

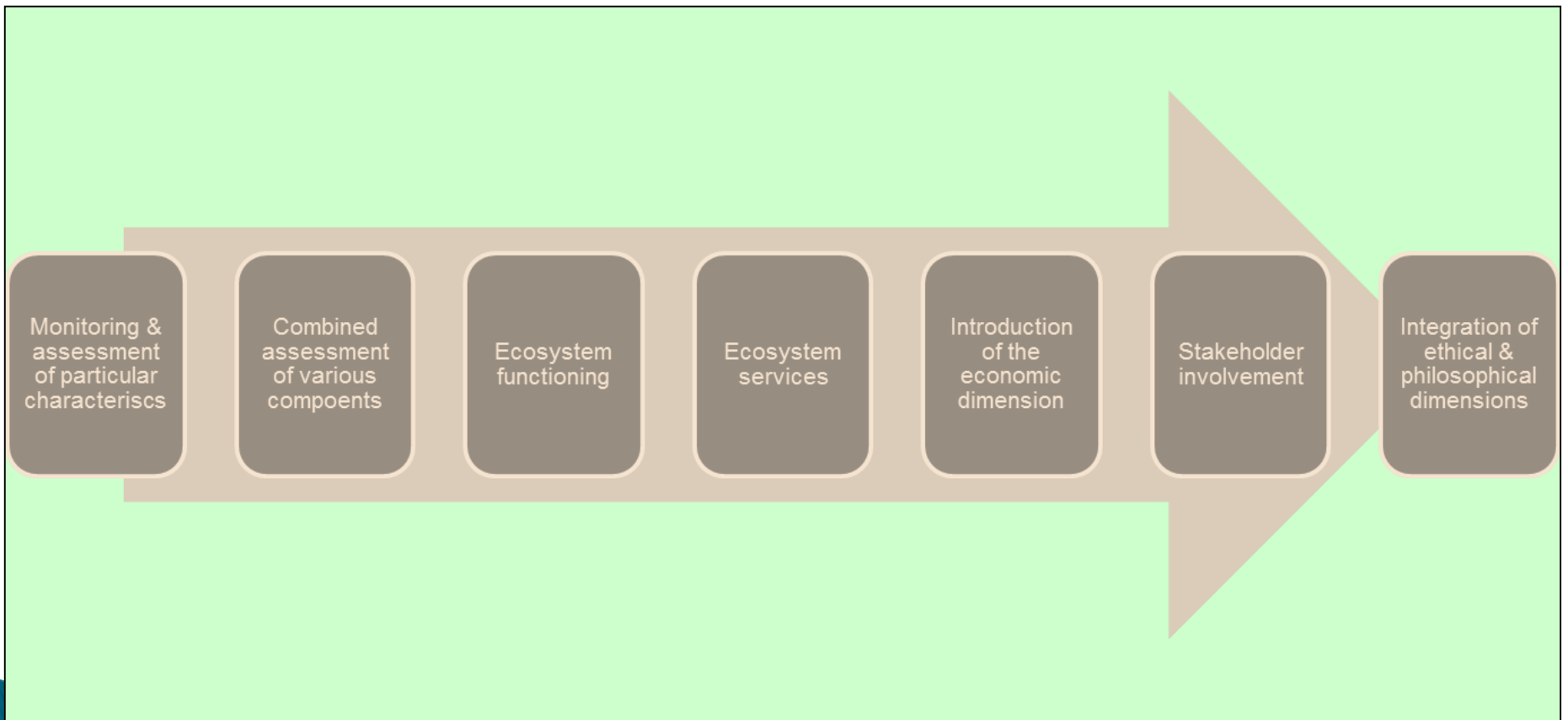
Development of E-learning tools and MOOCS to support education and training related to monitoring and management of water resources

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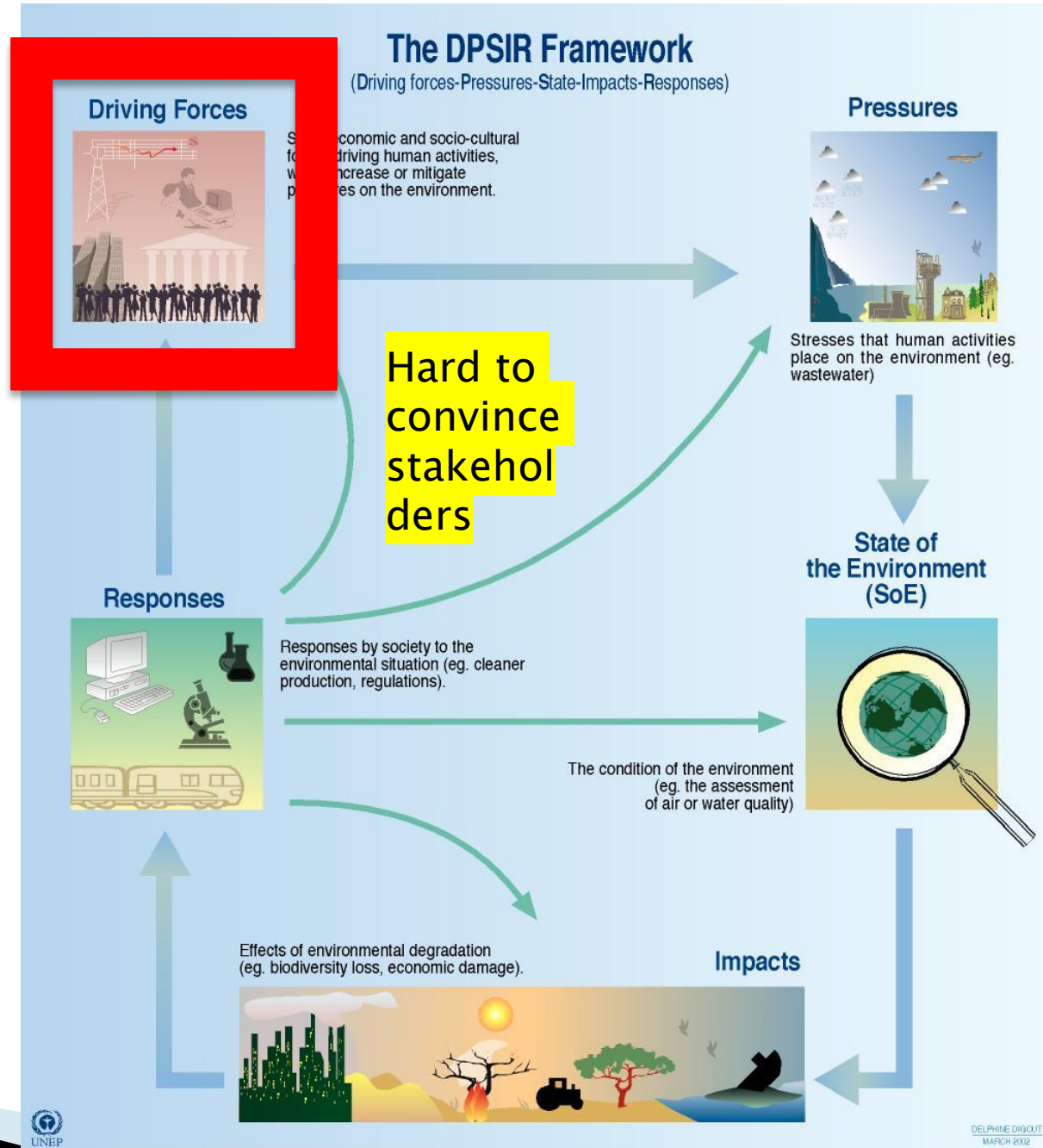
Problem formulation: from resources and ecosystem assessment towards sustainability assessment



Complex and dynamic

Needs for DSS tools

- Changes in environment and society
- Responses management



Green solutions are not that green: Damming

Impacts of Dams



Downstream Impacts

reduced biodiversity; poor water quality; lower crop production; decreased fish populations

Dam

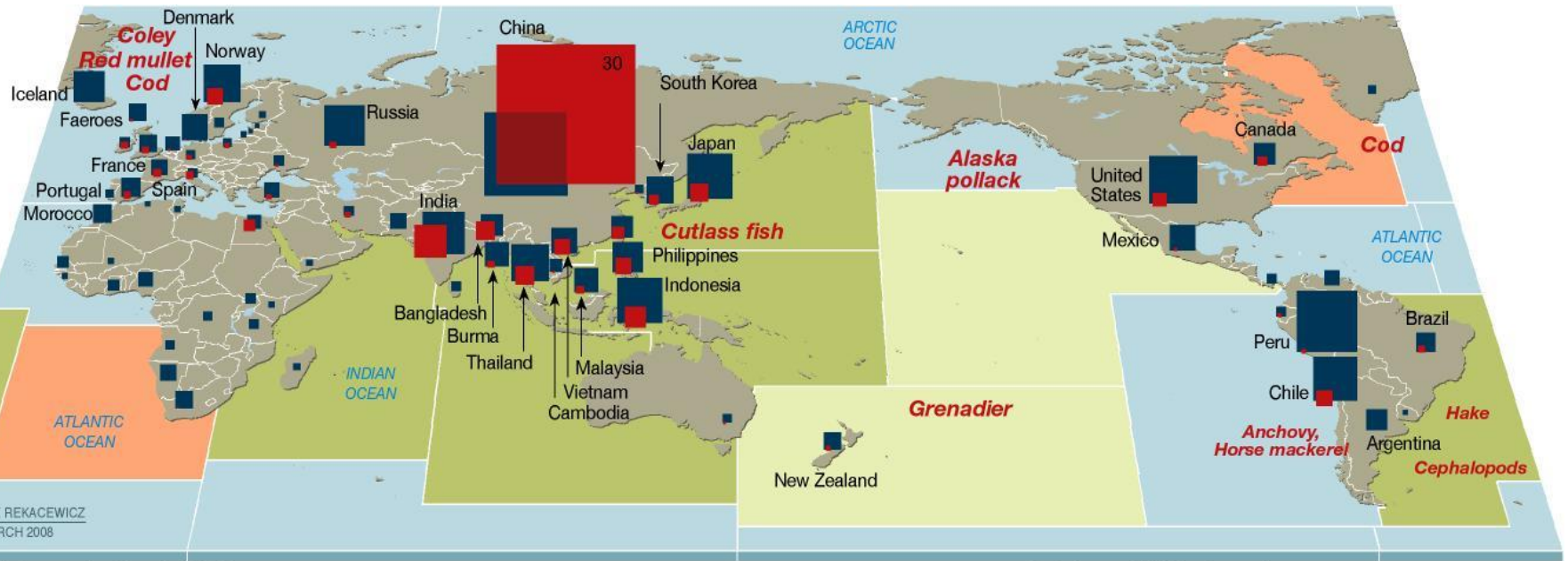
blocked fish migration; disrupted flow of sediments and water; hazards from ageing dams

Reservoir

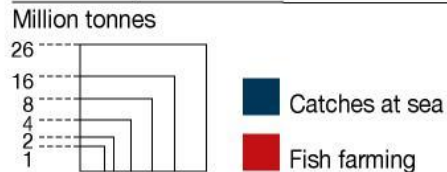
contributes to global warming; displaces communities; increases water-borne illnesses; triggers earthquakes

Needs for integrated perspectives

Fish Harvest / Aquaculture

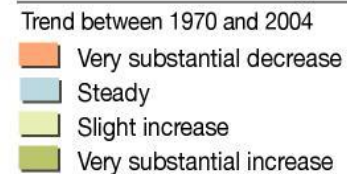


World fish production in 2004



NB: Drawing on research and statistical data since 2000, experts at the University of British Columbia in Vancouver have shown that catches reported by China are largely overestimated, concealing a substantial decline in world catches since the middle of the 1980s.

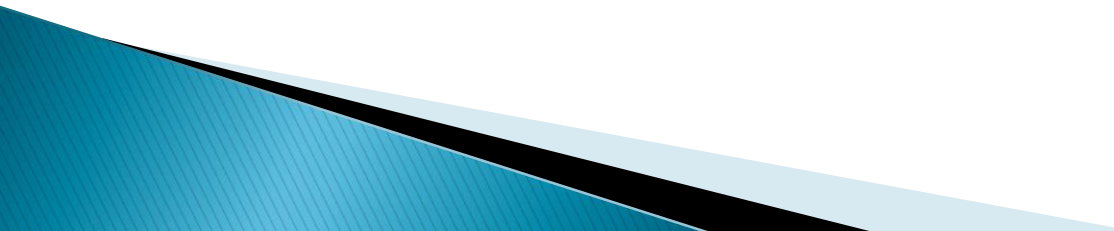
Catches of fish at sea by zone



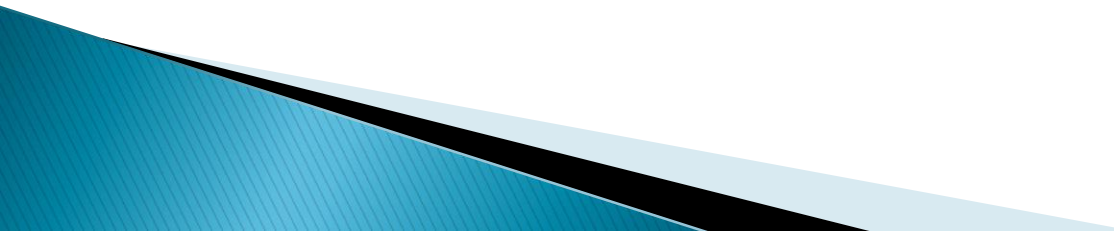
Sources: *The State of World Fisheries and Aquaculture 2006* and *Yearbook of Fishery Statistics 2004*, United Nations Food and Agriculture Organisation (FAO); *Global database on marine fisheries and ecosystems*, Sea Around Us Project, Fisheries Centre, University of British Columbia, Vancouver, Canada (<http://www.seaaroundus.org>); Map outline UNEP/GRID-Europe, Geneva.

Needs for integrated perspectives

E-learning Project: Belgium – Vietnam – Ecuador

- ▶ Lack of training in water resources management at many levels
 - ▶ Diverse needs for different sectors and potential users:
 - ▶ – students
 - ▶ – blue workers and plant operators
 - ▶ – politicians
 - ▶ – policy makers
 - ▶ – stakeholders
 - ▶ – citizens
- => change in behavior towards more sustainable practices
- 

Key aspects of E-learning tools and moocs

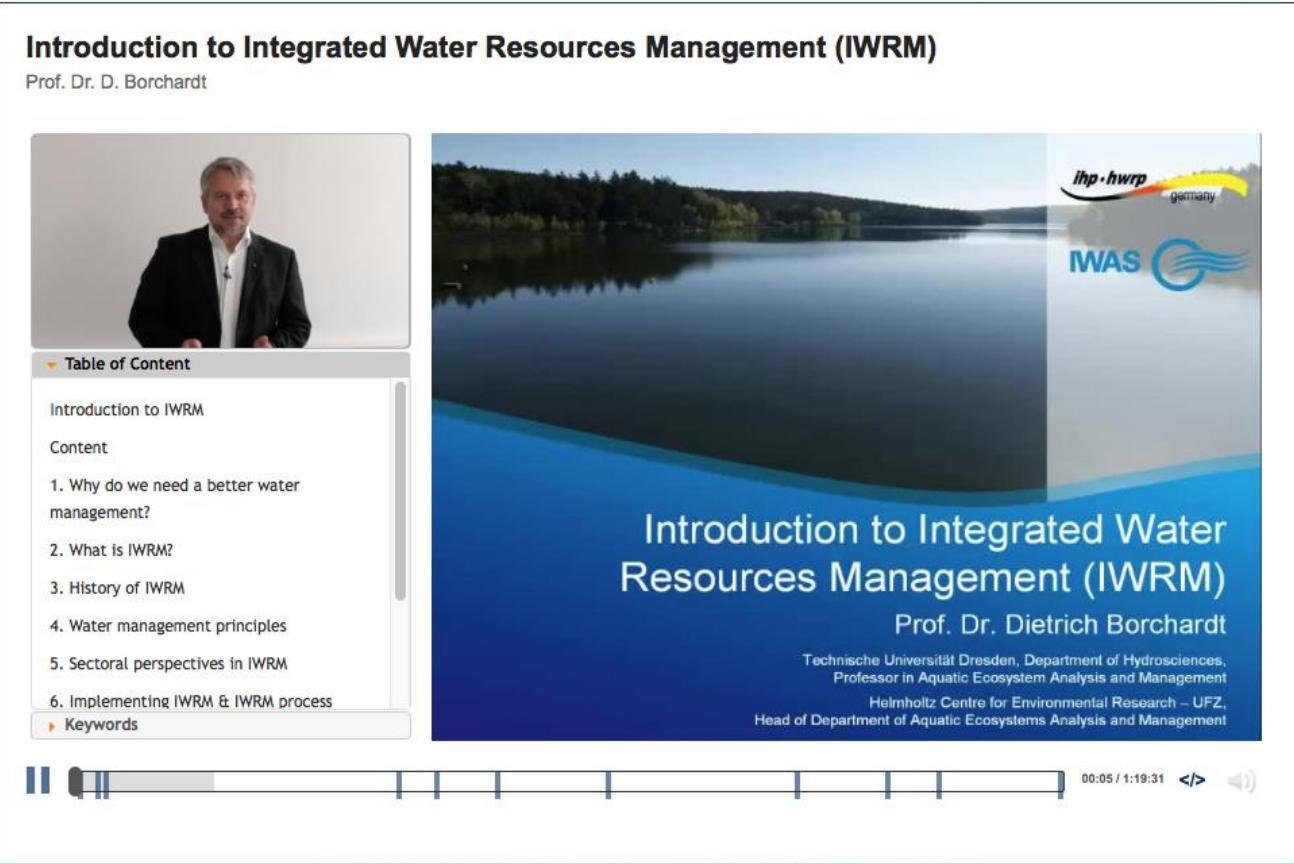
- ▶ Objectives: knowledge and skill development
 - ▶ Approaches (story lines) and type of learning (from knowledge to insight and application)
 - ▶ Assessing starting level and level to be achieved
 - ▶ Translation in some cases
- 

Examples and available software

Climate Change and Food Security | IWRM-education: Integrated Water Resources Management

Introduction to Integrated Water Resources Management (IWRM)

Prof. Dr. D. Borchardt



The video player displays a presentation slide with a background image of a lake and forest. The slide features the logos for 'ihp · hwrp' and 'gottwald' at the top right, and 'IWAS' with a blue wave logo below it. The main title on the slide is 'Introduction to Integrated Water Resources Management (IWRM)' by Prof. Dr. Dietrich Borchardt. Below the title, it lists his affiliation: Technische Universität Dresden, Department of Hydrosociences, Professor in Aquatic Ecosystem Analysis and Management, and Helmholtz Centre for Environmental Research – UFZ, Head of Department of Aquatic Ecosystems Analysis and Management.

Table of Content

- Introduction to IWRM
- Content
- 1. Why do we need a better water management?
- 2. What is IWRM?
- 3. History of IWRM
- 4. Water management principles
- 5. Sectoral perspectives in IWRM
- 6. Implementing IWRM & IWRM process

▶ **Keywords**

00:05 / 1:19:31

E-Learning Module on Integrated Water Resources Management | cc-by-nc-nd | About IWRM-education | Imprint

Examples and available software

Introduction to Integrated Water Resources Management (IWRM)

Prof. Dr. D. Borchardt



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Introduction to IWRM

Content

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Keywords

Some facts about the way we use our water...



<http://water.org/>



Graphics: IHP/HWRP-Secretariat, Germany



CLIMATE CHANGE IMPACTS ON FOOD SYSTEMS

What is a food system?

In a narrow sense, a food system is a set of activities from production through to consumption.

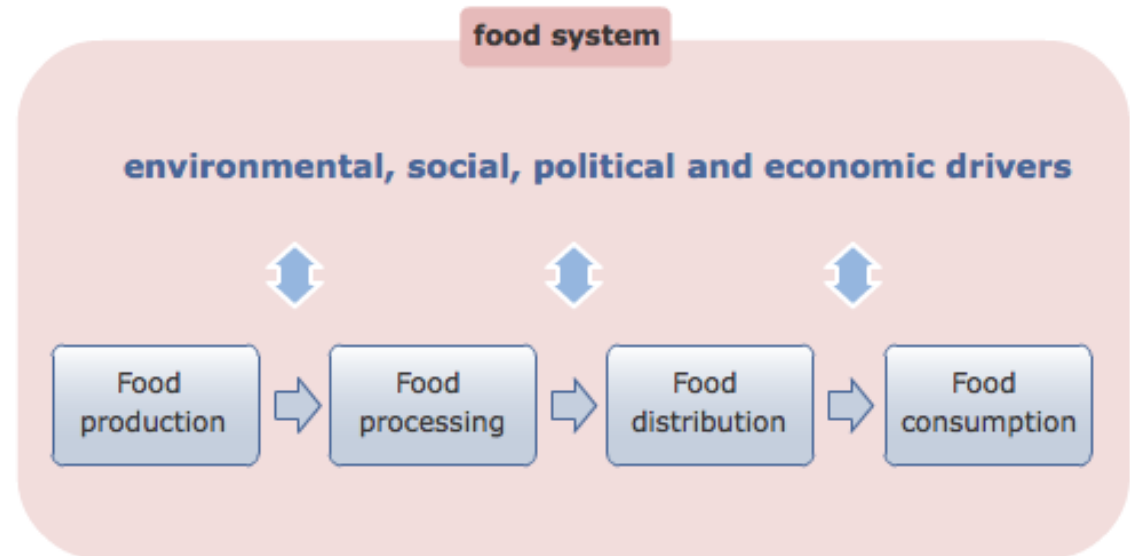


[Example](#)

In a broader sense, a food system also includes interactions with environmental and socio-economic drivers.



[Example](#)



Food security is an outcome of a food system.

Interaction and testing

CLIMATE CHANGE AND FOOD SECURITY Impacts of Climate Change on Food Security

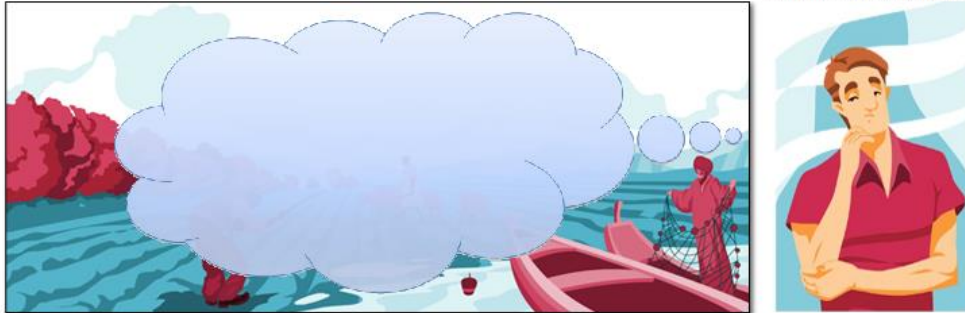
Food Security Information for Decision Making Additional Info


IMPACTS OF CLIMATE CHANGE ON AGRICULTURE




Let's focus on the agricultural sector, including crops, forests, livestock and fisheries.

Can you imagine how changes in climatic conditions constitute major challenges for agriculture productivity?

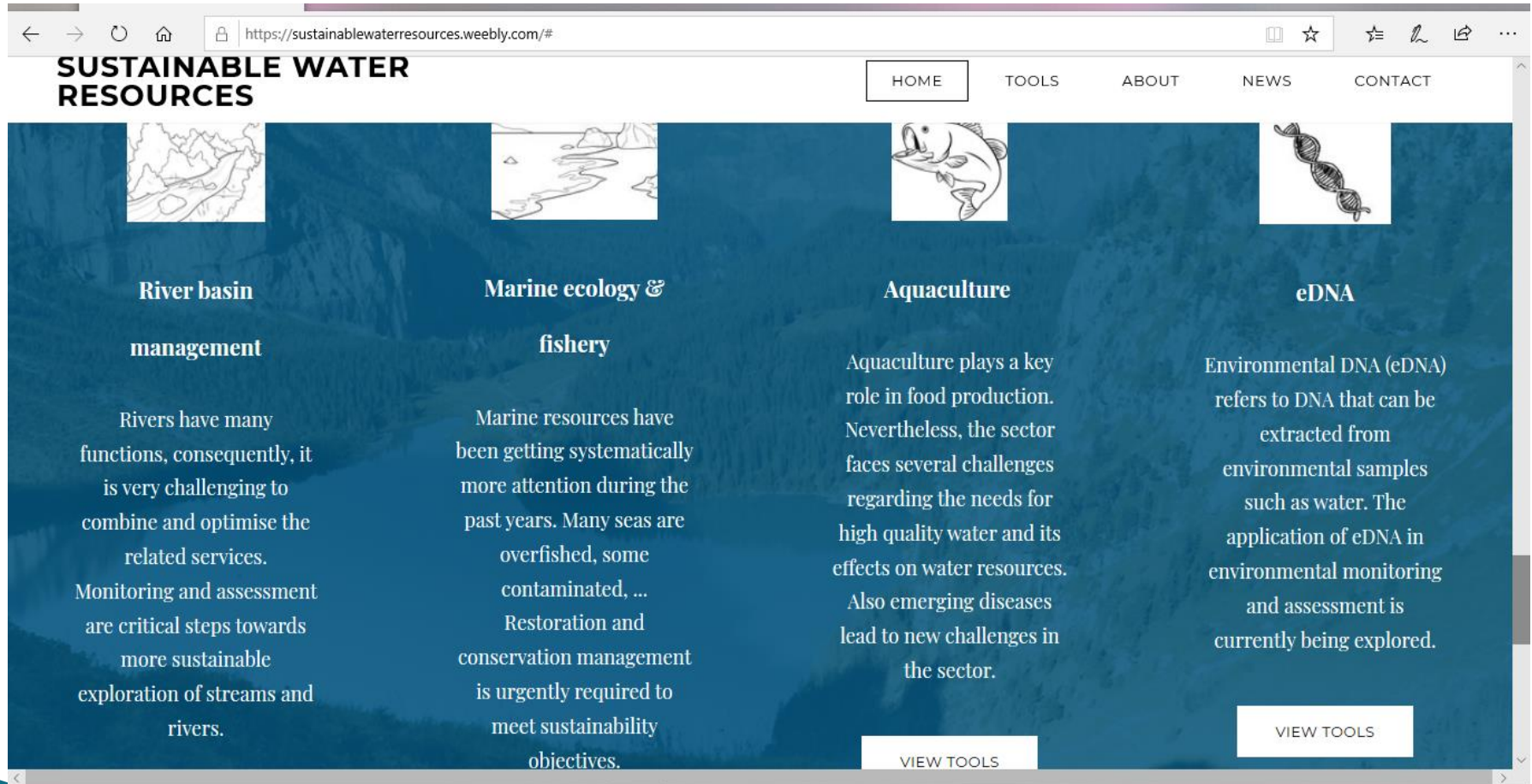
Click on the **callout** to read Robert's thoughts.



 [Global distribution of risks for agricultural production systems](#)

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Examples: project outcomes



The screenshot shows a web browser window with the URL <https://sustainablewaterresources.weebly.com/#>. The website has a dark blue background with a light blue pattern. The navigation menu includes HOME, TOOLS, ABOUT, NEWS, and CONTACT. The main content area features four columns, each with an icon, a title, and a paragraph of text. The first column is titled 'River basin management' and features a map icon. The second is 'Marine ecology & fishery' with a river icon. The third is 'Aquaculture' with a fish icon. The fourth is 'eDNA' with a DNA double helix icon. Each column has a 'VIEW TOOLS' button at the bottom.

SUSTAINABLE WATER RESOURCES

HOME TOOLS ABOUT NEWS CONTACT

River basin management

Rivers have many functions, consequently, it is very challenging to combine and optimise the related services. Monitoring and assessment are critical steps towards more sustainable exploration of streams and rivers.

Marine ecology & fishery

Marine resources have been getting systematically more attention during the past years. Many seas are overfished, some contaminated, ... Restoration and conservation management is urgently required to meet sustainability objectives.

Aquaculture

Aquaculture plays a key role in food production. Nevertheless, the sector faces several challenges regarding the needs for high quality water and its effects on water resources. Also emerging diseases lead to new challenges in the sector.

eDNA

Environmental DNA (eDNA) refers to DNA that can be extracted from environmental samples such as water. The application of eDNA in environmental monitoring and assessment is currently being explored.

VIEW TOOLS VIEW TOOLS

Conclusions

- ▶ Broad distribution
 - ▶ High investment
 - ▶ Careful think about objectives and to whom it is oriented
 - ▶ Use of feedback by users
- 