

The role of space and time in the interaction of farmers' management decisions and bee communities: Evidence from South India

Landscape Ecology

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Online Resource 2 Questionnaire (including consent form) of the second socioeconomic survey, 127 households, February and March 2018

Questionnaire

Running_ID:	
Transect:	
Village:	
Name of respondent:	
Name of enumerator:	
Date of interview:	

We are researchers from Göttingen University, Germany, and the University of Agricultural Sciences GKVK Bangalore (UASB). We are conducting research that tries to understand urbanization and the related processes in agriculture and environment.

A few weeks ago a colleague from the UASB visited your village and recorded plant and animal diversity at some locations around the village. One of your plots was close to one of these locations and therefore we would like to ask you some questions about how you managed this plot in the last months. If you agree, we would also like to take a small soil sample of your plot.

Your participation in this interview is entirely voluntary. Your responses will be treated with utmost confidentiality and the data will be used for research purposes only.

Do you have any questions that we need to clarify? *[Make clarifications in case there are questions]* If No, do you agree to take part in this survey?

Name_____

Signature_____

Do you allow us to take soil samples from your plot?

- ☐ **Yes**
- ☐ **No**

If no: Reason: _____

PART 1: Plot – Pan trap

All questions of this part refer to the plot, on which the pan trap has been installed.

0.1 Current state of the plot:

- ☐ Managed(1)
- ☐ Fallow(2)

If managed: 0.1.1 Harvested?

- ☐ Yes (1)
- ☐ No (2)

0.1.2 Years under agricultural management? _____

If fallow: 0.1.3 For how long is the plot Fallow? _____

- ☐ Month (1)
- ☐ Year (2)

0.1.4 Why is the plot fallow? (code: Fallow) _____ (if crop failed (1) indicate the reason with a second number or specify below!)

(Other, specify (88) _____)

MODULE 1 - Plot characteristics

1.1 Is this plot...

- ☐ Owned(1)
- ☐ Rented(2)
- ☐ Common area(3)
- ☐ Government land (with permission)(4)
- ☐ Government land (without permission)(5)

1.2 What is the size of the plot? _____ (1.3) ☐ Guntha(1) ☐ Acres in Guntha(2) ☐ Acres(3)

1.4 How much time do you need to get there (in minutes)? _____ (1.5) Mode of transport (code: mode of transport): _____

1.6 Please indicate the quality of the soil:

- ☐ Poor(1)
- ☐ Middle(2)
- ☐ Very good(3)

1.7 Please indicate the slope of the plot:

- ☐ None(1)
- ☐ Moderate(2)
- ☐ Steep(3)

1.8 On this plot, how many crops did you grow in the last 2-3 months? _____

MODULE 2 – Crop production

Please fill the following table asking for all crops grown on the “pan trap”-plot in the last months. Also fill information when crop failed!

	Crop_ID	1	2	3
2.1	Name: (code: Crops)	Crop 1:	Crop 2:	Crop 3:
2.2 (2.3)	On how much land did you grow (crop)?	☐ Guntha(1) ☐ Acres in Guntha(2) ☐ Acres(3)	☐ Guntha(1) ☐ Acres in Guntha(2) ☐ Acres(3)	☐ Guntha(1) ☐ Acres in Guntha(2) ☐ Acres(3)
2.4	Do you grow (crop) mainly for:	☐ Marketing(1) ☐ Home consumption(2) ☐ Fodder(3) ☐ Other, specify(88)_____	☐ Marketing(1) ☐ Home consumption(2) ☐ Fodder(3) ☐ Other, specify(88)_____	☐ Marketing(1) ☐ Home consumption(2) ☐ Fodder(3) ☐ Other, specify(88)_____
2.5	When did you sow (crop)?	Month:_____ / Year:_____	Month:_____ / Year:_____	Month:_____ / Year:_____
2.6	Did you already harvest (crop)?	☐ Yes(1) ☐ No(2)	☐ Yes(1) ☐ No(2)	☐ Yes(1) ☐ No(2)
<i>If harvested:</i>				
2.6.1	When harvested?	Month:_____ / Year:_____	Month:_____ / Year:_____	Month:_____ / Year:_____
2.6.2 (2.6.3)	Total output:	☐ Kg(1) ☐ Piece(2) ☐ Other, specify(88)_____	☐ Kg(1) ☐ Piece(2) ☐ Other, specify(88)_____	☐ Kg(1) ☐ Piece(2) ☐ Other, specify(88)_____
2.6.4	Home consumption:			
2.6.5	Saved as seeds:			
2.6.6	Gift, donations, etc.:			
2.6.7	Sold:			
2.6.8 (2.6.9)	Fodder:	☐ Kg(1) ☐ Piece(2) ☐ Bundle(3) ☐ Other, specify(88)_____	☐ Kg(1) ☐ Piece(2) ☐ Bundle(3) ☐ Other, specify(88)_____	☐ Kg(1) ☐ Piece(2) ☐ Bundle(3) ☐ Other, specify(88)_____
2.6.10	Which part of (crop) did you use as fodder?	☐ Residues(1) ☐ Consumable crop(2) ☐ Both(3)	☐ Residues(1) ☐ Consumable crop(2) ☐ Both(3)	☐ Residues(1) ☐ Consumable crop(2) ☐ Both(3)

MODULE 3 – Marketing (continue previous table)

Fill this table *ONLY* if one of the crops in the table above has been sold! – Continue in the same column!

	Crop_ID	1			2			3		
		Crop 1			Crop 2			Crop 3		
	Market_ID	1	2	3	1	2	3	1	2	3
3.1	Type of marketing channel (code: Marketing channels):									
3.2	Name of market:									
3.3	Location:									
3.4 (3.5)	Price:	☐ Kg(1) ☐ Piece(2) ☐ Other(88)	☐ Kg(1) ☐ Piece(2) ☐ Other(88)	☐ Kg(1) ☐ Piece(2) ☐ Other(88)	☐ Kg(1) ☐ Piece(2) ☐ Other(88)	☐ Kg(1) ☐ Piece(2) ☐ Other(88)	☐ Kg(1) ☐ Piece(2) ☐ Other(88)	☐ Kg(1) ☐ Piece(2) ☐ Other(88)	☐ Kg(1) ☐ Piece(2) ☐ Other(88)	☐ Kg(1) ☐ Piece(2) ☐ Other(88)
3.6	How often did you go to this market place for selling (<i>crop</i>)?									
3.7	How much did you pay for transporting (<i>crop</i>) to this market place (INR)? (Round trip, 1 time)									
3.8	Did you have to pay any additional money at this marketing place (weighting, post-harvest practices, market fees)?	☐ Yes(1) ☐ No(2)	☐ Yes(1) ☐ No(2)	☐ Yes(1) ☐ No(2)	☐ Yes(1) ☐ No(2)	☐ Yes(1) ☐ No(2)	☐ Yes(1) ☐ No(2)	☐ Yes(1) ☐ No(2)	☐ Yes(1) ☐ No(2)	☐ Yes(1) ☐ No(2)
3.8.1	<i>If yes:</i> How much (INR)? (1 time going there)									
3.9	Did you have any price information for (<i>crop</i>) before you left for this market place?	☐ Yes(1) ☐ No(2)	☐ Yes(1) ☐ No(2)	☐ Yes(1) ☐ No(2)	☐ Yes(1) ☐ No(2)	☐ Yes(1) ☐ No(2)	☐ Yes(1) ☐ No(2)	☐ Yes(1) ☐ No(2)	☐ Yes(1) ☐ No(2)	☐ Yes(1) ☐ No(2)
3.9.1	<i>If yes:</i> What kind? (code: Price information)									

MODULE 4 - Inputs: (continue previous table)

Please fill the following two tables asking for management practices and inputs for all crops grown on the “pan trap”-plot.

	Crop_ID	1	2	3
		Crop 1	Crop 2	Crop 3
Irrigation				
4.1	Was (crop) rainfed or irrigated?	☐ Rainfed(1) ☐ Irrigated(2)	☐ Rainfed(1) ☐ Irrigated(2)	☐ Rainfed(1) ☐ Irrigated(2)
<i>If irrigated:</i>				
4.1.1	Water source (code: Water source):			
4.1.2	Irrigation technology (code: Irrigation technology):			
4.1.3	On how many days did you irrigate (crop)?			
4.1.4	On these days, how many hours on average did you irrigate (crop)?			
<i>If sprinkler or drip irrigation:</i>				
4.1.2.1	How many sprinklers/emitters did you use for (crop)?			
4.1.2.2	Discharge per sprinkler/emitter (liter per hour):			
Tillage:				
4.2	Which tillage techniques did you use for (crop)? (If more than one technique, separate with comma) (code: Tillage techniques)			
4.3	Depth of ploughing (inch):			
4.4	Did you give straw back to the soil?			
Labor:				
4.6	How many household members worked on (crop)?			
4.7	Total Family Labor (Labor days):			
4.5	Did you hire labor for (crop)?	☐ Yes(1) ☐ No(2)	☐ Yes(1) ☐ No(2)	☐ Yes(1) ☐ No(2)
<i>If yes:</i>				
4.5.1	Female labor	Days:	Days:	Days:
4.5.2		Daily Salary:	Daily Salary:	Daily Salary:
4.5.3	Male labor	Days:	Days:	Days:
4.5.4		Daily Salary:	Daily Salary:	Daily Salary:

4.6 Did you use any inputs such as seeds, fertilizers, etc. for any of the crops planted on that plot? ☐ Yes(1) ☐ No(2)

If yes: Continue with the next table.

Crop_ID		Inputs_ID	4.6.1 Which inputs did you use for (crop)? (code: Inputs)	4.6.2 How much of (input) did you use?	4.6.3 Unit (code: Unit)	4.6.4 Was (input) produced on your farm?	If no:	4.6.4.1 How much did you pay for one (purchasing unit) of (input)?	4.6.4.2 Purchasing unit (code: Unit)	4.6.4.3 Did you receive (input) as subsidy?	4.6.4.3.1 If yes: Who provided the subsidy? (code: Subsidy)
1	Crop 1	1				☐ Yes(1) ☐ No(2)					
		2				☐ Yes(1) ☐ No(2)					
		3				☐ Yes(1) ☐ No(2)					
		4				☐ Yes(1) ☐ No(2)					
		5				☐ Yes(1) ☐ No(2)					
		6				☐ Yes(1) ☐ No(2)					
		7				☐ Yes(1) ☐ No(2)					
		8				☐ Yes(1) ☐ No(2)					
		9				☐ Yes(1) ☐ No(2)					
		10				☐ Yes(1) ☐ No(2)					
2	Crop 2	1				☐ Yes(1) ☐ No(2)					
		2				☐ Yes(1) ☐ No(2)					
		3				☐ Yes(1) ☐ No(2)					
		4				☐ Yes(1) ☐ No(2)					
		5				☐ Yes(1) ☐ No(2)					
		6				☐ Yes(1) ☐ No(2)					
		7				☐ Yes(1) ☐ No(2)					
		8				☐ Yes(1) ☐ No(2)					
		9				☐ Yes(1) ☐ No(2)					
		10				☐ Yes(1) ☐ No(2)					
3	Crop 3	1				☐ Yes(1) ☐ No(2)					
		2				☐ Yes(1) ☐ No(2)					
		3				☐ Yes(1) ☐ No(2)					
		4				☐ Yes(1) ☐ No(2)					
		5				☐ Yes(1) ☐ No(2)					
		6				☐ Yes(1) ☐ No(2)					
		7				☐ Yes(1) ☐ No(2)					
		8				☐ Yes(1) ☐ No(2)					
		9				☐ Yes(1) ☐ No(2)					
		10				☐ Yes(1) ☐ No(2)					

Please state whether you used any of the following management practices in the last 6 months. (*Tick if practice used by the farmer*)

	<i>Tick if used by the farmer:</i>
4.7 Minimum tillage / No tillage (1)	
4.8 Mulching / Leaving crop residues in the field / Cover crops (2)	
4.8 Organic Manure (3)	
4.9 Vermi-compost (4)	
4.10 Bio-pesticide / Integrated pest management (5)	
4.11 Live barriers on slope against erosion (6)	
4.12 Planting contour lines (7)	
4.13 Poultry manure (8)	
4.14 Legume intercropping (9)	
4.15 Crop rotation (10)	
4.16 Drainage ditches (11)	
4.17 Planting hedges to reduce erosion (12)	
4.18 Planting trees for shade / to reduce erosion (13)	
4.19 Collecting rainwater for irrigation (14)	
4.20 Keeping bees on the property (15)	

MODULE 5 – plot neighborhood

Ask for the land use and management of the surrounding plots. Use the picture below to help the respondent and to support your questions.

Code: Management: 1: Agriculture, 2: Fallow, 3: Forest, 4: Building, 5: Road, 88: Other,specify

	How many plots are on this side of your plot?_____ Management: _____, Crops:_____ Management: _____, Crops:_____ Management: _____, Crops:_____ Management: _____, Crops:_____	
How many plots are on this side of your plot?_____ Management: _____, Crops:_____ Management: _____, Crops:_____ Management: _____, Crops:_____ Management: _____, Crops:_____	YOUR PLOT	How many plots are on this side of your plot?_____ Management: _____, Crops:_____ Management: _____, Crops:_____ Management: _____, Crops:_____ Management: _____, Crops:_____
	How many plots are on this side of your plot?_____ Management: _____, Crops:_____ Management: _____, Crops:_____ Management: _____, Crops:_____ Management: _____, Crops:_____	

PART 2: General questions

MODULE 1 – other plots

1.1 Do you manage further plots?

- ☐ Yes (1)
- ☐ No (2)

If yes:

1.1.1 How many other plots do you manage?

Fill as many rows as plots.

Plot_ID	Plot (label starting with A)	1.1.2 State of the plot	1.1.3 Crops (code: Crops)	1.1.4 Rainfed or irrigated?	1.1.5 Tillage techniques (code: Tillage techniques)	1.1.6 Inputs (code: Inputs)
1		☐ Managed(1) ☐ Fallow(2)		☐ Rainfed(1) ☐ Irrigated(2)		
2		☐ Managed(1) ☐ Fallow(2)		☐ Rainfed(1) ☐ Irrigated(2)		
3		☐ Managed(1) ☐ Fallow(2)		☐ Rainfed(1) ☐ Irrigated(2)		
4		☐ Managed(1) ☐ Fallow(2)		☐ Rainfed(1) ☐ Irrigated(2)		
5		☐ Managed(1) ☐ Fallow(2)		☐ Rainfed(1) ☐ Irrigated(2)		

MODULE 2 – Household income

2.1 How high was overall income of you household in 2017 (INR)? _____

2.2 How high was the income you generated from agricultural production (INR)? _____

MODULE 3 – Management preferences and pollinator awareness

3.1 Please tell us which of the following bund management (strips between plots) practices you prefer. Rank them with 1 being your first preference to 3 being your least preferred option.

	Rank:
Spraying (herbicides) (1)	
Burning (2)	
No management (3)	

3.2 Now imagine you have three plots. On one plot you grow Ragi, on one Lablab, and on the last one Cucumber. We would like to ask you what you think is the best pest management strategy for each of these plots.

	Ragi	Lablab	Cucumber
Insecticide	☐ Normal (1) ☐ Bio (2) ☐ None (3)	☐ Normal (1) ☐ Bio (2) ☐ None (3)	☐ Normal (1) ☐ Bio (2) ☐ None (3)
Herbicide	☐ Normal (1) ☐ Bio (2) ☐ None (3)	☐ Normal (1) ☐ Bio (2) ☐ None (3)	☐ Normal (1) ☐ Bio (2) ☐ None (3)
Fungicide	☐ Normal (1) ☐ Bio (2) ☐ None (3)	☐ Normal (1) ☐ Bio (2) ☐ None (3)	☐ Normal (1) ☐ Bio (2) ☐ None (3)

I will now read you some statements. Please tell us how much you agree or disagree with the things I read.

	Strongly agree (5)	Agree (4)	Undecided (3)	Disagree (2)	Strongly disagree (6)
3.3 Some insects are good.					
3.4 All insects harm my crops.					
3.5 Some crops flowers need insects for pollination.					
3.6 Insects on my plot will decrease my yield.					
3.7 Insects can increase the quality of my crops.					
3.8 Good insects live in the neighborhood of my plots.					
3.9 Pesticides also kill good insects.					
3.10 Pesticides do not harm people's health.					
3.11 Pesticides harm the environment.					
3.12 Bees can increase the yield of some crops.					
3.13 Bees are insects.					

3.14 Do you know what pollinators are?

- ☐ Yes (1)
- ☐ No (2)

If yes:

3.14.1 Where did you get your knowledge from?

- ☐ School (1)
- ☐ A relative or friend told me (2)
- ☐ Extension services (3)
- ☐ TV (4)
- ☐ Other (88), specify _____

Crops

11 Arecanut
12 Avare / Lablab
13 Banana
14 Beans
15 Bengal Gram
16 Black Gram
17 Brinjal/Eggplant
18 Cashewnut
19 Castor
110 Chrysanthemum
111 Cluster beans
112 Coconut
113 Cowpea
114 Crossandra
115 Galdiulus
116 Gerbera
117 Grapes
118 Green Chillies
119 Green Gram
120 Ground nut
121 Guava
122 Horse Gram
123 Jasmine
124 Lemon
125 Maize
126 Mango
127 Marigold

128 Mulberry/silk
129 Mustard
130 Niger seed
131 Onion
132 Paddy
133 Papaya
134 Poma-granate
135 Potato
136 Ragi
137 Sapota
138 Sesamum
139 Silver oak
140 Small millet
141 Subabul
142 Sugar cane
143 Sunflower
144 Teak
145 Tomato
146 Tur / Arhar
147 Wheat
*148 Other
149 Carrot
150 Cabbage
151 Pumkin
152 Cucumber
153 Maize (Baby Corn)
154 Amaranth
155 Arcacia

156 Eucalyptus
157 Basil
158 Flower general
15 Bitter gourd
160 Capsicum
161 Cauliflower
162 Chilli
163 Coriander
164 Curry leave
165 Dill
166 Drumstick
167 Fenugreek
168 Timber general
169 Ginger
170 Turf/grass
171 Garlic
172 Jackfruit
173 Ridge gourd
174 Spinach
175 Jowar
176 Ladies' fingers
177 Masoor
178 Napier grass
179 Raddish
180 Rose
181 Palm
182 Sweet corn
183 Ivy gourd

184 Turnip
185 Button flower
186 Kakada flower
187 Snake gourd
188 Velvet bean
189 Beet root

Inputs

*1 Biopesticide
*2 Complex fertilizer
3 Farm manure
4 Fungicide
*5 Inorg. Fertilizer
*6 Insecticide
7 Lime
8 Micronutrient
9 Mulch
*10 Org. Fertilizer
*12 Pesticides
*13 Plant hormone
15 Poultry manure
16 Seedlings
17 Seeds (New variety)
18 Seeds (normal/traditional)
19 Urea
20 DAP
*22 Herbicide

!!! IMPORTANT !!!

If the answer of the respondent is not in the code provided here, write **88 AND specify**.

If you use code marked with *, you have to **further specify** the answer.

Example: 2 (for complex fertilizer), 16 20 20 (the exact composition of the fertilizer).

Water source

- 1 Piped
- 2 Tube well electric pump
- 3 Tube well with fuel pump
- 4 Rainwater
- 5 Dug, open well
- 6 Covered well
- 7 River, canal, stream
- 8 Pond
- 9 Tanker truck

Irrigation technology:

- 1 Water pump
- 2 Drip irrigation
- 3 Flooding
- 4 Furrow
- 5 Sprinkler
- 7 Pipe
- 13 Lift irrigation

Tillage techniques

- 0 None
- 1 Tractor (without plough)
- 2 Plough for tractor

- 3 Ox-plough
- 4 Harrow for tractor
- 5 Cultivator for tractor
- 7 Ox-harrow
- 8 Ox-cultivator
- 9 Manual

Marketing channels:

- 1 Neighbor
- 2 Middleman
- 3 As street vendor
- 4 Farmers market
- 5 Wholesale market
- 6 APMC
- 7 Contract
- 8 Cooperative
- 9 Traditional retailer
- 10 Modern retail format

Price information:

- 1 Other farmer
- 4 Internet/Online price information
- 5 Contact in market

- 78 Village member sent to market
- 79 Advice from scientist

Unit

- 1 kg
- 2 Gramm
- 3 Liter
- 4 Milliliter
- 5 Piece
- *7 Tractor load
- 9 Basket/bag (50kg)
- 10 Quintal
- 11 Ton

Mode of transport

- 1 Walk
- 2 Bicycle
- 3 Bus
- 4 Auto
- 5 Car
- 6 Train
- 7 Motorbike

Subsidy

- 1 Government
- 2 Contracting firm
- 3 NGO
- 5 Land owner

Fallow

- 1 Failed Crop
- 2 Water shortage
- 3 Soil recovery