

Systems Approach Framework Introduction

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**A SYSTEM APPROACH FRAMEWORK FOR
COASTAL RESEARCH & MANAGEMENT**



Who is familiar with Systems Approach?



- Ecosystems – a natural unit consisting of all plants, animals and micro-organisms in an area functioning together with all the non-living physical factors of the environment.





What is the **Systems Approach**?

Scientific Method -

- investigates what objects are
- iterates between hypothesis and proof

Systems Approach -

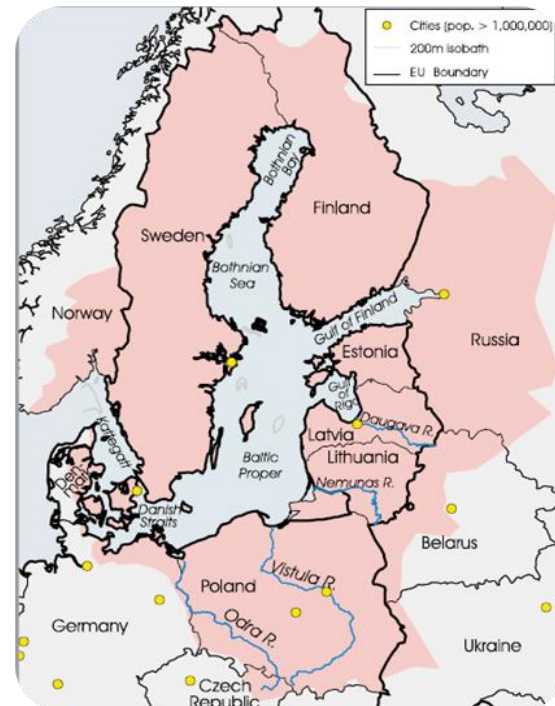
- investigates how systems function
- iterates between resolution and accuracy



Definition: **Systems thinking**

- is the process of understanding how things influence one another within a whole.

- Interdisciplinary
- Cross border
- Complex





Definition: **Systems thinking**

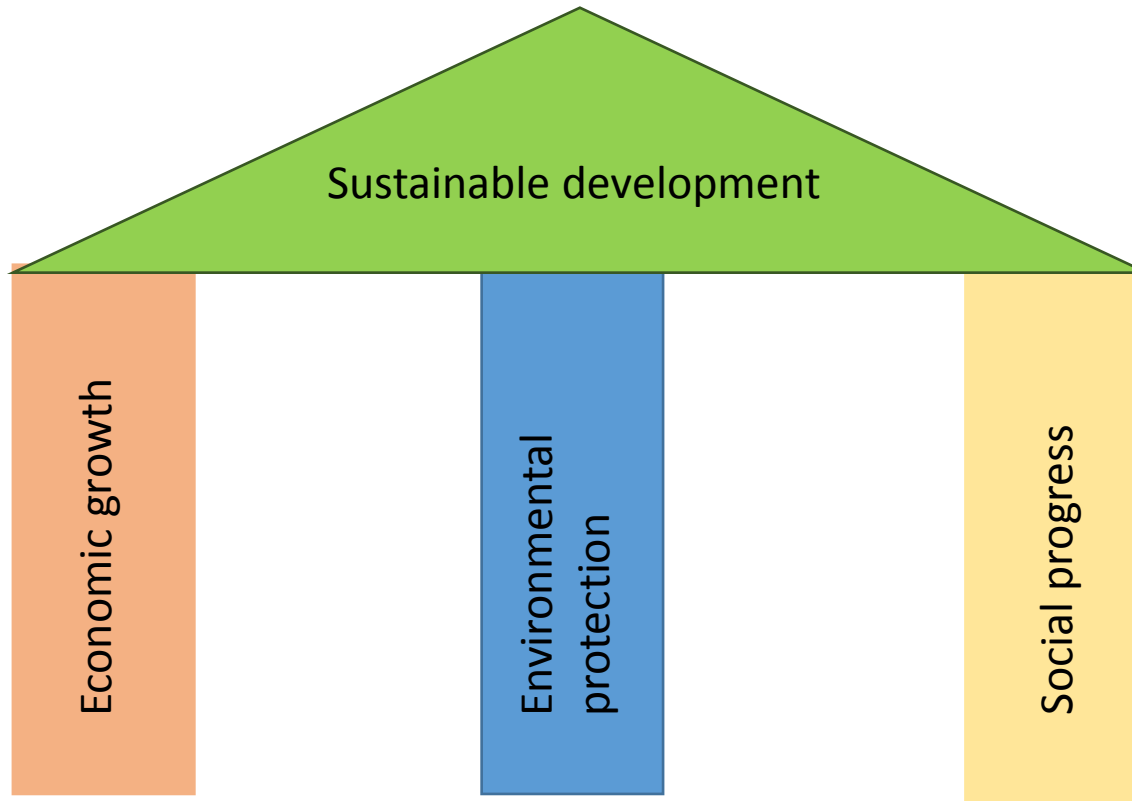
- an approach to problem solving, by viewing "problems" as parts of an overall system, rather than reacting to specific parts, outcomes or events and potentially contributing to further development of unintended consequences.
- focuses on cyclical rather than linear cause and effect.



- Aim of the SAF is to:
develop and test a structure for processing and evaluating multidisciplinary and trans-disciplinary information to enable environmental managers and policy-makers make sustainable solutions concerning the coastal zone, in order to improve:
 - ecological *sustainability*,
 - economic *efficiency*,
 - and social *equity*.

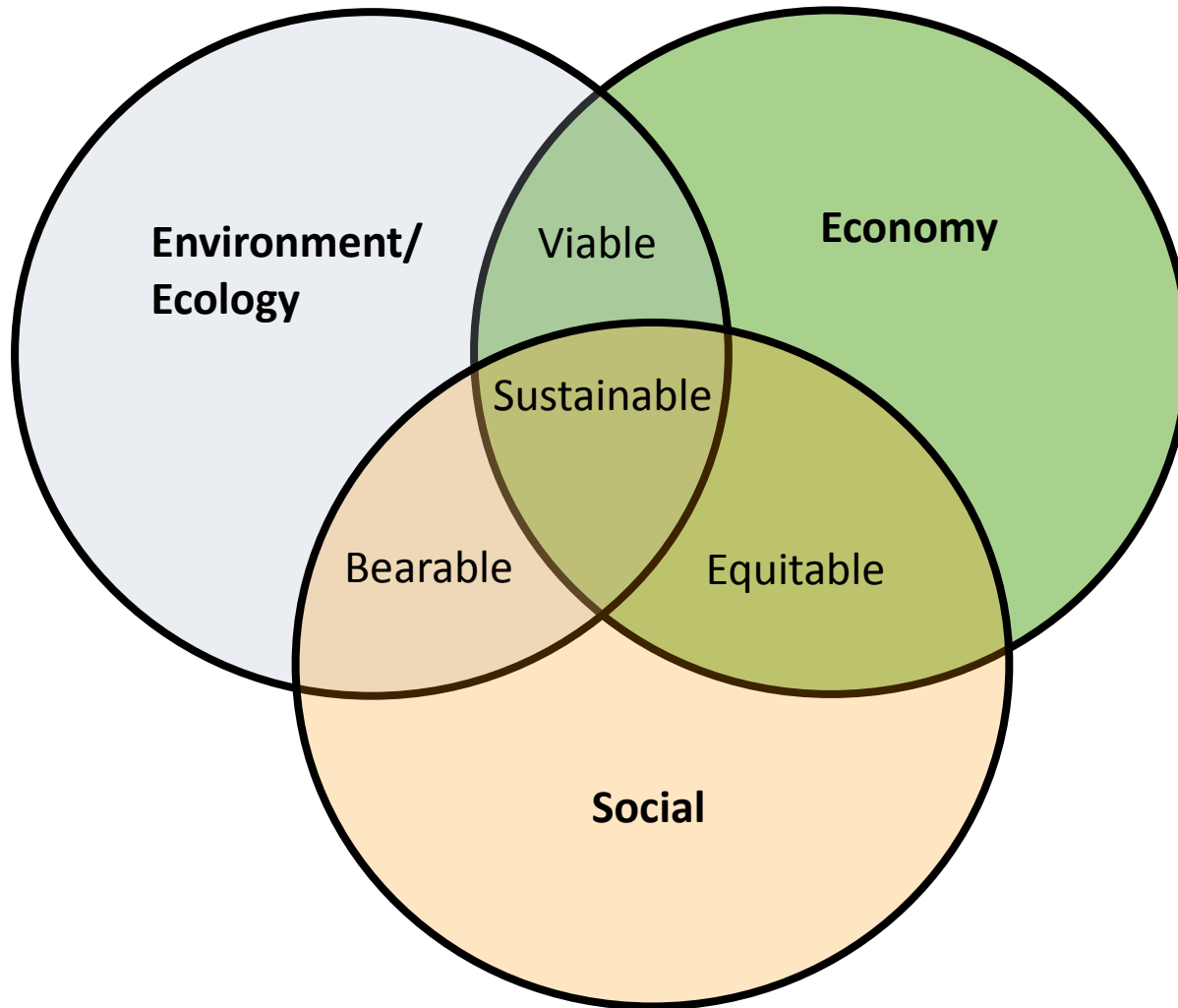


Systems Approach Framework





Systems Approach Framework



J. Dréo

(<https://commons.wikimedia.org/w/index.php?curid=1587372>)



The Ecological System

We already talked about the ecological system.

We might consider anthropogenic activities as part of this system – nutrient and metal pollution, litter, fishing etc.





The Social System

As an environmentalist we might simply suggest the solution to stop fishing, but what effect would this have on the lifestyles of those who work in the fishing industry?





The Economic System

The use of resources in the coastal zone; their effect on the economy of the zone be it through sales or sustaining jobs in the system.





Citizenship Framework





DEAD

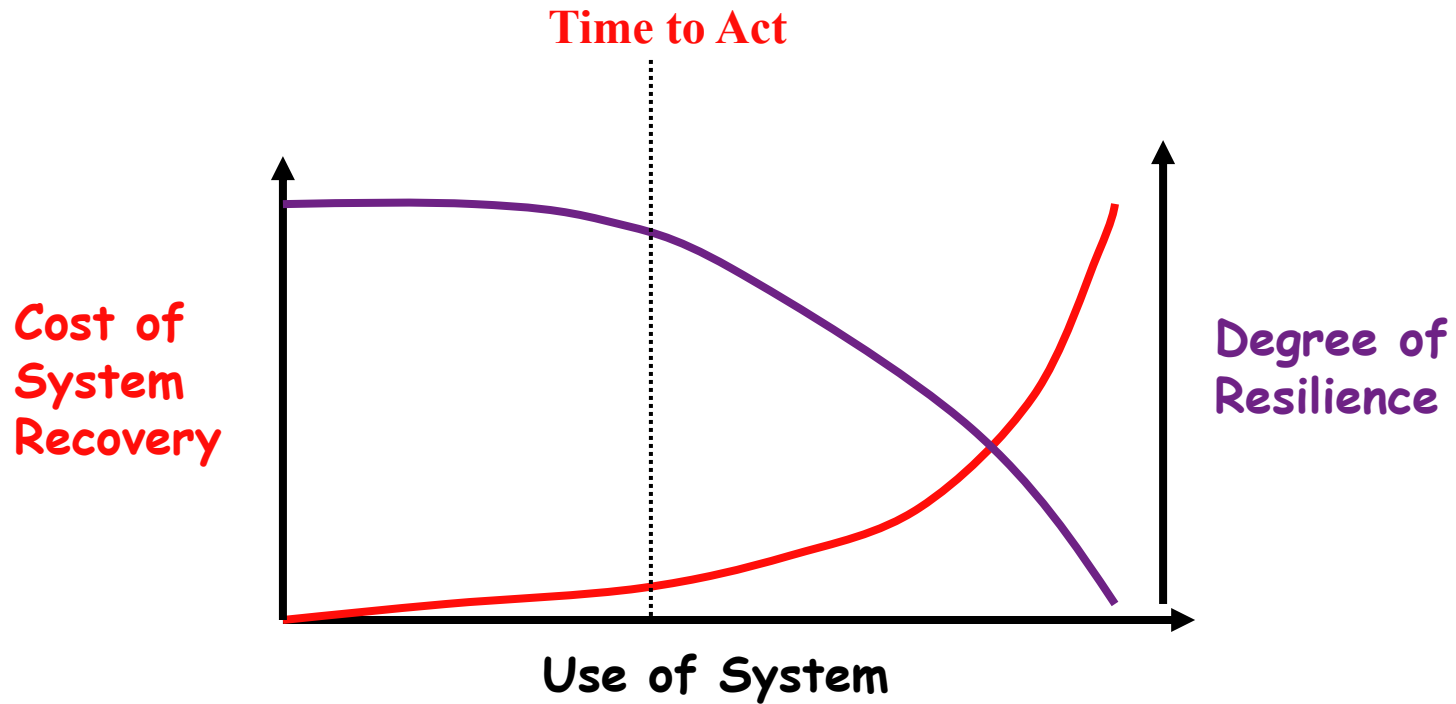
The traditional mode of decision-making which follows the sequence of:

- D**ecide on a course of action
- E**ducate to our way of thinking
- A**nnounce the decision, and then
- D**efend the decision from the ensuing protests

PEP

To a more positive model of decision-making:

- P**rofile the community or region so you know the people you need to work with
- E**ducate them about the issues and alternatives already identified
- P**articipate with them in a process of mutual education and joint problem solving

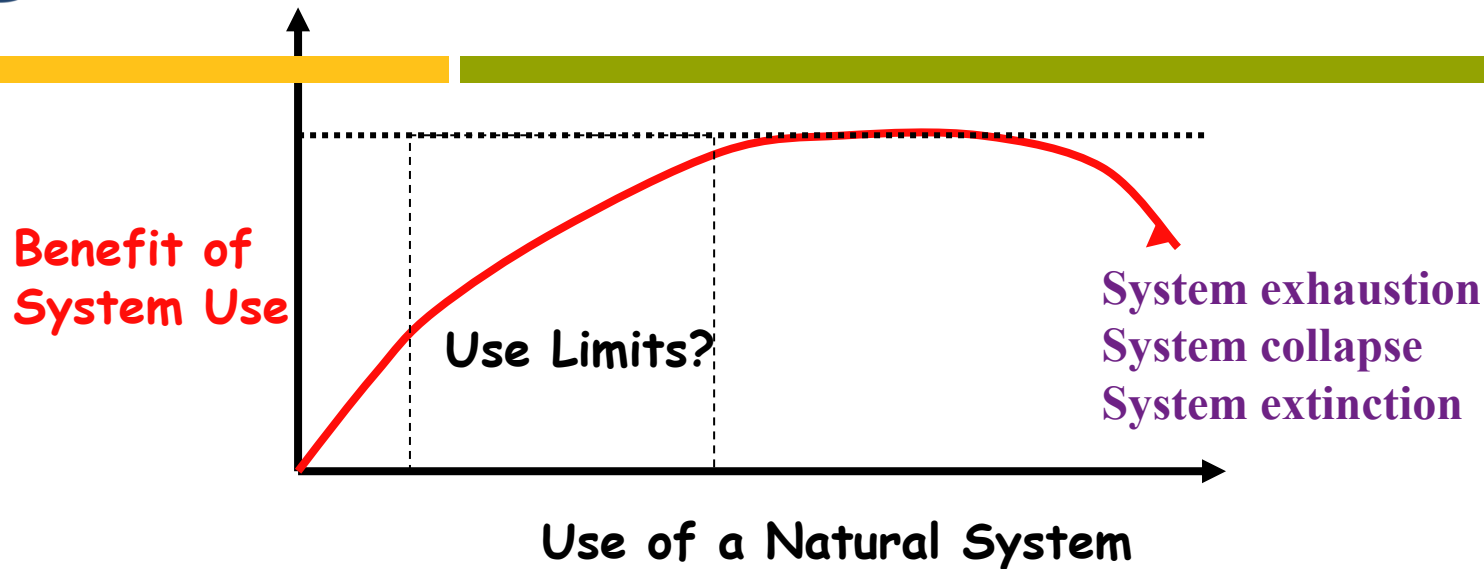


SPICOSA SAF would make the scientific-economic models to guide

Management on:

When to act, What to do, How to do it

From: Tom Hopkins



Policy concern:

Minimizing controversy over the use and preservation of these systems

Economic concern:

Minimizing the cost of their use and the expense of their maintenance

Science concern:

Maximizing our ability to understand and predict their behaviour



Systems Approach Framework

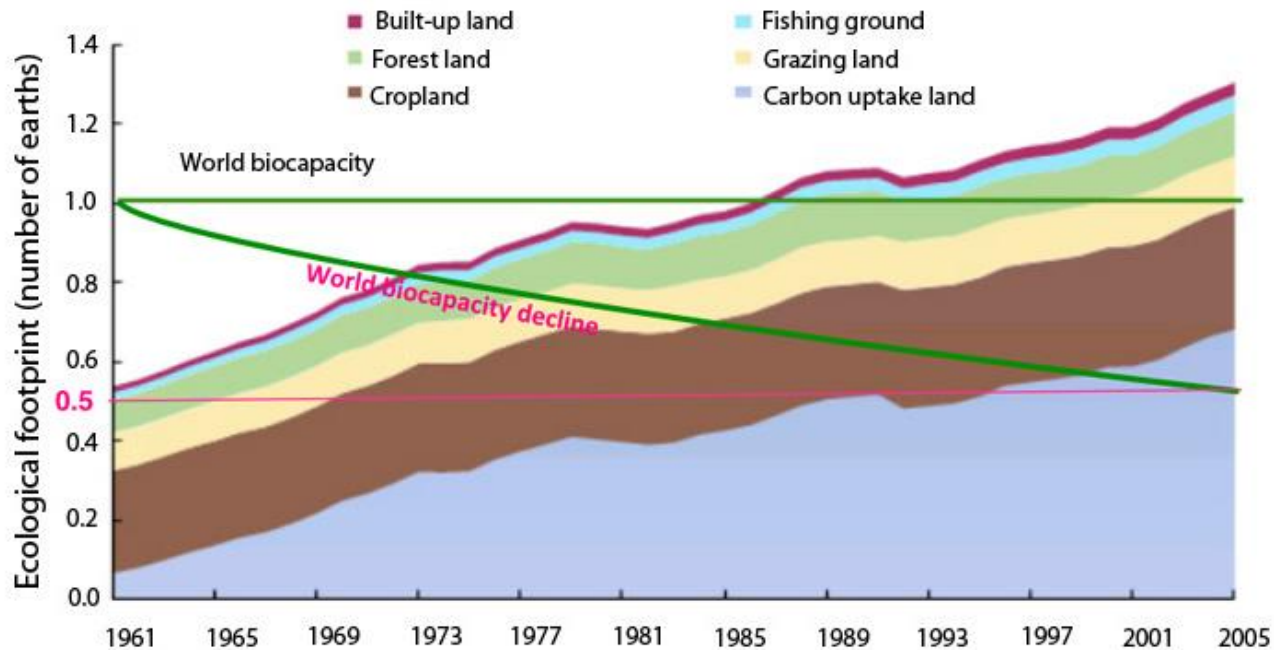


Fig. 1. The human ecological footprint from 1961 to 2005 (Ewing et al. 2008). The Ecological Footprint is a measure of the demand human activity puts on the biosphere, or Biocapacity (the capacity of an area to provide resources and absorb wastes), in global hectares (ascending red line). In 1986, humanity's consumption began its overshoot with respect to the reference biocapacity of 1961, which has not remained constant but has declined (descending green line), corresponding to its lowered productivity potential relative to its original natural capital. Note that for some commodities the yield (quantity) has remained relatively constant but changed in composition due to technical advances in harvesting that have large unaccounted costs to the environment. From Hopkins, Bailly & Støttrup, 2011.



The SAF is

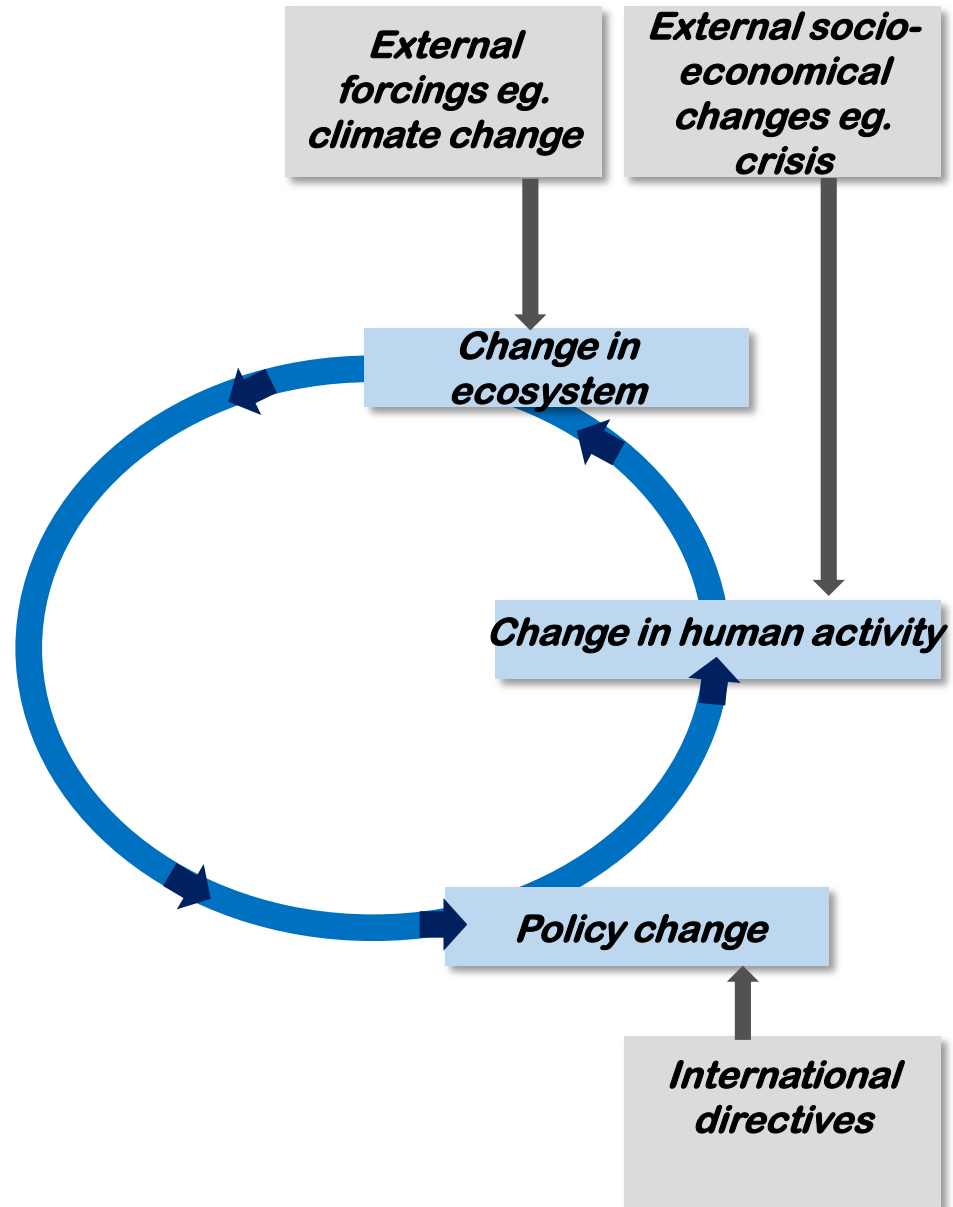
- A framework to allow a team to develop management strategy
- Based on interaction between science, policy and stakeholders
- Multidisciplinary
- Stringent in its application

The SAF is NOT

- A tool in itself
- A replacement for legislation
- A quick exercise
- Something which can be implemented by a single person



Systems Approach Framework



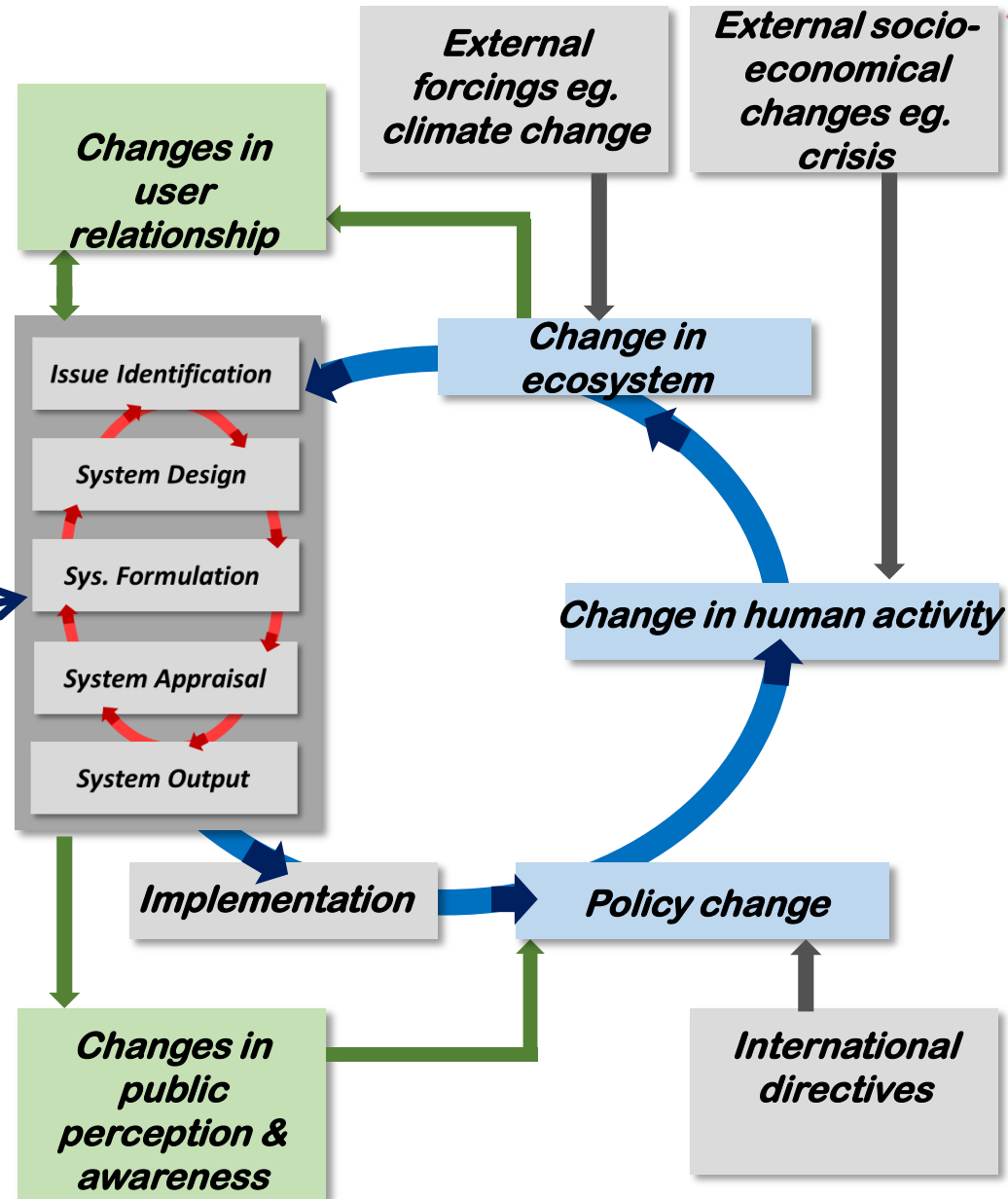


Systems Approach Framework



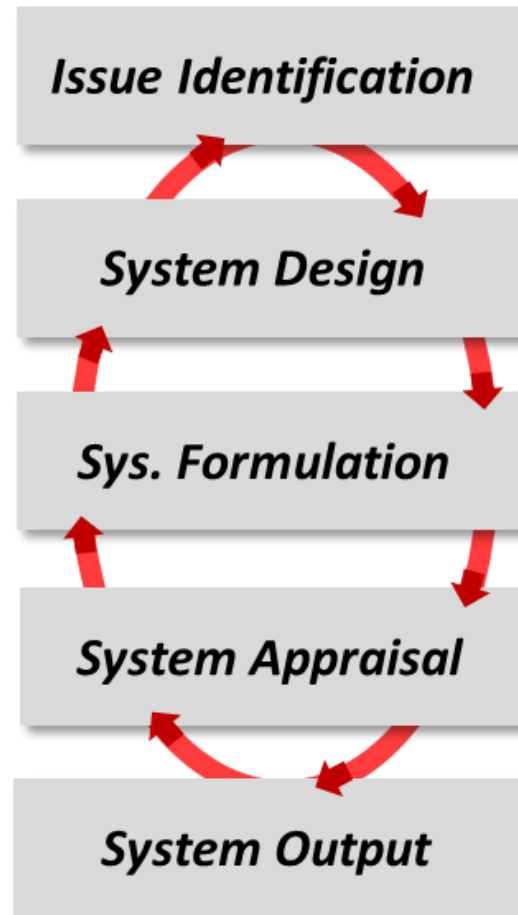
Systems Approach Framework (SAF)

ESE - assessment



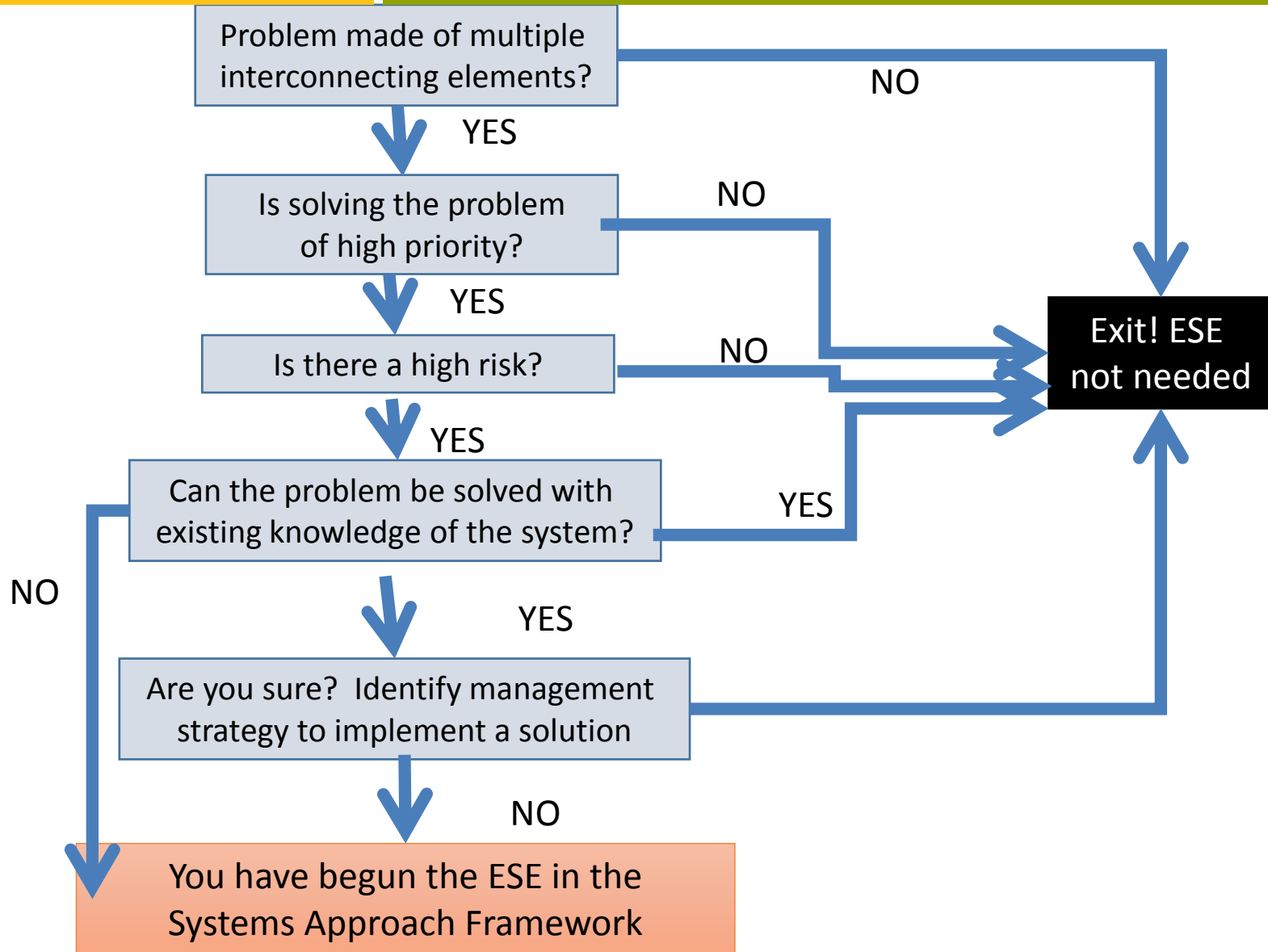


ESE assessment





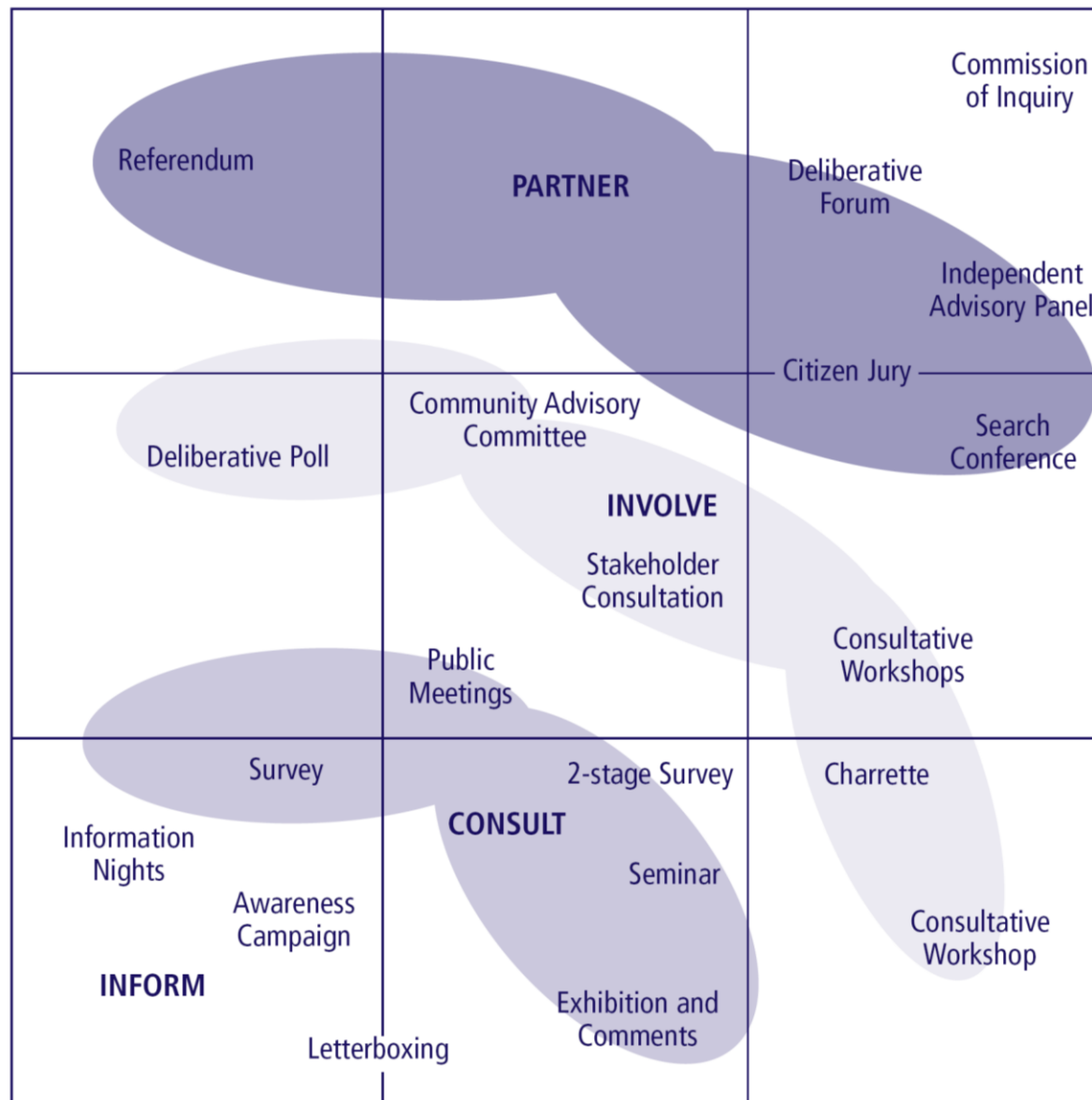
Do we need to run an ESE assessment?



High levels of risk in the situation eg. Potential for negative social and environmental impacts



Low levels of risk in the situation



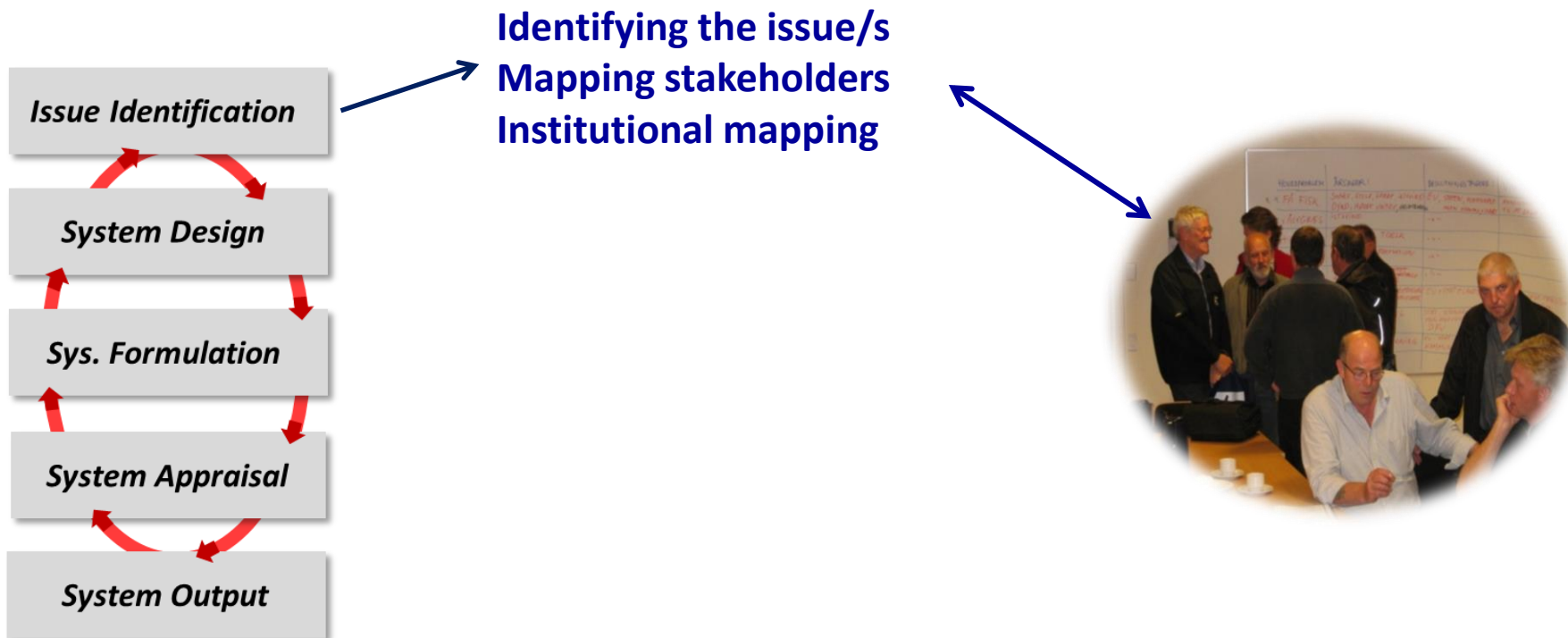
Simple information to be understood



Complex information to be understood



ESE assessment



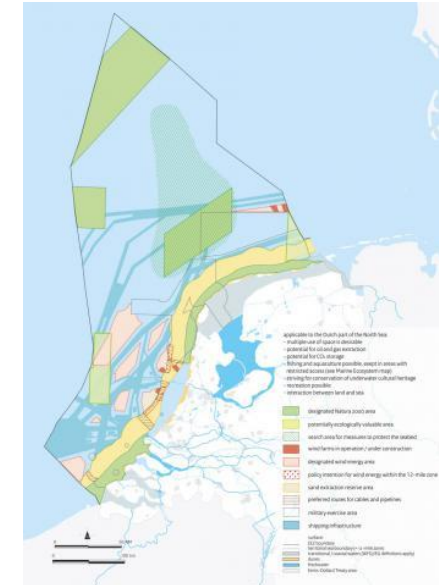


SAF – Issue Identification

Issue = problem

- Conflict between Human Activities
- Conflict between HA and Nature Protection

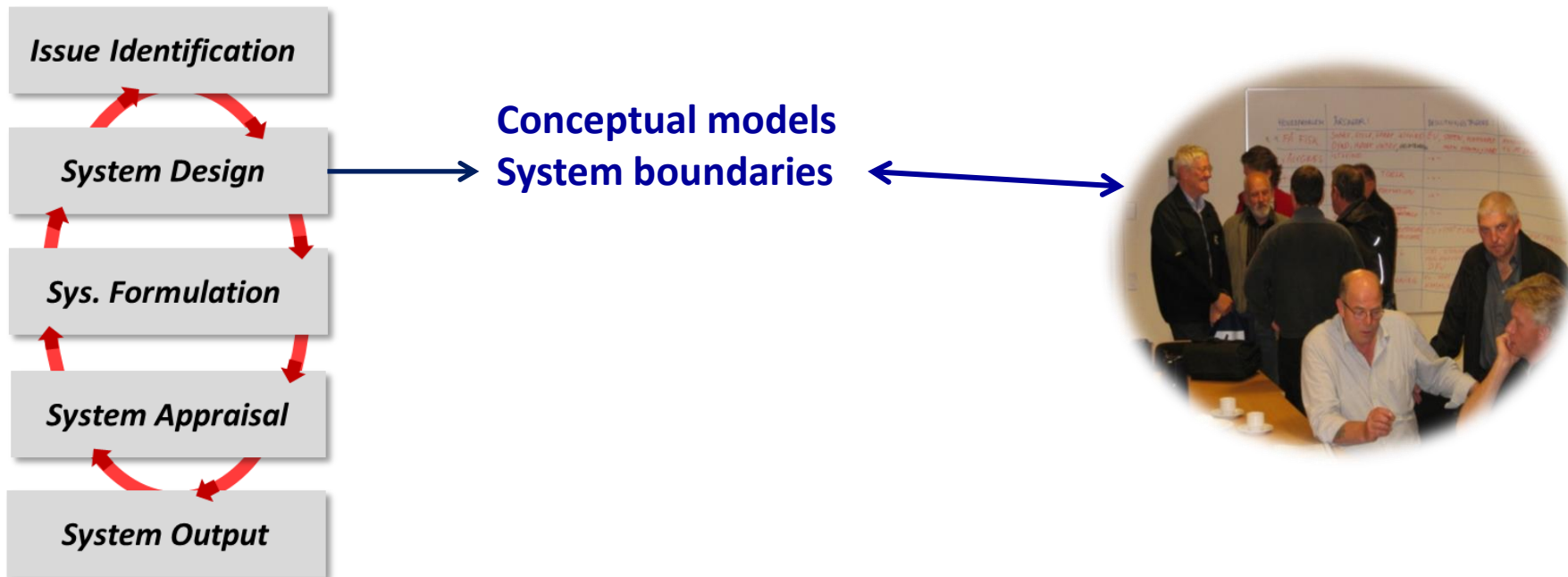
Needs to be solved = sustainable and acceptable to society



Can you think of an Issue?



ESE assessment

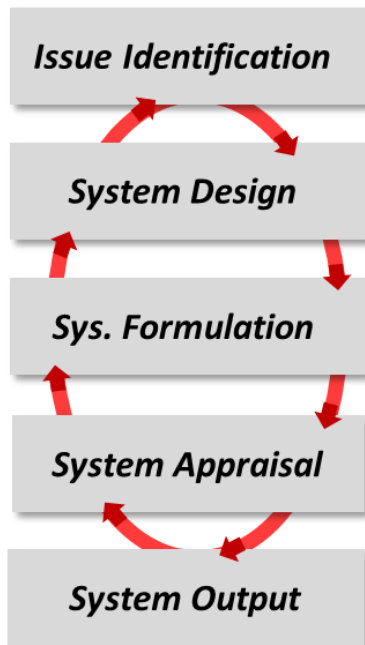




- **Do we need to have a mathematical model?**
- **Do we have enough data?**
- **How complete a model?**
- **Can we include environmental, economic and social data in the model?**



ESE assessment

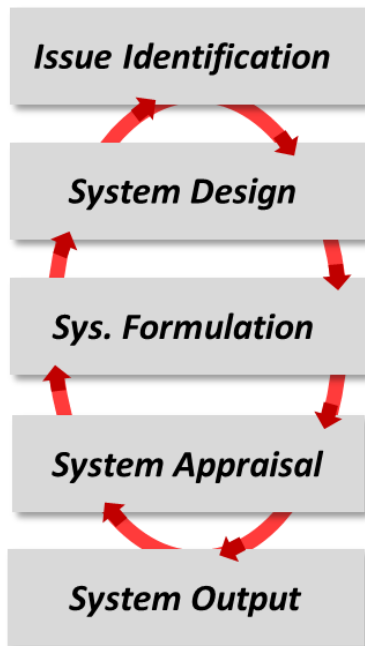


Generating systems model
Calibration and validation
Preparing scenarios





ESE assessment

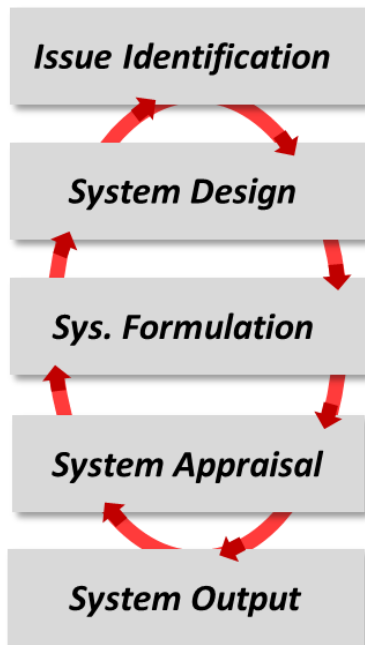


Linking ESE model
components
System simulation of
scenarios
Out preparation





ESE assessment



Running scenarios
Presenting to stakeholders
Evaluation
Deliberation of management options for
Implementation



Questions?

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