

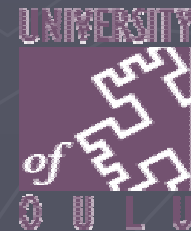
# Impact of management measures on fishermen's commitment to sustainable fisheries exploitation

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COMMIT



# Focus: Commitment

- ▶ Which factors determine fishermen's commitment to sustainable fisheries goals?
- ▶ What impact commitment has on the level of stock exploitation?
- ▶ How can commitment be improved?



# Case: Restoration of the Atlantic Salmon stocks in the Baltic Sea



- ▶ Salmon Action Plan: aims at strengthening the remaining salmon stocks and rebuilding stocks in potential salmon rivers



# SAP-rivers in Finland

- ▶ Salmon rivers:  
Tornionjoki, Simojoki
- ▶ Potential salmon rivers:  
Kuivajoki, Kiiminkijoki,  
Pyhäjoki



# Commitment means support



- ▶ The salmon stock restoration process would be most successful if all the fishermen were committed to it.
- ▶ Commitment means a promise to act consistently in a way supporting the common goal.
- ▶ Commitment would make it easier to accept certain management procedures.

# Method: Bayesian Belief Networks (BBN)

- a) to graphically present the factors influencing fishermen's commitment
- b) to quantitatively express the impact of these factors on fishermen's commitment
- c) to predict changes in commitment given future changes in the factors determining commitment
- d) to predict the impact of changes in commitment on future catches and the exploitation of the fish stocks

# The process of modelling

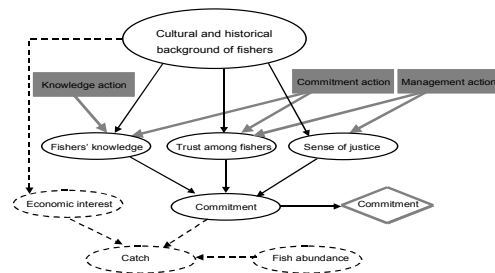
## STEP 1: Obtaining the model structure

Semi-structured interviews

- key-person
- key-person
- key-person

Nvivo  
Hugin

General belief network structure



## STEP 2: Populating conditional probability tables

Structured questionnaire

- 1.Question
- 2.Question
- 3.Question
- 4.Question
- 5....

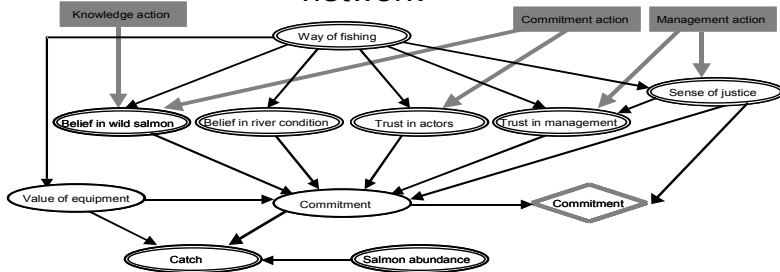
SPSS  
Hugin

Conditional probability tables

Belief in wild salmon	No wild salmon			
Belief in river condition	Completely belief			
Trust in management	Completely trust			
Trust in actors	Compl...	Some...	Slightly...	Com
Completely committed	0.38	0.88	0.41	0.49
Somewhat committed	0.38	0.04	0.33	0.31
Slightly not committed	0.08	0.04	0.13	0.07
Not committed	0.16	0.04	0.13	0.13

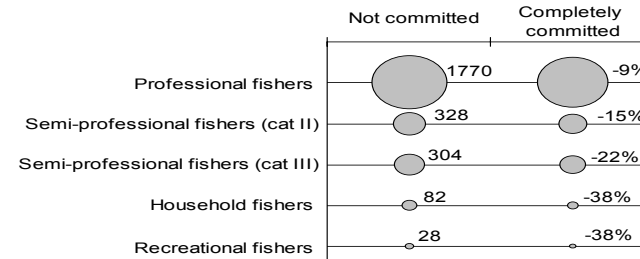
## STEP 3: Examining the impact of different management measures on commitment and subsequent catch levels

Bayesian belief network

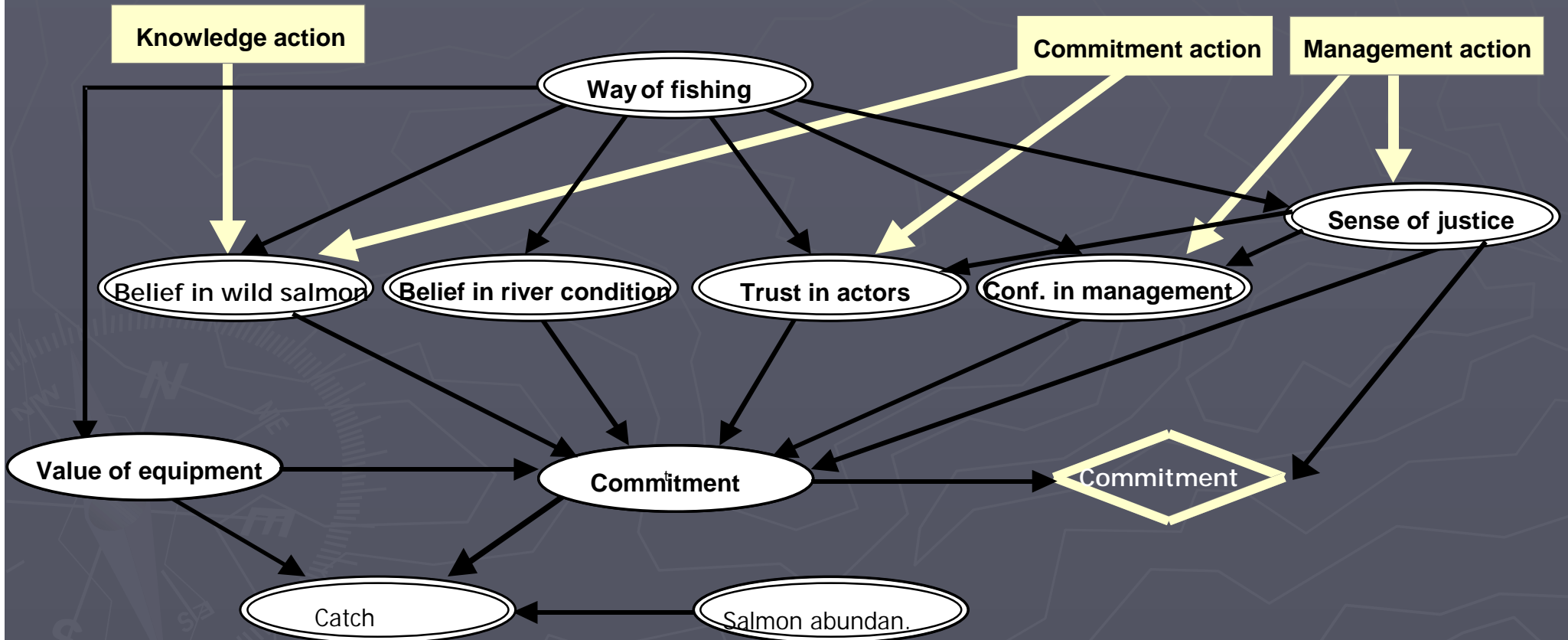


Hugin

Quantitative results of level of commitment on catches



# Model structure



# Factors decreasing commitment

- ▶ Lack of belief that there is salmon from potential salmon rivers in their catches
- ▶ Lack of belief in the river conditions of potential salmon rivers
- ▶ Lack of trust in other fisherman groups and administration
- ▶ Sense of unjust treatment > poor confidence in management

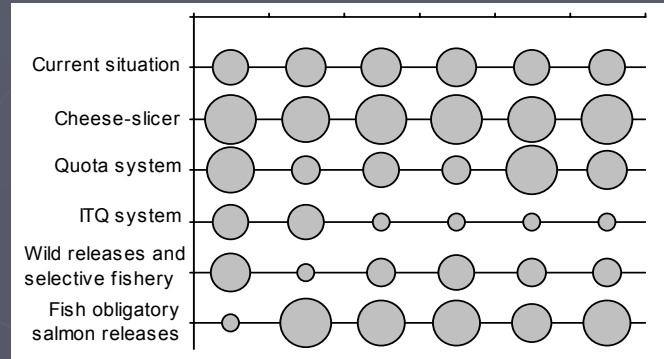


# Level of commitment depends on the economic intrests in fishing

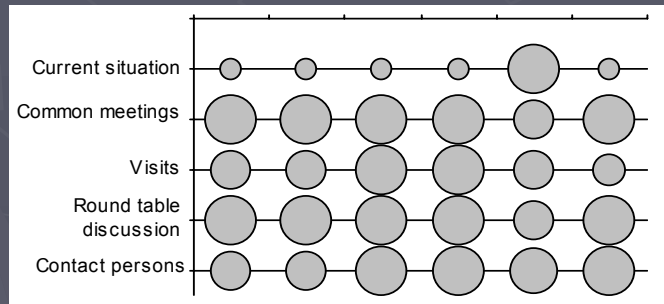
Level of commitment	Profession als	Recreatio nal f.
High investm.	50 %	82 %
Lower invest.	71 %	88 %



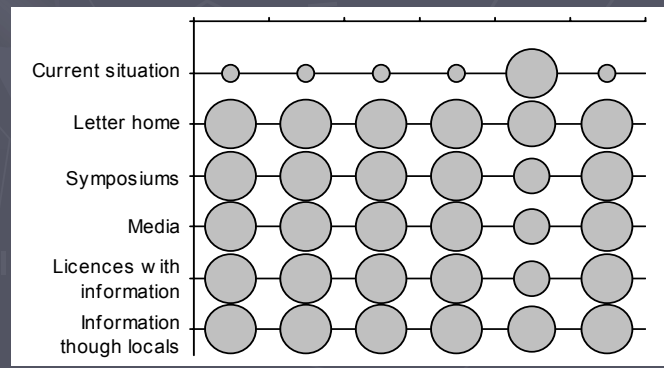
Management actions



Commitment actions

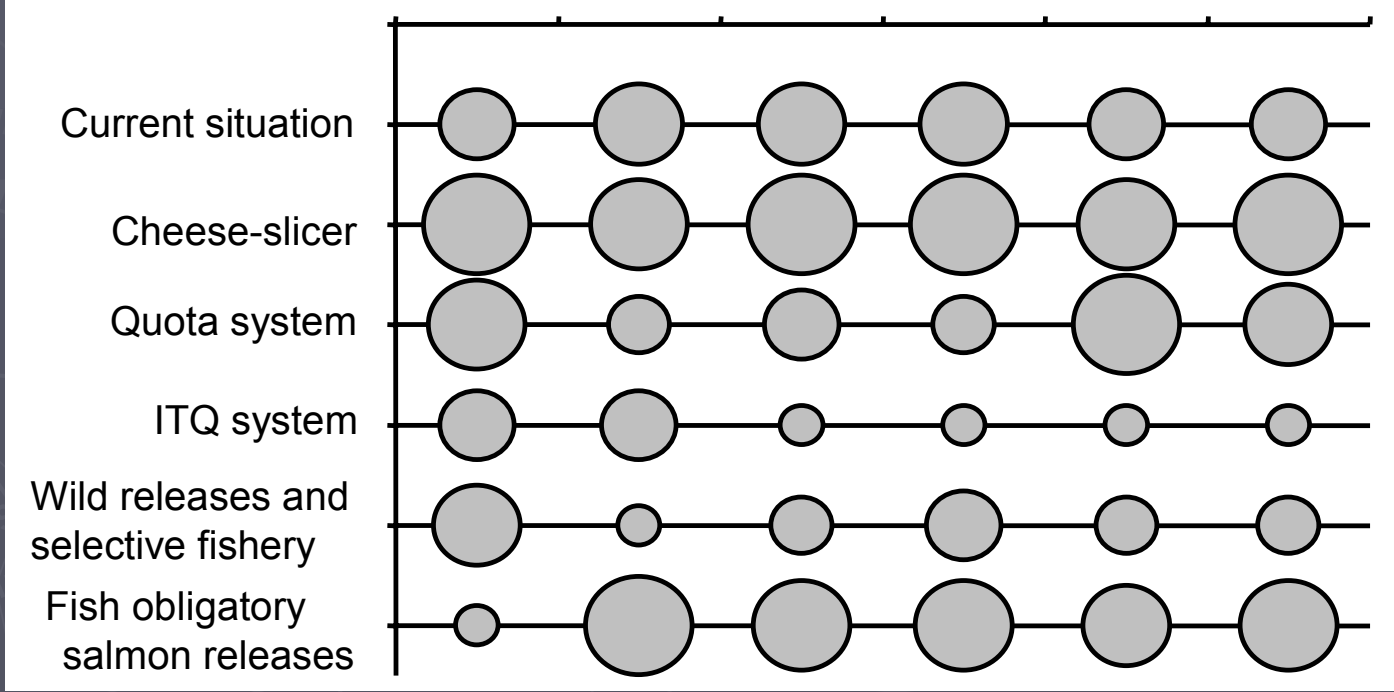


Knowledge actions

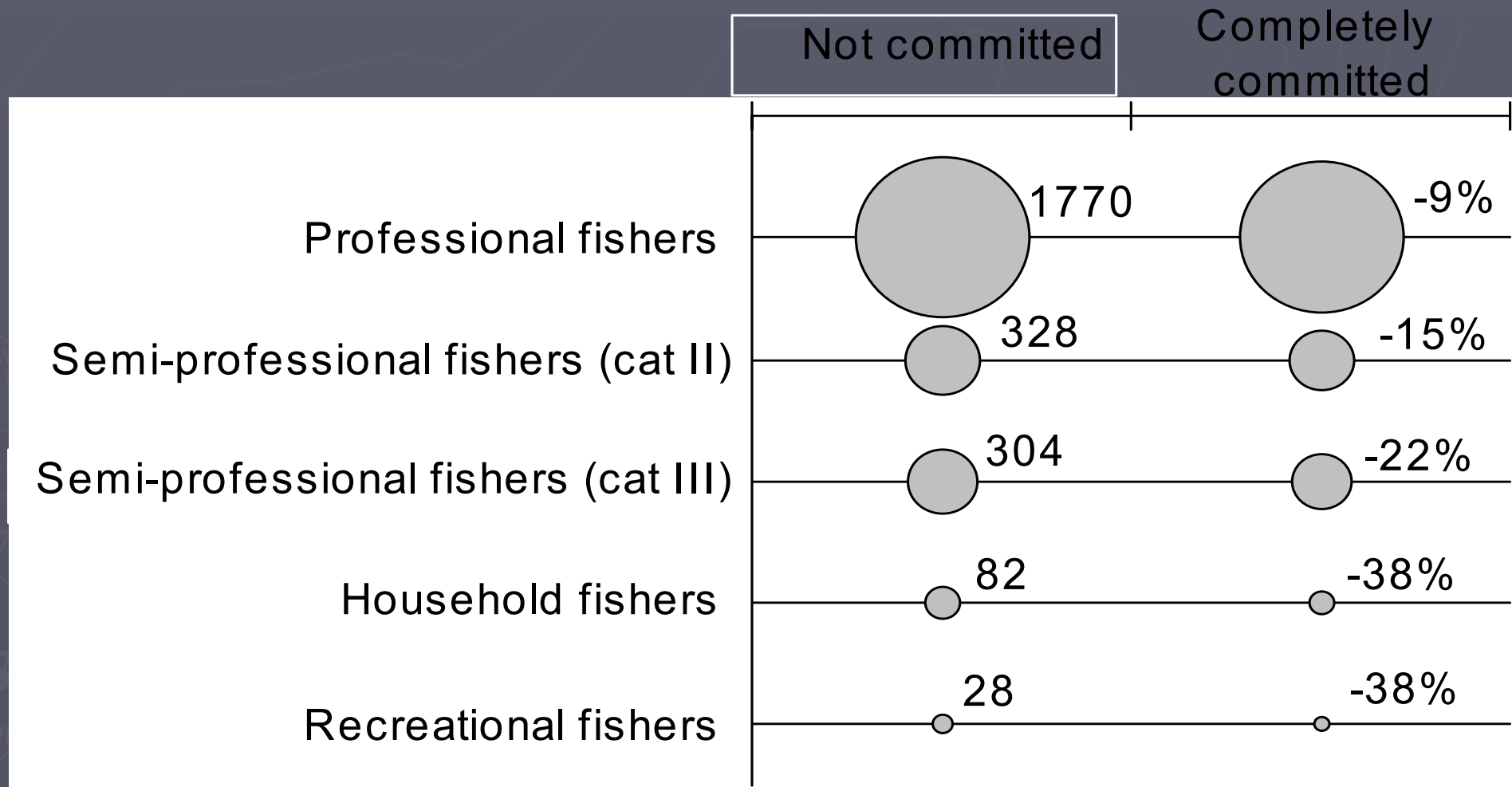


- Impact of management, commitment, and knowledge actions on fishermen's commitment
- Commitment can be improved!

# Management actions



# Impact of commitment on catches



# Main results

- ▶ Economic dependency on fishing is the most important factor determining commitment.
- ▶ A management action increasing sense of justice would be the best way to improve commitment ("cheese slicer").
- ▶ Committing would decrease the exploitation levels of fish stocks!

# Potential of Bayesian Belief Networks



- ▶ makes it possible to integrate fishermen's attitudes into the framework of fisheries stock assessment and management
- ▶ this is essential for sustainable long-term management planning in fisheries
- ▶ a framework for interdisciplinary "fisheries management science"?

Thank you!

