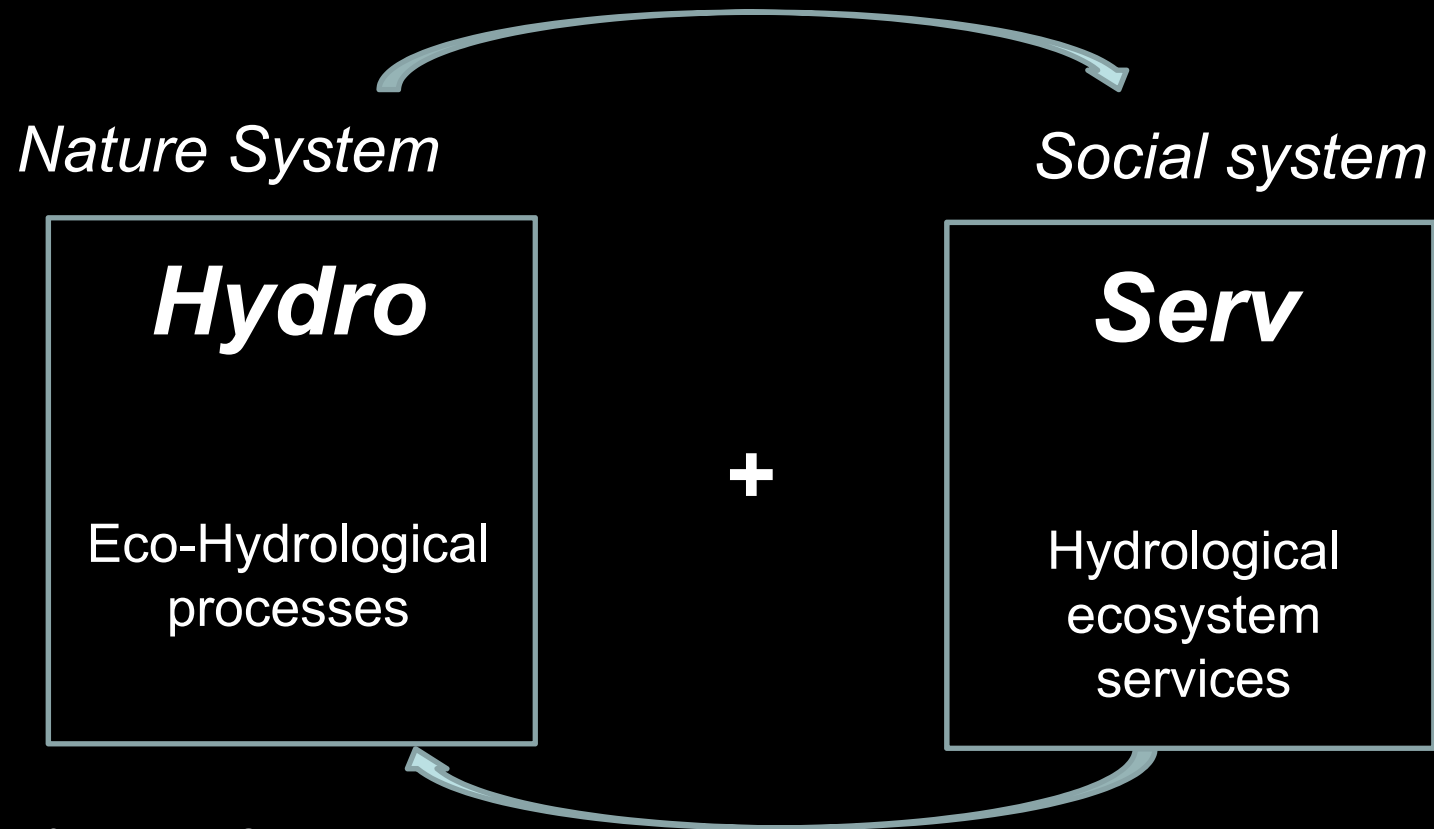


HydroServ - Vulnerability of hydrological ecosystem services



Prof. Adrienne Grêt-Regamey (ETH)

Prof. Paolo Burlando (ETH)

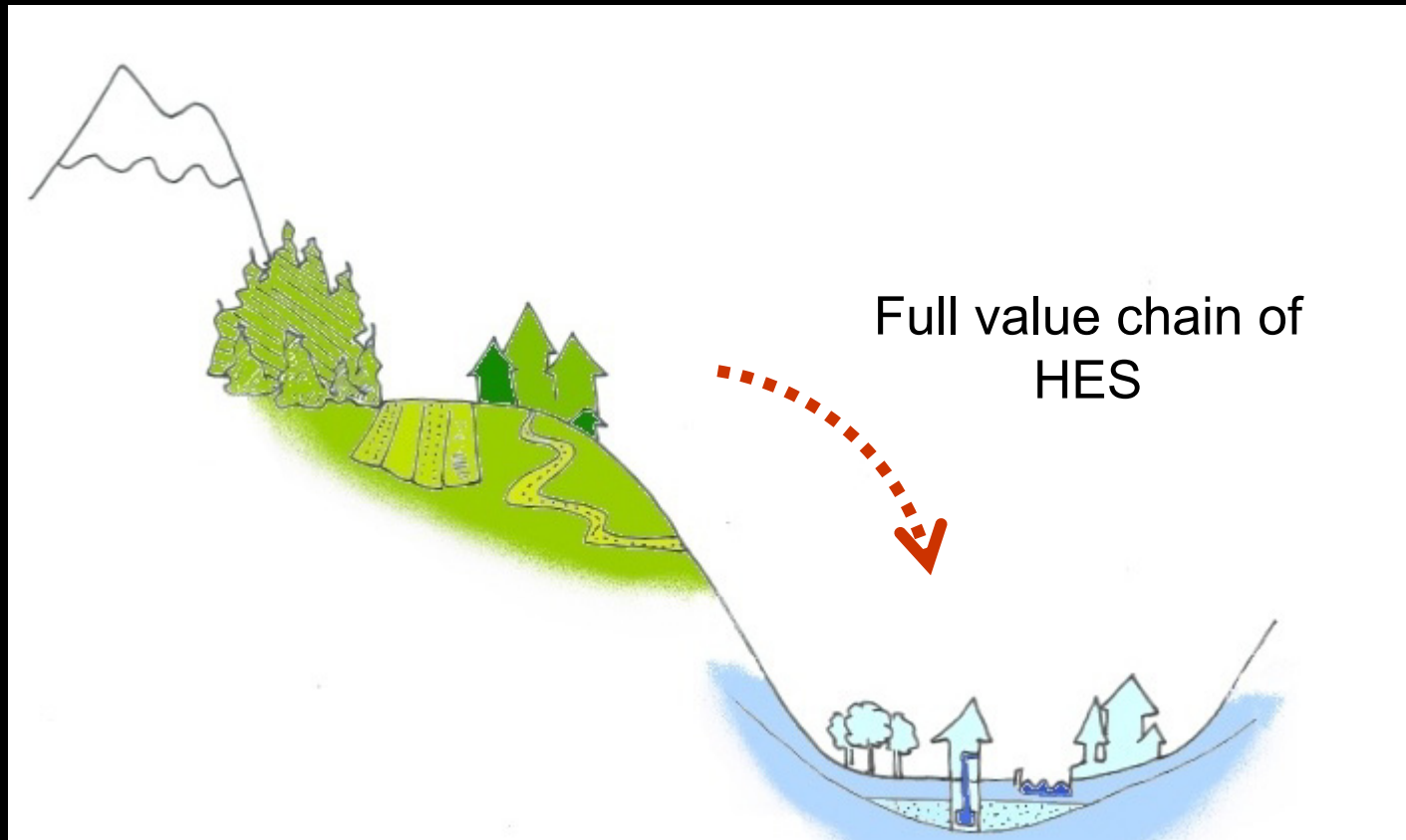
Prof. Harald Bugmann (ETH)

Prof. Thomas Köllner (Uni Bayreuth)

Prof. Peter Knöpfel (IDHEAP)

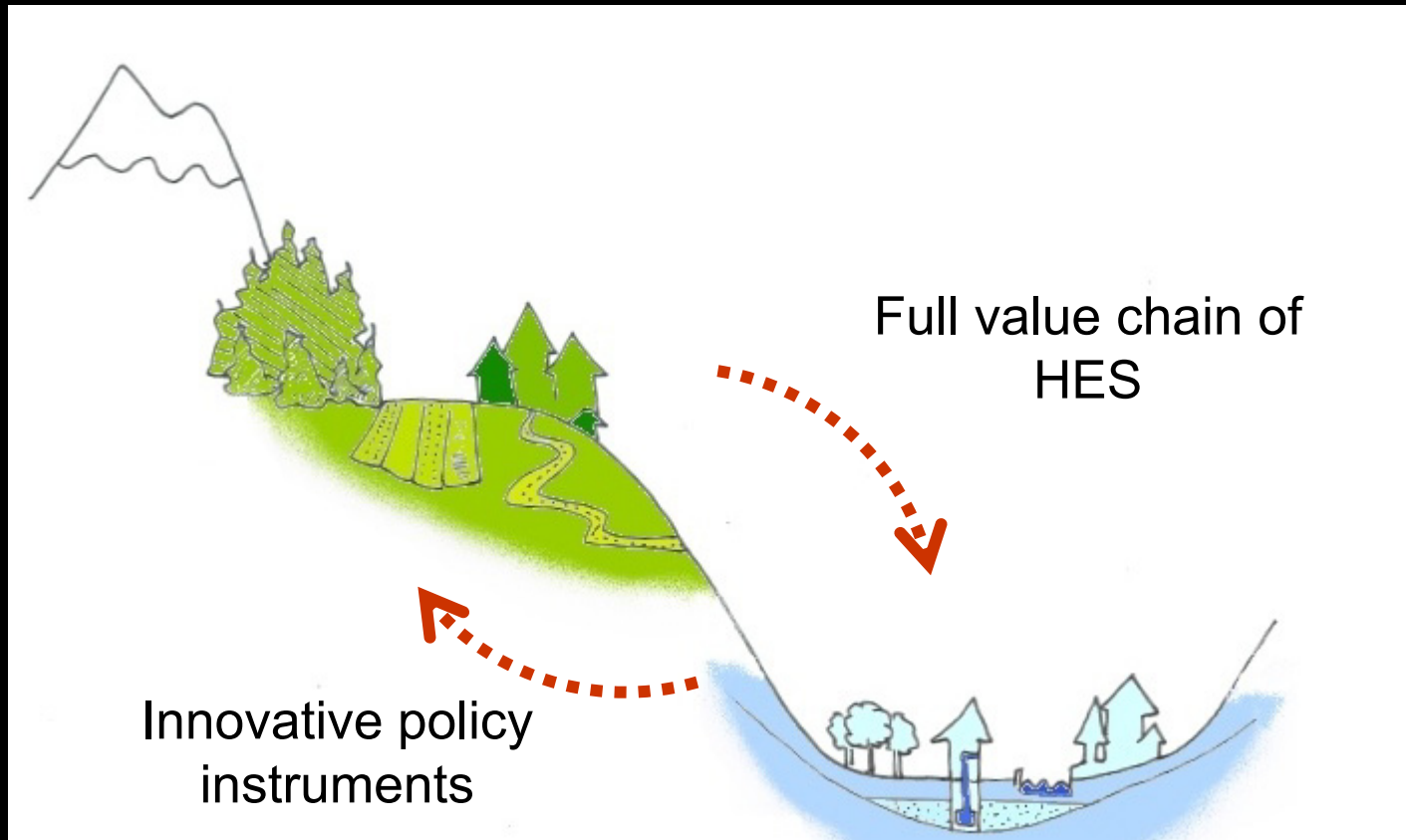
Main goals

- fostering understanding on **the full value chain of HES**

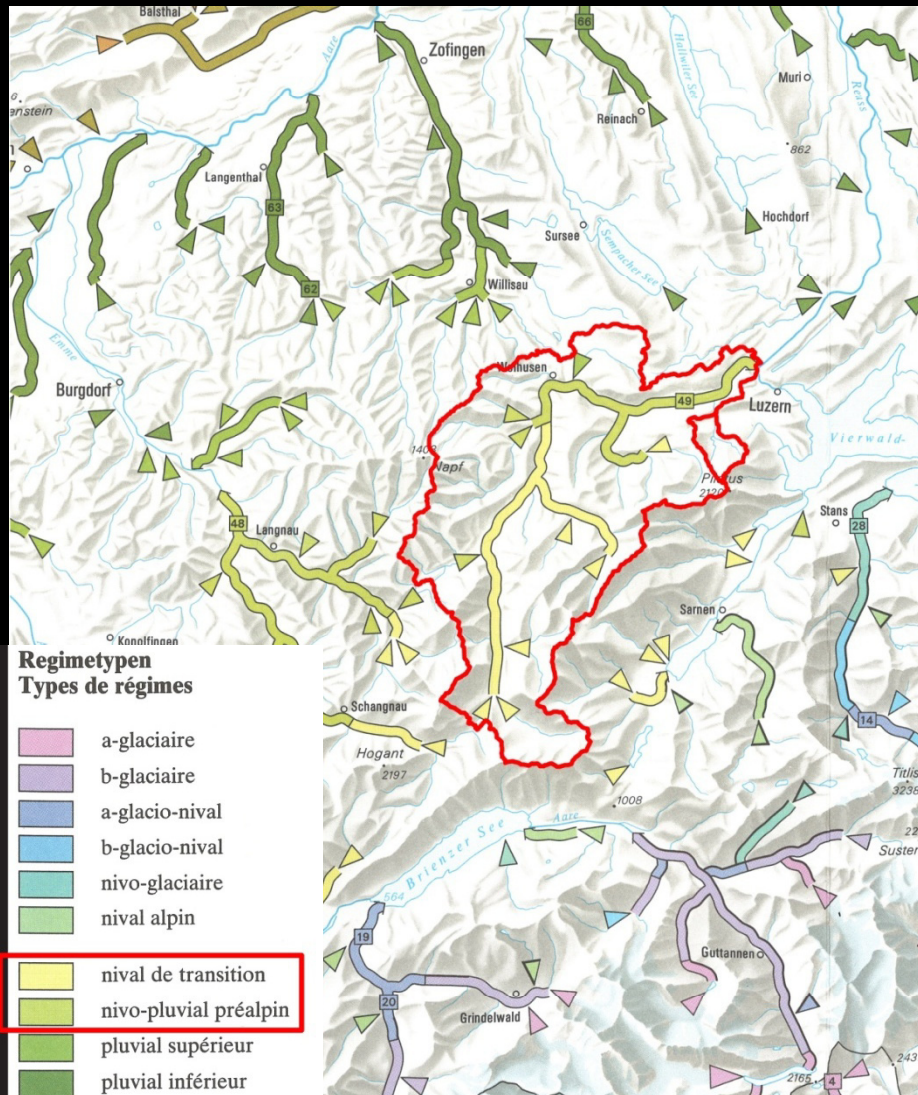


Main goals

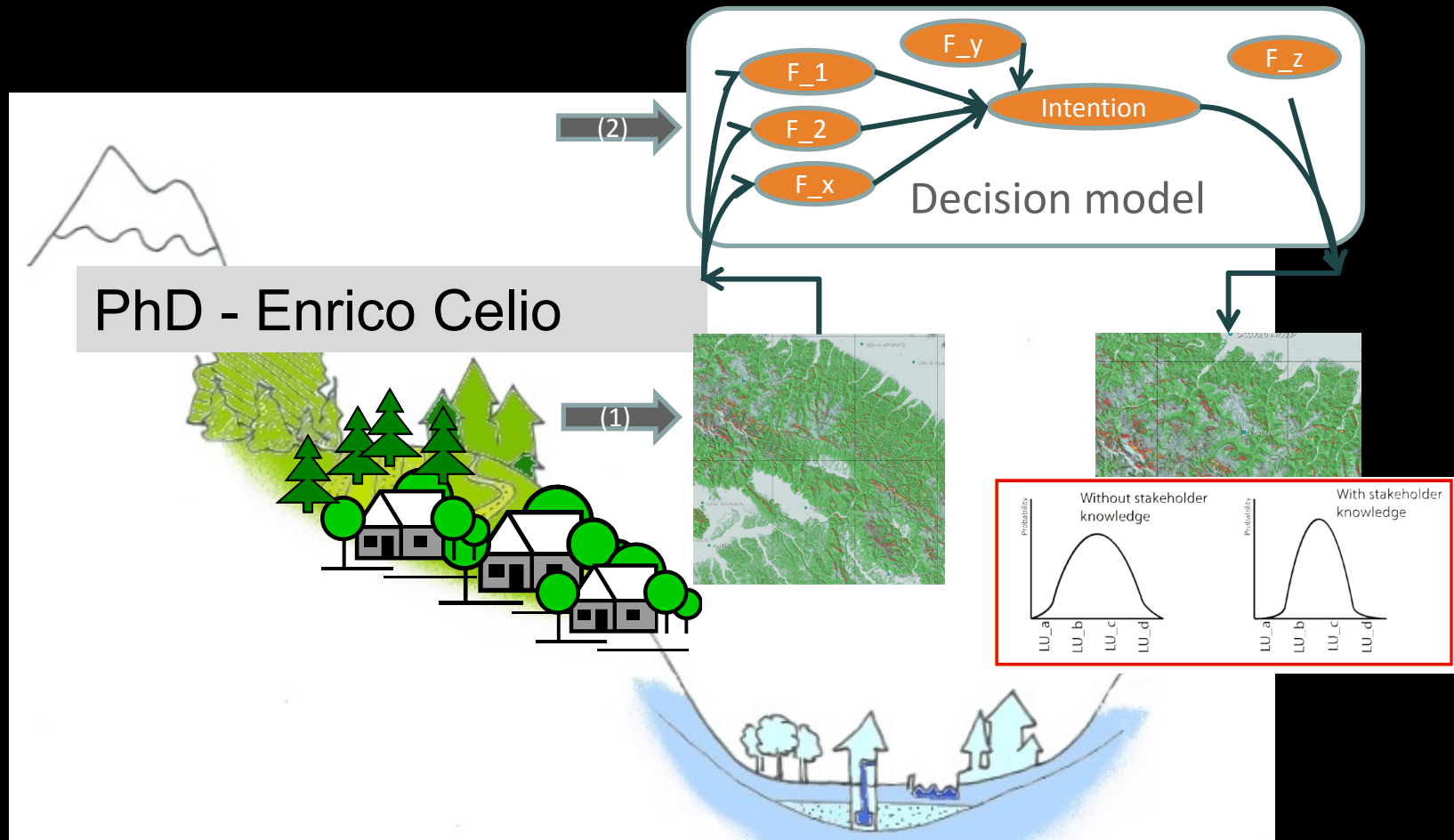
- fostering understanding on **the full value chain of HES**
- suggests **innovative policy instruments to bridge supply and demand for HES**



Kleine Emme



Stakeholder-based land use decision model based on a spatially explicit Bayesian Network



Fragebogen im Rahmen des Projekts HydroServ

Entscheidungen in der Landwirtschaft

➔ Meine eingesetzte Arbeitszeit für meinen Betrieb empfinde ich als zu hoch. Gerne würde ich weniger arbeiten.

	1	2	3	4	5	
richtig						falsch

➔ Meine Entscheidungen zur Bewirtschaftung des Betriebes fälle ich primär nach den folgenden Gesichtspunkten (bitte zu jeder Kategorie eine Angabe machen).

	überhaupt nicht wichtig	1	2	3	4	5	sehr wichtig
Naturschutz							
Finanzen							
Arbeitsbelastung							
Umweltaspekte							
Nachfrage auf dem Markt							
Ausübung meiner Freizeitaktivitäten							

Tasks achieved

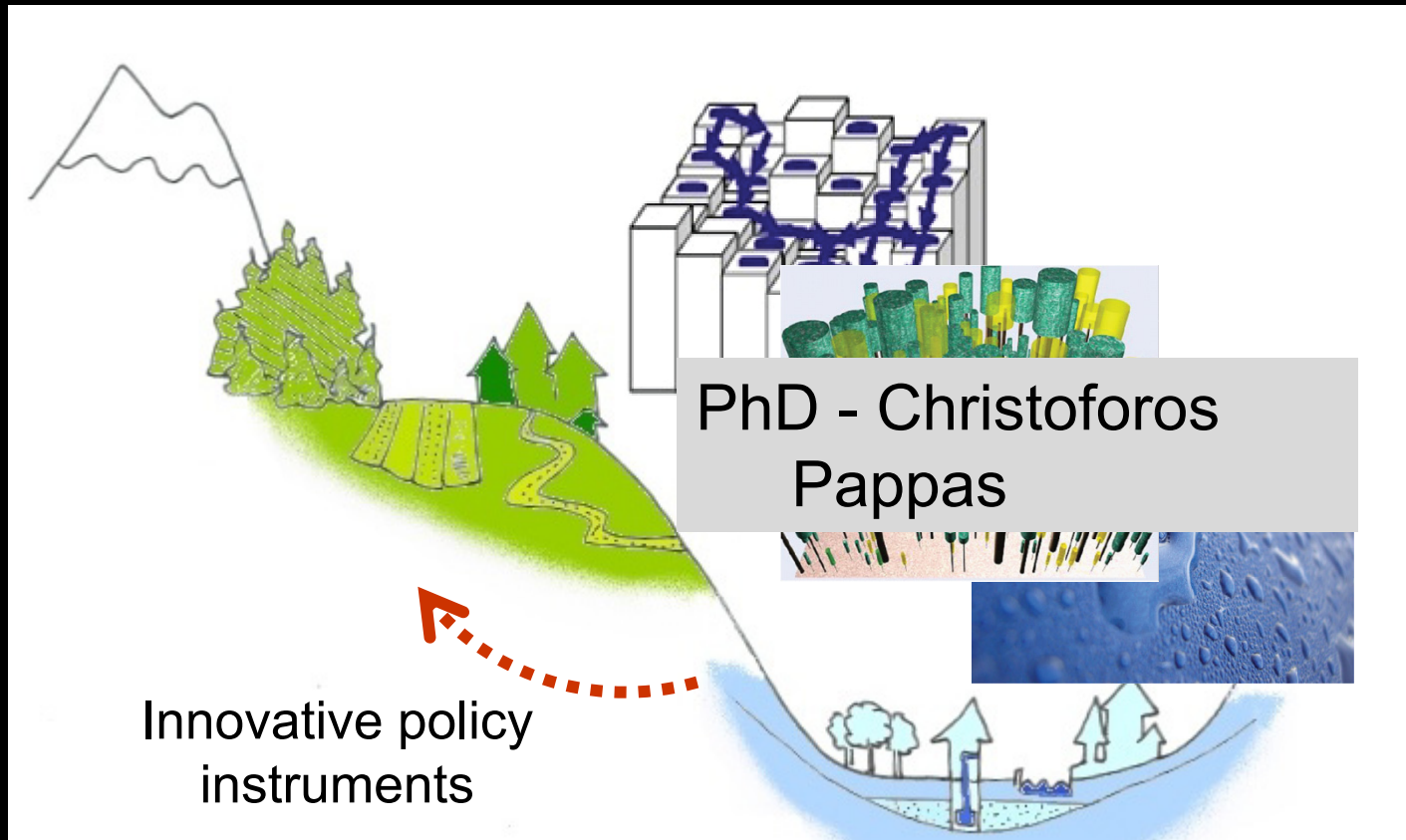
- ✓ Collection of influence factors
- ✓ Weighting of influence factors
- ✓ Causal relations (work in progress) and states of the influence factors

To Do

- Estimation of prior probability distributions with experts
- Validation meeting with expert group
- Update of probability distribution with local actors
- Sensitivity analysis & validation

Eco-hydrological model

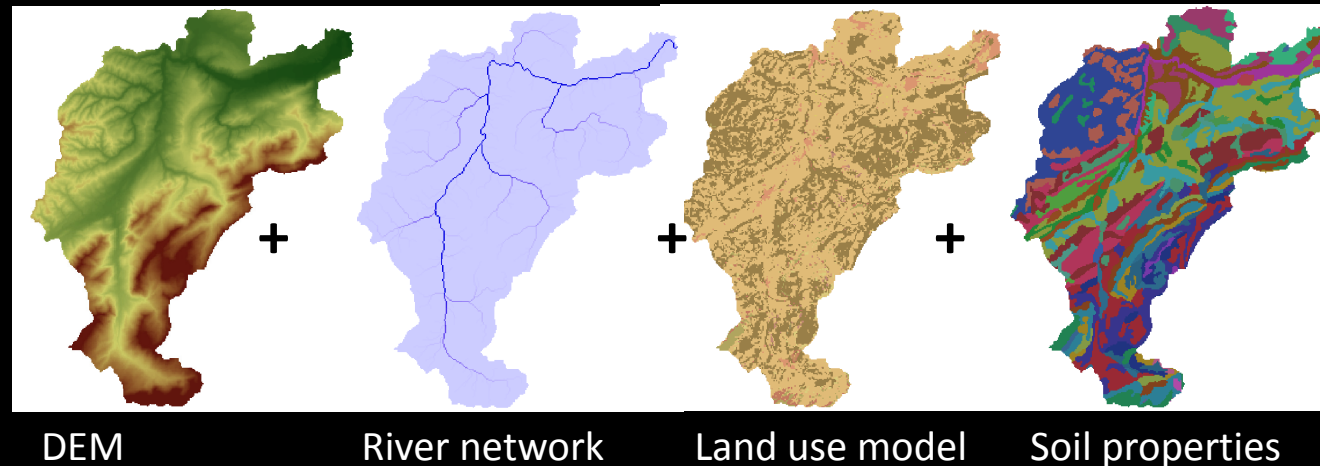
under land-use changes and climate variability



Eco-hydrological model

- (a) Core module: hydrological model TOPKAPI-ETH
- (b) Forest-landscape model: LPJ-GUESS vegetation model
- (c) Water quality model

Eco-hydrological model = (a) + (b) + (c)



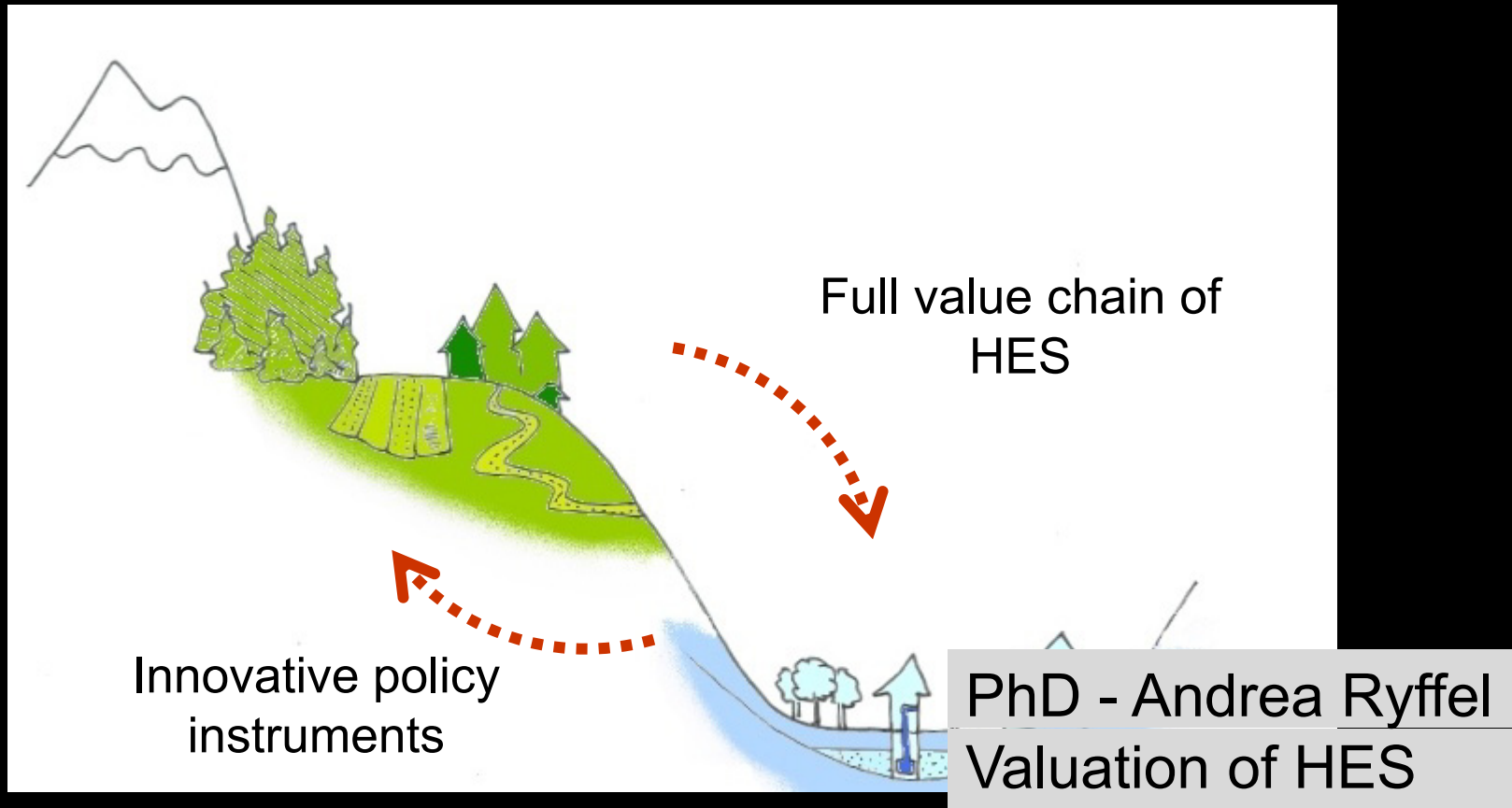
Precipitation
Temperature
Vegetation Dynamics
Nitrogen
Phosphorous

Coupling TOPKAPI with LPJ-GUESS in four steps:


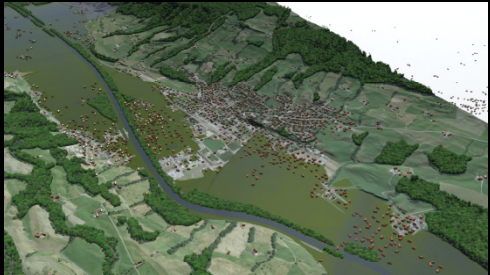
1. Sensitivity analysis of LPJ-GUESS model
2. External coupling of two models (the models run separately)
3. Full coupling based on constant values of biomass and leaf area index (LAI)
4. Full coupling

Valuation of HES

Spatial trade-offs between upland and lowland



Choosing a future: 2100

	Scenario A	Scenario B	Neither
Landscape in upland			Both choices don't convince me. = Risk
Landscape in lowland			
X Damage potential	Medium	Medium	
X Frequency	Every 100 years	Every 300 years	
Cost/year	3%	1%	
I choose	<input type="checkbox"/> Scenario A	<input type="checkbox"/> Scenario B	

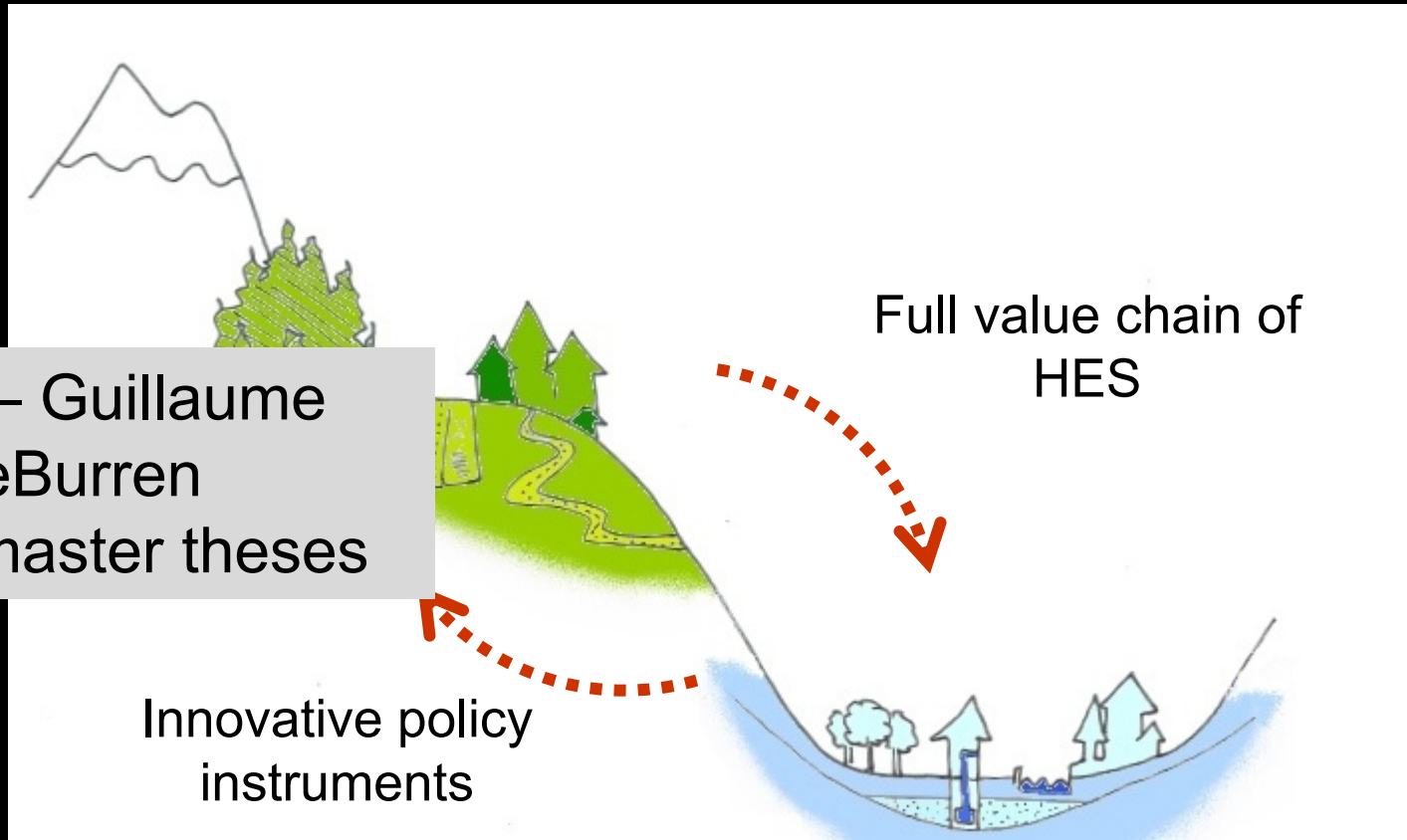
Innovative policy instruments

Interresources Institutional Regime

PhD – Guillaume
deBurren
and master theses

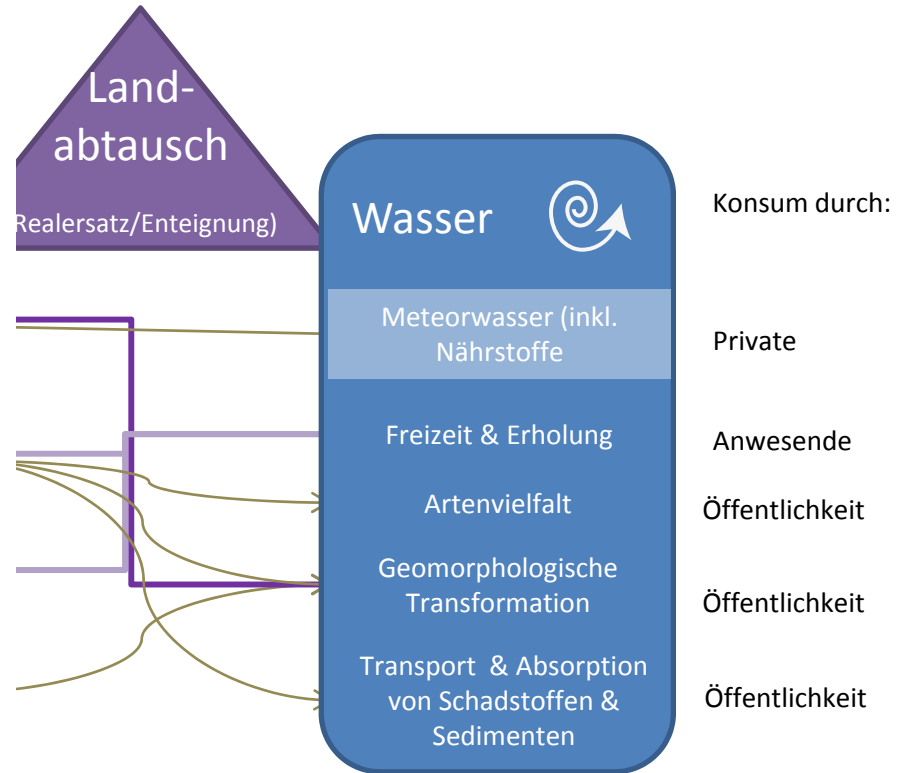
Innovative policy
instruments

Full value chain of
HES





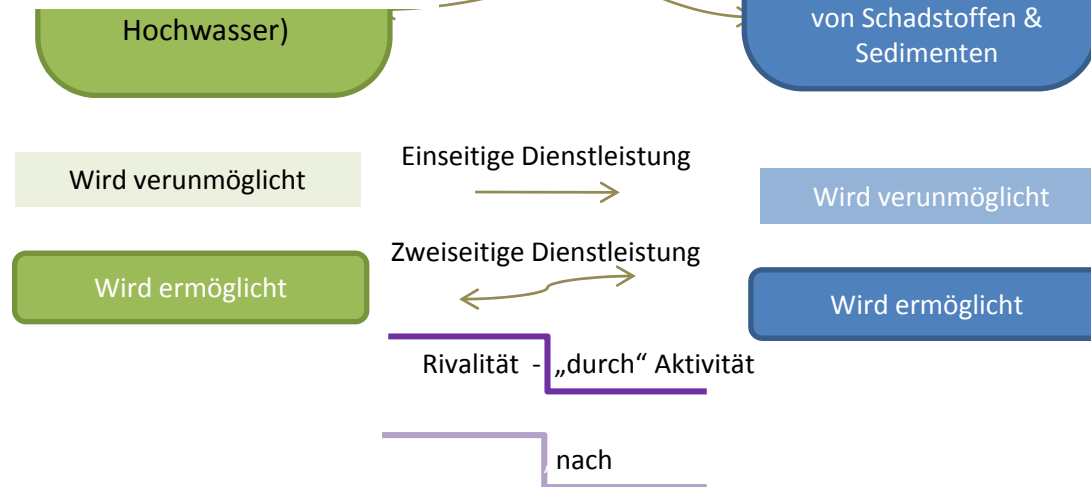
✓ Case study in Sörenberg



Rivalitäten in der Landnutzung

Nachhaltigkeitsanalyse des institutionellen Ressourcenregimes im Skigebiet Sörenberg

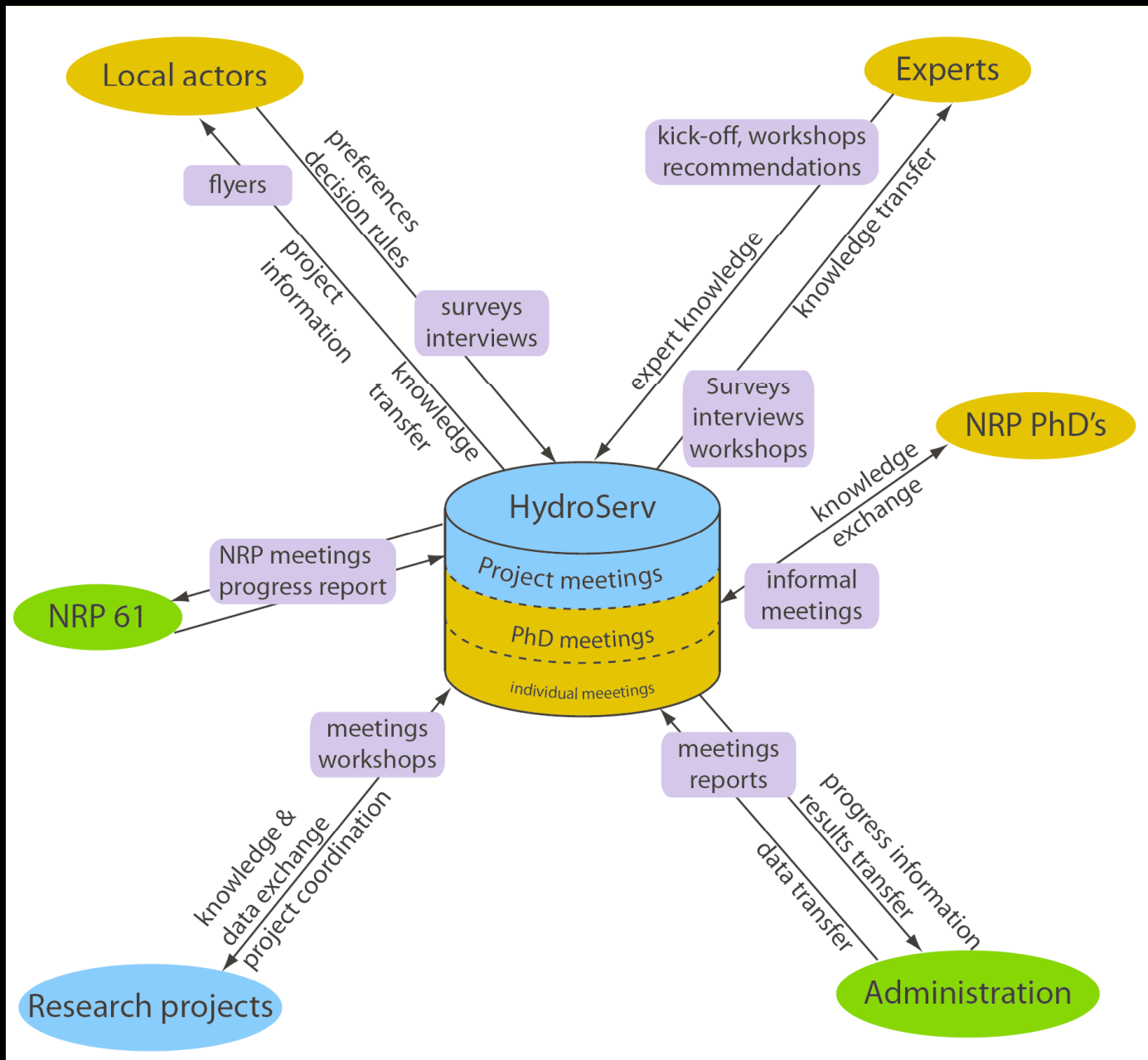
✓ Work in progress: Case study in Werthenstein



Scenarios for 2030 and 2100

- **Tasks achieved**
- ✓ Time horizons:
 - 2030 (for socio-economic scenarios)
 - 2100 (driven by climate change scenario)
- ✓ CCES Mountland scenarios as foundation (IPCC „A1B“, „A2“, „B1“)
- ✓ Weighting of variables with regard to the case study area & adaption of story lines (work in progress)
- **To Do**
 - Downscaling of climate scenarios
 - Validation through local expert knowledge

	Growth & convergence	Regional centers & protection	G
Global Trends	A1B	A2	B
Climate	A1B	A2	B
Population CH	9.5 Mio	7.5 Mio	9
Migration within CH	Migration to Agglomeration	Regional Centres	A M
Accessibility of mountain regions	High Increase	High Increase	M I
Tourism Development	Exploitive	Exploitive	S e
Resource Management	Exploitive	Exploitive	S e
Environmental Awareness	Technical Solutions	No Interest	T S
Consumption	Global	Regional	C P



Our communication platform

www.hydroserv.ethz.ch

- Information about the project
- Exchange of data and documents
- Presentation of results