Fig.1: Indicator development, development and use as a chain of processes.

Fig. 1 Indicator identification, development and use as a chain of processes.

4   *Table 1.* *Criteria and potential indicators to assess water management options. Because an indicator can inform multiple criteria, the total number of indicator*

5   *profiles among criteria exceeds 146 (total number of indicator profiles). Numbers in parentheses indicate the number of proto-indicators that could not be further*

6   *formalized.*

Criteria	Indicator profiles		
Name	**Content**	**No.**	**Names of selected examples**
Safety	Damage caused by water; Public health and drinking water	9 (2)	Number of days under critical low flow; Runoff coefficient of upstream areas
Food security	Quantity of food products; Healthiness of food products	4	Nutritional content of food production; Energy content of food production
Local identity	Protecting agricultural identity and local expertise; Landscape diversity (non-specialization)	20 (1)	Agricultural land cover diversity; Proportion of farms and production types with a quality label
Wealth and employment	Agricultural sector; Tourism; Hydropower	14 (1)	Cumulative revenue of all farms in the area; Diversity of potential recreational water activities; Hydropower production from existing plants
Biodiversity	Aquatic and terrestrial biodiversity	14	Pollution from plant protection practices; Variation in minimum average flow for 10 consecutive days; Heterogeneity in landscape composition and configuration
Long-term adaptability of water-use activities	Vulnerability to socio-economic shocks; Vulnerability to changes in water availability; Development capacities	27(3)	Crop yields under climate change; Available water stock at the end of each irrigation season; Diversity of agricultural production
Adjustment potential	Leeway for water managers and users to adapt water supply to demand (and vice-versa) throughout the year	9	Impact of water-use restrictions on agricultural production; Temporal distribution of water needs
Maintaining	Natural functioning of hydrological system; Natural	18 (3)	Number of days with bare soil;

natural capital	functioning of soils		Renewal rate of underground water stock; Volume of rainwater returned to the environment
Equity among water users	Equity in distribution of water use potential; Equity in distribution of costs and effort	11	Number of farms with increased/decreased irrigation costs; Areas with increased/decreased irrigation water
Efficiency	Efficiency of water management decisions; Efficiency of the water management infrastructure; Efficiency of agricultural water	19	Yield of agricultural production compared to potential yield; Cost of 1 cubic m of water released from reservoirs; Use rate of reservoirs
Political intelligibility	Conformity with political/regulatory objectives; Citizen approval	8	Number of days with decreed restrictions on water use; Average water consumption per ha

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Table 2. Extract of the indicator profile database for indicators used as examples in the results (indicators are listed in the order in which they appear in the text)

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No. (see Appendix)	Indicator name	Definition	Source	Criterion/a	Estimation method	Resolution of raw data	Aggregation scale(s)	Evaluation scale(s)	Representation(s)
67	Area affected by water restrictions at key periods	Number of ha that encounter water use restrictions when crop production is highly sensitive to water stress.	experts	Adjustment potential	Model simulation	Islet/Field	Farm type; Agricultural landscape; Crop type; Restriction zone	Landscape; Sub-landscape (spatial units); Sub-landscape (classes)	single values; map
21	Irrigation cost per ha	Average annual costs per ha related to irrigation (including amortization of equipment costs)	experts	Equity	Model simulation	Islet/Field	Crop type	Landscape	single values
44	Variation in water stored in soils	Difference between water stored in soils at the end of the simulation period (15 years) and the beginning of simulation	authors	Reproduction of natural capital	Model simulation	Islet/Field	Elementary watershed	Landscape; Sub-landscape (spatial units)	map

94	Pollution from plant protection practices	Qualitative estimate of pollution pressure based on: - the quantity of chemicals applied - the moment when chemicals are applied (occasional leaching or not)	stakeholders+ authors	Preservation of biodiversity; Safety	Model simulation	Islet/Field	Elementary watershed; Entire landscape	Landscape; Infra (spatial units)	map; single value
113	Volume of rainwater returned to the environment	Volume of rainwater returned to water bodies or soil each year (average) (Underground infiltration + Surface flow + Sub-surface flow - Irrigation) / Rainwater	authors	Reproduction of natural capital	Model simulation	Islet/Field	Entire landscape	Landscape	single value
70	Irrigation capacity of all farms	Cumulative value of the irrigation capacity of all irrigation equipment, expressed relative to the irrigation needs of crops.	experts; stakeholders	Long-term adaptability of water-use activities	Calculations based on scenario data	Islet/Field	Agricultural landscape	Landscape	graph
112	Impact of water use restrictions on agricultural yields	Average yields without restrictions - Average yields with restrictions	stakeholders+ authors	Adjustment potential	Model simulation	Islet/Field	Farm type; Agricultural landscape	Landscape; Infra (classes)	graph

139	Use rate of reservoirs	Volume of water withdrawn from reservoirs for agricultural use / Volume of water stored in the reservoirs	stakeholders+ authors; experts	Efficiency	Model simulation	Reservoirs	Entire water system	Landscape	graph
50	Semi-natural elements contributing to water purification	Proportion of the landscape covered by semi-natural elements that contribute to water purification (wet grasslands, forests, etc.)	stakeholders+ authors	Safety	Calculations based on scenario data	Land cover unit	Land cover unit; Entire landscape	Landscape	single value; map
69	Match between water storage capacity and irrigation needs	Storage capacity in reservoirs for agricultural use / Volume of irrigation water necessary to meet crop needs	experts	Efficiency	Model simulation	Islet/Field; Reservoirs	Entire landscape	Landscape	single value
144	Farms with increase/decrease in irrigation costs	Farms with an increase or decrease in irrigation costs compared to the reference scenario (with different thresholds: -30%, -20%, -10%, +10%, +20%, +30%)	experts	Equity	Calculations based on scenario data	Farm	Farm; Farm type; Agricultural landscape	Landscape	graph; map
101	Two-year flood flow	Value of the 2-year flood flow under a scenario of change / Value of the 2-year flood flow without water withdrawals	experts; stakeholders	Reproduction of natural capital	Model simulation	River/river segment	River/river segment	Landscape; Sub-landscape (spatial units)	single values; map

|									
2	Impacts on the diversity of recreational water activities	Expert estimates of impacts of scenarios on swimming, canoeing-kayaking, and fishing based on scenario descriptions and simulations of the quantity of water in rivers. Impacts must be estimated in terms of: - number of potential sites where the activities are practiced - maintenance / disappearance / development of currently practiced activities	experts; stakeholders+ authors	Wealth and employment; Local identity	Expert estimates	Entire water system; Site of practice	Entire water system; Site of practice	Landscape	map; narratives
81	Nitrate pressure	Quantity of nitrates that could pollute vulnerable drinking water watersheds (due to previous pollution or lack of proper equipment).	experts	Safety	Model simulation	Islet/Field	Specific zone	Landscape; Sub-landscape (spatial units)	map
76	Changes in gross margin generated by each type of agricultural production	For each form of agricultural production: (gross margin in the scenario −reference gross margin) / reference gross margin. The number of employees involved in the value chain of each production type should be included as additional information.	experts; stakeholders+ authors	Wealth and employment	Model simulation	Islet/Field	Crop type	Landscape; Sub-landscape (classes)	graph

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Variation of withdrawals on water bodies
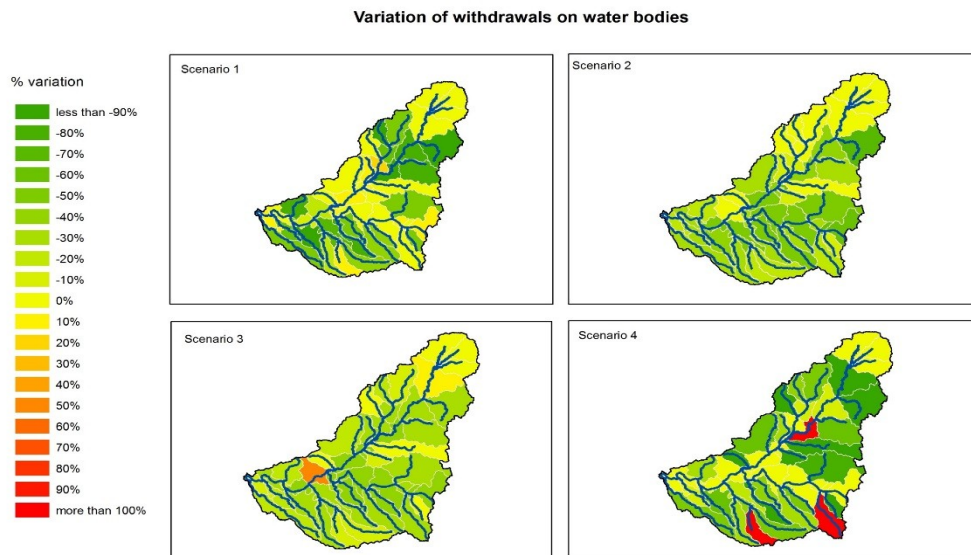
Fig. 2: Indicators resulting from two different spatial aggregation choices. Up: partial aggregation (at the scale of elementary watersheds); down: complete aggregation (at the scale of the entire landscape). The two series of indicators are made out of the same raw data of agricultural water withdrawals simulated at the field scale for 4 scenarios.