Environmental aspects of viability of agroecological practices in Africa

Participatory Cost Benefit Analysis Group Discussion Protocol

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Background

Agroecological practices are expected to deliver multiple economic, social, environmental and livelihood benefits to farmers and communities. However, conventional assessments of the performance of agricultural systems typically only consider a limited set of indicators, such as yield, gross or net income, or returns to labour. The Viability Project seeks to understand **"the extent to which agroecological practices are useful to farmers and farm households and meet their multiple needs, wishes, constraints and concerns…"** or in other words, the viability of agroecological practices as assessed by farmers.
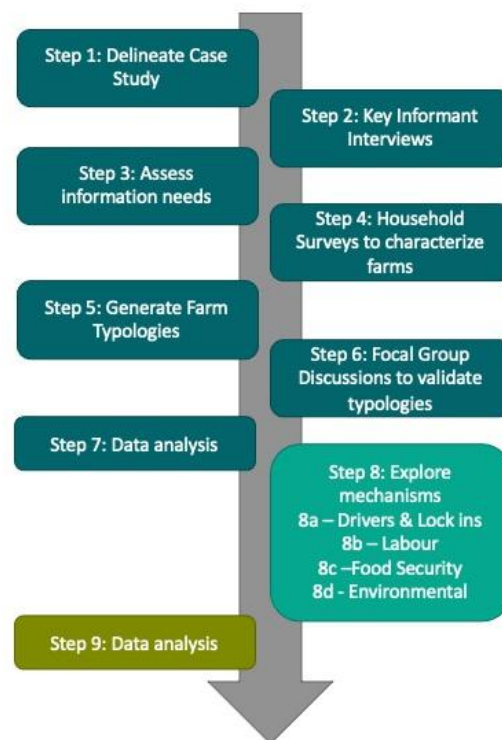
FIGURE 1 STRUCTURE OF THE VIABILITY PROJECT. THIS WORKSHOP PROTOCOL IS PART OF STEP 8D – ASSESSING ENVIRONMENTAL DIMENSIONS OF AGROECOLOGICAL VIABILITY

Environmental processes and impacts are a key dimension of agroecology, and are included in most definitions of agroecology. In this activity, **we seek to understand the extent to which environmental factors contribute to farmers' assessment of the viability of agroecological practices in their context**.

An underlying assumption of the project is that if agroecological practices contribute to farm viability, then farmers will be more likely to use agroecological practices. Thus, the literature on technology use and change offers a useful starting point for assessing the contribution of environmental services to agroecological viability. Adoption of an agricultural practice has been shown to depend on a large number of factors, from properties of the practice itself, to demographic and biophysical characteristics of the farm and farming household, to availability of information on the technology, to social connections, to institutional support and to environmental awareness (Arslan et al., 2020; Knowler & Bradshaw, 2007; Kuehne et al., 2017). Adoption can be thought of as an iterative social process involving four main components: propositions, encounters, dispositions and responses (Glover et al., 2019), as well as farmers' pre-existing beliefs and attitudes. This framework (Figure 2) then serves as the basis for data collection for understanding the role of environmental services in farmer's assessment of agroecological viability in Step 8d.
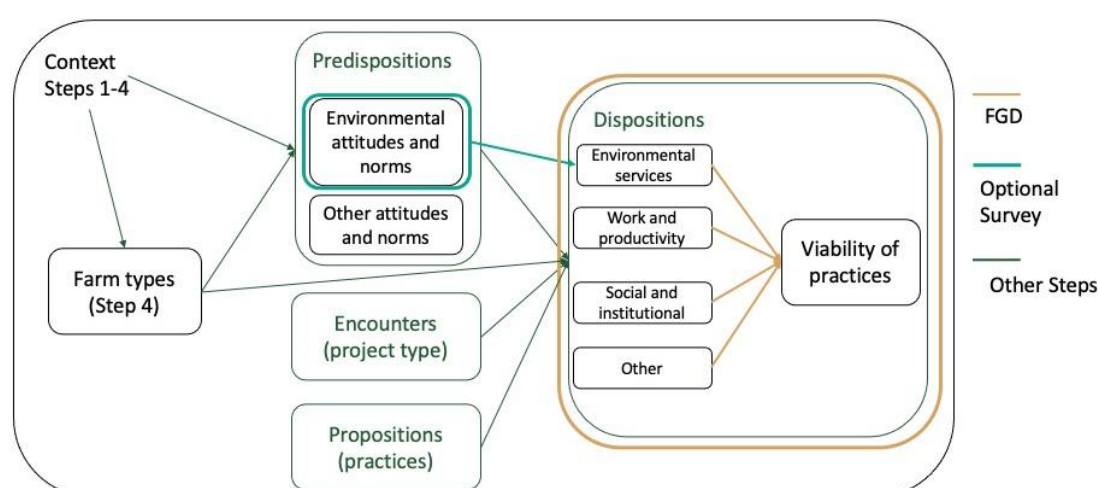
FIGURE 2 FRAMEWORK FOR ASSESSING CONTRIBUTION OF ENVIRONMENTAL FACTORS TO FARMERS' PERCEPTION OF VIABILITY OF AGROECOLOGICAL PRACTICES. THIS WORKSHOP PROTOCOL FOCUSES ON THE "DISPOSITIONS" BOX HIGHLIGHTED IN YELLOW

We developed and tested a process for understanding factors in the Dispositions box of Figure 2. It is based on focus group discussions with farmers and the full protocol is below.

Ideally, we would then add investigation of the Predispositions element of Figure 2. This requires individual-level data and careful development of context-specific attitude scales. We could not devise a general protocol for doing that. However if there are case study teams interested in pursuing it we would be pleased to work with them.

Overview of the focus group discussions (FGDs)

This research is a structured as a **participatory cost-benefit analysis**, where a group of farmers will identify the main advantages and disadvantages of different farm types (sets of practices) that are specific to their context. The group will then give an overall assessment of the viability of each farm type, considering all the identified costs and benefits. This protocol is based on the protocol developed by Mkindi et al. (2021) to assess the costs and benefits of botanical pesticides for smallholder farmers in Tanzania.

Each FGD is intended to be approximately a half-day exercise, taking between 3 and 4 hours to complete.

Generating local farm types

Before you begin, the case study team should have completed Steps 4-6 of the Viability Project activities (see Figure 1). Specifically, you will need to have generated a typology of farm types (Step 5) for your case study context. This typology puts farms and farmer households into groups characterized the common farm practices and household attributes found within your case study.

Based on the existing Typology, you will need to select **at least two Farm Types**, one representing a less agroecological farm and one a more agroecological farm. You may select additional farm types from your typology, but not more than four or data collection will take too long. It is important that the farm types you select are common in the study area and will be familiar to the workshop participants. Thus, if a farm type was very rare in your case study (practiced by <10% of farmers) then it may be best to leave that type out of the analysis.

For example, the ICRAF Kenya case study team identified three main Farm Types in their study area based on Steps 4-6:

Farm Type 1	Farm Type 2	Farm Type 3
• Use compost manure • Intercrop with legumes • Use fallowing and box ridges for • Source of knowledge is farmer groups This is considered 'least agroecological' and is conventional practice in the area	• Use animal manure • Keep livestock • Own agricultural equipment • Source of knowledge is shopkeepers/input distributers This is considered more agroecological as crop and livestock production are closely integrated.	• Have home gardens • Use crop rotation • Use mineral fertilizers • Practice mixed cropping • Practice agroforestry • Source of knowledge is demonstration trials This is also consider more agroecological that Type 1.

These farm types and the typology will also serve as the basis for selecting participants for the workshop.

Note that Step 8abc of the project, that focuses on work, is also based on a selection of the farm types identified in Step 4, suggesting selecting 2 (more and less agroecological). Selecting the

same types for study in Step 8abc and Step 8d would be optimal. See Section 3.1 of Step8abc_GeneralApproach_10une22.doc.

Sampling Strategy / Participant Selection

Participants in the workshop should be farmers from your case study site/s. At least two groups should be assembled, one representing "less agroecological" farmers and one representing "more agroecological" farmers based on the typology of farms in your case study area (Figure 3).

FIGURE 3 FARMERS SELECTED FOR FGDS BASED ON CURRENT PRACTICES

Each workshop group should have about 10 participants each. The participants will work in one group throughout the workshop, so keeping numbers low enough to enable all group members to participate is key. If you have more than about 10 farmers, you could consider splitting them into two groups and running the workshops in parallel[1]. Optionally, groups could also be subdivided into men and women groups if case study teams are interested in gender dynamics as well (Figure 4).
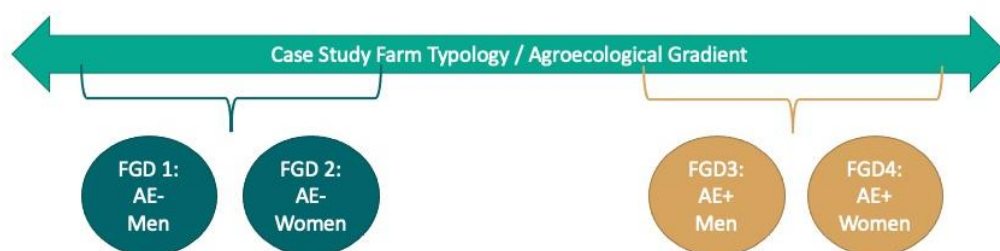

FIGURE 4 PARALLEL FGDS FOR MEN AND WOMEN IS RESOURCES ALLOW

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[1] This would increase sample size for each farmer type. You may want to add plenary activity where groups would share their assessments with each other. We imagine Activities 1 & 2 would be in plenary, then Activities 3-5 would happen in the groups, and a final closing plenary activity 6 for sharing back results and discussion of similarities/differences.

Running each Workshop (FGD)

Materials need
- Flip charts or large format paper
- Cards or sticky notes in multiple colours
- Tape
- Marker pens
- Appropriate Covid19 protective supplies

Setting up the Space

Working with the community group, identify an appropriate space for the discussion, which is readily accessible for your participants. It is important that participants are all able to see and discuss the materials that are generated, so an indoor location with walls for hanging up flip chart sheets is ideal. However, an outdoor location where materials can be mounted on flip charts or laid on the ground will also work.

Before you begin

Ahead of time, prepare flip chart sheets for each of the farm types you will discuss in the workshop. These sheets should include a description of the main crops grown, practices used, or other key attributes used to delineate the farm type in your analysis, such as assets, access to information, land size, etc. Your sheet might look something like this:

Activity 1: Introductions (15 min)

1. Welcome your participants as they enter the space.
2. Observe necessary protocols/customs for opening a meeting.
3. Introduce yourself / your team
4. Have the participants introduce themselves
5. Ice-breaker. If your group is not familiar with each other, you may want to add a small ice-breaker activity to make everyone more comfortable.
6. Explain to the participants why you are here and the purpose of the workshop.
   a. To share results from the household surveys they participated in earlier
   b. To understand their perspectives on the advantages and disadvantages of the farm types identified in the survey activity.
7. Share appropriate ground rules for the work today
   a. Respect each other's opinions
   b. Give space for everyone to speak
   c. There are no right or wrong answers

Notes:

Activity 2: Establishing Farm Types (45 min)

1. Facilitator will introduce the idea of "Farm Types" to the participants.
   o There are many ways to farm in our area, and lots of different practices that farmers use. I'm going to describe a type of farm that is typical in our area…
2. Using the Flip Chart sheets you have prepared ahead of time, describe Each Farm Type
   a. "In our area, some farms grow XXXX crops, use XXX practice and have XXX assets…"
3. Verify the Farm Type
   a. Does this farm type sound familiar?
   b. Do we need to change, add or subtract anything in the description?
   c. What name would you give this farm type?
4. Repeat for all of your farm types.
5. Display the Farm Type Descriptions prominently so that they can be referred to later.

Notes:

The farm types are derived from the household surveys that took place in your case study site, so they should be familiar to your participants. If, however, a farm type is unfamiliar to the group, you can eliminate it from the rest of the activity.

Try to keep the group at an appropriate level of detail when describing the farm type. It's important to know if a farm type uses intercropping, but not necessary to know the exact spacing or order of rows in the intercrop! Farmers are experts in these practices, so you may need to reign in the discussion so that this exercise doesn't take too long.

Activity 3: Advantages of each Farm Type (45 min)

In this activity, the farmers will identify and score the advantages for each of the farming types they agreed on in the previous activity.

Prepare a flip chart sheet for each of your farm types, and write the name of the farm type and the word "Advantages" at the top. Divide each sheet into three equal sections, labelled "+ + +", "+ +" and "+". This will indicate the score or relative importance of each advantage identified. Your prepared sheets should look something like this:
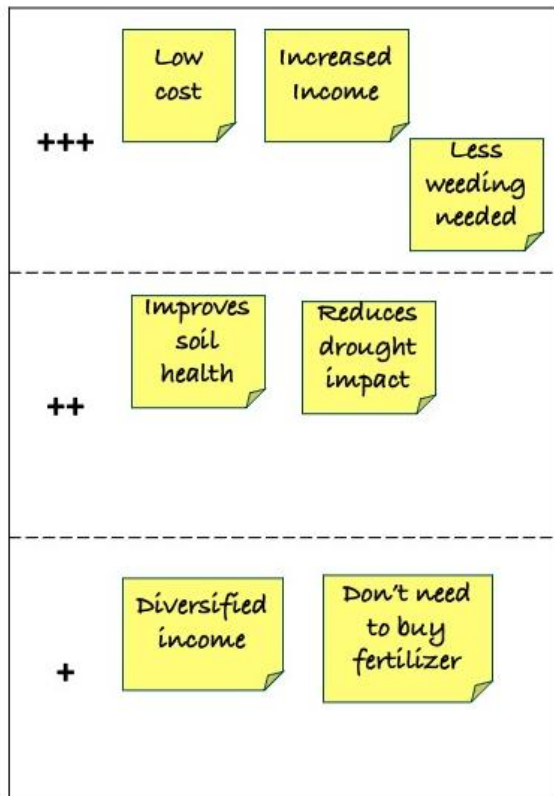
Farm Type 1: Advantages
+++
++
+

Farm Type 2: Advantages
+++
++
+

Farm Type 3: Advantages
+++
++
+

1. Facilitator will introduce the exercise by explaining what is meant by "Advantages"
   a. What are the advantages of this farm type compared to another?
   b. What would a farmer get out of this type of farming?
   c. What are the positive impacts of farming this way?
2. Hand out sticky notes or cards to the participants
3. Begin with the **least agroecological** of your Farm Types.
4. Ask them to brainstorm advantages for Farm Type 1.
   a. Write the advantage on the note
   b. Use a new note/card for each advantage you can think of
5. Identify advantages.
   a. Ask one participant to share an advantage they came up with.
   b. Ask if anyone else had that advantage. Collect the similar sticky notes and agree on a consolidated advantage.
6. Score the advantage
   a. Ask the participants how important that advantage is. Is it the most or critically important? Somewhat important or not very important?
   b. Place the sticky note for the advantage in the correct spot on the board.
   c. There is no limit to how many advantages can be in each category.
7. Ask if the advantage applies to the other farm types
8. If yes, create another sticky note and score the advantage for that farm type.
9. Go back to Step 5.
   a. Ask a different participant to list another advantage that hasn't been mentioned yet.
   b. Consolidate and score that advantage for Farm Type 1.
   c. Consider if the advantage also applies to the othe Farm Types.
   d. Repeat until all advantages have been identified.
10. Prompt the Group for completeness.
    a. Have we captured all the advantages? Are we missing anything?
    b. If the group has only identified advantages related to production or livelihoods, you may prompt them for other types of advantages (social, environmental, off farm, etc.)

11. Repeat for all remaining farm types.

You should end up with flip charts that look something like this:

Notes:

Activity 4: Disadvantages of each Farm Type (45 min)

Now we will repeat the activity, but focus on the disadvantages or costs for each Farm Type.

Prepare a flip chart sheet for each of your farm types, and write the name of the farm type and the word "Disadvantages" at the top. Divide each sheet into three equal sections, labelled "- ", "- -" and "- - -". This will indicate the score or relative importance of each disadvantage identified. Your prepared sheets should look something like this:

Farm Type 1: Disadvantages	Farm Type 2: Disadvantages	Farm Type 3: Disadvantages
-	-	-
- -	- -	- -
- - -	- - -	- - -

1. Facilitator will introduce the exercise by explaining what is meant by "Disadvantages"
   a. What are the disadvantages of this farm type compared to another?
   b. What would be expenses from this type of farming?
   c. What are the negative impacts of farming this way?
2. Hand out sticky notes or cards to the participants
3. Begin with the **least agroecological** of your Farm Types.
4. Ask them to brainstorm disadvantages for Farm Type 1.
   a. Write the disadvantage on the note
   b. Use a new note/card for each disadvantage you can think of
5. Identify disadvantages.
   a. Ask one participant to share a disadvantage they came up with.
   b. Ask if anyone else had that disadvantage. Collect the similar sticky notes and agree on a consolidated disadvantage.
6. Score the disadvantage
   a. Ask the participants how important that disadvantage is. Is it the most or critically important? Somewhat important or not very important?
   b. Place the sticky note for the disadvantage in the correct spot on the board.
   c. There is no limit to how many disadvantages can be in each category.
7. Ask if the disadvantage applies to the other farm types
8. If yes, create another sticky note and score the disadvantage for that farm type.
9. Go back to Step 5.
   a. Ask a different participant to list another disadvantage that hasn't been mentioned yet.
   b. Consolidate and score that disadvantage for Farm Type 1.
   c. Consider if the disadvantage also applies to the other Farm Types.
   d. Repeat until all disadvantages have been identified.
10. Prompt the Group for completeness.
    a. Have we captured all the disadvantages? Are we missing anything?
    b. If the group has only identified disadvantages related to production or livelihoods, you may prompt them for other types of advantages (social, environmental, off farm, etc.)
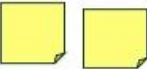
11. Repeat for all remaining farm types.
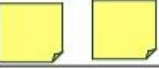
You should end up with flip charts that look something like this:
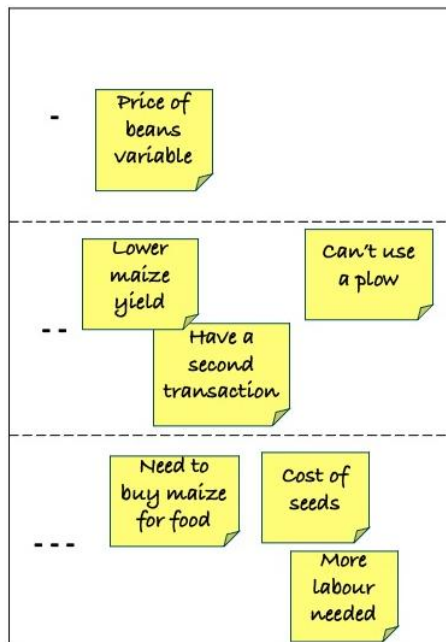
Notes:

Activity 5: Weighing the Costs & Benefits (30 min)

To complete the workshop, you will lead your participants in a group discussion weighing the advantages and disadvantages of each of the farming types. Try to arrange the flip charts generated for each farm type somewhere where everyone can see them. Use a wall to organize all of the information if possible.

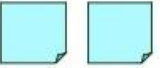|	FT 1: Monocropping	FT 2: Legume Intercropping	FT 3: Livestock Integration
+++	□	□ □	□ □ □
++	□	□	□ □
+	□ □	□	
-	□	□ □	□ □
--	□ □	□	
---	□		□

You will need:

- Cards or sticky notes
- A rapporteur to help capture the discussion

1. Overall Assessment of Farm Types
    a. Begin with the first farm type.
    b. Ask the participants to give the farm type an overall rating of positive, negative or netural.
        i. **Considering all of the advantages and disadvantages that we have identified…Do you feel that this farming type is overall advantageous or disadvantageous?**
    c. Capture the reasons WHY the farm type is getting this rating
        i. **Why is it overall advantageous/disadvantageous?**
        ii. Do the costs outweight the benefits (or vice versa)? Why or why not?
        iii. Make sure to have someone able to take notes for you!
        iv. You might want to add any new ideas that come up to the flip charts.
        v. Feel free to ask probing questions.
    d. Give the Farm type it's overall rating. You could use marks like ☺ ☺ ☹ or +/0/- . Whatever works for you!
    e. Repeat this conversation for each of the Farm Types.
        i. **Please note – there is no requirement that Farm Types be given different scores. All could be scored as positive or all negative. It's completely up to the group!**

2. Comparison of Farm Types
    d. Ask the group: **Which is the most advantageous farm type? Why?**
        i. Capture most advantageous and least advantageous farm type
        ii. Capture the main points fo the discussion. How is the group deciding?
        iii. Feel free to ask probing questions.
    e. **Which farming system do most people practice? Why?**
    f. **Do you practice the most advantageous farm type? Why or why not?**
    g. If additional factors come up, add them to the charts and assessment.
        i. For example, if they say livestock is the most advantageous, but no one is doing it because they can't afford to buy a cow then this should be captured as a negative…

Activity 6: Closing

Conclude the workshop by thanking the participants for their time and participation in the day's discussions. Inform the participants of what to expect going forwards, how the information will be used. Observe correct local protocols and formalities for closing the meeting.

Be sure to capture all of the outputs from the workshop. Take legible photos of the materials produced, and carry the originals with you if possible.

Data capture and processing

Field recoding
The types of information and suggested ways of recording each are listed in the table below.

TABLE 1 TYPES OF DATA

Data type	Recording	Comments
Meta data on the group, location, etc	Notes	
Farm types evaluated	Notes use to record information on farm types provided to farmers and reported by farmers	The origin of the typology (eg analysis of data from Step 4) and selection of types to study will be needed for reporting
Advantages and disadvantages	Notes or photos of the boards with farmer generated results	There will probably be important comments not captured on boards so note taking is necessary
Balance and reasons	Notes or photos of the boards with farmer generated results	

Organising

The data is essentially qualitative but well structured. As usual with qualitative data, the original records (notes, photos, etc) need to be kept securely for reference during analysis.

The core data should be kept in a structured way to facilitate analysis withing each case study and synthesis across studies.

An Excel workbook has been designed to capture the core data. See…. , which includes data from the pilot exercise in E Kenya. It contains 4 sheets, one for each of the data types listed in Table 1. The sheet named 'Raw data' is the only one that needs explanation.

The sheet 'Raw data' contains the data on each factor that is identified as an advantage or disadvantage. There is a row of data for each factor mention as advantage or disadvantage for each farm type in each group. The data illustrated in Figure 5 would thus generate 7 rows of data. The factors identified should be organised to remove duplicates from any group before data entry. For example, if there is an item 'Price of beans variable' (Fig 5) and another 'Uncertain price of beans' these can be combined before data entry.
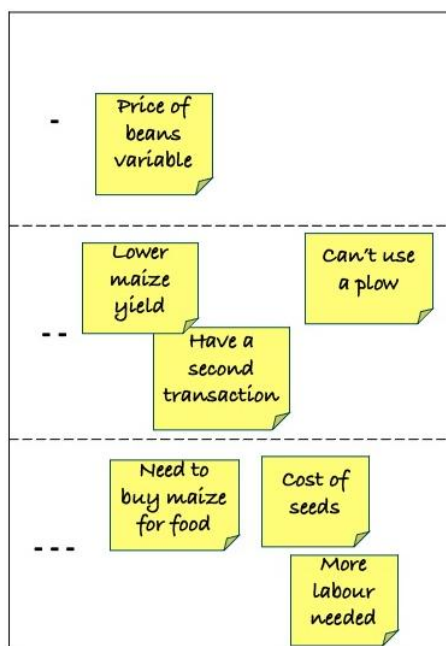

FIGURE 5 EXAMPLE OF DISADVANTAGES

The columns of the sheet 'Raw data' are

> **Identification columns:** the groups providing data and the farm types being compared. These should match data in the Groups and Types sheets.

> **Factors:** the advantages and disadvantages identified, along with a column to code whether it is an advantage (+) or disadvantage (-) and the rating given (1, 2 or 3)

> **Categories:** each factor is given categories describing whether they refer to environmental or other dimensions. The first level categories (categories_ 1) are linked to four groups of

principles commonly used (eg CIDSE), environmental, social, economic and political. The second level categories (categories_2) refer to the different principles that fall under environment in the CIDSE formulation. Using the categories of Figure 2 would be an alternative. Putting each factor into categories is subjective so it would be a good idea to have more than one person do it and resolve any discrepancies. A factor could fall in >1 categories at either level. First level categories have been proposed for the example data.

Analysis aims

The overall aim is to obtain insights into the extent that environmental factors are part of choices or systems to use. The data show tendencies rather than direct causal evidence and comes from various comparisons:

- Comparing identified advantages and disadvantages within one system and the level of environmental factors.
- Comparing the consensus balance of advantages and disadvantages within one system along, the reason given for it, and the environmental factors listed.
- Comparison of advantages and disadvantages and the importance of environmental categories of more and less agroecological farm types.
- Comparison of advantages and disadvantages and the importance of environmental categories as rated by more or less agroecological farmers.

Statistical analysis and hypothesis testing is unlikely to be relevant unless you have done the exercise in many different groups, providing many replicates

Analysis methods

Analysis requires qualitative assessment of the evidence for environmental factors being involved. This is made easier by the right data displays.

Excel can be used for part of that, and the format was designed to make that as easy as possible. For example, listing the + and – environmental factors mention.

TABLE 2

Positive environmental factors noted
Manure
Manure is available for farm fertility
Trees provides fresh air
Trees attract rainfall
Trees provide shade
Fallen tree leaves helps improve soil nutrients
Provide micro climate for some crops
provide nectar for bees

Pest and diseases
Livestock damage crop and trees
Soil erosion
Inadequate pest management
Competition
Rainfall shortage
Pests and diseases
Excess shade damage crops
Compete for nutrients with crops
Invasion of pests especially termites.
Depressed rains

Pivot tables can be used for summary counts, such as Table 3.

TABLE 3 NUMBERS OF ENVIRONMENTAL FACTORS IDENTIFIED

group	+/-	rate	agroforestry	cereal-legume intercropping	crop-livestock integration
1	+	1			1
		2			2
		3			
	-	1		1	1
		2		1	1
		3		1	1
2	+	1	1		
		2	3		
		3	2		1
	-	1	1		
		2	1		
		3	2		2

Some interpretations of Table 3:

- More environmental factors, both + and -, are associated with agroforestry than the other farm types.
- Legume-cereal intercropping, considered the least agroecological, only has negative environmental factors.
- Group 2, the more agroecological farmers, identified fewer environmental factors associated with cereal-legume intercropping than Group 1. That is surprising and needs follow up.

Graphical displays may be more useful, such as the example in Figure 6. We will provide code for generating these that can be adapted by analysts. However, such graphs will only ever be part of the analysis and a careful look at the qualitative information behind each one will be needed.
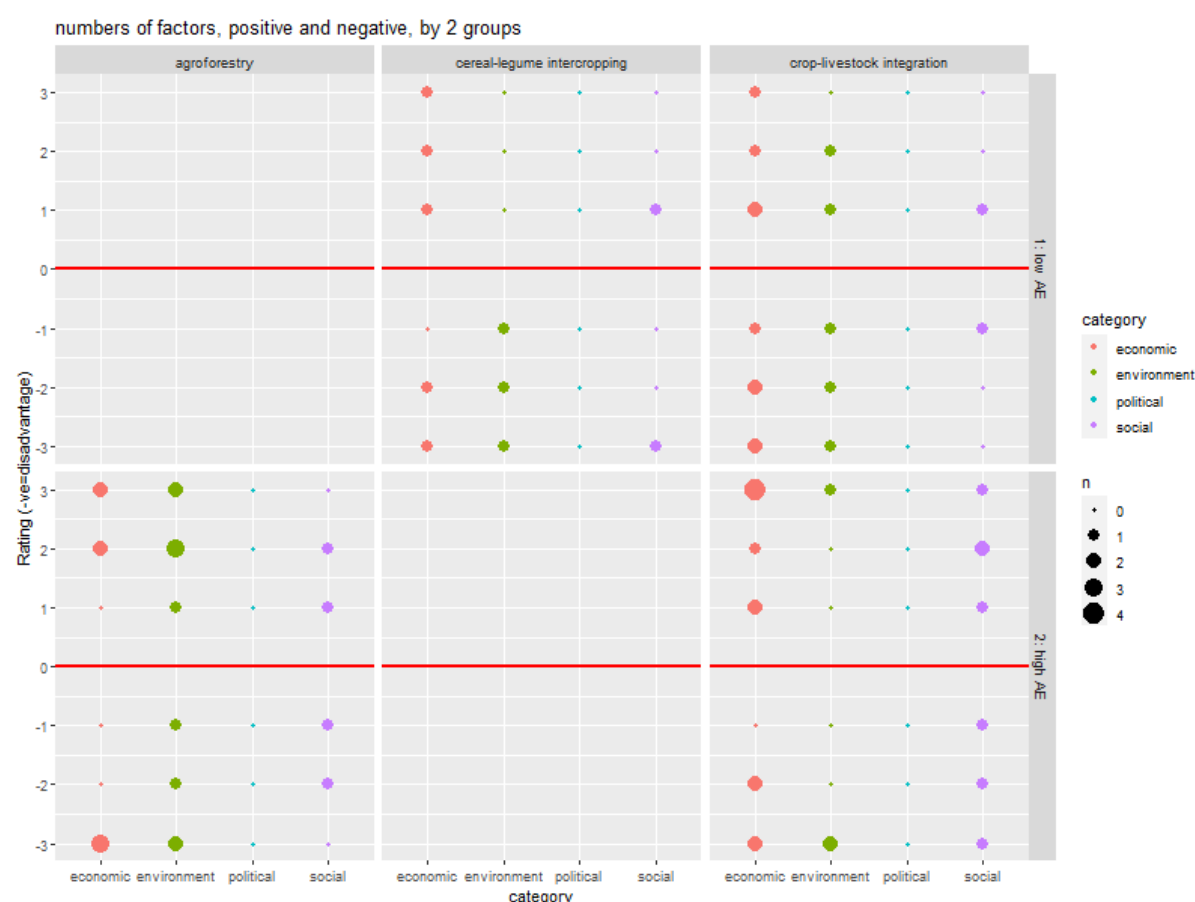

FIGURE 6 EXAMPLE GRAPHICAL DISPLAY OF THE SAME DATA.

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