

Closure

LuWQ2022

**Agriculture and the
Environment**

-

**How to improve
water quality**

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National Institute for Public Health
and the Environment
Ministry of Health, Welfare and Sport



AARHUS
UNIVERSITY
DEPARTMENT OF BIOSCIENCE



International Interdisciplinary Conference on
Land Use and Water Quality
Agriculture and the Environment
Maastricht, the Netherlands, 12-15 September 2022





International Interdisciplinary Conference on
Land Use and Water Quality
Agriculture and the Environment
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***207 participants
from 24 countries***



International Interdisciplinary Conference on
Land Use and Water Quality
Agriculture and the Environment
Aarhus, Denmark, 3–6 June 2019

***240 participants
from 32 countries***



International Interdisciplinary Conference on
Land Use and Water Quality
Effect of Agriculture on the Environment
The Hague, the Netherlands, 29 May–1 June 2017

***195 participants
from 29 countries***



International Interdisciplinary Conference on
Land Use and Water Quality
Agricultural Production and the Environment
Vienna, Austria, 21–24 September 2015

***175 participants
from 31 countries***



International Interdisciplinary Conference on
Land Use and Water Quality
Reducing Effects of Agriculture
The Hague, the Netherlands, 10–13 June 2013

***170 participants
from 30 countries***



International Interdisciplinary Conference on
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Nice icebreaker and pre-registration at Poshoorn Sunday 11 September, 18.00-20.00





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The LUWQ2022 at a glance

Welcome to MECC
Maastricht

Monday
12 September
for start of the
conference

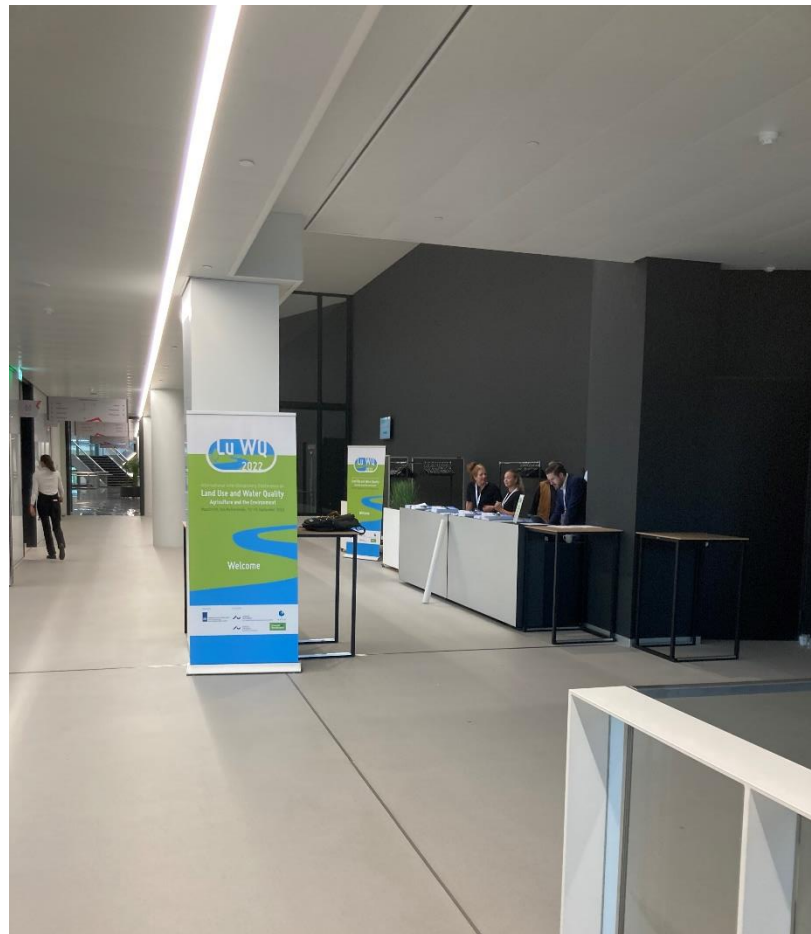




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The LUWQ2022 at a glance

Great support from
registration desk and
assistance from
technicians etc.

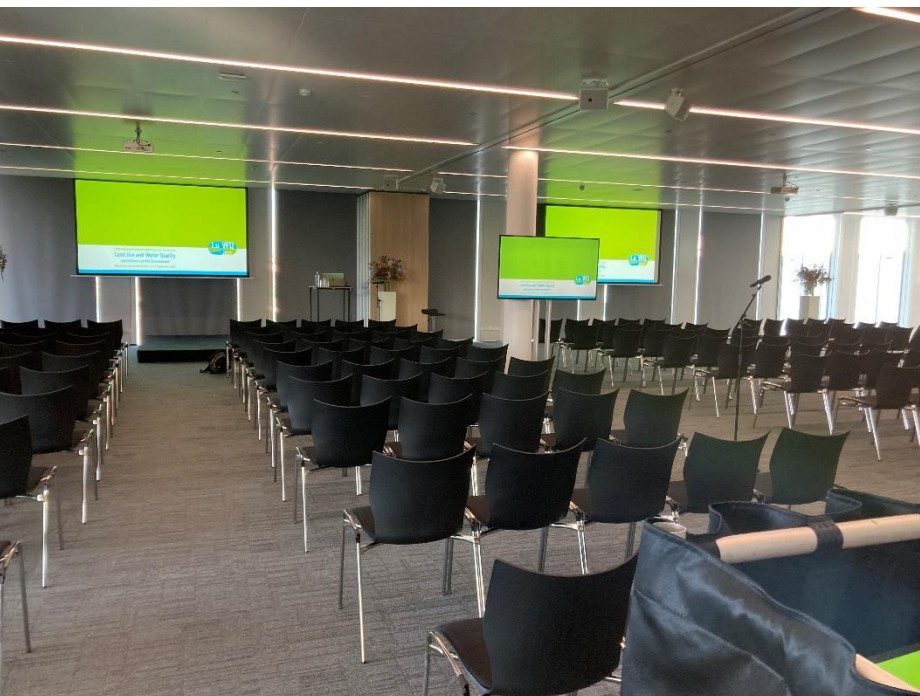




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The LUWQ2022 at a glance

Our nice plenary room before start and with the entire audience waiting for kickoff of LUWQ2022





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The LUWQ2022 at a glance

Our nice reception and welcome at the Maastricht Town Hall



The LUWQ2022 at a glance

Dico Fraters in the
Maastricht
„Burgemeester“
chair



The LUWQ2022 at a glance

Our nice walking dinner
starts in front of the
town hall with
interesting
stories on the history
of Maastricht





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The LUWQ2022 at a glance

Very fine and
plenty of coffee
and food for
lunches





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The LUWQ2022 at a glance

Great conference dinner at the Chaeteau St. Gerlach Tuesday, 12 Septeber 2022





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The LUWQ2022 at a glance

Thanks from all of us to you that made the Conference
a great success by assisting and helping us during the entire
Conference - without your help -
no Conference !
And it all went so smoothly

Many thanks from all of us to:

- Robbin Grouwels
- Yvonne van den Booren
- Roos Kolenberg
- Marijke Daniels
- Bo Lambi

from Klinkhamer Group





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The LUWQ2022 at a glance

Great oral
contributions



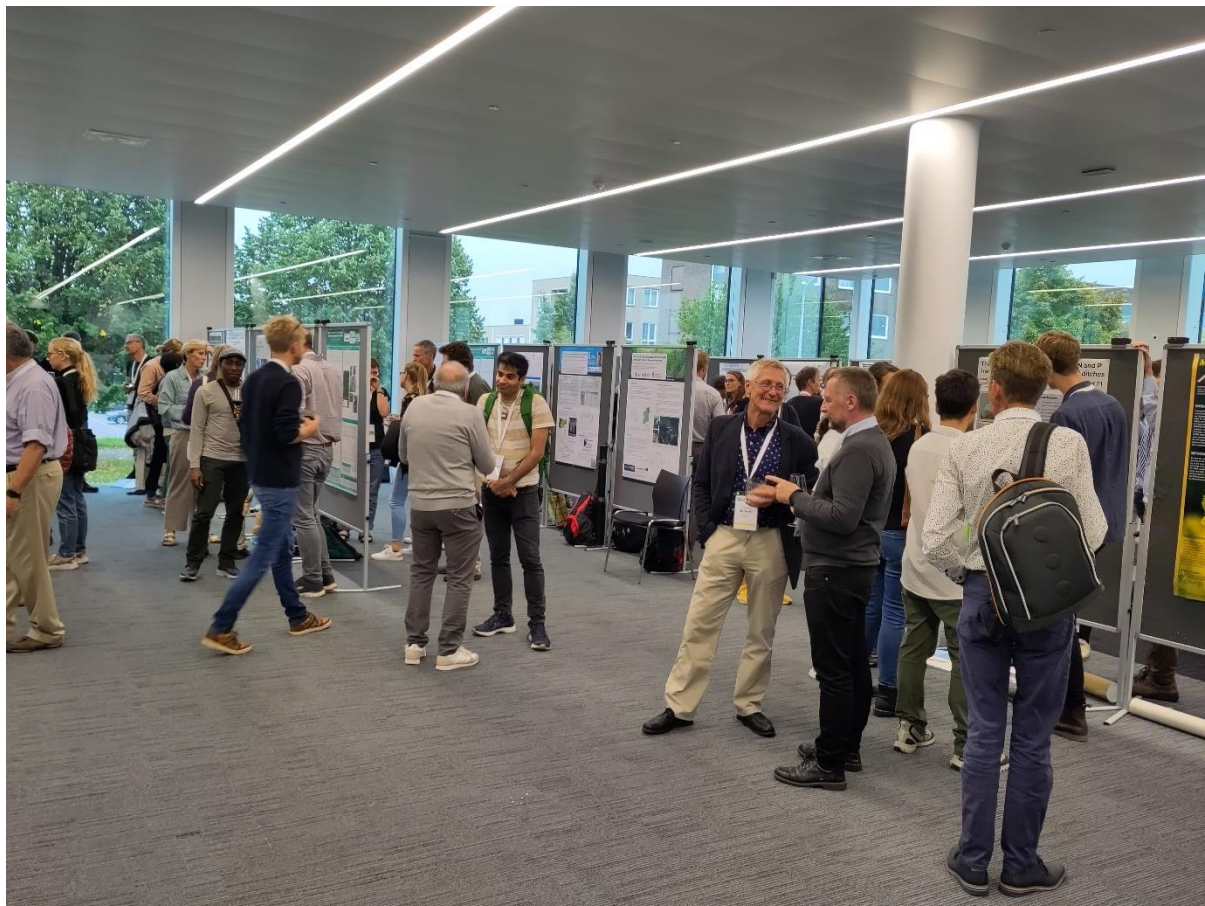


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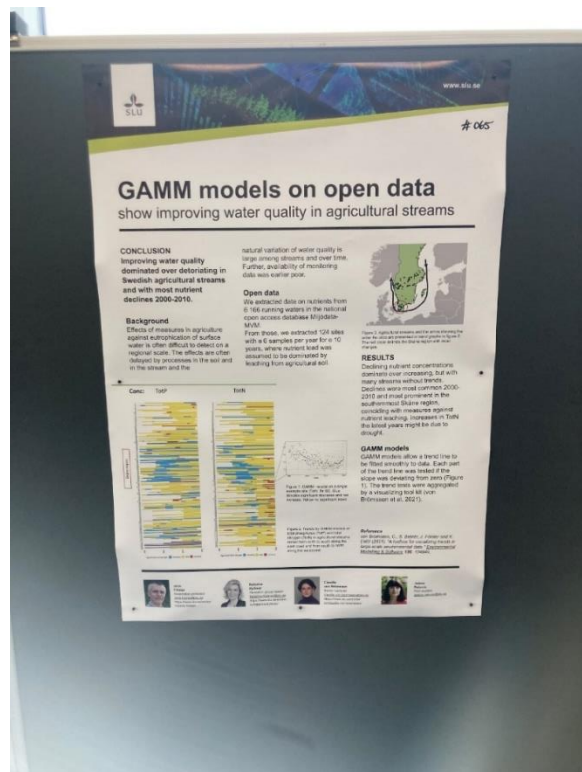
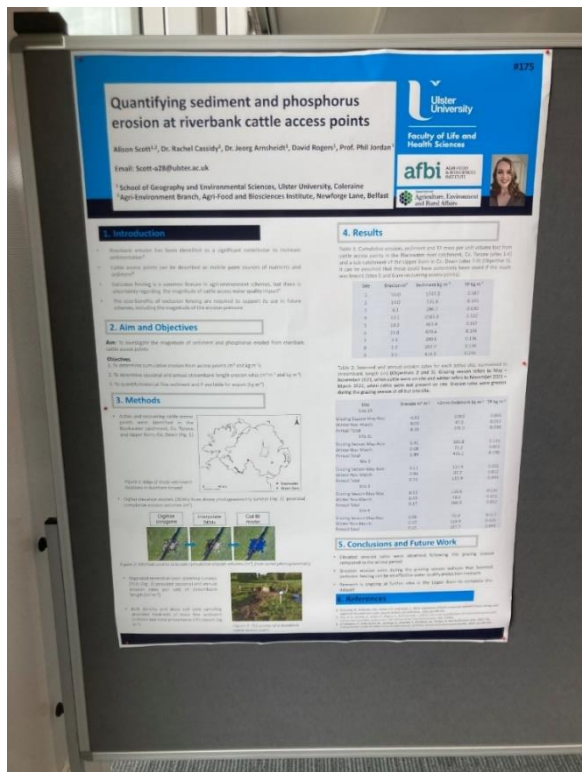
A lively
Poster Session

Wednesday,
14 September



The LUWQ2022 at a glance

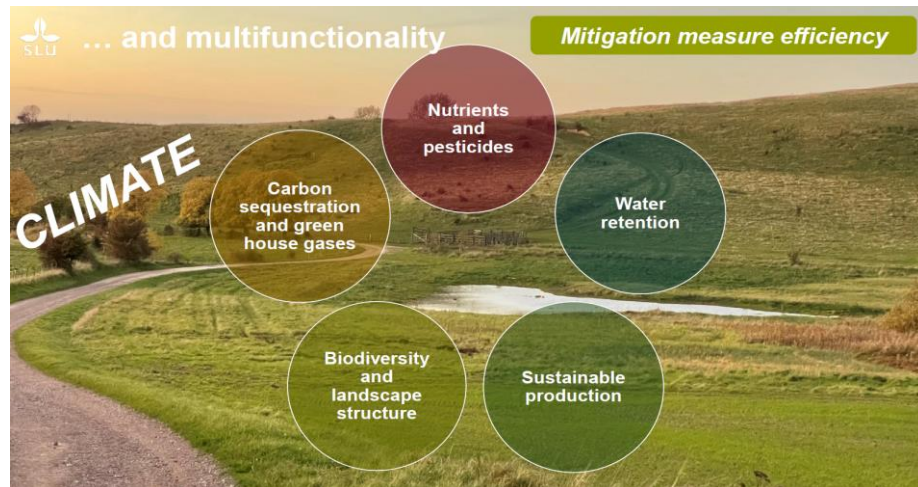
With great posters on display



The LUWQ2022 at a glance

A few key trends over the series of LUWQs

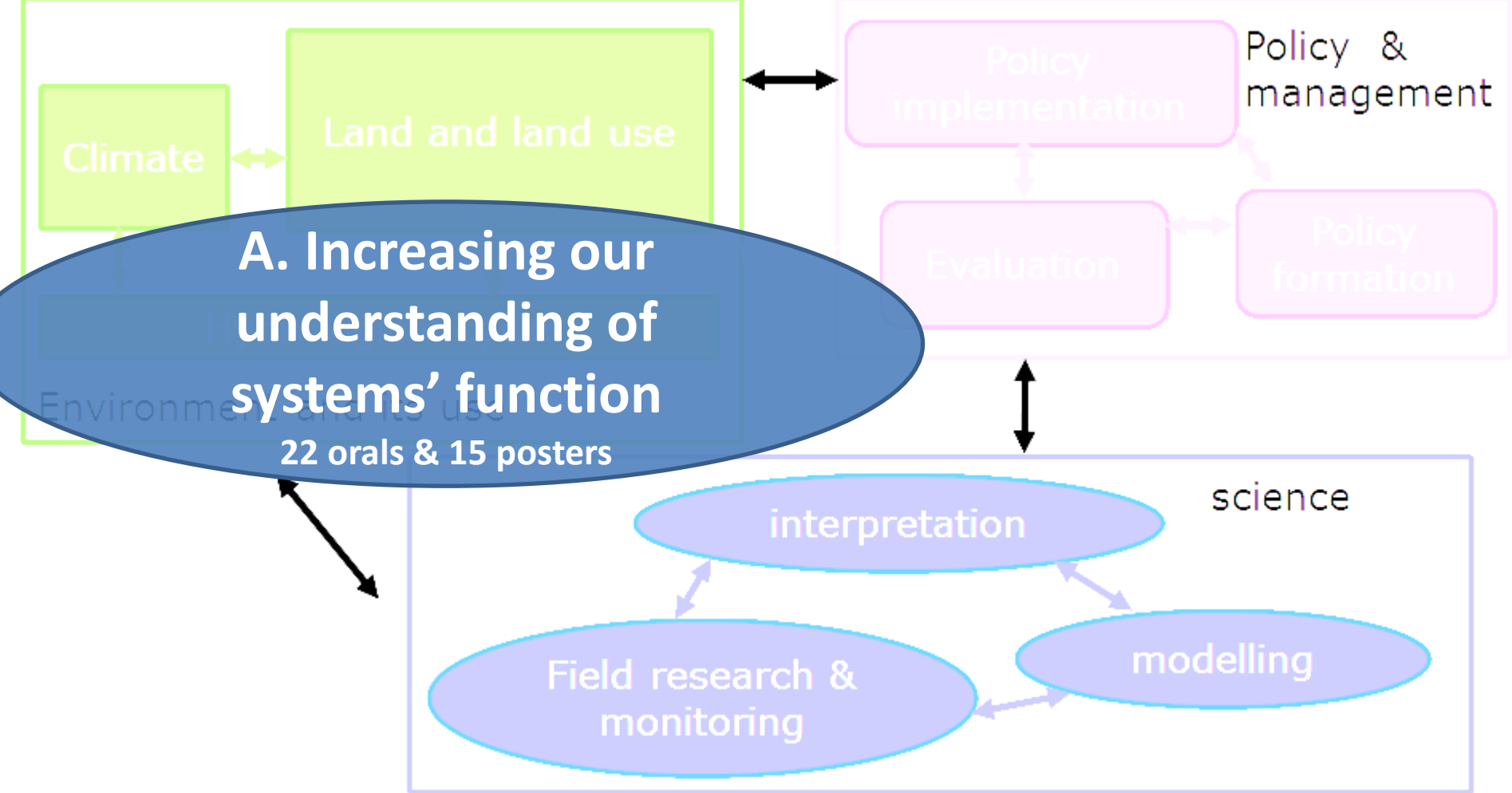
- A major shift from national regulations to targeted regulations
- Much more focus on local management
 - knowledge sharing, co-operation, pilot testing in catchments of local developed management plans
- New more holistic management including both nutrients and climate actions - reduction goals for both nitrogen and GHG emissions.



A few key trends over the series of LUWQs

- More experiments and data analysis on linking agro-indicators (crop types and N-surplus with nitrate in soil water drain water.
- More focus on mapping redox conditions, groundwater age and denitrification in soils and groundwater
- More on climate extremes – both droughts and heavy rains.
- More on new sensor monitoring methods and their use in communication with farmers





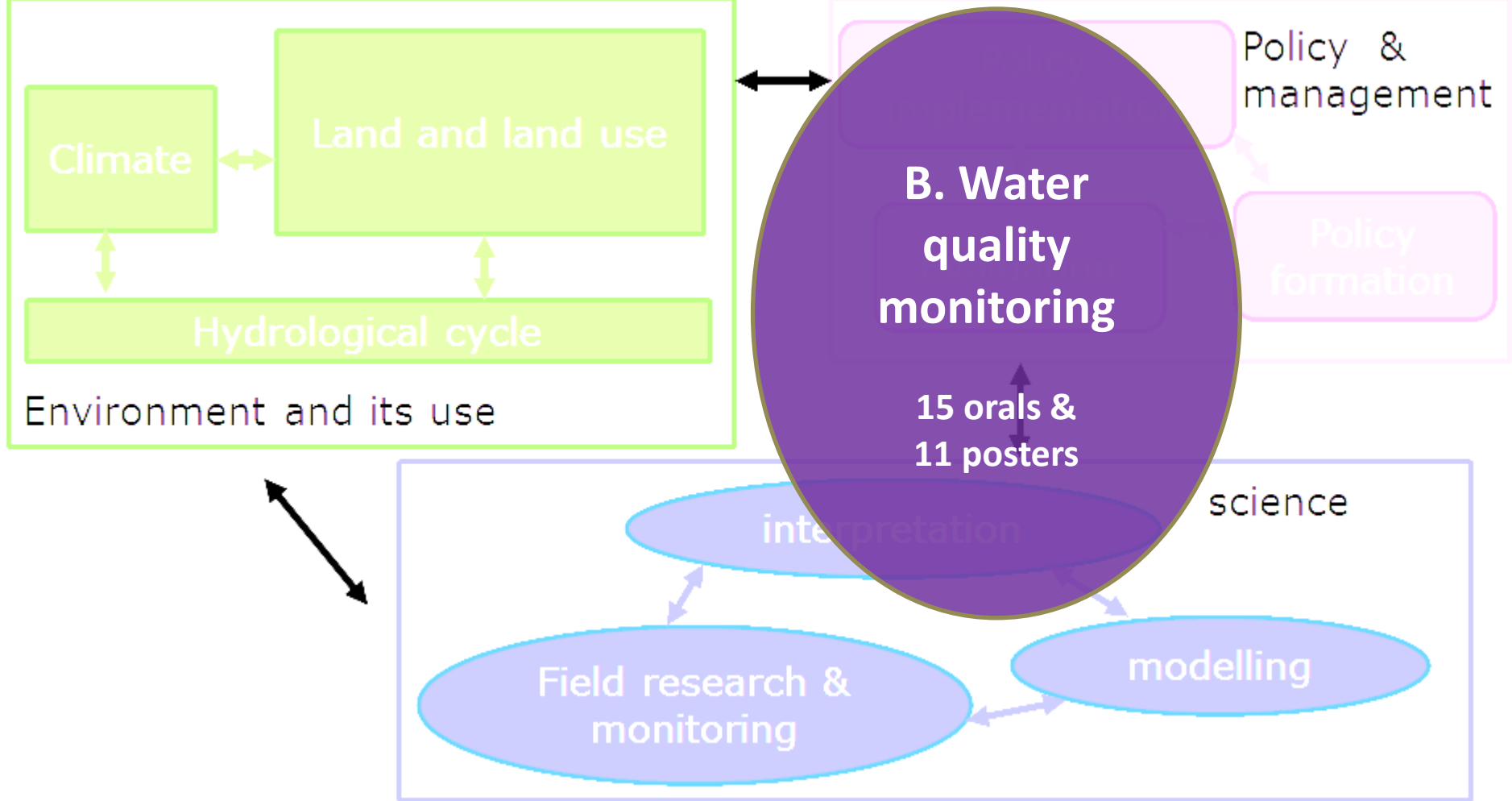


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The LUWQ2022 at a glance

Important findings Theme A: Understanding of systems' function

- Long term contamination governs N and P leaching in soils
- Targeted localisation of N-mitigation requires knowledge on soils and hydrological pathways
- Clay soils have higher denitrification than sandy soils
- Main N-flow
 - through tile drains gives immediate responses on implemented measures
 - to groundwater might severely delay the response in surface waters
- knowledge of delayed nitrogen responses may avoid implementation of costly regulation and management
- N-retention mapping in 'all' catchments to determine hot spots for leaching is cheaper than to subsidise general measures





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The LUWQ2022 at a glance

Important findings Theme B: Water quality monitoring

- Knowledge of tile drainage areas is needed to determine the extent of Nitrogen C.S.A.'s
- High investments in monitoring infrastructure needs to be matched by investment in QA and QC
- Important to have monitoring (spatially) to understand the continuum of P and N for different catchments
- Important to secure for tests (funding) when changing laboratories and instruments in monitoring
- Difficult to find proper indicators (farm/field) and monitoring strategies for N pollution
- Difficult to find and set references for N and P concentrations

C. Impact of climate change on land use and water quality

8 orals & 6 posters

Policy implementation

Policy & management

Evaluation

Policy formation

interpretation

science

Field research & monitoring

modelling

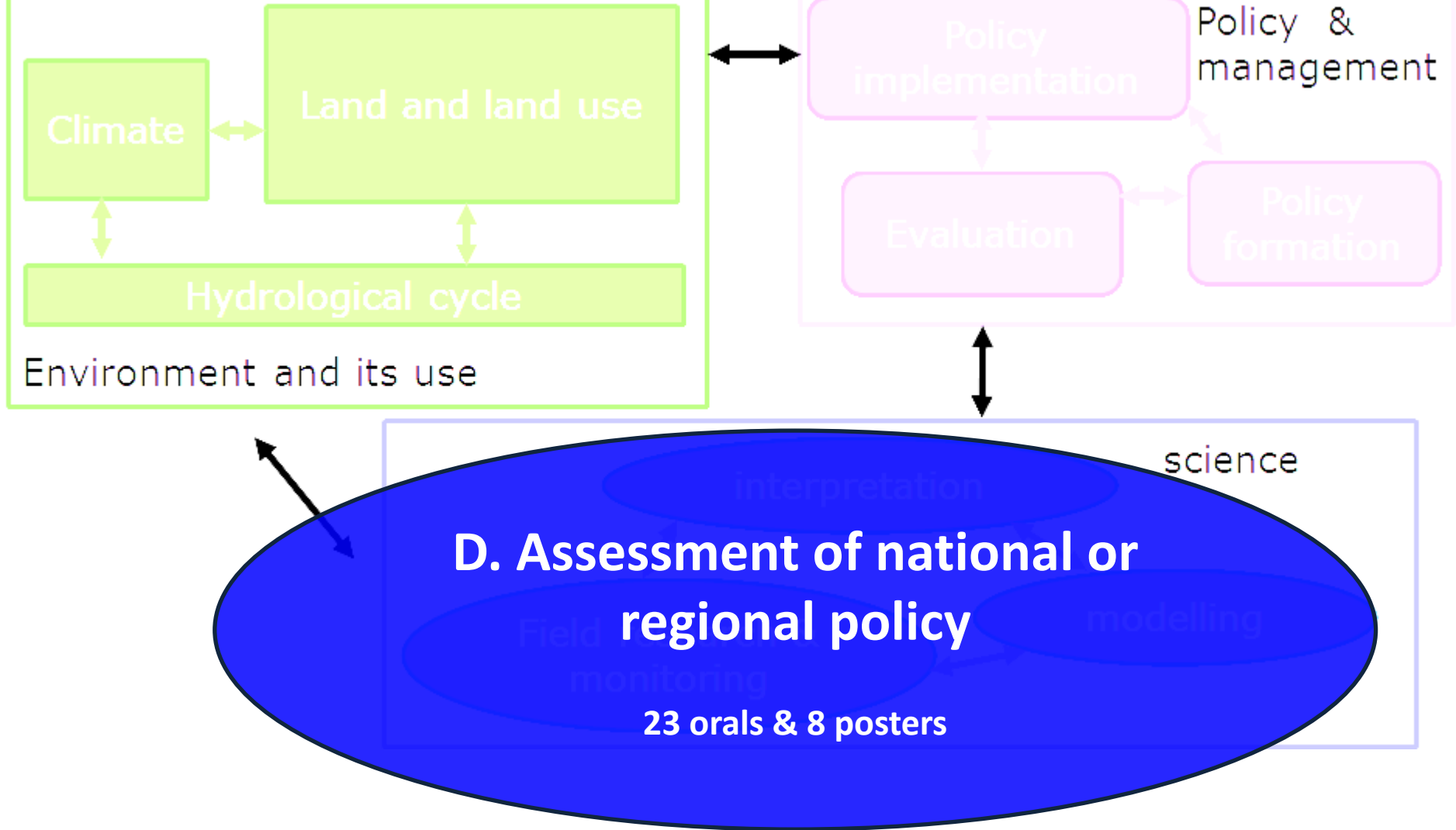


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The LUWQ2022 at a glance

Important findings Theme C: Impact of climate change

- Climate change phenomena (weather conditions) have great impacts on N and P concentrations
- Maybe for N counteracted by a higher crop uptake
- Important to counteract impacts of climate change on N & P losses in WFD RBMP's
- Climate change extremes – droughts and heavy rain – has impacts on N-balances and also N-leaching and N-losses thereby making trend analysis difficult for informing the public on effects of management plans
- Seasonal trend analysis needed to support



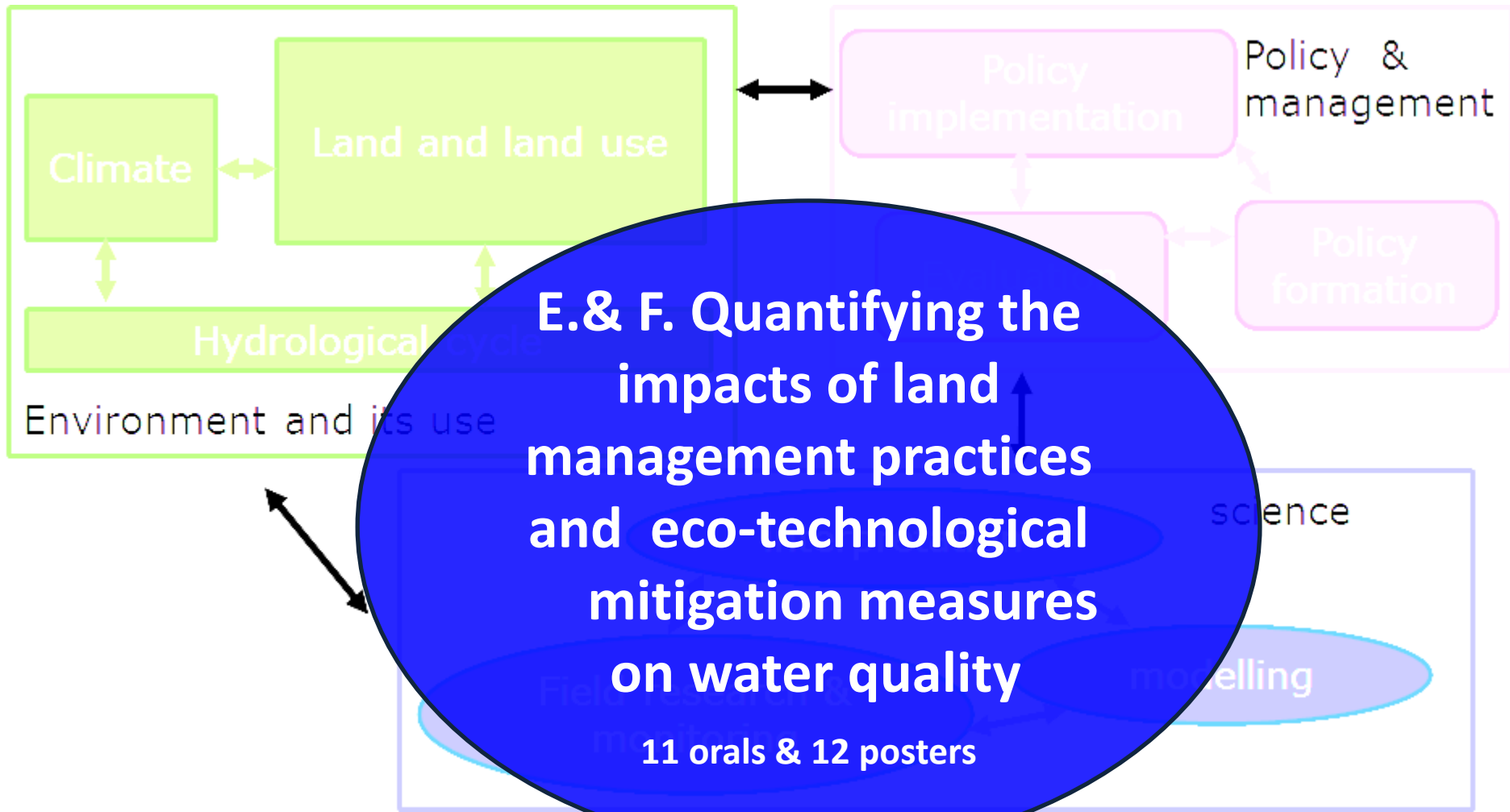


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The LUWQ2022 at a glance

Important findings Theme D: Assessment of policy

- Data management, uncertainty and transparency in models are equally important for policy advice as for stakeholders
- Stakeholders needs to understand and accept uncertainty
- Cross border science and policy are often not aligned which means there are challenges in setting targets/plans
- It is becoming more challenging to reduce N concentrations – low hanging fruits are picked
- The driver of too much N is what we eat and it is a global problem
- New models are evolving from agro-economics and climate change



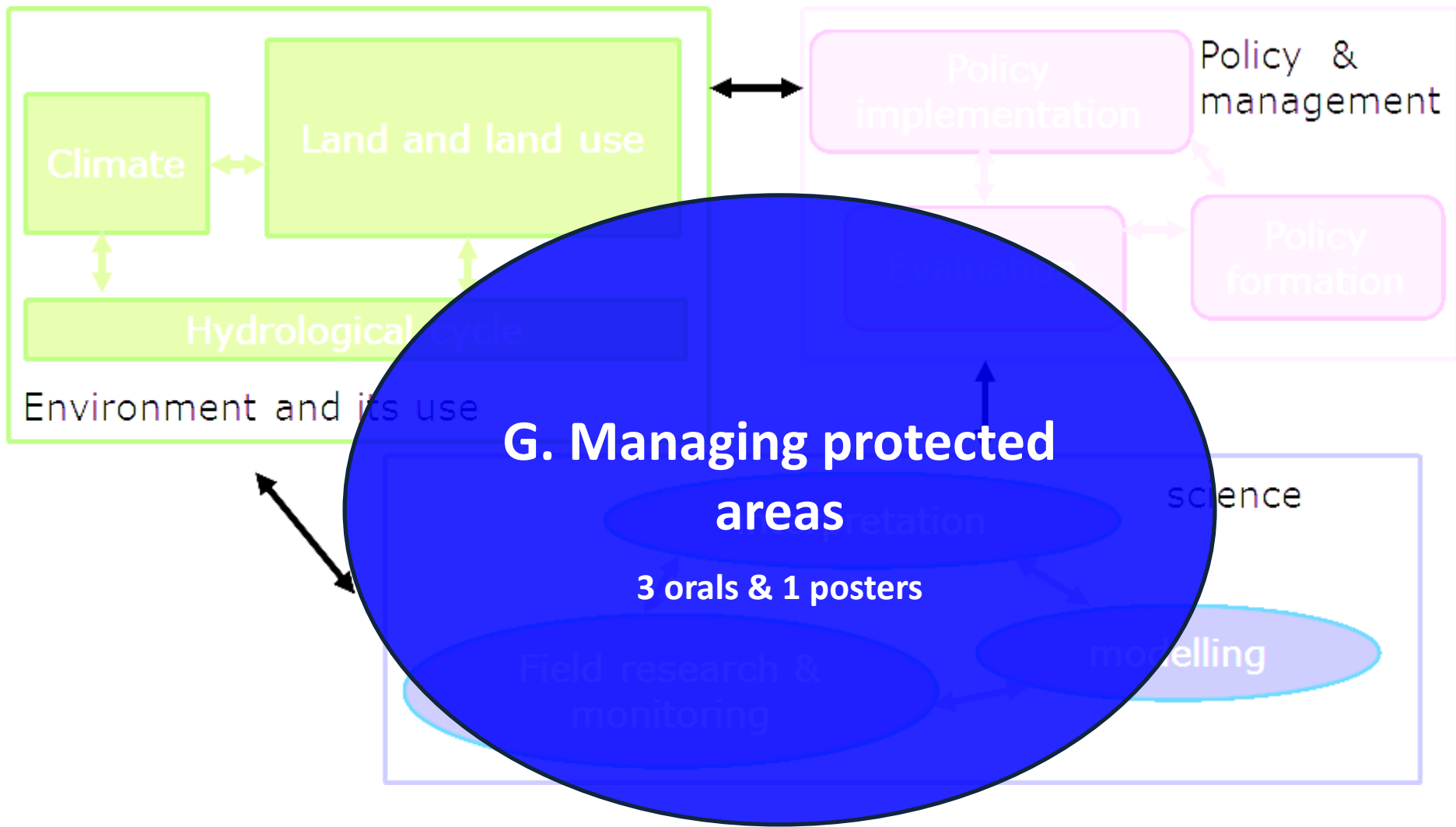


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The LUWQ2022 at a glance

Important findings Theme E.F: Quantifying the impacts of measures

- High N & P retention in saturated buffer zones
- Different nutrient leaching calculation models – need for comparison of different tools
- More cost-effective implementation of catch crops if N-retention is calculated on smaller scale (field ?)
- On the country (larger scale) the management effect is not easily seen – but can be detected on smaller scale monitoring
- For 'problematic' crops (maize, potato, oilseed and flowers) it looks like there are no solutions/regulations as yet
- Organic farming and water quality – first results show confusing results
- Challenge if no political will to enforce regulation beyond voluntary measures



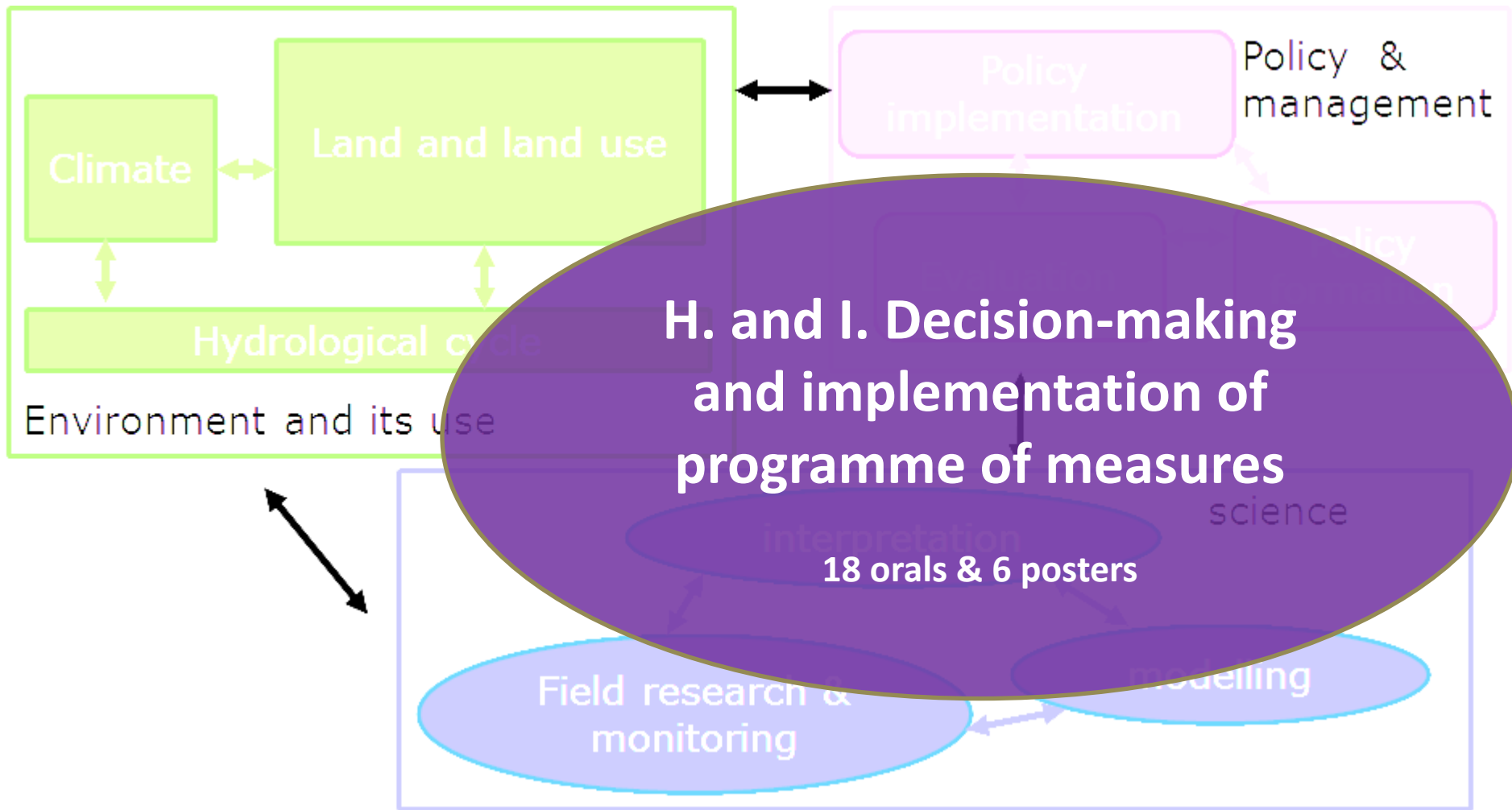


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The LUWQ2022 at a glance

Important findings Theme G: Managing protected areas

- The primary source of nutrients, fine sediments and pesticides is often diffuse pollution from agriculture
- Progress towards the water quality targets has been slow
- The governance approach based on voluntariness helps to build trust and equity, facilitates the exchange of ideas, knowledge and experience – and helps to reduce agricultural impacts, but ... is not adequate for meeting standards



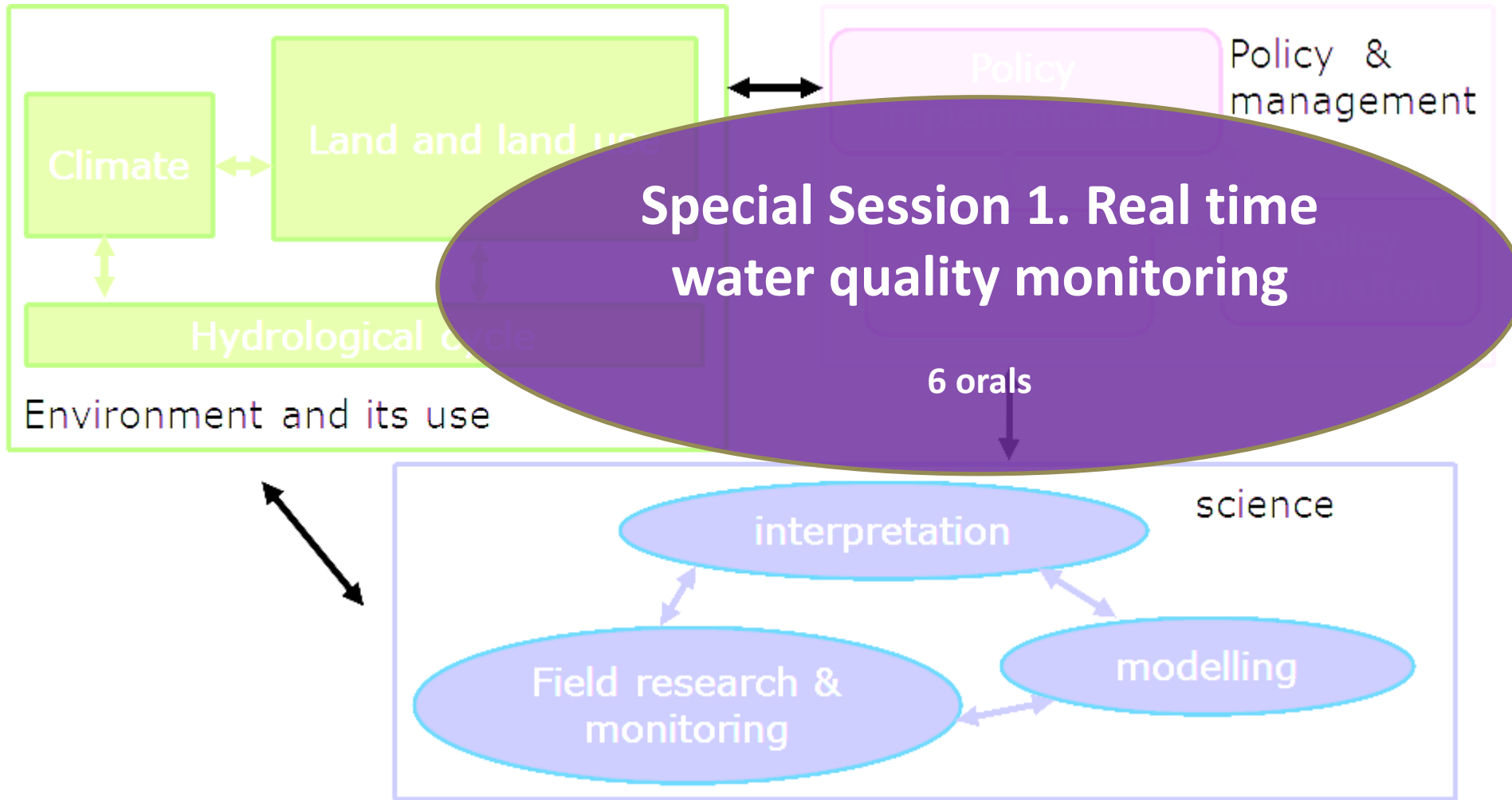


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The LUWQ2022 at a glance

Important findings Theme H.I: Programme of measures

- Need for balancing top-down and bottom-up
- Trust is of paramount importance
- Good partnerships requires time, resources and right purposes
- Early involvement is crucial
- Need for joining up actions – multi-functional – nutrients, climate, biodiversity, etc.
- Need for collaboration (cross party, stakeholders, public, etc.)
- Should we use carrot and stick?
- Evidence base to underpin policy, engagement - systematic mapping reviews



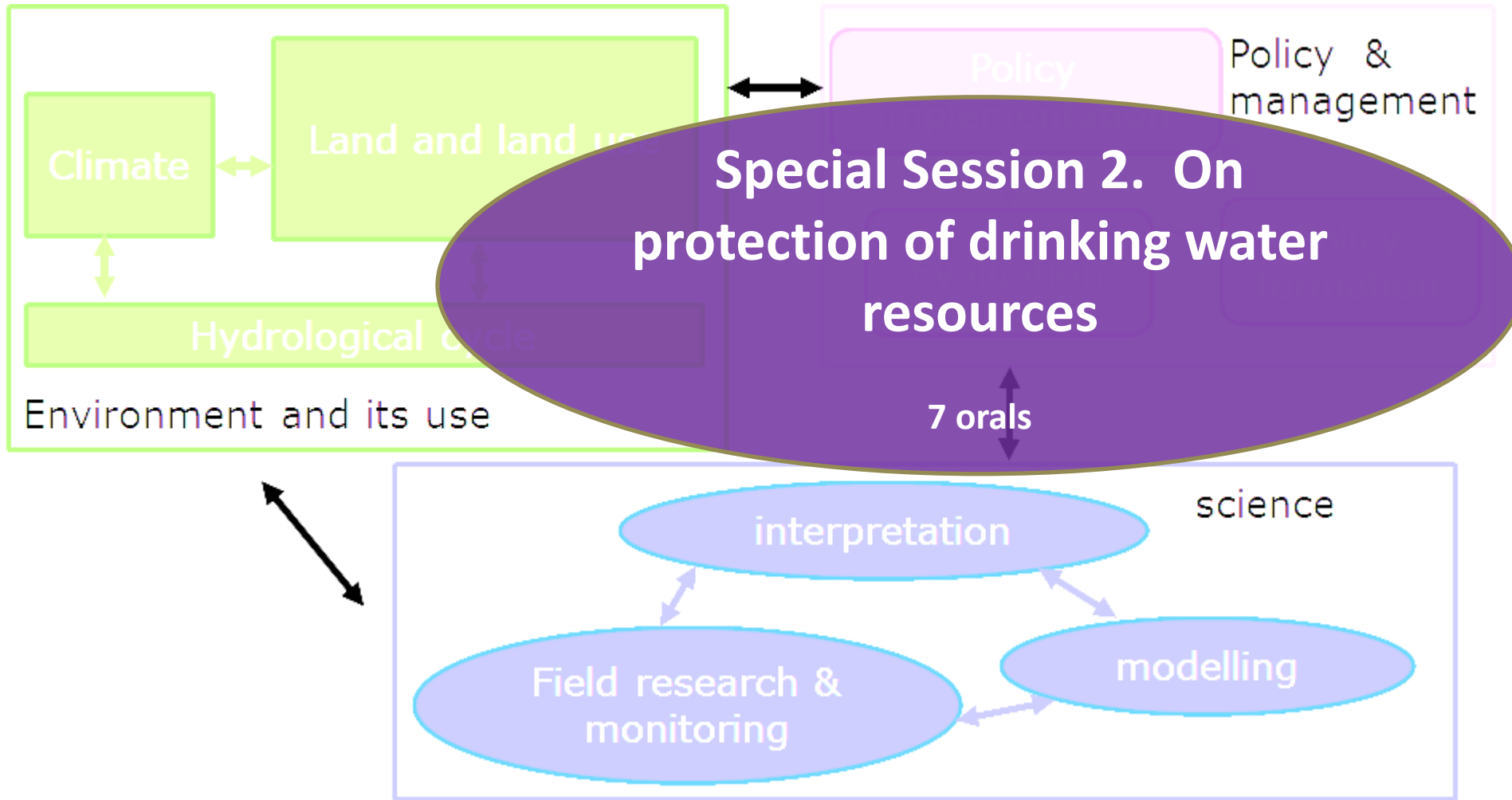


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The LUWQ2022 at a glance

Important findings SS1: Real time water quality monitoring

- Strong need for homogenizing sensor data cleaning procedures – need for testing for different procedures on common datasets
- Short term event changes in concentrations can only be captured by sensors
- We learned that stakeholders like sensor data and can learn from them to manage better their fertilizer/manure spreading – important communication tool
- Question on how often we need to clean sensor equipment in the field – and is zero point changes linear or?
- Need of common protocols for setting up and running different sensors – might be some information from CEN?





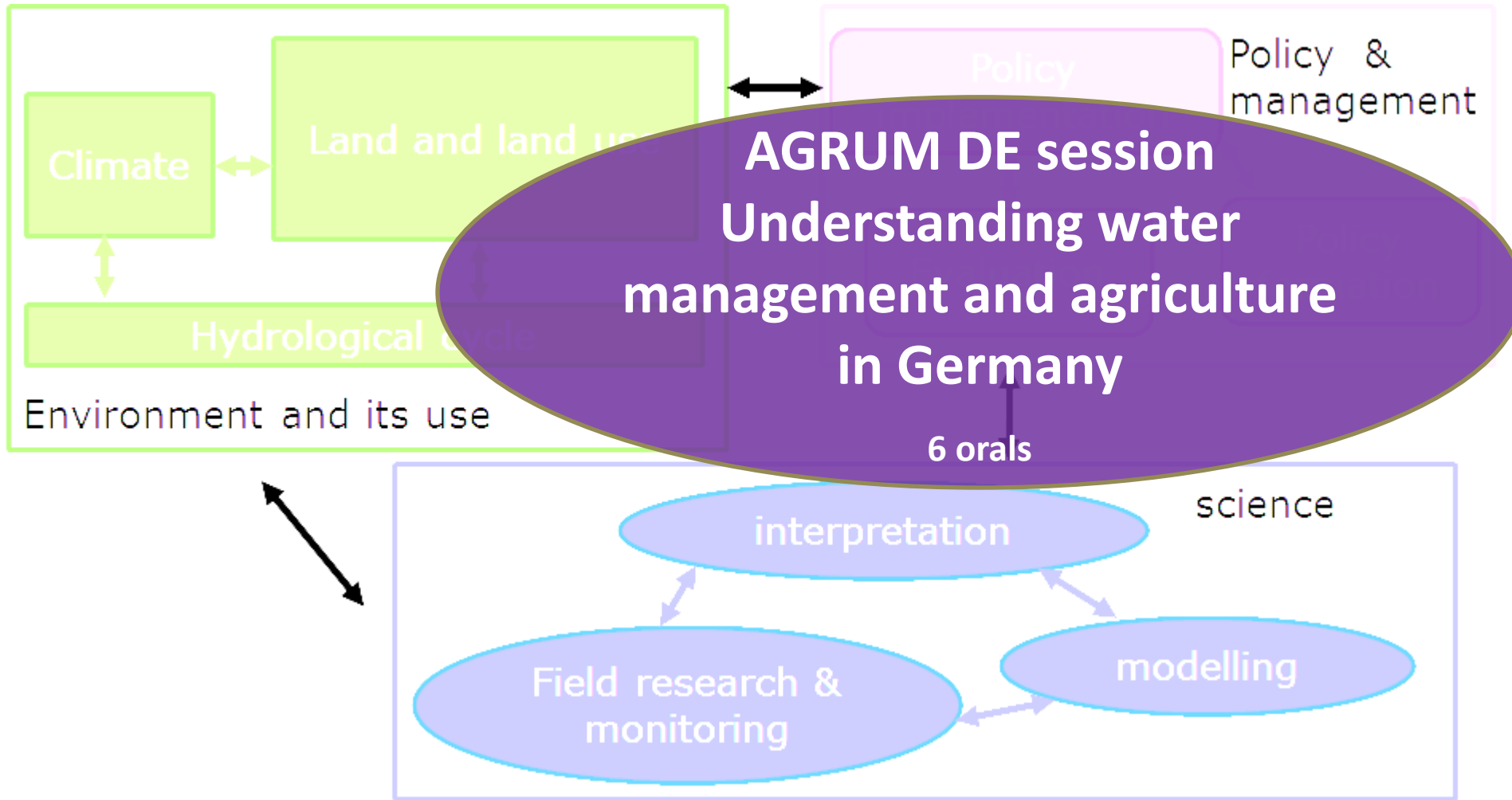
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The LUWQ2022 at a glance

Important findings SS2: Protection of drinking water resources

Protection of drinking water from agricultural pressures:

- Independent advisory service to farmers – extension services from research institutes/universities?
- Governance: more clarity on objectives and suitable instruments fit for purpose
- Data, indicators: clarification of design principles, monitoring data + methodologies





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Important findings AGRUM DE: water management and agriculture

Towards a common understanding :

- Harmonized Germany-wide modelling of emissions, loads, and reductions need to fulfil WFD and MSFD
- Farm-level database allows for very high spatial resolution of N surpluses
- Fertilizer Ordinance will likely contribute to reduce N surpluses in many (but not all) regions
- The national monitoring and modelling program is ambitious, and expectations of authorities and farmers may differ

Not least we as participants are very grateful to the two fathers of this series of Conferences - the main organizers of the scientific sessions:

Dico Fraters & Karel Kovar

Greatly assisted by
Brian Kronvang & Frank Wendland

And with the help of the scientific advisory committee members they have done a splendid job in setting up the sessions for the conference.

Without the great work of Dico and Karel this 5th LUWQ2022 Conference would not have been such a great success !



Once again, we have all enjoyed
attending the LUWQ2022 Conference

So

We are looking forward to
the next LUWQ Conference

Where to be hold, will be decided later