Analysing and interpreting data in QCA: an overview of the key challenges

Experiences from an fsQCA study

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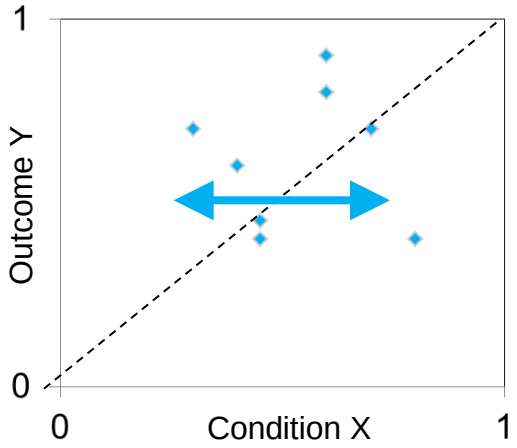
October 29th 2015
IUSF-TIAS Autumn School



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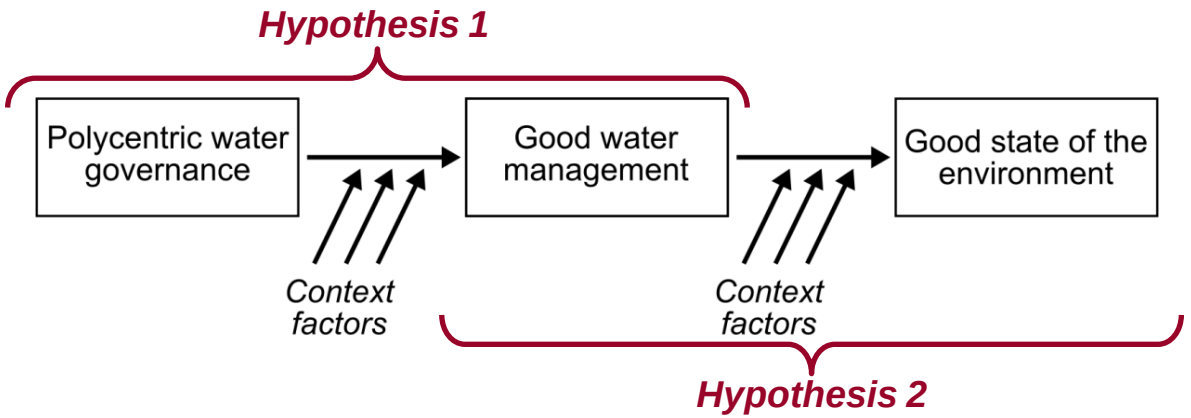
Background

- Challenges experienced in own fsQCA research (Knieper & Pahl-Wostl, submitted):
  - Analysis of how water governance and management are related to the environmental state of river basins
  - Based on dataset from Twin2Go study
  - Two related hypotheses, each addressed with fsQCA



Main Challenge

- Main challenge encountered: High number of **choices** with impacts on results, e.g. regarding
  - Calibration rules
  - Aggregation rules (in case of composed conditions)
  - Consistency threshold
  - Limited diversity, types of solution formulas
- No „perfect“ solution to all issues

Transparent documentation of the whole QCA process required!

Calibration Rules

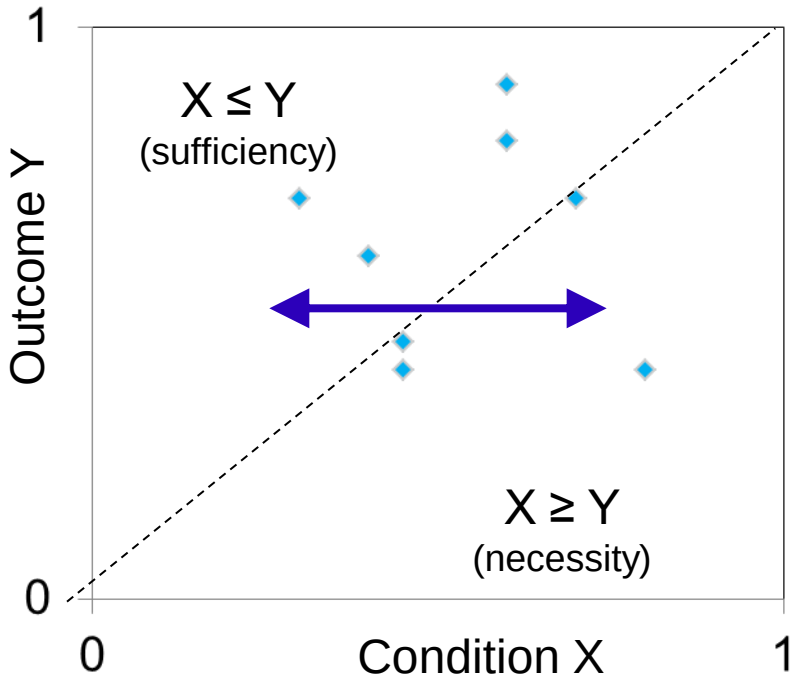
- Data must fit a range from 0 to 1
- Data transformation through mathematical functions or classification rules
  - Reflects personal judgements of the researcher

Indicator	Calibration Rules	
	Original score [Some answer options have been simplified here. See Pahl-Wostl and Lebel (2010, updated 2011) for the original answer options.]	**fsQCA value**
Integration of domestic water legislation	A: One single piece of legislation exists to coordinate/integrate the water-related framework	1
	B: A single piece of legislation does not exist, but is under formation	0
	C: A single piece of legislation does not exist	0
Distribution of functions, responsibilities and authority	A: Functions, responsibilities and authority are allocated to various administrative levels	1
	B: Functions and responsibilities are distributed, but no authority	0.3
	C: Legislation only at one level, no distribution at all	0
Vertical coordination between governance authorities	A: Cooperation and clear allocation of tasks	1
	B: Clear allocation of tasks, and coordination	0.8
	C: Task overlap, but coordination	0.4
	D: Clear allocation of tasks, but no coordination	0.2
	E: No coordination, much overlap	0

Modified from Knieper & Pahl-Wostl (submitted)

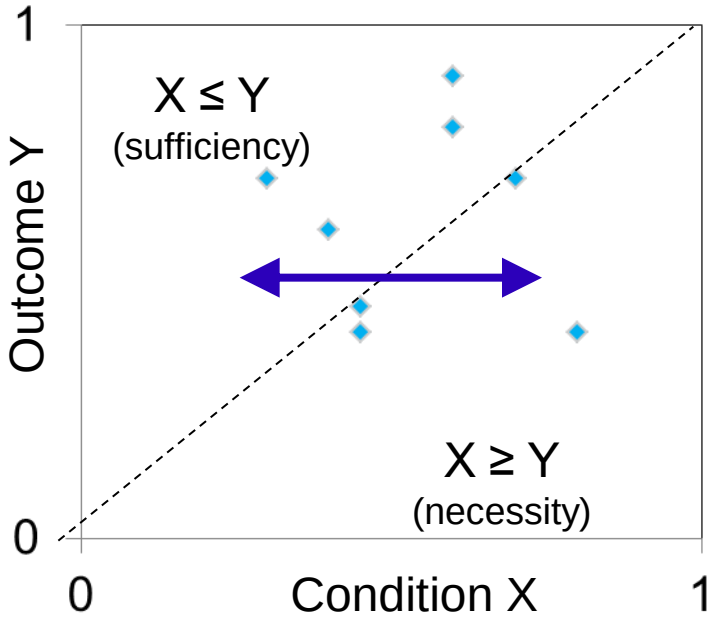
Calibration Rules

- Low (high) values of a condition X favour the detection of sufficiency (necessity) for an outcome Y



Aggregation Rules

- V
- S

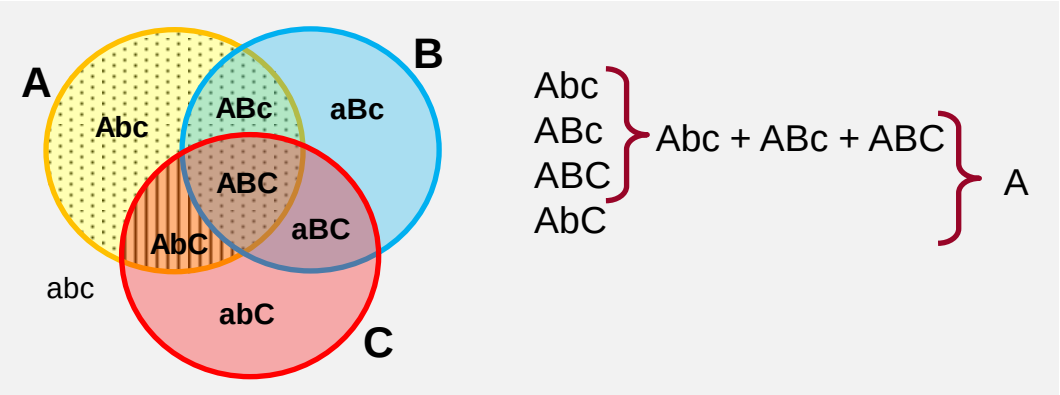


Case	(Min. + Mean)
Guayas (EC)	
Lake Kyoga (U	
Tisza (HU)	

- Again, low (high) values make the detection of sufficiency (necessity) likelier

Consistency Threshold

- Threshold determines which configurations are included in Boolean minimisation
- (Non-)inclusion of a configuration changes solution term:



- Recommendations
  - *Necessity:* High threshold of 0.9 (Skaaning, 2011)
  - *Sufficiency:* Never below 0.75 (Schneider & Wagemann, 2007). Common threshold of 0.8 or higher (Ragin, 2009)

Limited Diversity

- Logical remainder: Configuration not represented by cases => How to determine Outcome?
  - csQCA: all cases have membership of 0
  - fsQCA: all cases have membership below 0.5

Truth table for the model ENV = f(HYDRO, USE, MNGT).

HYDRO	USE	MNGT	Number of cases	Outcome ENV
0	1	0	3	1
1	1	0	5	1
1	0	0	4	0
1	0	1	7	0
0	1	1	0	-
1	1	1	0	-
0	0	1	3	0
0	0	0	7	0

Modified from Knieper & Pahl-Wostl (submitted)

Limited Diversity - Possible Solutions

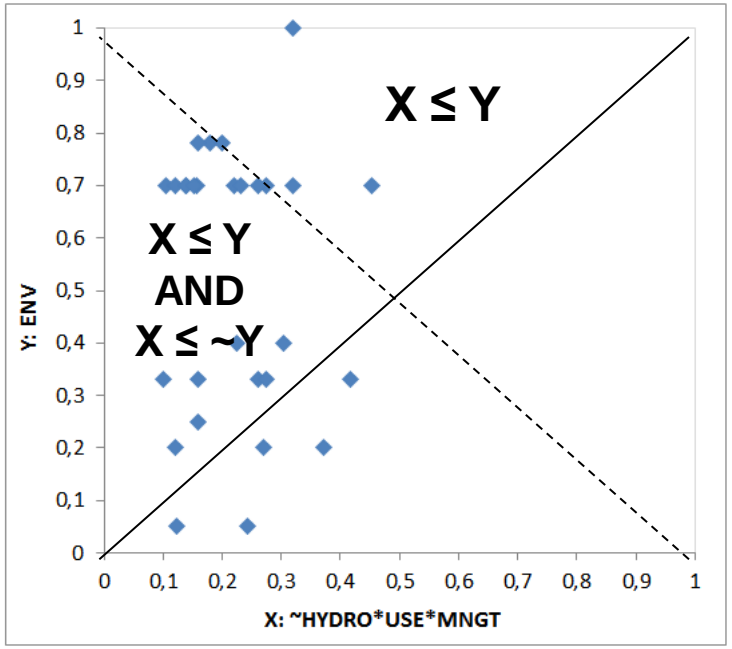
- Reduce limited diversity
  - reduce no. of conditions, redefine conditions, add cases
- Determine missing outcomes despite lim. diversity
  - *Parsimonious solution* or *intermediate solution*
  - fsQCA: consider consistency values

HYDRO	USE	MNGT	Number of cases	Outcome ENV	Consistency
0	1	0	3	1	0.924
1	1	0	5	1	0.907
1	0	0	4	0	0.896
1	0	1	7	0	0.887
0	1	1	0	-	0.908
1	1	1	0	-	0.936
0	0	1	3	0	0.803
0	0	0	7	0	0.708

Modified from Knieper & Pahl-Wostl (submitted)

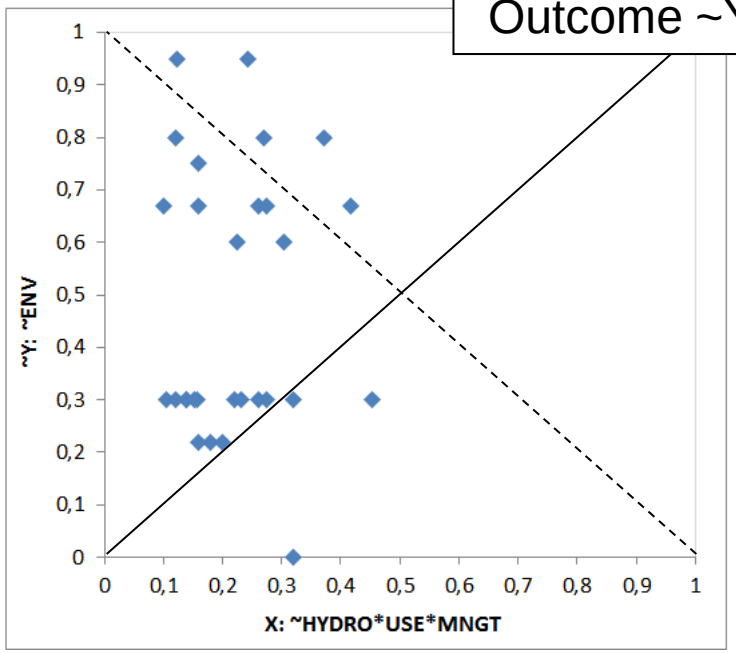
Logical Paradox in fsQCA

- Cooper and Glaesser (2011)



Consistency = 0.908

Negated Outcome ~Y



Consistency = 0.924

*~HYDRO*USE*MNGT is sufficient for the outcome and its negation!?!*

Logical Paradox – PRI Consistency

- Schneider & Wagemann (2012) suggest applying the Proportional Reduction of Inconsistency (PRI) consistency

HYDRO	USE	MNGT	Number of cases	Outcome ENV	Consistency	PRI Consistency
0	1	0	3	1	0.924	0.773
1	1	0	5	1	0.907	0.712
1	0	0	4	0	0.896	0.685
1	0	1	7	0	0.887	0.634
0	1	1	0	-	0.908	0.454
1	1	1	0	-	0.936	0.384
0	0	1	3	0	0.803	0.272
0	0	0	7	0	0.708	0.268

Modified from Knieper & Pahl-Wostl (submitted)

- PRI rarely applied, no common threshold so far

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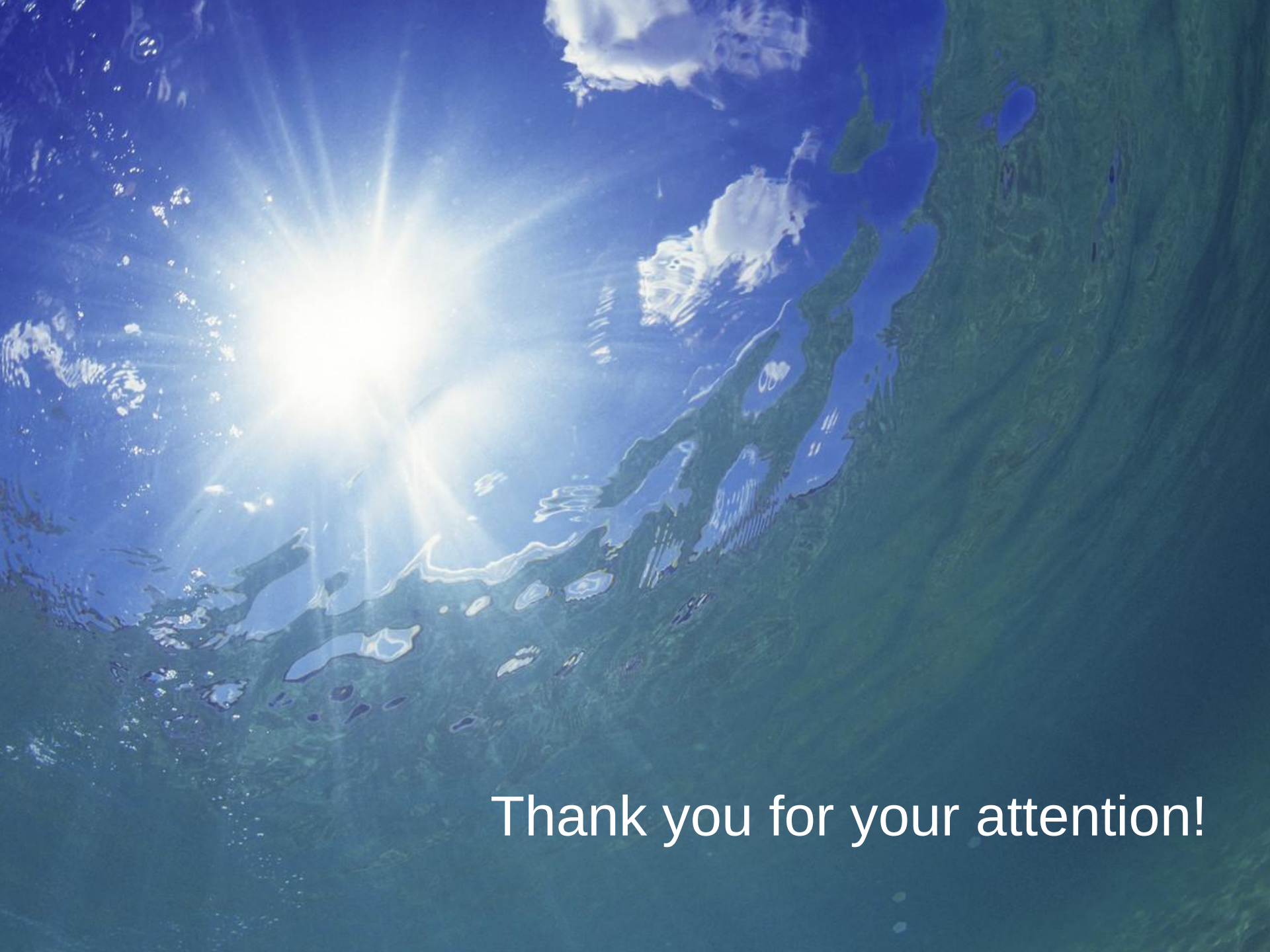
Thank you for your attention!