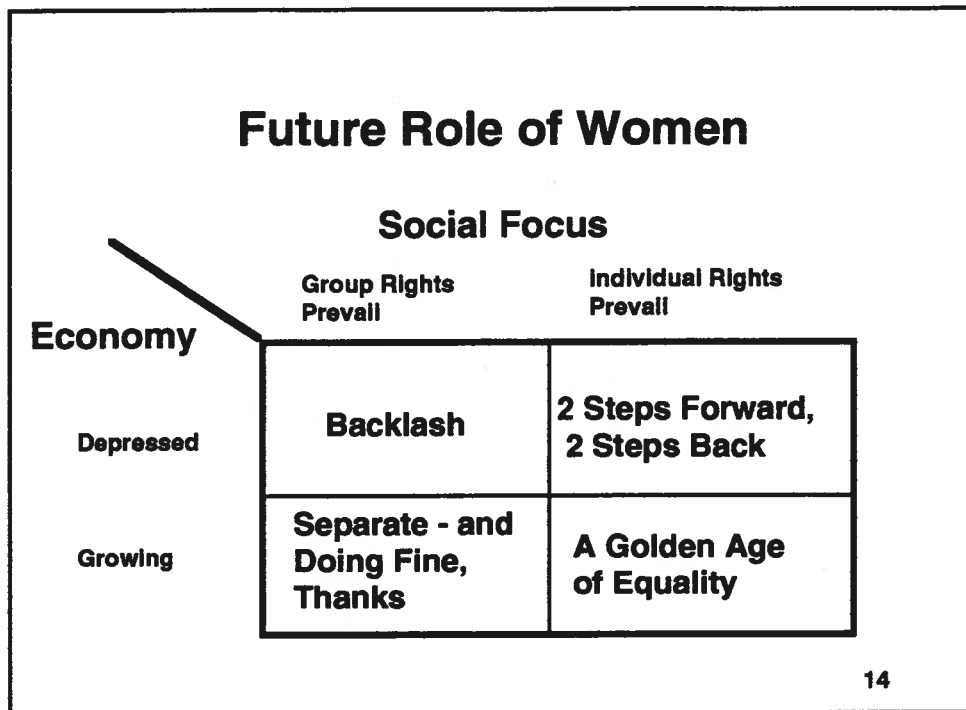
I Will - A future in which you want and get the ability to make your life uniquely yours. You co-produce the products and experiences you consume, through a ubiquitous Net. Your loyalty is to your tools, knowledge, and skills. Atomized structure of firms; "... a working pandemonium of individuals, organized by jobs rather than geography."

Consumerland - Individual desires meet a social and corporate center. Everyone is the ultimate consumer, with wide choices, through the Net, tailored to the individual's tastes. Governments lay down standards and regulations for corporations. Citizens become consumers - served by society.

Ecotopia - An emergence of widely shared ecological values, through the voluntary embrace of cohesion, cooperation, and reduced consumption, backed by legislative and even corporate policies. The Net serves as a "replacement technology", conserving paper and travel.

New Civics - Values are shared, but in many small, competing groups. It is a decentralized world of tribes, clans, "families", networks, and gangs. The Net is used to bring together the members and to encourage economic and social linkages among the members.

Lawrence Wilkinson, **How to Build Scenarios** (HotWired Network, 1995)



The Issue: What will the role of women be in the Global Society of the 21st Century? Is equality between the sexes even possible by 2015?

Major Uncertainties: Individual rights versus group rights and Global economic performance.

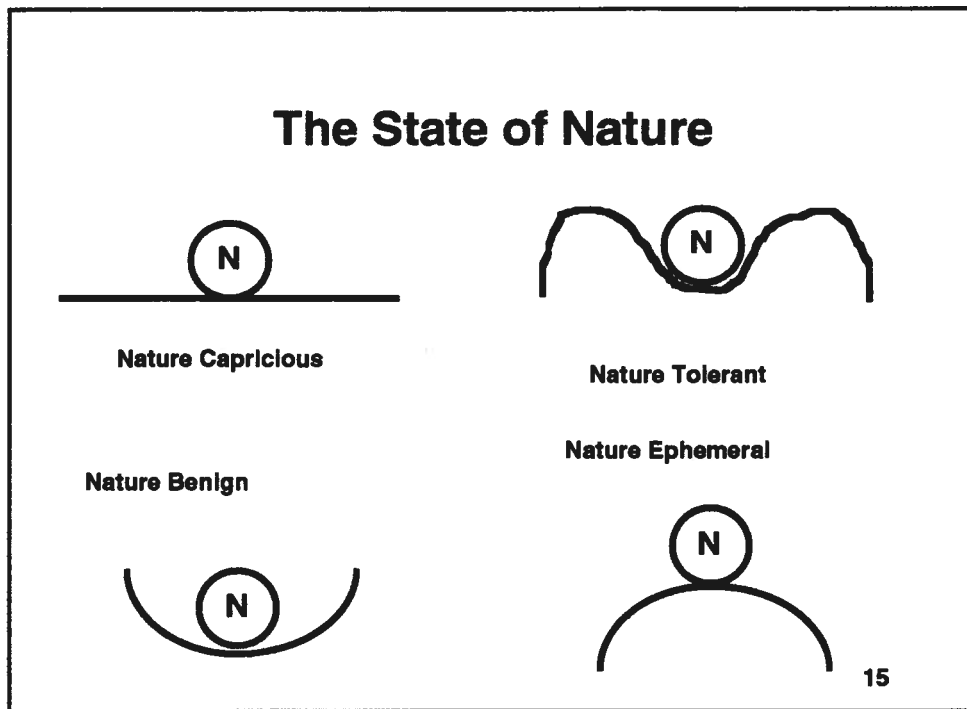
Backlash - Temporary economic alliances, widespread volatility in employment and currencies, and a growing "underground" economy, coupled with protectionist governments, leads to family stresses, growing violence, and expediency rather than strategic planning. Women are first to lose their jobs, underpaid, and exploited. Women's networks collapse. (p.21ff.)

Golden Age of Equality - Growing prevalence of individual rights, rule of law, and respect for privacy, coupled with strong growth in an integrating world, result in a world of equality, with balance in work and family responsibilities for both partners, and a renaissance of creativity and productivity growth.(p.75ff.)

Two Steps Forward, Two Steps Back - With a weak global economy, international migrations become large, environmental actions are eliminated, polarization of incomes and wealth increases. Activist women's groups have to focus their efforts on nutrition, protection from domestic violence, and workplace safety. (p.135ff.)

Separate and Doing Fine - Thanks! - The emphasis on group rights translates into authoritarian governments and the suppression of open discourse, leading to a disregard for the rights of women. The frustration and impatience results in de facto separation, helped by an invisible international network of experienced women. (p.189ff.)

Pamela McCorduck and Nancy Ramsey, **The Futures of Women: Scenarios for the 21st Century**, Addison-Wesley, 1996.



The assumptions about the absorption capacity and resilience of the environment flow from the "Myths of Nature" and in turn determine the attitudes that people have about the tradeoffs between social interests and the interests of nature and the environment.

These four different attitudes reflect the different perceptions of risk, and can influence the identification of environmental problems, even if there is widespread agreement on the scientific facts.

M. Schwartz and M. Thompson, **Divided We Stand: Redefining politics, technology and social choice**, New York, Harvester Wheatsheaf, 1990.

Model Uncertainties

- **Snippets**
- **Agreed-on linkages**
- **Contested linkages**
- **A model is a collection of many snippets**

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A “snippet” is a statement that “A causes B” or that “A and X together determine C and D”. For example, an increase in income will lead to more consumption and to a sense of being better off.

There are many snippets or causal chains on which there is wide agreement. However, there are others which are more contentious.

Sometimes the causal ordering is in dispute. Do higher wages cause inflation, or does inflation lead to demands for higher wages?

An econometric model can be thought of as an organized set of “snippets”, specifically dealing with economic linkages. The setting of assumptions also relies on “snippets” to determine their values in a way that is consistent with some implicit model. For example, the notion of fiscal restraint needs to be translated into downward adjustments of real per capita spending levels for various government programs. How far one goes, the choice of which components to lean on most, etc., all rely on some “snippets” or mental models.

In some cases, these model uncertainties might be the basis for different scenarios, although usually the uncertainty about driving forces is greater than model uncertainties.

One example, is the model uncertainty associated with the linkage between interest rates and debt ratios or deficits. It is clear and well accepted that higher interest rates will increase deficits and debt ratios, since this is in essence “debt arithmetic”. But it is more contentious to suggest that higher debt ratios or larger deficits necessarily lead to higher interest rates.

Overview of Activities

- **The Scenario Agenda**
 - Context
 - Relevant issues
- **Scenario Development Process**
- **Applications**
 - Support future decisions
 - Spread the conversation
 - Build a consensus
 - Improve planning process

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The idea of a "strategic conversation" contains three major elements -

- The setting of the scenario agenda - what are the issues to be developed? What time frame?
- The process of iteratively formulating various scenarios - based on a discussion that first widens the perspectives of participants and then re-focuses them around a group of scenarios.
- The use of the scenarios - varying from simply widening perceptions of what is possible, to a detailed evaluation of different options under the various scenarios.

Keys to Success of Process

- **Participants**
 - Balance
 - Multi-disciplinary
 - Open-minded
- **Perseverance**
- **Adequate resources - \$ and time**
- **Plan for use**

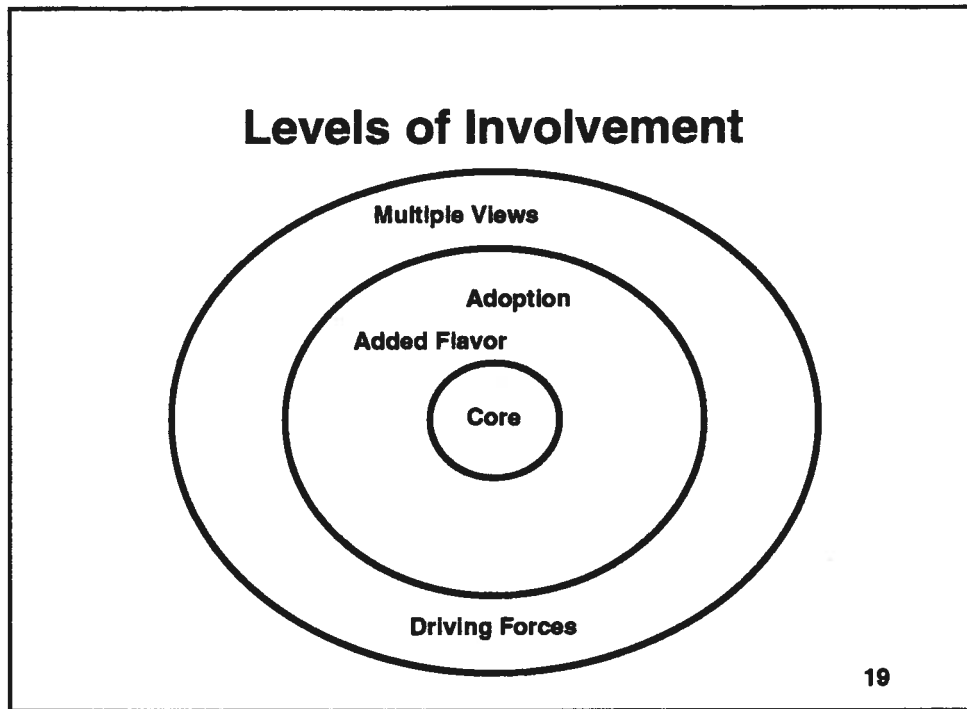
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Multi-disciplinary scenarios requires a team from multiple disciplines.

Bright, open-minded, able to “think the unthinkable”, able to deal with “information overload”, and good communication skills.

Include some “outsiders” - particularly from affected sectors and with a “public interest” link.

Quick exercises can be done, but there is not likely to be a “breakout” from conventional wisdom. It is better to save the “quickies” for communication of existing sets of scenarios and for training purposes.



The core group develops the scenarios and learns from that process.

The second ring of people participate through “re-running” the scenario exercise, starting with the existing set and explaining the logics of each scenario. They will usually adopt them and add some flavor that extends them to their circumstances.

The third ring can include the public, special-interest groups, and others. They may adopt one scenario as their “preferred view”, but the process forces them to recognize the legitimacy of other scenarios, or, at least, the driving forces on which they are based.