Cheap and accurate indicators to assess livestock impact on biodiversity

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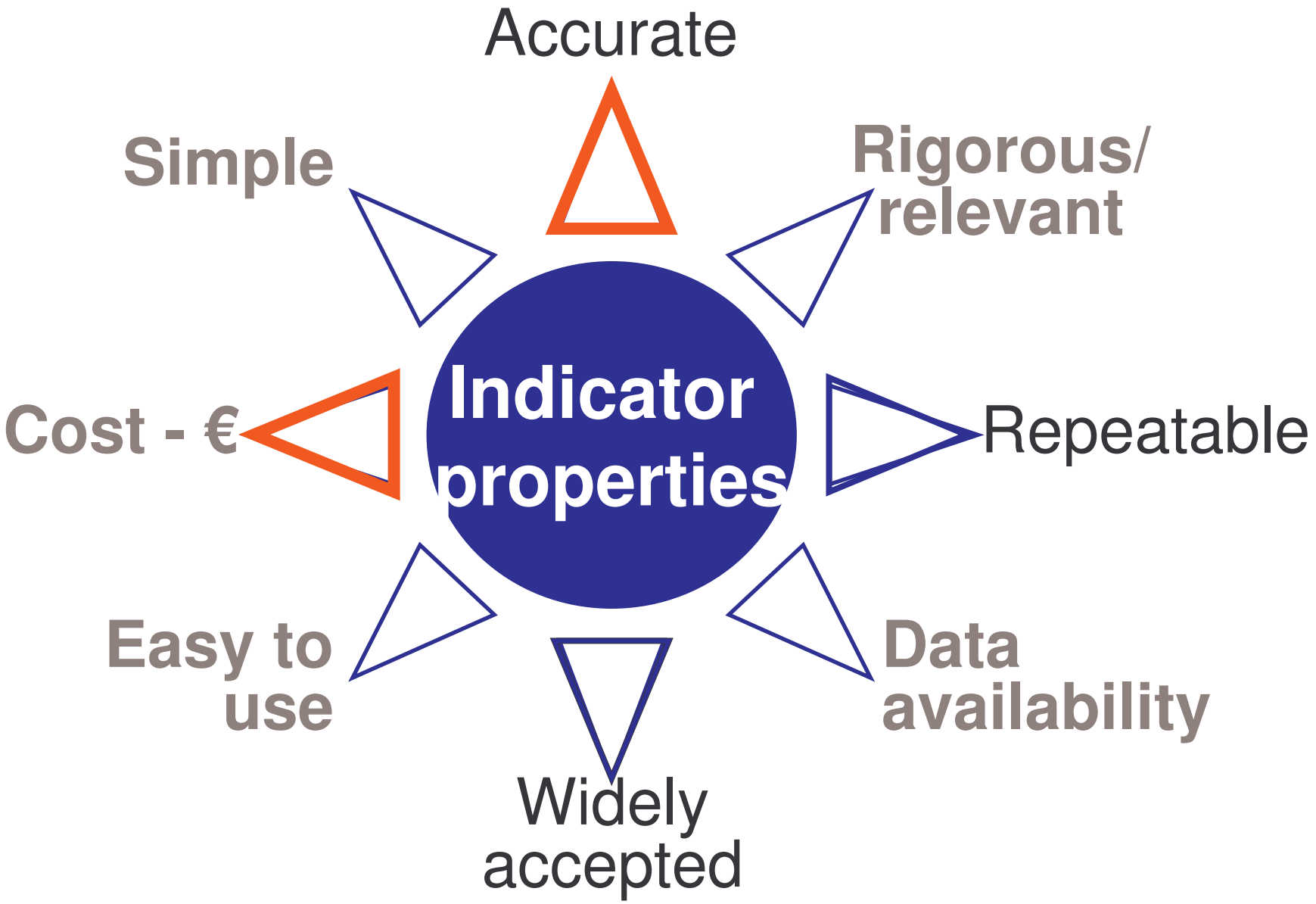
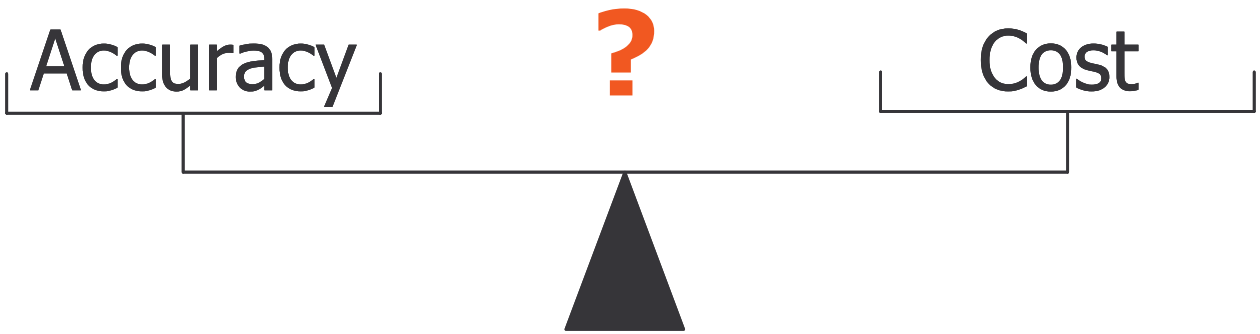
Problem statement



Problem statement



Objective -> To assess the **accuracy** and **cost** of a wide range of indicators of livestock impact on biodiversity to find out those with the best compromise

OUTLINE

- Why matter about accuracy and cost ?
- Accuracy of models combining different sets of indicators to assess livestock impact on biodiversity
- Usefulness of the different models on the basis of their **accuracy** and **cost**

Why matter about ACCURACY and COST ?

- Agri-environment schemes: "action oriented payments" for good practices
- Mixed benefits of AES for biodiversity (*Kleijn et al. 2007, Wilson et al. 2007*)
- Biodiversity : management X ecological quality (e.g. for bird biodiversity *Tichit et al. 2005, 2007, Durant & Tichit 2008, Ottvall 2007, Van der Wal 2008*)
- Combining indicators on management and ecological quality into models

BUT

Why matter about ACCURACY and COST ?

- Uncertainty in input variables, equation and parameters → low accuracy
- Complexity does not warrant accuracy, the opposite is also true!
- Model cost = f (n° indicators)
- Cost of indicators: time for data collection, measurement methods

Why matter about ACCURACY and COST ?

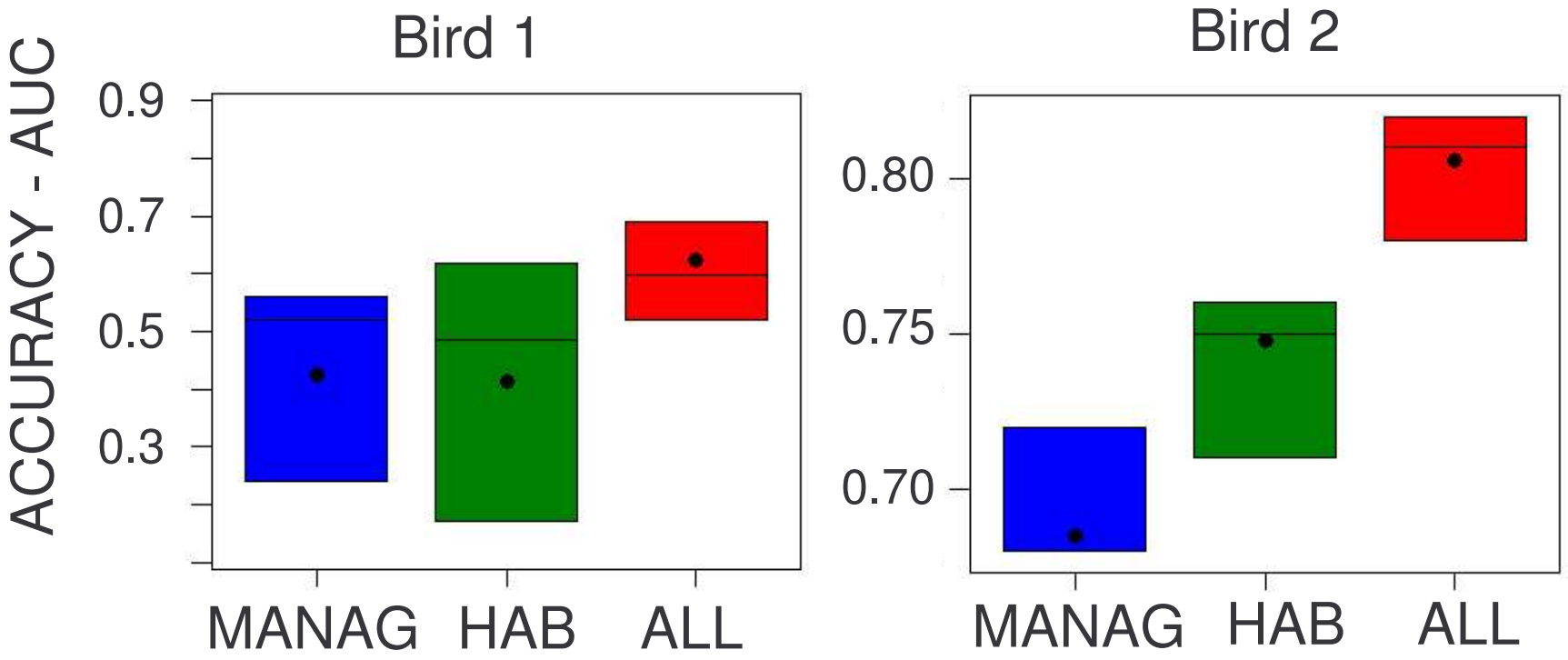
Type of indicators used as input variable into models		n	**Cost €**
Management (67 farms)	single survey	4	531
	repeated survey	4	**1173**
Habitat (252 fields)	computed using GIS	3	138
	visual estimates	6	1221
	repeated measurements	12	**2505**

DATA and statistical methods

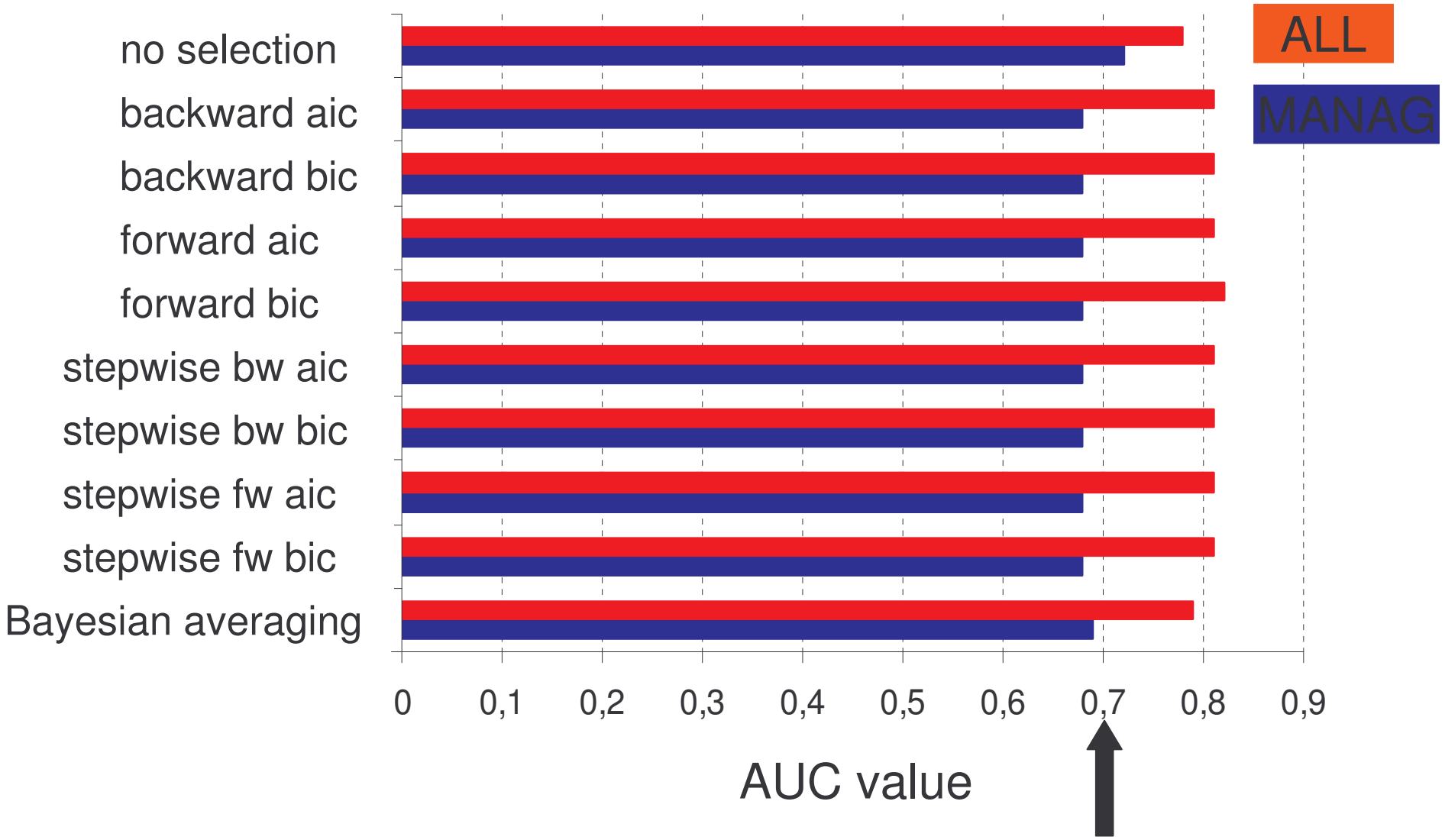
- Data 2005 and 2006 / 252 fields / 67 farms
  - 29 indicators = input variables
  - Biodiversity measurements (2 bird species)

- Logistic regression to predict bird presence
  - Model discriminatory ability assessed with ROC methodology
  - Model cost : significant input variables
  - 10 selection methods

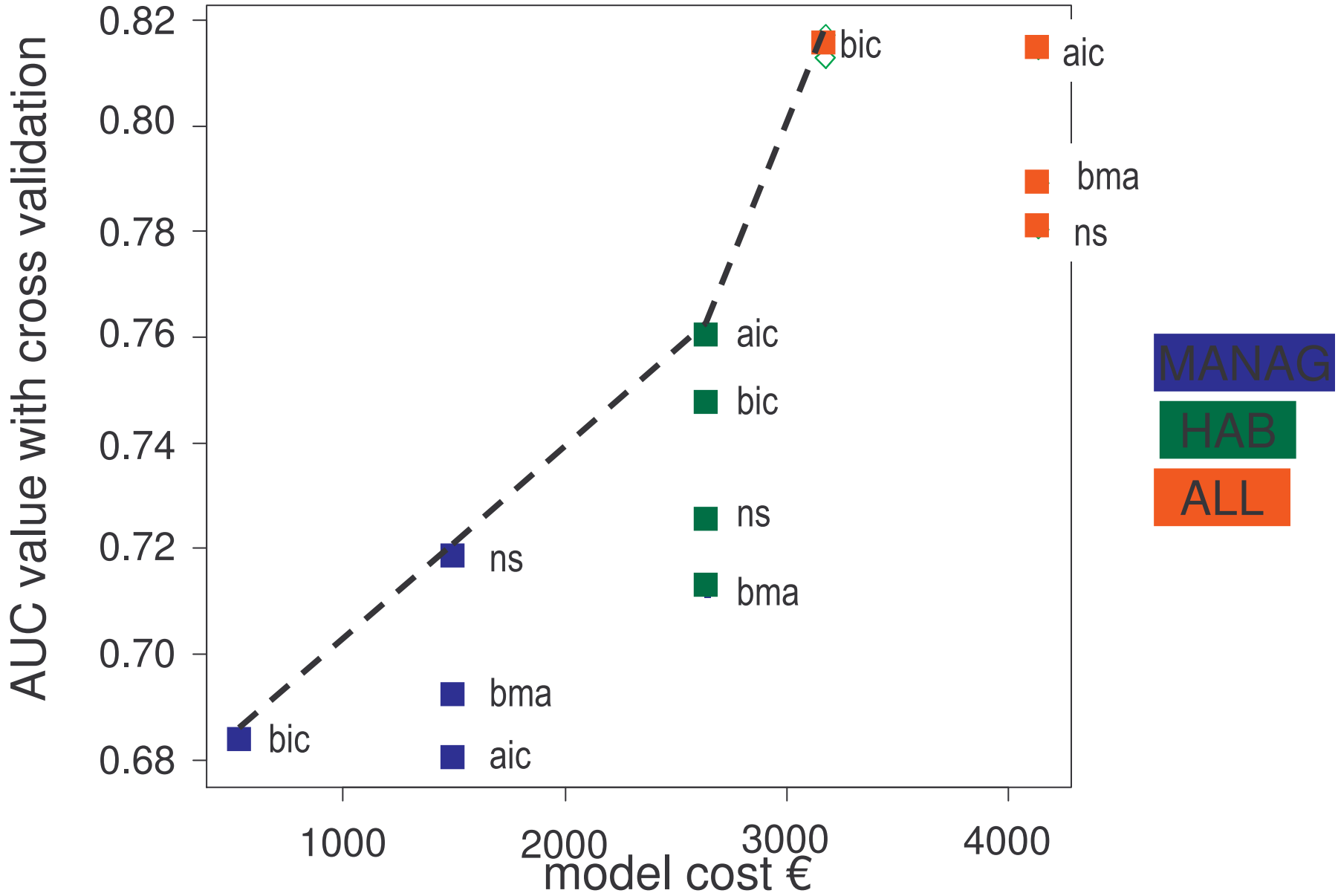
Model performances & type of variable



Model performances & selection method for bird 2



Model performance *versus* cost for Bird 2



CONCLUSIONS

	MODEL 1	MODEL 2
Accuracy	≈ 0.7	≈ 0.8
Cost	1600 €	3000 €
Selection method	no selection	selection + BIC
Input variables	2 MANAG	2 MANAG 4 HAB

- Hierarchy according to cost and accuracy → useful to simplify data collection
- Important for decision making

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This is bird 1

and bird 2

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