PREFERENCE CASE SELECTIONS

CASE I - STRATEGY ANALYSES OF NATIONAL INSURANCE POLICY STRATEGIES

One complex but important issue is insurance design for large-scale insurance compensation. In such cases, there are large uncertainties involved. Nevertheless, such situations require an analytical model providing insights into the effects of imposing different policy strategies for risk management programs. Below, we briefly demonstrate how *Decide*IT can be used for deciding national large-scale policy strategies for public-private insurance and reinsurance design for natural catastrophe events, such as floods or earthquakes.

At a national base, there are several stakeholders involved, e.g., municipalities, insurance companies, individual property owners, as well as central and regional governments. Insurance premiums are paid annually, but individual property owners can normally choose whether to buy insurance or not. This choice affects the outcome both for the individuals and for the insurance companies. The financial consequences of different strategies also depend on factors, such as the compensation level from the government and the insurance companies in the event of a natural catastrophe.

In the analysis, different policy strategies are typically based on large amount of data or models where failures are simulated and where geographical, hydrological, social, and institutional data are taken into account. The generated results are thereafter automatically transposed to decision trees under three stakeholder perspectives. Thus, taking background data into account, the strategies are analyzed with *Decide*IT for evaluating the various costs, criteria and probabilities involved.

INDICATORS

Indicators are used for measuring important outcomes. In an insurance policy design, such indicators can be of various types, for instance, financial, agricultural, cultural or human losses, fluctuations of GDP, or production disturbances. Integrating such with stakeholder interests, decision variables can be obtained. For instance, policy strategies for flood management from a financial perspective can involve factor such as,

- Amount of compensation from government
- Balance for the insurance companies
- Balance for a set of cities or municipalities

POLICIES

Insurance policy designs can be suggested in terms of the indicators, for instance,

- Government compensates a certain percentage of property damages.
- Some amount of the households have private (bundled) property insurances, whereof a certain percentage is risk-based.
- Holders of private (bundled) insurance receive compensation from the insurance companies.
- People should not be forced to leave their properties.
- The insurance premium is based on the property value and the area.

RISK AND CONSEQUENCE ANALYSES

These policies are then evaluated considering the various consequences, e.g.,

- The governmental load is extensive, in extreme occasions up to an unacceptable level.
- Insurance companies become insolvent when an event occurs. Risk reserves are insufficient.
- Property owners with insurance perform very well. Some individuals in high-risk areas can gain a certain amount from an event.
- The average municipality balance is negative in all decades, and with a reasonably probability, the costs are too high according to the general wealth.

DECISION ANALYSIS

Problems to decide reasonable insurance policies are multi-criteria and multi-stakeholder problems. Such problems can be represented in *Decide*IT as decision trees as in the multi-level tree shown below. The most likely outcomes are shown with their probability and value ranges. The last level contains the weights of the stakeholders' importance in the problem. As was mentioned above, there are large uncertainties involved and the information is therefore represented by intervals based on statistical data or earlier simulations as well as confidence interval calculations.

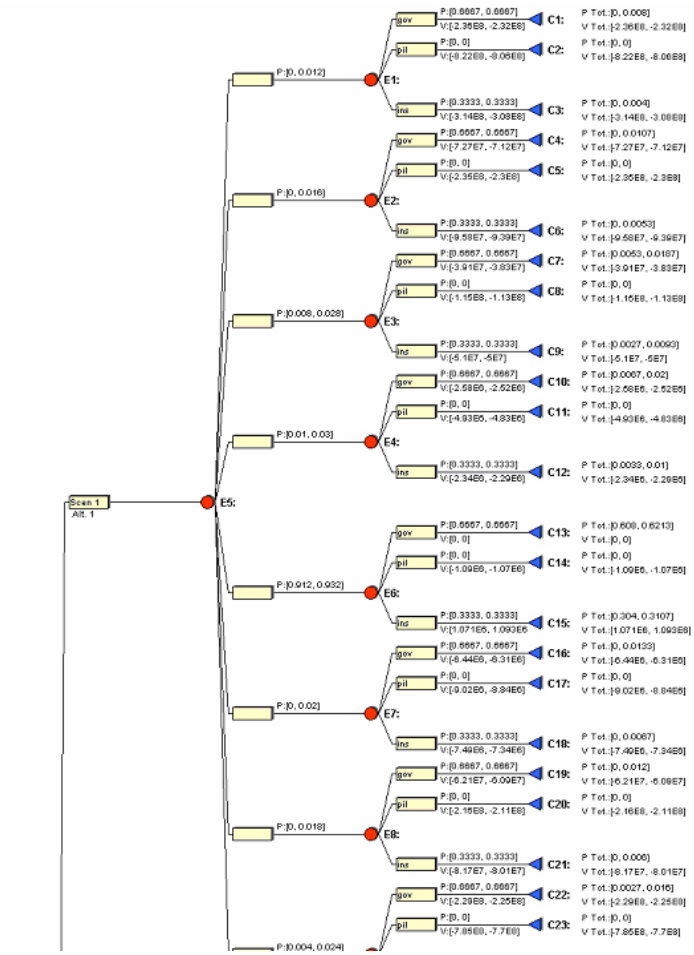

Figure: A multi-level tree

In the figure below, the evaluation of the some strategies is shown as three pair wise comparisons between the alternatives respectively.

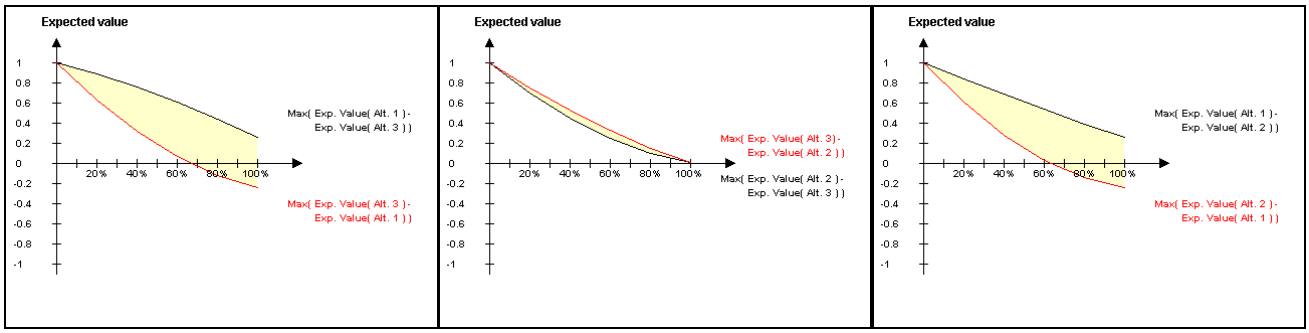

Figure: Example of strategy evaluation

From the above analyses, we can see that strategy 1 is better than both the strategies 2 and 3. However, the strategies 2 and 3 are fairly equal. The latter is important information as well. More information may be needed to separate these and further analysis is required. *Decide*IT provides various tools for localizing particularly critical variables and for investigating whether some strategies might imply unacceptable consequences.

Please contact Preference for further details.