

## Appendix 5

### Details of QCA

#### *A priori* variables for the QCA

1. Geographically effective design (GEO): The fence was situated such that it included only communities that desired the fence and did not lead to a major hindrance to the livelihood of those communities (e.g. fence did not result in blocking access to firewood)
2. Cash buy-in (CASH): whether the community had contributed cash towards the upkeep of the fence, suggesting investment in the success or failure of the fence;
3. Ease of collective action: communities were able to act collectively to maintain the fence based on one or both of the following two factors:
  - a. Ethnic homogeneity (HOMO): homogenous communities might find it easier to cooperate and hence undertake collective action due to lower transaction costs, greater trust, and shared social norms;
  - b. Proactive leadership (LEAD): communities with a leader who proactively championed fence maintenance facilitated maintenance. (Heuristic: when community members unanimously or nearly unanimously named the same person as associated with and actively involved in fence maintenance).

$$\text{LEAD}(\sim\text{HOMO}^*\sim\text{CASH} + \text{CASH}^*\sim\text{GEO}) \rightarrow \text{W}$$

#### 1. Raw data matrix

The raw data matrix consists of each case as a row with the columns representing the variables of interest and outcome. We have used ‘crisp-set’ (‘1’ and ‘0’) in order to define the set membership of the case to that variable, i.e., it is either a full member of the set or not a member at all. Crisp-sets were chosen over fuzzy-sets and multiple-value sets as they best reflected the nature of the variables on the field and our *a priori* hypothesis.

Community/Areanar	GEO	CASH	HOMO	LEAD	outcome
Baghmari	1	0	1	1	1
Haabasti	1	0	1	0	0
Gorumara	1	0	1	1	1
Jalokhiabasti	1	1	1	0	0
Ajgarjuli	1	1	1	1	0
Kolbasti	0	1	1	1	1
Aadhiyachap...	0	1	0	1	1
Wenzajuli	1	0	0	0	0
Talabari	0	0	0	1	1
Botiagaon	1	0	1	1	0
Simalugaon	1	0	1	1	0
Sagunbasti	1	1	0	1	0
Babamura	1	1	1	0	0
Bihpukhuri	1	0	1	0	0
BaluDanga	1	0	1	1	0
Manimuni	1	1	1	0	0
Mrigamari	1	0	0	1	1
Boribeel	1	0	0	1	1
Pukhuripar	1	0	1	0	0

Fig 5.1: Villages with the variables of interest and outcomes

## 2. Formation of truth table

A so-called ‘truth table’ was created in the software where the configurations of conditions and the resultant outcomes appear with the number of times they appear. Contradictory conditions, ie, cases that have the same conditions but lead to contradictory outcomes were used to refine the theory. The threshold for consistency was kept at the suggested 0.75, owing to the fact that the data was crisp-set (i.e., ‘1’ and ‘0’) and of an intermediate n (Ragin 2008).

LEAD	HOMO	CASH	GEO	number	outcome	cases	raw consist. ▼	PRI consist.	SYM consist
1	0	0	1	2	1	cases	1	1	1
1	0	0	0	1	1	cases	1	1	1
1	0	1	0	1	1	cases	1	1	1
1	1	1	0	1	1	cases	1	1	1
1	1	0	1	5	0	cases	0.4	0.4	0.4
0	1	0	1	3	0	cases	0	0	0
0	1	1	1	3	0	cases	0	0	0
0	0	0	1	1	0	cases	0	0	0
1	0	1	1	1	0	cases	0	0	0
1	1	1	1	1	0	cases	0	0	0

Fig 5.2: Truth table of the villages

### 3. Logical Minimization

After the process of creation of a truth table, the remainders were logically minimized, ie, of the potential of configurations, the configurations that did not appear in our cases were interpreted using the ‘intermediate solution’ where only those remainders that are consistent with the researcher’s theoretical and substantive knowledge are included (Rihoux and Lobe 2009). This was done using the Quine-McCluskey algorithm. Here, since empirical evidence suggests that the presence of LEAD, HOMO, CASH, and GEO lead to an outcome of 1, they were marked as ‘present’.

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--- INTERMEDIATE SOLUTION ---
frequency cutoff: 1
consistency cutoff: 1
Assumptions:
LEAD (present)
HOMO (present)
CASH (present)
GEO (present)
raw unique
coverage coverage consistency
-----
LEAD*~HOMO*~CASH 0.428571 0.428571 1
LEAD*CASH*~GEO 0.285714 0.285714 1
solution coverage: 0.714286
solution consistency: 1

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Cases with greater than 0.5 membership in term LEAD\*~HOMO\*~CASH: Talabari (1,1), Mrigamari (1,1), Boribeel (1,1)  
Cases with greater than 0.5 membership in term LEAD\*CASH\*~GEO: Kolbasti (1,1), Aadhiyachapori (1,1)