Negotiation-support toolkit for learning landscapes

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9b | Gender perspectives in selecting tree species (G-TreeFarm)[1]

Sonya Dewi, Janudianto and Endri Martini

Gender Perspectives in Selecting Tree Species and Farming Systems using an Analytic Hierarchy Process (G-TreeFarm) reveals two layers of decision-making processes in selecting tree species and farming systems between different gender or other diversified groups, such as migrant and native groups. The tool produces 1) lists of tree species and farming systems based on the order of preferences (what); and 2) lists of selections and the order of perceived importance (why). The first list has direct uses for development programs to identify tree species that people want and the second list can guide to a broader search of tree species and farming systems that match the important criteria that people have, which are not in the first list.

Introduction

An important factor that affects the failure or success of development programs with tree planting and agricultural development is the buy-in and adoption rates of farmers. Understanding the perspectives and aspirations of farmers is crucial, since self-motivation will lead to high adoption rates of any introduced farming or land-use management system. In the past, many landscape rehabilitation or reforestation programs have failed owing to top–down approaches in selecting and introducing types of tree species and farming systems that were imposed on the farmers. On the other hand, there are success stories from development programs that supported and provided technology and good seedling material of tree species that people wanted.

Gender, social and cultural inclusions in a community should be captured to understand the diverse perspectives and preferences in selecting tree species and farming systems. Development programs should respect social diversity by not ignoring minor community groups; often these groups are the stakeholders in need of aid.

Introduction of new tree species and farming systems is often tricky since adoption rates are influenced by many unpredictable factors. However, criteria used for selecting tree species and farming systems can guide the task of searching for suitable new species and systems, along with success stories from other places. Addressing the criteria can also help to reconcile diverse preferences, if necessary, as well as stimulate discussion and negotiation among farmers. In addition, the criteria can be indications of constraints or barriers met in specific local areas that may burden intervention processes in development programs.

[1] This method will also be discussed in Janudianto et al. (2014). A related ranking technique is described by Kiptot and Franzel (2014); specifically for fodder shrubs Carsan et al. (2014) discusses options and preferences.

Analytic hierarchy process (AHP) is a decision-making framework used for large-scale, multiparty, multi-criteria decision analysis developed by Thomas L. Saaty in the 1970s. This framework was adopted and used in the TreeFarm[2] module to elucidate the gender differences in selecting tree species and farming systems in Sulawesi, Indonesia. Decision making in AHP is undertaken by:

- identifying criteria and assigning relative importance to each in selecting tree species and farming systems; and
- identifying potential tree species and farming systems in the area and the relative preferences of each with regard to each criterion.

Objectives

The objective of G-TreeFarm is to first clarify, for different stakeholder groups, the primary functions needed and then focus on which trees, crops and farming systems can fulfil these functions. Subsequent analysis can clarify gender and social differentiation in criteria and knowledge of options to provide the desired functions.

Steps

1. Prepare separate group discussions for men and women. The discussions can be held in parallel in the same area but at different places. The 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 consensus at the beginning of the discussion. Encourage participants to relate the actual field or landscape conditions based on their perceptions and observations.
3. Ask the participants to develop a list of existing and potential farming systems (annual cropland, monoculture perennials, mixed perennials, mixed annual–perennials) based on their perceptions.
4. Rank the farming system according to their importance to farmers (for example, cash benefits, subsistence) (Table 9b.1).

Table 9b.1. List of existing farming systems in the community (the example is taken from a women-only group)

Farming system	Source of cash? (Yes/No)	Rank (1 as the highest source of cash)	Source of non-cash?[a]	Rank (1 as the 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

[2] The TreeFarm module is part of the Capacity-Strengthening Approach to Vulnerability Assessment (CaSAVA) tool developed to analyze decision making in selecting tree species and farming systems that incorporates gender specificities.

Farming system	Source of cash? (Yes/No)	Rank (1 as the highest source of cash)	Source of non-cash?[a]	Rank (1 as the highest source of food)
Mixed perennials	-	-	-	-
Mixed annual–perennials	-	-	-	-
Shrublands	-	-	-	-
Forests	-	-	-	-

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

5 Ask the participants to identify a list of criteria in selecting the farming system based on their perceptions (Table 9b.2). The criteria comprise the background used by participants when selecting the most profitable farming systems in the community (for example, price, market access, available technology).

Table 9b.2. List of criteria on selecting farming systems (or tree species) in the community

No.	Criterion	Notes
1	Easy to market	
2	High price	
3	Available good planting materials	
4	Low labour input	
5	Can be mixed in a plot	
6	Easy to harvest	
7	Quick to produce	

6 Assess the relative weight of the criteria by comparing each pair of criteria using a score of 1 to 5 based on importance to livelihoods (Table 9b.3). Note that the shaded cells should be left empty because the matrix is symmetric and the diagonal cells are left blank since they are self-comparison. Put 1/1 if each pair of criterion has the same weighting; otherwise 1/5 if one criterion has extremely strong weighting compared to another. The first number represents the row cell, the second one the column. For example, the weighting 5/1 of the red shaded cell in the second row, fourth column of Table 9b.3 means that the first criterion (easy to market) was extremely important compared to the second criterion (available good planting materials). Give attention to the weightings that are given, such that there are no conflicts or inconsistencies across the weighting schemes. Ideally, the scores should be entered and tested in the AHP software for consistencies but it is often not possible to be run during a group discussion without disturbing the flow of the discussion. Take notes if there are consistent disagreement among particular sub-groups: it is an indication that there are marked diversity within a group. Explore further what characterize sub-groupings, for example, size of land owned.

Table 9b.3. Criteria weighting (the example is taken from a men-only group in Southeast Sulawesi)

Criterion	Easy to market	High output price	Available good planting materials	Low labour input	Can be mixed in a plot	Easy to harvest	Quick to produce
Easy to market		1/1	5/1	5/1	5/1	5/1	1/1
High output price			1/1	1/1	3/1	1/1	1/1
Available good planting materials				1/1	1/1	1/1	1/1
Low labour input					3/1	1/1	1/1
Can be mixed in a plot						1/3	1/3
Easy to harvest							1/5
Quick to produce							

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

- Assess the farming system weighting in each of the criterion by comparing each pair of farming systems with a similar procedure. In the example in Table 9b.4, we seem to have a tree species list but in this area farmers manage their farm mostly in mixed systems: fruit farming system means various fruit tree species dominate the plot, which has several other species as well. Put 1/1 if each pair of farming systems has similar importance to the criterion and 1/5 if one of the farming systems is extremely important compared to the others. The weighting 1/5 in the red shaded cell of Table 9b.4 means that in terms of marketing, pepper was deemed far easier to market than patchouli. Similarly to Step 6, pay attention to inconsistencies.

Table 9b.4. Farming system weighting using criterion 'easy to market' identified by a male group

Tree-Farming	Patchouli	Cocoa	Pepper	Fruit	Timber	Coconut	Sago
Patchouli		1/5	1/5	1/5	5/1	5/1	1/5
Cocoa			1/1	5/1	5/1	5/1	1/1
Pepper				5/1	5/1	5/1	1/1
Fruit					5/1	5/1	1/5
Timber						1/5	1/5
Coconut							1/5
Sago							

Note: For each criterion, do comparisons between farming system options for couples as in the previous step

8. Conduct similar steps for tree species selection using a similar table. Create a list of existing and potential tree species (Table 9b.1), identify a list of criteria in selecting the tree species (Table 9b.2) and conduct the criteria weighting and tree species weighting (tables 9b.3 and 9b.4).
9. Enter the data in spreadsheet format and run the AHP software to get the results. Table 9b.5a shows an example of results: low labour input is being perceived as by far the most important criterion, which perhaps indicates other livelihoods' options and/or available labour market. Introducing a farming system that is labor intensive to this group will have a low probability of success. Table 9b.5b shows the weighting results of farming systems based on each criterion. For example, in terms of low labour input, patchouli and pepper systems are the two most-preferred systems. Cocoa and pepper are perceived as the most preferred as far as easy to market is concerned. Table 9b.5c shows the combined weights between criteria and preferences based on each criterion. Patchouli comes first, mostly because it is being perceived as having low demand for labour compared to other farming systems, while low labour input is the criterion most important within the list of criteria.

Table 9b.5a. Ranking of importance of criteria

Criterion	Weight	Rank
Low labour input	0.4454	1
Easy to market	0.1804	2
Easy to harvest	0.0990	3
Quick to start producing	0.0934	4
Planting material is easily available	0.0685	5
High output price	0.0618	6
Can be mixed	0.0515	7

Table 9b.5b. Weightings of farming systems based on each criterion

	Easy to market	High price	Available good planting materials	Low labour input	Can be mixed in a plot	Easy to harvest	Quick to produce
Patchouli	0.0663	0.1262	0.1328	0.2850	0.0513	0.0807	0.4519
Cocoa	0.2464	0.0614	0.1805	0.1148	0.1146	0.0807	0.1420
Pepper	0.2464	0.1378	0.1805	0.2467	0.0449	0.0807	0.1420
Fruit	0.0827	0.0417	0.1805	0.1319	0.2609	0.3278	0.0796
Timber	0.0396	0.2082	0.1647	0.0719	0.2245	0.0511	0.0523
Coconut	0.0880	0.2582	0.1328	0.1148	0.2609	0.3278	0.0680
Sago	0.2306	0.1665	0.0282	0.0350	0.0430	0.0511	0.0643

Table 9b.5c. Rank of preferences of farming system across all criteria

Farming systems	Weights	Rank
Patchouli	0.2086	1
Pepper	0.1988	2
Coconut	0.1443	3
Fruit	0.1419	4
Cocoa	0.1389	5
Timber	0.0848	6
Sago	0.0827	7

Example of application

The method has been applied in 40 villages in Sulawesi, across gender groups, and showed some interesting findings regarding the perceptions of male and female groups on an existing farming system, variations of preferences in tree species and farming system, and criteria perceived as most important in selecting tree species and farming system.

- Across the 20 group discussions held in different places, the variations in lists of criteria and the orders of importance were marked. In addition to low labour input and easy to market criteria, land and climate suitability, food self-sufficiency, customary and cultural values, acquired cultivating skills, long productive lifespan and multiple benefits of the farming system were perceived as being important. The local context, such as cultural factors, market access, infrastructure, land access etc, shaped the criteria and their importance in selecting tree species and farming systems. This finding can be used to guide broader research of potential tree species and farming systems than what appeared in the list during the discussion.
- The Sulawesi exercise showed that segregation data was possible to collect through the separate-but-parallel discussion sessions with male and female groups. The gender differences were clearly shown in the process of tree and farming system selection within the community. As an example, the results of the women-only group of the same study area as the example given above show more even weightings across criteria but nevertheless low labour input is the lowest while land and climate suitability is the highest. The two gender groups agree that the criterion 'easy to market' is the second-most important criterion.

Key references

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

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

The landscape scale is a meeting point for bottom–up local initiatives to secure and improve livelihoods from agriculture, agroforestry and forest management, and top–down concerns and incentives related to planetary boundaries to human resource use.

Sustainable development goals require a substantial change of direction from the past when economic growth was usually accompanied by environmental degradation, with the increase of atmospheric greenhouse gasses as a symptom, but also as an issue that needs to be managed as such.

In landscapes around the world, active learning takes place with experiments that involve changes in technology, farming systems, value chains, livelihoods' strategies and institutions. An overarching hypothesis that is being tested is:

> Investment in institutionalising rewards for the environmental services that are provided by multifunctional landscapes with trees is a cost-effective and fair way to reduce vulnerability of rural livelihoods to climate change and to avoid larger costs of specific 'adaptation' while enhancing carbon stocks in the landscape.

Such changes can't come overnight. A complex process of negotiations among stakeholders is usually needed. The divergence of knowledge and claims to knowledge is a major hurdle in the negotiation process.

The collection of tools—methods, approaches and computer models—presented here was shaped by over a decade of involvement in supporting such negotiations in landscapes where a lot is at stake. The tools are meant to support further learning and effectively sharing experience towards smarter landscape management.

World Agroforestry Centre
ASB Partnership for the Tropical Forest Margins
AARD
Federal Ministry for Economic Cooperation and Development
Norad
IFAD Enabling poor rural people to overcome poverty
CGIAR Research Program on Forests, Trees, and Agroforestry