- EXECUTIVE SUMMARY -

An AHP-Expert Choice Model for the Strategic Results Framework of the CGIAR
by
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1 THE STRATEGIC RESULTS FRAMEWORK OF THE CGIAR

The Strategic Results Framework (SRF) of the CGIAR will determine the research strategy pursued by the IARCs. Key elements of the SRF will be a relatively small number of mega programs which bundle research programs and activities.

2 THE DECISIONS TO BE MADE

The task of the Strategy Team is to recommend a SRF to the CGIAR. The design of a SRF requires the Strategy Team members to make complex, difficult choices among many possible courses of action. The Strategy Team has an advisory role and, as a vicarious decision maker, must be able to explain and justify to the CGIAR its strategy recommendations. This imposes additional constraints on the Strategy Team's decision making process.

Decision problems are constructs of the human mind and decisions are therefore always subjective. When several persons are involved in a joint decision, a mechanism must be found that amalgamates the individual decisions into a joint one. This may be achieved in several ways, one of which is to agree on a shared representation of the decision problem combined with individual evaluations of the choice alternatives, and a mechanism for aggregating the individual choices into a joint one.

3 AHP-MECHANICS

The Analytical Hierarchy Process (AHP) is a well-established decision support method. It has proven its worth in R&D decision making in many industries, including agriculture and food. The mechanics of the AHP comprise:

(i) Representation of the decision problem as a hierarchy with three types of levels - global goal at the top of the hierarchy, one or several intermediate levels of criteria, one level at the bottom of the hierarchy which comprises the decision alternatives.

(ii) Evaluation of all items below the global goal with respect to their contribution to or importance for the items at the next higher level of the hierarchy; for instance, all top-level criteria at the 1st level below the global goal are evaluated with respect to their importance/relevance/ significance for that goal; similarly, all alternatives at the bottom of the hierarchy are evaluated with respect to their contribution/relevance/importance for the criteria at the level just above the bottom level. The evaluations may be made by pairwise comparisons, or by assigning numerical ratings. When pairwise comparisons are made a scale of 1 to 9 is commonly used, where 1:= indifference or equality between two items in relation to an item at the next higher level of the hierarchy, and 9:= extremely strong preference for one item over another, or one item is regarded as extremely more important than the other with respect to an item at the next higher level of the hierarchy.

(iii) Synthesis, using matrix algebra, of all evaluations to obtain global and local weights for all items of the hierarchy. The global weight of an item expresses the contribution of that item towards achieving the global goal.

4 AHP-ATTRIBUTES

The AHP has several desirable attributes for the task of defining a SRF by the Strategy Team:
(i) Complexity is reduced by representing the decision problem as a hierarchy; (ii) collective and individual subjectivity are not suppressed; collective subjectivity is reflected in the jointly accepted

representation of the decision problem as a hierarchy, and individual subjective judgments are reflected by the pairwise comparisons that can be made by each member of the Strategy Team; (iii) transparency is assured by reporting to the CGIAR the hierarchy together with the assessments; (iii) consistency is encouraged by consistency indicators; (iv) the sensitivity - or robustness - of the derived weights to changes in the assessments may be computed and visualized.

5 SOFTWARE: EXPERT CHOICE

Various software products are available for implementing AHP. Expert Choice is a proven product with more than 20 years of market presence.

6 THE STRATEGY TEAM'S AHP-EXPERT CHOICE MODEL

After a short introduction to the AHP and an AHP-demonstration with Expert Choice the Strategy Team has decided to represent its decision problem as hierarchy with three levels: (i) global goal; (ii) five goal criteria, and (iii) seven mega programs.

The **global goal** is to fulfill the vision of the CGIAR. The global goal is rendered more specific by three **criteria**:

C1:   Lift annual agricultural (total factor-) productivity;
C2:   Contribute to reduction of hunger and improved nutrition;
C3:   Deliver outcomes in a sustainable way (by using less water and reversing deforestation and soil degradation).

The **mega programs**, as defined by the Strategy Team, are:

MP1:   Agricultural Systems for the Poor and Vulnerable;
MP2:   Institutional Innovations and Markets;
MP3:   Genomics and global crop improvements;
MP4:   Agriculture, Nutrition and Health;
MP5:   Climate Change and Agriculture
MP6:   Water, Soils, and Ecosystems;
MP7:   Forests and Trees.

Members of the Strategy Team rated on a 1-100 scale the criteria with respect to the global goal, and the mega programs with respect to the criteria. Technically, the AHP-model with two levels under the global goal, and ratings is equivalent with a scoring model. Based on average ratings, the following weights for the mega programs obtained:
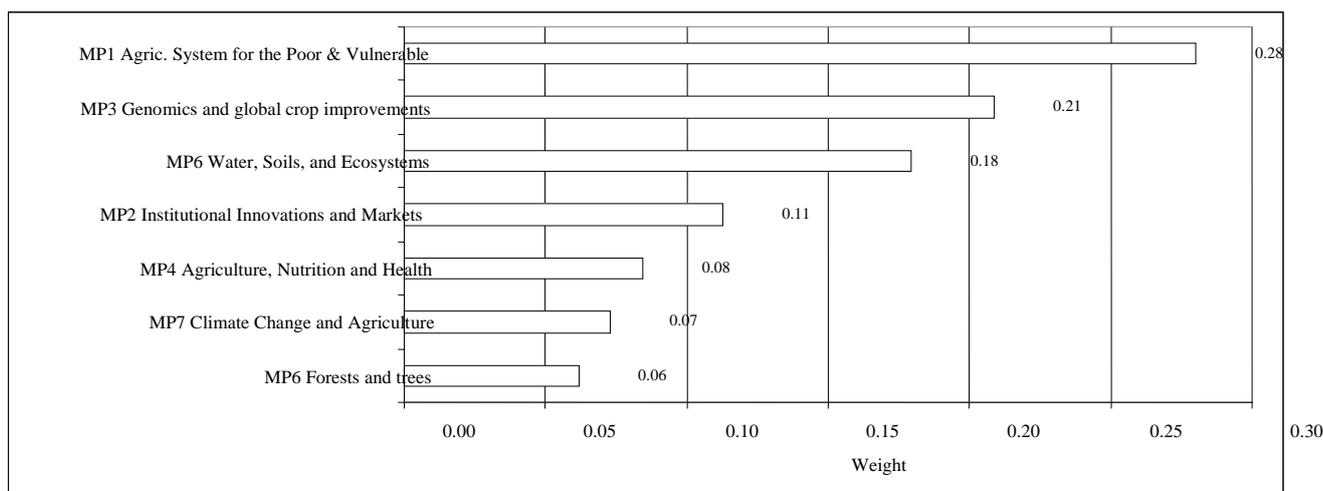
The weights for the mega programs derived from the assessments may be used to guide relative resource allocations to the mega programs.