What is / What are Questions

- the State of Forest Economics Research?
- the Status in the Forest Research Community?
- the Relevance for Forest Sector at Large (policy makers, forest owners, and industry)?
- the Challenges for Forest Economics Research?
Governments and industries are downsizing but require science to deliver more benefits to the public at a lower cost and more rapidly.

But science as it exists today can only be maintained with large amounts.

Intellectual progress, as measured by advances in specific disciplines, no longer seems to generate the necessary funding.

To secure funding science has to meet critical social needs.

Issues high on the political agenda must become high on the agenda of the scientific community.

The downsizing is driven by demands on decreased costs and increased production profound impacts on society.

Public opinion and mode is reflecting lack of confidence in the ability of governments and other sectors of society — including science — to address fundamental social needs properly.
However the cost per se is not the issue.

The issue is the potential for scientific and technical advances to improve efficiency in different sectors of society.

This constitutes an invitation for science and higher education to secure their own future.

The current contract between university science and education is based on the understanding that universities will provide research and education with a relatively high degree of freedom in return for public funding.

Under this contract research establishments have operated relatively independently.

Institutional impermeability has gradually become more porous.

International trends signal the end of this institutional arrangement.
A new social contract is now requested
This cannot be achieved merely by patching up the existing framework
The new contract has to reflect the increasing complexity of society
The current contract assumes most important communication was from science to society
But now society is speaking back to science demanding the pursuit of national objectives

In the current contract science delivers “reliable knowledge”
The new contract requests “socially robust knowledge”
This will draw science into a larger and more diverse range of problem area, which mainly lies outside traditional disciplinary boundaries
“Reliable knowledge” was only reliable within boundaries.

Science was incomplete because it is primarily a method rather than a final answer.

“Socially robust knowledge” implies that “reliable knowledge” remains incomplete in a conventional sense but also that science in the future can no longer be validated as reliable by conventional norms and science has to be sensitive to a much wider range of social implications.

“Reliable Knowledge” / “Socially Robust Knowledge”

- Genetically Modified Organisms (GMOs)
  - Reliable in conventional scientific sense but not “socially robust” until much wider societal concerns are taken into account.

- Superconducting Super Collider (SSC)
  - Inability of a narrow group to extend its boundaries sufficiently.

- Lothar
  - Did not meet public demands.
The formulation of scientific problems have moved from the previous institutional locations in government, industry and university to the public space. With media increasingly active, and new information technology plays a prominent role. The public space is where today’s societal and scientific problems are framed, defined and the solutions negotiated. The role of scientists is changing as expertise spreads throughout society. Scientists must extend their knowledge to widely disparate areas and try to integrate what they know with what others want to do in the future.

“Socially robust knowledge” can not arise out of the views of one scientific discipline or group of highly respected scientists. It must come from bringing many different knowledge dimensions together. The production has to be regarded as transparent and participative. The more open and comprehensive science is the more socially robust. The “socially robust knowledge” has to be recognized institutionally; it can not be done by communication experts or journalists.
Where is Forest Economics within this Framework?

Making Sense of Complex Problems Important for Society, e.g., Sustaining Forestry, Climate Change, and Information Technology

- More components and sectors are continuously added to the societal structure, technical systems are adding ways for interaction with the societal structure, in one dimension the fragmentation is increasing but at the same time, in another dimension, the global interaction is increasing. The political overview is becoming difficult if not impossible. The integrated dependencies are increasing, the structure more complex and more difficult to describe and understand.
Characteristics of the Societal Structure are:

- big
- complex
- system
- socio-technical

In addition, the complex political and economic systems are goal-setting, self-transforming and creatively adaptive systems.

- For complex and controversial problems it is probably more important to define which problem should be solved in comparison to identify the economic, technical solution. Thus, it is crucial to get the *problem formulation privilege* in order to influence the policy making.

- The policy making of complex problems is a cluster of decisions and actions, which are formed by processes and actors based on their values and norms.
In the policy making of complex problems *coordination* is the springboard for survival, expansion and profit making. In society today we have got an increased structure for specialization and at the same time a decreased structure for coordination. Thus, there is imbalance between *differentiation* and *integration*.

Why are complex problems having an identified economic and technical solution not solved? The solution is not a straightforward simple problem solution but a solution that identifies the characteristics of the system which are linked to institutions and human behavior.

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**How Are Forest Economists Dealing with the Complex Problems?**

Economists try to position themselves as hard scientists, similar to physicists or chemists. They have derived laws of economics on which they base their advice to business and politicians. But hard scientists derive their laws from study controlled environments and are repeated under the same conditions. Economists don’t have that luxury. Each economic cycle is unique and has no obvious starting or ending point. Moreover, society is constantly changing in ways that are hard to understand while those changes are taking place. Economists are asked to forecast the economic development of complex problems and they do. But they should be more forthright in saying it can’t be done.
The economists are trying to put a monopoly on the ownership of the problem instead of analyzing “who is the owner of the problem”

Over time, problem orientation has weakened and methodological orientation has strengthened — methods are more important than the problem.

I also think that von Foerster’s (1984) Theories are becoming more and more valid with respect to forest economics.

**Theory 1:** The more profound the problem that is ignored, the greater the changes for fame and success.

**Theory 2:** The hard sciences are successful because they deal with the soft problems; the soft sciences are struggling because they deal with the hard problems.
Probably too many standard methods are used for complex problems, von Neumann and Morgenstern showed already in 1944 that the market (if there are more than two players) will be unstable and unpredictable. Coalitions are made and dissolved continuously. Any self-regulation towards equilibrium does not exist.

In spite of this the most used tool on complex forest sector problems is general equilibrium models instead of dynamic economics.

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**Forest Economic Theory Building**

- Faustmann
- Samuelson imported and transformed Faustmann’s theory to successful general economics
- Nowadays, forest economics is importing everything from general economics (mainly techniques)
- Thus, there is a lack of theory building within forest economics
Example of a Social Complex Problem to Tackle

- Post-industrial society and forest sector development
  - Time scales (see figure)
  - Multiple uncertainties
  - Managing the forest sector in a completely sustainable environmental and economic manner is probably impossible
  - Technological changes
  - Governance of the forest sector
  - Extreme events

Wide Range of Time Scales Associated with Climate, Ecological and Socioeconomic Systems

Characteristic time scales in the Earth system

- Atmospheric composition
  - Process: (Period in years)
    - Mixing of GHGs in global atmosphere (2 to 4)
    - Time for 50% of a CO₂ pulse to disappear (50 to 200) - WGI 3.4
    - Time for 50% of a CH₄ pulse to disappear (8 to 12) - WGI 4
  - Air temperature to respond to CO₂ rise (100 to 150) - WGI 9
  - Transport of heat and CO₂ to the deep ocean (100 to 200) - WGI 9.11
  - (Up to 10000): Sea level to respond to temperature change - WGI 9.11
  - (Up to 10 000): Ice cap to respond to temperature change - WGI 11

- Climate system
  - Acclimation of plants to high CO₂ (1 to 100) - WGI 3
  - Life of plants (1 to 1000) - WGI 3, WGI 5
  - Decay of plant material (10 to 500) - WGI 3

- Ecological system
  - Change in energy supply technologies (1 to 10) - WGI II 5.5.9
  - Change energy supply technologies (10 to 50) - WGI II 5.5.9
  - Infrastructure (30 to 100) - WGI II 3.5.9
  - Social norms and governance (30 to 100) - WGI II 3.5.9

- Socio-economic system
  - Infrastructures (30 to 100) - WGI II 3.5.9
Though this be madness, yet there is a method in it...

*William Shakespeare; Hamlet*