User Guide for the climate Adaptation Decision explorer (ADx)
Version 2-1 – July 2012

Background: the ADx was conceived as a decision support tool to screen adaptation options and provide guidance on appropriate options. The philosophy of ADx is there is no cure-all method to analyse everything: do not rely on only one approach! According to the 'concept' of the tool, users will be able to access several engines to select adaptation options. Decision-makers will be able to choose an appropriate engine or several different engines - each one being an implementation of a type of approach/method.

July 2012 version 2-1: In this version a AHP method was added to the ADx tool. This is the second 'engine' (i.e. (decision-making method available for selection and application) to be added to the 'shell' (i.e. the meta-level container for selection and comparison of engines). It may be used alongside the 'Voting engine' added in 2011. The shell was developed earlier in a prototype phase in 2008. Common to all methods utilised is the need for prior selection of adaptation options, coded into an XML file which can be read into the ADx tool.
AHP, however, requires the further inputs of goals, criteria and sub-criteria, which were implicit in voting and therefore do not exist as concepts in the xml (although to some extent the information is there in the element fields). The AHP implementation is a modified version of JAHP application (available on sourceforge.org) to deal with the handling of data input and output. ADx now has a GPL license as of this release (2.1). The development of the second engine is important because it allows comparison of results to be made, which is a main purpose of the tool. Currently, if both engines are checked (see figure 1) voting always executes before AHP.
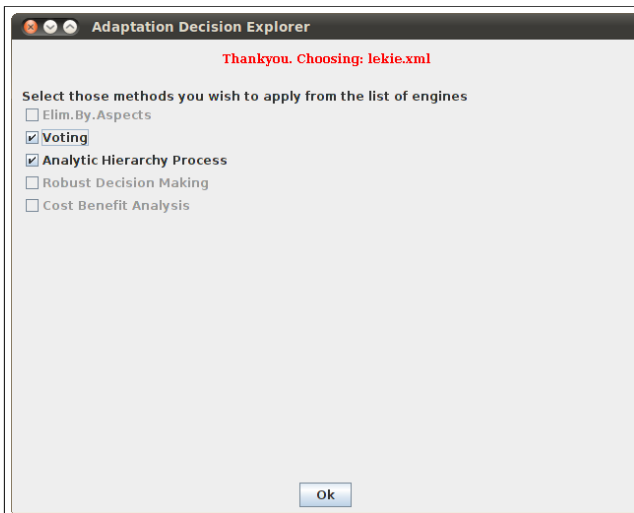
Voting
Voting is a participatory method that is meant to be carried out in a workshop or classroom setting with a facilitator present to guide the group through a series of screens. Each participant (or subgroup of participants) in turn may input his/her/their preferences for particular options. When the last participant has entered information and the "finalize poll" button is clicked we are presented with a results screen showing an average 'score' and an overall ranking for each option.

There are several parameters that can be modified by the group to fine-tune the tool in both the inputting of preferences and the computation of scores and ranks. In the final step, the most preferred options of the voting method are carried forward into a combined results screen, where the results of different decision-making methods can be compared. The voting method and the overall ADx shell has been tested on the Tanzania NAPA agricultural sector adaptation decision screening case. In 2011 the voting method will be tested in participatory exercises with partners with several other cases, i.e. new decision-screening problems that will be introduced, with the objective of finding the conditions of applicability of this method and also making improvements to the specification and to the interface.

AHP
AHP is most often used by a single decision-maker, but can also be used in group settings. In the latter case, participants are obliged to agree on a single value judgement for each comparison pair. This could be seen as a drawback/difficulty, but could also lead to interesting additional discussion. The AHP engine handles the definition of goals, criteria and sub-criteria by taking keyboard input from the user in text fields. In the top panel the decision goal can be added. In the middle panel, the user is prompted to add criteria one by one. In the bottom panel the AHP engine will extract and display the names of the options from the xml file. These appear in a list from which the user may then select a subset for the pairwise comparison. The possibility to select a subset could be useful where there are many options defined in the xml, which would otherwise make AHP very slow to perform, whereas other engines do not have this constraint.

This illustrated guide starts from the point just after the input XML file has been selected and read by the ADx 'shell'.

The ADx has a 'Voting' method and an 'AHP' method available. Options should be ticked (as they are by default) in order to apply them. On moving the mouse cursor of each of these methods 'Tooltips' information can be seen.

If more than one are selected they will be applied in sequence: 'Voting' will be carried out before 'AHP'. The OK button should be pressed to start the methods.
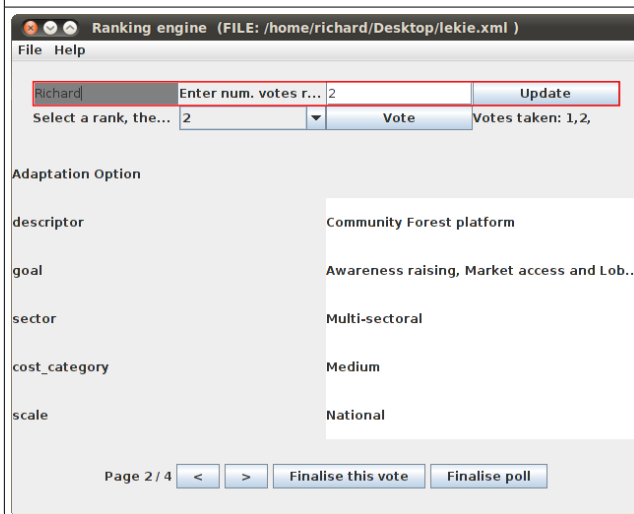
The voting screen allows each participant in turn to input his/her preferences. The name of the current voter should be entered in the text field in the top left corner of the voting 'card'. The number field to the right (and associated update button) can be used to edit the number of votes that each voter is allowed – only the first voter can change the number of chances of voting.

Eg, if there are five options and voter wants to vote for all options they can change the number of chances of voting to 5. Points are awarded based on the votes but these are in a strict sequence (5 points, 4 points. ..etc. 1 point for last option voted for).
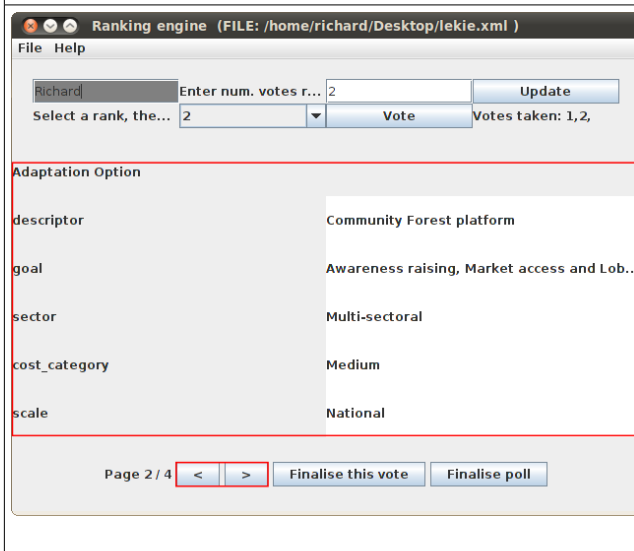
The "adaptation options browser" in the central part of the screen shows the different options and is navigated using the arrow buttons in the bottom panel of the screen.

Votes are applied by selecting from the drop-down box and clicking the 'Vote' button in the top part of the screen.

Any votes already taken are listed on the top right hand side (Votes taken: ..). Votes can be applied in any order and can be changed at any time by reselecting from the drop down.

When the current voter has finished entering information, the vote card can be finalised and registered with the voting engine by clicking 'Finalise this vote'. The final voter should click directly on the 'Finalise poll' button.

The results screen gives a detailed information view on the data held by the voting engine. This takes the form of a table including the adaptation option information read from the XML input file (the first five columns in the table) and collected and computed by the engine (the remaining five columns). The latter set includes total 'points' by combining the votes of each voter. It includes the 'score' which is the total points divided by the number of voters. It includes the 'rank' which is the highest to lowest ordering of scores – in this example 'community forest platform' is ranked first (number 1).


If there are many options, a scroll bar will appear on the right hand side allowing others to be viewed. It is convenient to order them by rank by clicking on the column name.

In the case shown opposite, there are two options tying for second place with identical scores – as a consequence there is no third-placed option. There is a text field for 'No. preferred options' that will determine the number of options that are carried forward into a combined results screen. It is possible to change this parameter from its default value. Click the 'Ok' button to continue.
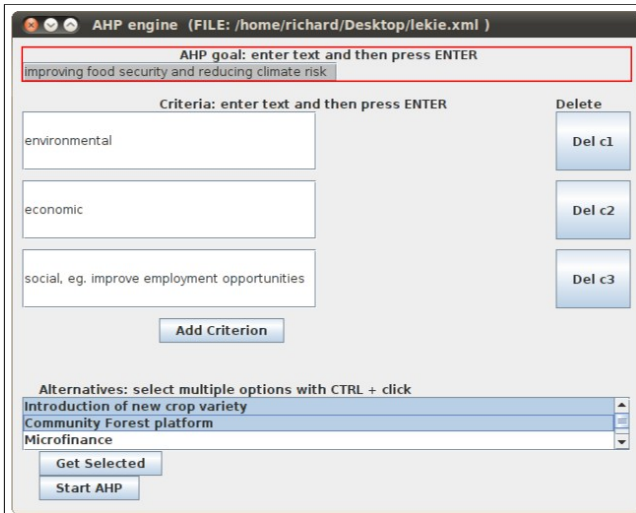
If AHP was selected, it will now start. First there is a screen taking keyboard input from the user in text fields. In doing so, we will follow the hierarchical ordering of concepts in AHP, namely goals, criteria and alternatives (options). These inputs can be modified at a later stage. In the top panel the decision goal can be typed in.
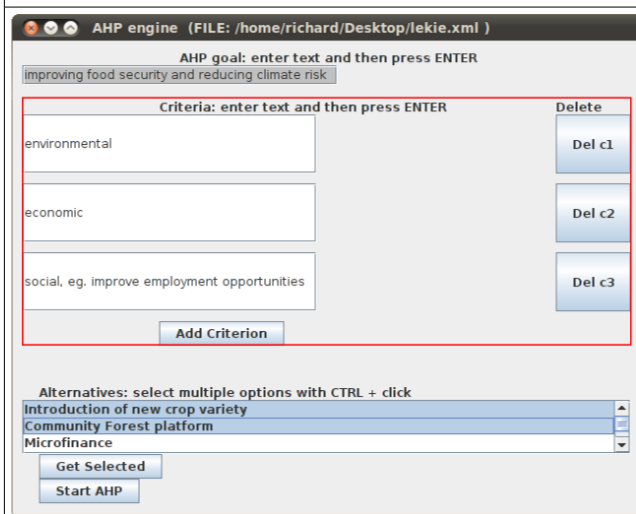
In the middle panel the user is free to add as many criteria as desired. These should be added one by one using the 'Add Criterion' button but they can also be edited, or can be deleted using the respective buttons on the right.

It is advisable to be as specific as possible with the criteria entered, because this will make comparisons easier.
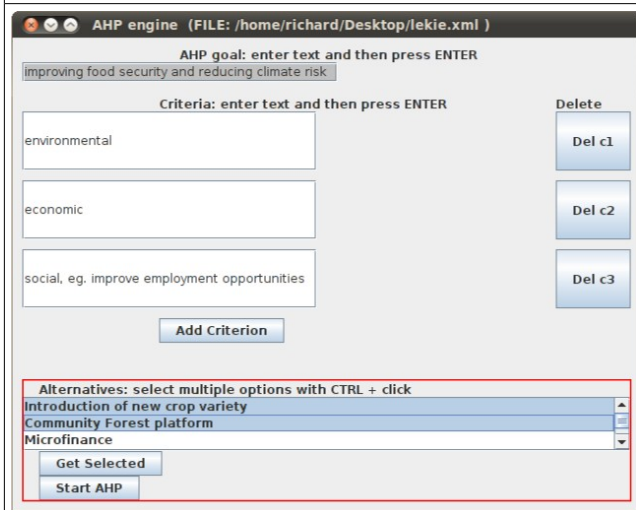

Finally in the bottom panel selects adaptation options from the overall list provided by the ADx shell. Particularly if there is a long overall list, the selection of a subset can improve the speed of application of AHP. Alternatively all options can be selected.
The 'Get Selected' button can be used to check the selection, and 'Start AHP' will record the currently selected options in the hierarchy and will start the main AHP engine (adapted from JAHP).

|	Introduction of new crop variety	Community Forest platform	Microfinance	Training in new livelihood strategies
Introduction of new crop variety				
Community Forest platform				
Microfinance				
Training in new livelihood strategies				

This is a matrix of adaptation options (alternatives) proposed for Leckie case study. The same options are listed in rows as columns. Each blank cell in the matrix corresponds to one pair of options and to one 'slider' for 'pairwise comparison' in the central panel of the AHP window shown below.

A similar matrix can be used to guide the comparison of criteria in relation to goals.
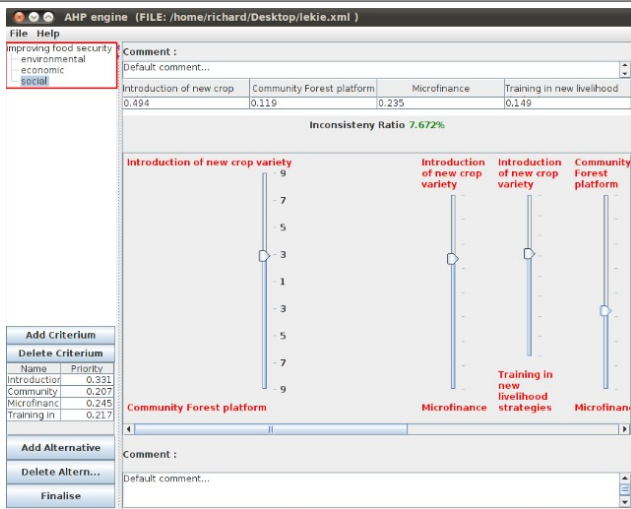
The top left panel shows the goal and options that were input in a tree-like, hierarchical structure. It is possible to edit these entries, and using the buttons below to add or delete entries. It is also possible to add sub-criteria, for example with 'social' criteria highlighted on the left we could use 'Add Criteria' to add sub-criteria to 'social'

We need to have 'social' highlighted to carry out the pairwise ranking of alternatives in relation to their importance to the social decision criterion.
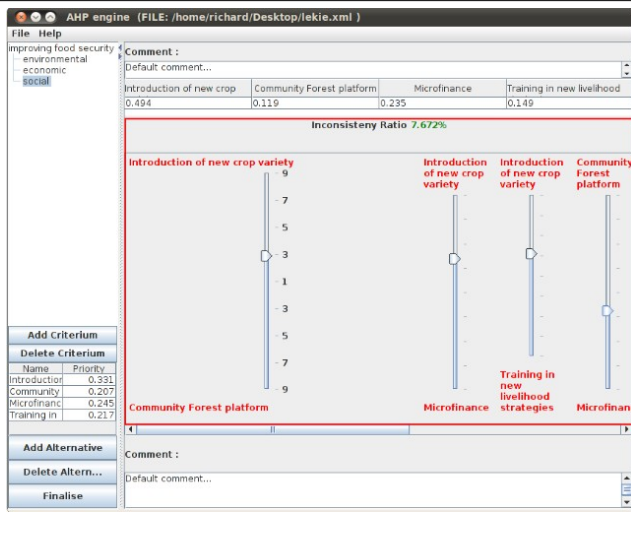
The pairwise ranking is done in the central panel. The alternatives will appear in pairs, labelled at the top and bottom of the sliders. For each pair, move the slider towards the most important alternative for the highlighted criterion and set preference values accordingly:
1 – Equal
3 – Slightly
5 – Strongly
7 – Very Strongly
9 – Extremely
If working in a group, values should be agreed, in a way that establishes the best consensus. Repeat the ranking for each criterion listed in the top left panel.
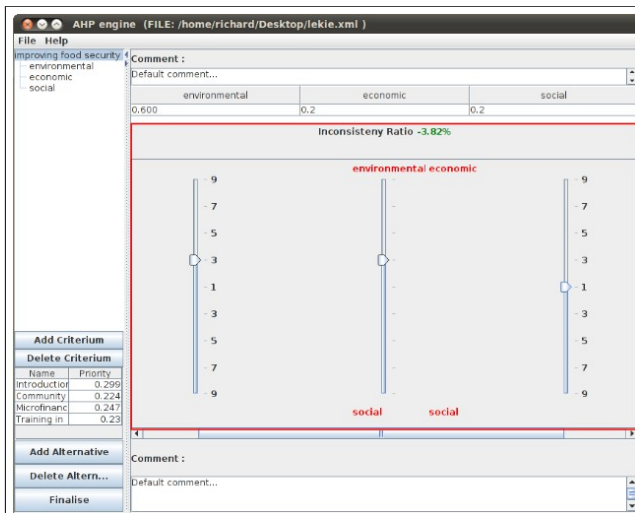
In the same way, perform the pairwise ranking of criteria in relation to the main goal, which should be selected in the hierarchy structure on the right.

Other parts of the frame show the results of the analysis, i.e. the relative priorities of criteria and options, which are continuously updated.

As with the other engine there is a 'Finalize' button which should be pressed to complete the application of AHP.

As with the voting engine, a results screen will appear tabulating information held in the AHP engine. The additional columns show the overall priority values of options and their ranking (the highest to lowest ordering of priorities). The table entries can be ordered by clicking on the column headers.

Any adaptation options that were not selected as alternatives for application of AHP will have n.a. (not applicable) entries in these columns.

Finally, the number of preferred options can be set. This value determines the number of options that are carried forward into a combined results screen. It is possible to change this parameter from its default value. Click the 'Ok' button to continue.

The combined results screen shows the adaptation option information along with a new column added for each selected engine or method. The screen shot illustrates this for an example application of voting and AHP.

Each engine returns a number of preferred options determined from the results table of that engine. Preferred options are shown highlighted with an asterisk. In this case there are three options from the voting (because second place was tied) and two options from the AHP.

This final screen therefore will allow us to compare the results of various methods that have been adopted for the case study.