Understanding gender perspectives in selecting tree species and farming systems using analytic hierarchy process

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Analytic hierarchy process is a decision-making framework used for large-scale, multiparty, multicriteria decision analysis developed by Thomas L Saaty in the 1970s. This framework was adopted and used in TreeFarm module to elucidate the decision-making process in tree species and farming system selection within different gender groups in Sulawesi, Indonesia.[1] Decision-making in the TreeFarm Module is undertaken by identifying:

- Criteria and assigning the relative importance of each criterion in selecting tree species and farming systems
- A range of potential tree species and farming systems in the area, assigning the relative preferences of each species and each farming system with regard to each criterion

In this method, in addition to ranking tree species and farming systems based on preferences, the sole output of the direct scoring method and the relative importance of each criterion are identified. Moreover, ranks of preferences of each tree species and farming system are developed for each criterion. Often, the list of criteria reflects the landscape context and other important information about households and gender classes. The more similar the list among various groups or stakeholders, the stronger the landscape context is, in relation to the larger community.

Gender specificities can be analysed by comparing the lists and ranks of criteria. Targeted interventions can be identified by combining ranks of criteria, species, and farming system preferences within each criterion. The ultimate output will show the tendency and trend of men and women in selecting tree species and farming system (including agroforestry systems) in relation to the wider context of landscapes under various climatic changes and natural disturbances.

[1] The TreeFarm module is developed by Dewi (2013) as part of Capacity Strengthening Approach to Vulnerability Assessment (CaSAVA) tool (Dewi et al. 2013) to analyse decision making in selecting tree species and farming systems that incorporates gender specificities.

Materials

- Flip charts
- Metacards
- Tape
- Pushpins
- Coloured marker pens

Study team

- Facilitator
- Documenter

Steps

1. Prepare to conduct separate discussions for groups of men and women. The discussion can be held parallel, but at different places in the study area. The group participants may represent certain villages, clusters or landscapes within the study areas, with 8-10 participants in each group.

2. Explain the discussion objective, the background of the study, and the general rules at the beginning of the discussion. Encourage participants to think and voice their perceptions based on their daily experiences.

3. Ask the participants to develop a list of existing and potential farming systems (annual cropland, monoculture perennials, mixed perennials, mixed annual-perennials) in their surroundings based on their perceptions. An example is shown in Table 1.

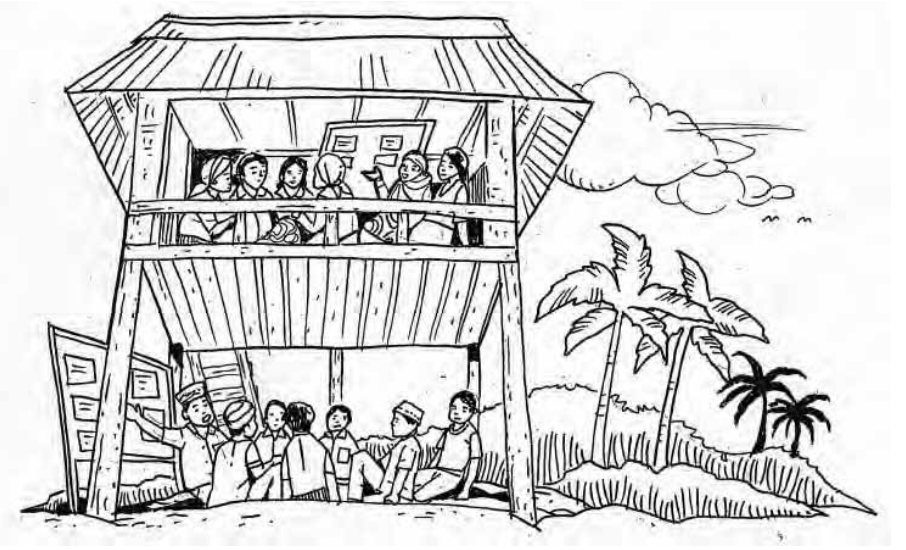

Table 1: List of existing farming systems in the community (the example is taken from a female group)

Farming system	Source of Cash (Yes/No)	Rank (1 = highest source of cash)	Source of Non-cash[a]	Rank (1 = highest source of food)
Annual cropland				
• Paddy	Y	3	1	1
• Patchouli	Y	2	2	
• Maize	Y	1	1	2
Monoculture perennials				
• Rubber	Y	1	3	
• Coconut	Y	2	3, 5	1
Mixed perennials	-	-	-	-
Mixed annual-perennials	-	-	-	-
Shrublands	-	-	-	-
Forest	-	-	-	-

Food=1; Medicinal=2; Timber=3; Energy=4; Handicraft=5; Cultural and aesthetics=6; Livestock=7; Bush meat=8; Other=9

4. Ask the group to rank the farming system according to the degree of importance to farmers (e.g. cash benefits, subsistence).

5. Ask the group to identify criteria for selecting the farming system. The criteria comprised the factors considered by participants when selecting their tree species and farming systems for their managed plots of lands in the community (e.g. price, market access, available technology). An example is shown in Table 2.

Table 2: List of criteria on selecting farming systems (or tree species) in the community.

No.	Criteria	Note
1	Easy to sell	
2	High output price	
3	High availability of seed	
4	Low initial investment	
5	Quick to produce	

6. Assess the relative weight of criteria by comparing each pair of criteria using a score of 1 to 5 based on importance to livelihoods. Put 1/1 if each pair of criterion is identified to be equivalent in terms of preference (equal weights); otherwise 1/5 if one criterion is very strongly preferred than the other. For example, Table 3 means that the third criterion, high availability of seed was extremely important compared to the second criterion (high output price).

Table 3: Criterion (high availability of seed)[a]

Criteria	Easy to sell	High output price	High availability of seed	Low initial investment, need less capital	Quick to produce		
Easy to sell							
High output price							
High availability of seed		5/1					
Low initial investment, need less capital							
Quick to produce							

[a] Criteria weighting is done by comparing each pair of criteria (1=same, 5=extremely strong). In this example, only 5 criteria are given.

7. Assess the farming system weighting in each of the criterion by comparing each pair of farming system using similar procedure. Put 1/1 if each pair of farming system has similar importance to the criterion, and 1/5 if one of the farming systems is very strongly preferred over the other. The weighting 1/5 in Table 4 below means that in terms of market, paddy was deemed far easier to sell than patchouli.

8. Repeat steps 4-7 for tree species selection using the same table templates (Tables 3 and 4) as those for farming system selection

Example of the results in Sulawesi, Indonesia

The method was tested and applied in Sulawesi, Indonesia. The study, including field work and method applications, was fully supported by AgFor Sulawesi Project funded by the Canadian International Development Agency (CIDA). The results showed that:

Table 4: Farming system weighting using criteria identified by the female group[a].

Farming system option	Paddy	Patchouli	Maize	Rubber	Coconut		
Paddy							
Patchouli	1/5						
Maize							
Rubber							
Coconut							

[a] For each criterion, do comparisons between farming system options for couples as in the previous step.

- Among 20 group discussions held, 19 referred to the dominant annual crop types as sources of cash income. The exception was Tahura Nipa Nipa village, where according to the women's group, vegetables are self-consumed.
- The Sulawesi exercise showed that data segregation through parallel discussion sessions by men and women groups was useful in identifying gender differences in tree and farming system selection within the community.
- The dynamism during each group discussion was marked with lively discussions, which were consistently experienced throughout 20 discussions for each gender group, spread in two provinces, 4 districts in Sulawesi.
- List of criteria and relative importance of criteria as well as preferences within each criterion are quite different between the two gender groups and across geographical locations.

Advantages

- The AHP method can be adopted in a wide range of farms, villages, and areas in Indonesia and other countries. It can capture and quantify the variabilities of gender perspectives.

Limitations

- The assessment of farming systems and trees should be done separately, possibly in sequence. The process of listing farming systems should be conducted sequentially to that of tree species. This sequential process will avoid bias and confusion amongst participants because from the farmers' perspective, there is little difference between trees and farming systems.

Key considerations

- During the discussion, facilitators have to be alert in finding any inconsistencies in the series of pairwise comparisons in completing the tables. In such cases, facilitators need to go back and cross check with the participants.
- Often the discussions and reasoning on why people decide to put a particular weight against the others when there are disagreements among participants are very insightful. These notes should be captured, validated and consulted during the analysis of the results.
- If facilitators find that there are distinct sub-groups that continuously disagree with each other, facilitators should capture this and note the characteristics of the members of the sub-groups.
- Facilitators should carefully explain 'criteria' using simple language, and illustrate it with some concrete examples. Make sure participants understand the meaning of criteria because it is key to the method.

Do's and don'ts

- Do employ a good facilitator to run discussions.
- Do use clear and simple language (if possible use the local dialect).
- Do clarify participants' perspectives to ensure that the data are valid.
- Do be familiar with the farming system, species, landscape, culture, etc., to be able to provide examples and illustrations that are familiar to them.
- Don't allow the discussion to be negatively influenced. Don't permit sensitive or out of context conversations.
- Don't direct participants in answering the questions. Let them think about it and respond with their answers. It is sometimes difficult for them to

enumerate and compare the practices and products as they work in these systems and with these products everyday.

Recommended readings

Dewi S. 2012. Questionnaire of TreeFarm Module. Unpublished work.

ICRAF. 2012. Capacity Strengthening Approach to Vulnerability Assessment (Cassava). Module.

Ho W. 2008. Integrated analytic hierarchy process and its applications – a literature review. European Journal of Operational Research. Elsevier. 186:211–228.

Saaty TL. 2008. Decision making with the analytic hierarchy process. International Journal of Services Sciences 1 (1):83–98.