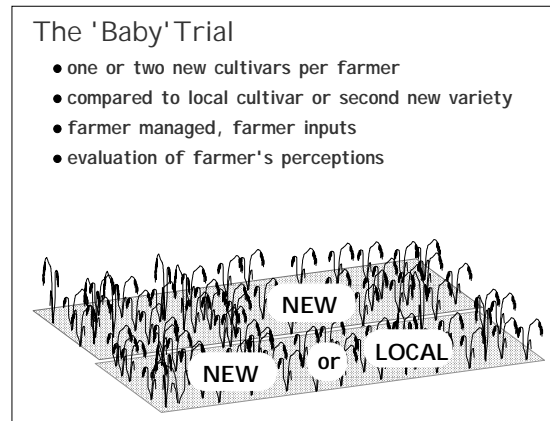


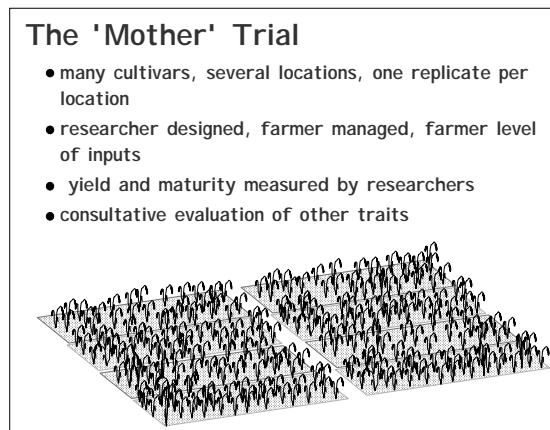
# Mother and Baby Trial System

1. The mother and baby trial system recognises the difficulty of obtaining reliable yield data from many, widely dispersed participatory trials, so in these trials — called baby trials — only farmers' perceptions on yield are collected.



**Figure 1. The baby trial**

2. Yield data are collected from mother trials - carefully managed and monitored trials where all of the entries are compared with each other.



**Figure 2. The mother trial**

3. The mother and baby trials are followed by methods of popularisation – Informal research and Development (IRD) and seed sales and dissemination.

Stage	Trial name
Initial	Mother and baby trials
Adaptive (can be done simultaneously with mother and baby trials)	IRD
After recommendation by project or SAU	Seed sales and dissemination

## Summary of differences between mother, baby and IRD trials

Mother	Baby	IRD
<b>Obtain yield data</b> <ul style="list-style-type: none"> <li>• Few trials</li> <li>• Researcher designed and supervised</li> <li>• All entries, single-replicate design, small plots</li> <li>• Yield is measured</li> <li>• Farmers' perceptions usually measured by matrix ranking</li> <li>• Farmers' management BUT seed priming and, if needed, more weeding</li> <li>• Farmer can be compensated for growing the trial</li> <li>• Repeated on research station as RCBD</li> </ul>	<b>Obtain perception data</b> <ul style="list-style-type: none"> <li>• Many trials</li> <li>• Simple design - farmer supervised</li> <li>• One or two entries, simple design, large plots</li> <li>• Yield is <u>not</u> measured</li> <li>• Farmers' perceptions measured by HLQ</li> <li>• Farmers' management</li> <li>• Farmer bears the cost and risk (but has free seed)</li> <li>• Not repeated on research station</li> </ul>	<b>Popularise</b> <ul style="list-style-type: none"> <li>• More trials than baby trials</li> <li>• <u>No design</u></li> <li>• One entry – the identified variety</li> <li>• Yield is <u>not</u> measured</li> <li>• Farmers' perceptions measured informally (by anecdote)</li> <li>• Farmers' management</li> <li>• Farmer has free seed and benefit</li> <li>• Not repeated on research station</li> </ul>

4. The quantities of seed to be given in baby trials and IRD can vary but it is recommended that, in general, the following quantities are given:

5 kg per trial	1 kg per trial	0.5 kg per trial	
Maize	Rice	Chickpea†	Niger
Wheat	Chickpea	Sunn hemp	Black gram
	Wheat†	Horsegram	

†When seed availability is limiting

5. Research station trials and mother trials must include the GVT 'check' varieties. These checks are essential entries in the trials and include farmer-preferred varieties and promising entries. Unless these are included it is not possible to tell if a test variety is better or worse than the ones GVT are currently promoting in the formal and informal seed supply system.
6. Detailed protocols for the design and conduct of the mother trials are described below.

## Description of the mother trial

<b>Purpose</b>	<u>The mother trial gives statistically analysable data on yield per hectare.</u>	
<b>Design</b>	Each trial consists of a single replicate of a randomised complete block design. Hence every mother trial has a separate randomisation. The plots should have a border of the local variety wherever possible. Plot size will vary with the land available but are larger than is normally used in research station trials	
<b>Number and location</b>	There are only a few mother trials compared to the number of baby trials. As a minimum, three mother trials are grown in each of two villages. The three mother trials in a village are grown by different farmers in different fields.	
<b>Colour coding of entries</b>	Not required.	
<b>Selection of farmers</b>	The mother trials will be conducted in villages in which GVT is well established with farmers that have co-operated with the project in the past. There is no need to change the farmers and locations over years so the trials will become progressively easier to run.	
<b>Management</b>	As farmer's practice. Two changes are allowed (seed priming to obtain more uniform stand establishment, and additional weeding if required)	
<b>Costs</b>	<p>Only for mother trials can the farmer be compensated for the use of his or her land. This is done when (a) farmer is reluctant to devote such a large area of land to the trial or (b) when the project wishes to retain the seed from the trial. GVT or the SAU can pay for the estimated amount of produce that would have been obtained from the area of the trial. The project can also pay for purchased inputs (fertilizer) but the fertilizer dose must still be as farmer's usual practice.</p> <p>Labour is supplied free of cost by the farmer. The seed from the mother trial belongs to the project when compensation has been given, but the fodder from the trial belongs to the farmer.</p>	
<b>Responsibilities</b>	<ol style="list-style-type: none"> <li>1. <i>Layout of the trial</i></li> <li>2. <i>Sowing of the trial</i></li> <li>3. <i>Growing and trial management</i></li> <li>4. <i>Trial monitoring and data collection</i></li> <li>5. <i>Harvesting and threshing</i></li> <li>6. <i>Plot measuring</i></li> <li>7. <i>Plot weighing</i></li> </ol>	<p>project staff† supervised by project staff farmer (but see management above)</p> <p>project staff</p> <p>supervised by project staff</p> <p>project staff harvest weighed by project staff (whole plot harvest) to determine <u>yield per hectare</u></p>
<b>Pre-harvest participatory evaluation</b>	A matrix ranking of the performance of the varieties can be done by a group of interested farmers when the varieties are near to maturity.	
<b>Post-harvest participatory evaluation</b>	Optional (because yield data is the primary objective). Can be done if the participating farmer is allowed to retain some of the harvest. A post-harvest interview to rank the varieties is useful.	

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†SAU or GVT staff, as applicable

The mother trial is repeated on the research station as a conventional three- or four-replicate, randomised, complete-block design (RCBD). Additional check and test varieties can be added to the trial if desired.

## Baby trials

<b>Purpose</b>	The baby trials <u>give statistically analysable data on farmers' perceptions and acceptance of varieties.</u>	
<b>Design</b>	<p><b>Design 1 – single test entry.</b> Single variety per farmer compared to local control. (This is the method that has been followed so far in GVT).</p> <p><b>Design 2 – two test entries.</b> Two varieties per farmer†. This method is more powerful, and colour coding helps farmers lay out the trials correctly without staff supervision at sowing time. When there are two test entries there may, or may not be, a <i>formal</i> local control. There will always be an <i>informal</i> local control (the farmer's own crop, or a neighbour's crop, grown on an adjacent or nearby field, or the farmer's recollection).</p>	
<b>Number and location</b>	There are many more baby trials than mother trials. To avoid confusion it is simpler not to have any farmer growing both a mother and a baby trial. As a minimum, trials should be in four villages. Each variety should be tested a minimum of a total of six times (and to get six successful trials more are initially needed). Baby trials are not repeated on the research station.	
<b>Colour coding of entries</b>	Required. Varieties are allocated colours (e.g., red, blue, green, yellow, white) and supplied in cotton bags of that colour. The name of the variety, and the year of supply, is also written on the bag. Each bag is supplied with four short bamboo pegs of the same colour for the farmer to mark out the plot.	
<b>Selection of farmers</b>	By group meeting of villagers and random allocation of varieties to farmers. All three wealth ranks should be included.	
<b>Management</b>	Strictly as farmer's practice.	
<b>Costs</b>	Farmers pay all costs. All seed and fodder belongs to the farmer. Only subsidy is that the seed is provided free of charge.	
<b>Responsibilities</b>	<ol style="list-style-type: none"> <li>1. <i>Layout of the trial</i></li> <li>2. <i>Sowing of the trial</i></li> <li>3. <i>Growing and trial management</i></li> <li>4. <i>Trial monitoring</i></li> <li>5. <i>Harvesting &amp; threshing</i></li> <li>6. <i>Plot measuring</i></li> <li>7. <i>Plot weighing</i></li> </ol>	<p>farmer (layout is discussed in detail in the group meeting)</p> <p>farmer</p> <p>farmer</p> <p>project staff complete page 1 of the HLQ (see below) that describes the trial. This needs to be completed whilst the trial is in the field – preferably after the last fertiliser application</p> <p>farmer</p> <p>not required</p> <p>not required</p>
<b>Post-harvest evaluation</b>	Essential. Project staff complete page 2 of HLQ and pages 3 and 4 as well in the case of design 2 (see below). Data in the HLQ is collected on a 'more, same or less' qualitative evaluation. There are now powerful statistical methods to analyse such data. By not collecting yield data, many more trials can be conducted to give a more reliable estimate of farmers' perceptions.	

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† The number of varieties is low so all possible paired comparisons  $(n(n-1)/2)$  can be made. For example, with four varieties there are 6 possible comparisons, with five varieties 10, and with six there are 16 comparisons. However, there is no need to compare every variety with every variety, so when the number of varieties is larger a sample of comparisons (e.g., comparisons where each entry appears twice and comparisons are allocated randomly =  $n$  comparisons) can be made and validly analysed.

**Non-participatory data – Mother trials**

7. Yield data are collected by carefully measuring the area of each plot and the total plot yield. Other traits such as plant height and days to flower or tassel are also recorded. A complete data set (optional traits in italics) will comprise the following.

- |                            |   |
|----------------------------|---|
| 1. Date of sowing          | 6. Plot area (length and breadth)                     |
| 2. Days to flowering       | 7. <i>Straw yield (kg per plot)</i>                   |
| 3. <i>Days to maturity</i> | 8. <i>Incidence of diseases</i>                       |
| 4. Plant stand             | 9. <i>Incidence of insect-pests</i>                   |
| 5. Yield per plot (kg)     | 10. Comments on the trial e.g., occurrence of drought |

**Matrix ranking – mother trials**

8. Two examples are given of matrix ranking for mother trials below – one for rice and one for maize. Not all of the characters need to be ranked, only those considered important by farmers. There is no point in trying to rank a trait if farmers say there is little difference between the varieties.
9. It will not be possible to matrix rank the varieties for post-harvest traits unless
- the participating farmer has been allowed to retain the seed i.e., it has not been purchased by the project.
  - sufficient time has elapsed after harvest for grain processing, consumption and sales.

**The household-level questionnaire – baby trials**

10. The baby trials are monitored by household-level questionnaires (HLQs). This consists of either two or four pages:

For Design 1	For Design 2
Page 1 Trial details	Page 1 Trial details
Page 2 Test entry versus local	Page 2 Test entry 1 versus Test entry 2
	Page 3 Test entry 1 versus Local variety
	Page 4 Test entry 2 versus Local variety

11. How to complete the question concerning the cross section of the trial on page 1 of the HLQ may not be obvious, so examples are given in Fig. 3.

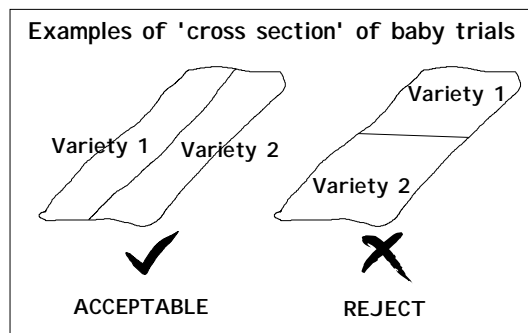


Figure 3. Examples of cross section of the trial from page 1 of the HLQ of the baby trial.

## MATRIX RANKING OF VARIETIES IN FGDs FOR RICE

**Rank varieties on scale where Best = Total no. of varieties being evaluated e.g., 1-5 when there are 5 varieties with 5 = best and worst = 1.**

**Ranking to be done by group consensus.**

Variety	Name
V1	
V2	
V3	
V4	
V5	
V6	
V7	
V8	

Number of participants in FGD =

Parameter	V1	V2	V3	V4	V5	V6	V7	V8
Germination								
Days to flowering								
Days to maturity								
Plant height								
Lodging resistance								
Disease resistance								
Insect resistance								
Ease of dehusking								
Grain yield								
Straw yield								
Grain colour								
Grain type								
Cooking quality								
Taste								
Fodder quality								
Market price								
Additional traits of farmers' liking								
(1)								
(2)								
(3)								

# MATRIX RANKING OF VARIETIES IN FGDs FOR MAI ZE

**Rank varieties on scale where Best = Total no. of varieties being evaluated e.g.,  
1-5 when there are 5 varieties with 5 = best and worst = 1.**

**Ranking to be done by group consensus.**

Variety	Name
V1	
V2	
V3	
V4	
V5	
V6	
V7	
V8	

**Number of participants in FGD =**

Parameter	V1	V2	V3	V4	V5	V6	V7	V8
Germination								
Days to silking								
Days to tasseling								
Tasseling silking interval								
Plant height								
No. of cobs								
Cob placement (height)								
Cob size								
Cob filling and husk cover								
Days to maturity								
Lodging resistance								
Disease resistance								
Insect resistance								
Grain yield								
Straw yield								
Grain colour								
Grain type								
Cooking quality								
Fodder quality								
Market price								
Additional traits								
(1)								
(2)								
(3)								

# Page 1. Household Level Questionnaire for FAMPAR Baby Trial

The answers in the boxes on this page describe the trial

## KEY INFORMATION

Farmer name:	<input style="width: 95%;" type="text"/>	Village:	<input style="width: 95%;" type="text"/>	Falia:	<input style="width: 95%;" type="text"/>	
State:	Year:	Season:	<i>kharif/rabi/summer</i>	Crop:	<input style="width: 95%;" type="text"/>	
Interviewer:	<input style="width: 95%;" type="text"/>				Date of interview:	<input style="width: 95%;" type="text"/>
	Names of V1 and V2	Colour codes of V1 and V2	V2 is:			
Variety 1 (V1):	<input style="width: 95%;" type="text"/>	<input style="width: 95%;" type="text"/>	V1 is a test entry			
Variety 2 (V2):	<input style="width: 95%;" type="text"/>	<input style="width: 95%;" type="text"/>	local / test entry			

## TRIAL DETAILS

	Variety 1	Variety 2	Soil local name:	<input style="width: 95%;" type="text"/>
Date of sowing:	<input style="width: 95%;" type="text"/>	<input style="width: 95%;" type="text"/>	Slope (score):	level / gentle / steep
Date of harvest:	<input style="width: 95%;" type="text"/>	<input style="width: 95%;" type="text"/>	Slope (%):	<10% / 10-20% / >20%

**Map of the trial:**  
Draw the trial layout with the positions of variety 1 and variety 2. Include field name:

**Cross section of the trial:**  
Draw the topography of the trial:

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Any other comments on conduct of trial e.g., is weeding, plant population, intercropping the same for Variety 1 and Variety 2?

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	FYM	Urea	DAP
Variety 1:	<input style="width: 95%;" type="text"/>	<input style="width: 95%;" type="text"/>	<input style="width: 95%;" type="text"/>
Variety 2:	<input style="width: 95%;" type="text"/>	<input style="width: 95%;" type="text"/>	<input style="width: 95%;" type="text"/>
Did variety 1 get:	more/same/less FYM than Variety 2?	more/same/less Urea than Variety 2?	more/same/less DAP than Variety 2?

Was Variety 1 grown under the same management as Variety 2?



## Page 2. COMPARE VARIETY 1 WITH VARIETY 2

The answers in the boxes on this page determine if Variety 1 is better, about the same, or worse than Variety 2

1. Establishment:

Variety 1 is  for establishment than variety 2?

2. Flowering time (tasseling):

Variety 1 is  to flower than variety 2?

If flowering time (tasseling) is different then by how many days ?

Variety 1 is  days earlier than local (Either 'days earlier' or

Variety 1 is  days later than local 'days later' as applicable)

3. Yield: Variety 1 yields  than variety 2?

If the yield is different provide more information in the box below. Give the farmer's description e.g., in local units, as a proportion (e.g. half as much again), or a percentage.

4. Grain quality:

V1 is  in quality than variety 2?

5. Market price:

V1 is  in price than variety 2?

6. Overall preference:

V1 is  overall than variety 2?

7. Intention variety 1:

Will the farmer grow Variety 1 next year ?

8. Intention variety 2:

Will the farmer grow Variety 2 next year ?

Question 8 applies only if V2 is a test entry. (Otherwise it is assumed the local variety will be grown next year)

Add any other information that the farmer thinks is important. This could include reaction to pests and diseases; particular quality traits such as taste, cooking quality, milling quality; and whether the farmer mentions that he or she has given seed to others.

Variety 1

Variety 2

**Page 3. ONLY FOR DESIGN 2 (TWO TEST ENTRIES). COMPARE THE VARIETY 1 WITH THE LOCAL VARIETY**

The answers in the boxes on this page determine if Variety 1 is better, about the same, or worse than the local variety

**1. Establishment:**

Variety 1 is  for establishment than the local variety?

**2. Flowering time (tasseling):**

Variety 1 is  to flower than the local variety?

If flowering time (tasseling) is different then by how many days ?

Variety 1 is  days earlier than local      Either 'days earlier' or

Variety 1 is  days later than local      days later' as applicable.)

**3. Yield:**      Variety 1 yields  than the local variety?

If the yield is different provide more information in the box below. Give the farmer's description e.g., in local measures, as a proportion (e.g. half as much again), or a percentage.

**4. Grain quality:**      V1 is  in quality than the local variety?

**5. Market price:**      V1 is  in price than the local variety?

**6. Overall preference:**      V1 is  overall than the local variety?

Add any other information that the farmer thinks is important. This could include reaction to pests and diseases; particular quality traits such as taste, cooking quality, milling quality; and whether the farmer mentions that he or she has given seed to others.

Comments on the local variety versus Variety 1

**Page 4. ONLY FOR DESIGN 2 (TWO TEST ENTRIES). COMPARE THE VARIETY WITH THE LOCAL VARIETY**

The answers in the boxes on this page determine if Variety 2 is better, about the same, or worse than the local variety and ranks all 3 entries

**1. Establishment:**

Variety 2 is  for establishment than the local variety?

**2. Flowering time (tasseling):**

Variety 2 is  to flower than the local variety?

If flowering time (tasseling) is different then by how many days ?

Variety 2 is  days earlier than local      (Either 'days earlier' or  
 Variety 2 is  days later than local      days later' as applicable.)

**3. Yield:**

Variety 2 yields  than the local variety?

If the yield is different provide more information in the box below. Give the farmer's description e.g., in local units, as a proportion (e.g. half as much again), or a percentage.

**4. Grain quality:**

V2 is  in quality than the local variety?

**5. Market price:**

V2 is  in price than the local variety?

**6. Overall preference:**

V2 is  overall than the local variety?

Add any other information that the farmer thinks is important. This could include reaction to pests and diseases; particular quality traits such as taste, cooking quality, milling quality; and whether the farmer mentions that he or she has given seed to others.

Comments on the local variety versus Variety 2

**7. Rank of three varieties: Rank V1, V2 and local variety in order of preference:**

Rank	Variety name
1 (Best)	<input style="width: 300px; height: 20px;" type="text"/>
2	<input style="width: 300px; height: 20px;" type="text"/>
3 (Worst)	<input style="width: 300px; height: 20px;" type="text"/>

