

Abstract

Considering the projected precipitation and temperature developments for the county of **Saxony-Anhalt**, there are increasing demands for **climate adaptation** in this region. For this purpose, educational institutions must **raise awareness** and train future decision-makers. The teaching and learning rooms **BIKAB** and **BIKASA** therefore offer basic information on climate change based on the concepts of different forms of learning. **Regional case studies** are used as training objects which are illustrated in web-based learning modules as well as within the framework of lecture series, case studies and science camps. The project's results are implemented as a **Rich Internet Application (RIA)** in a modular **e-learning platform**, so that a sustainable usage in German-speaking areas is possible. Selected content is prepared for outdoor education in field apps. The e-learning tools in BIKAB are especially designed for **students** in grades 10 and 12 or 13 of secondary schools and grammar schools as well as for students of **STEM subjects** at universities. BIKASA aims at **addressing vocational students** in the agricultural sector.

Introduction

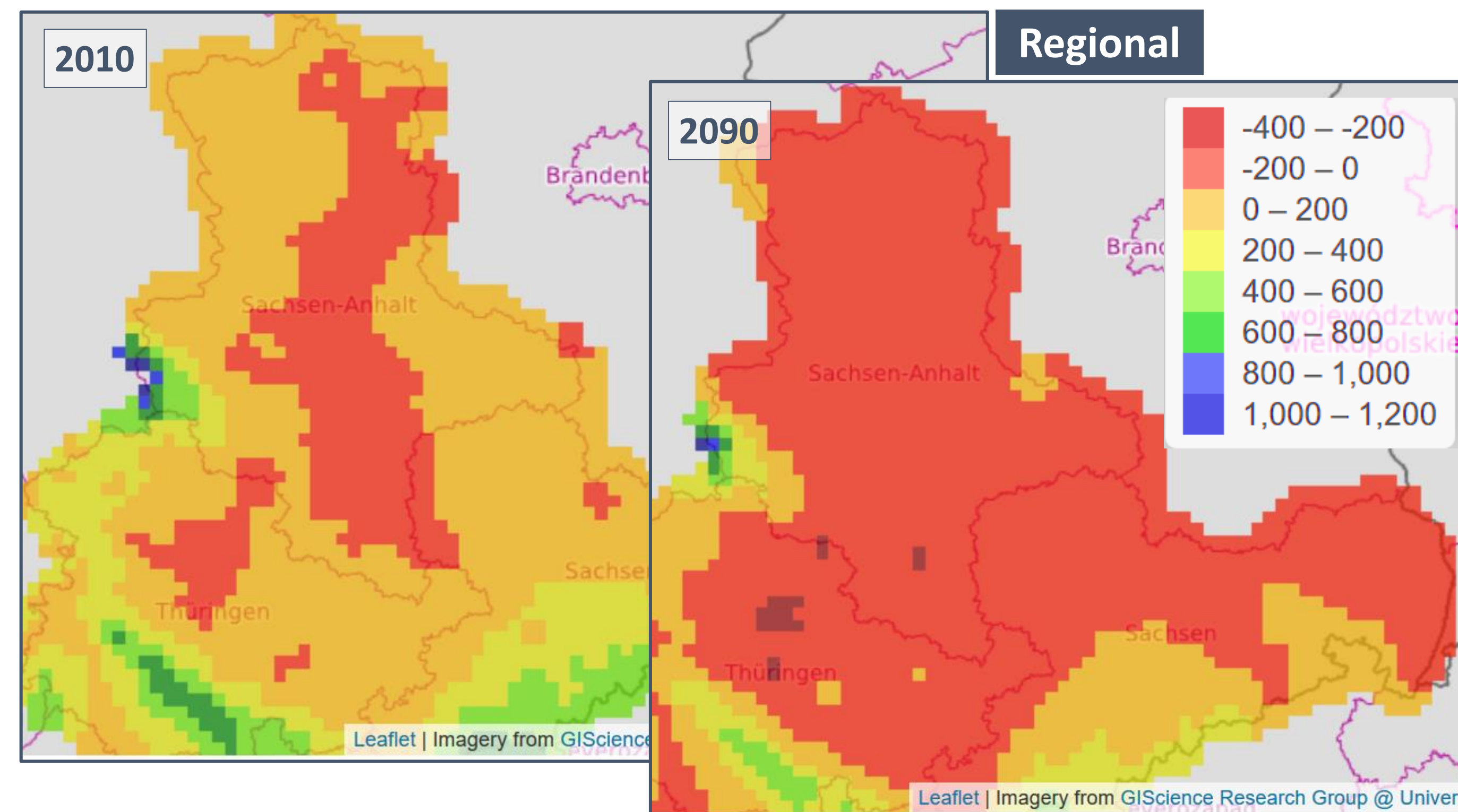


Figure 1: Climatic Water Balance in Central Germany – SRES Scenario B1 (Source: <https://bit.ly/2sUIB0D>)

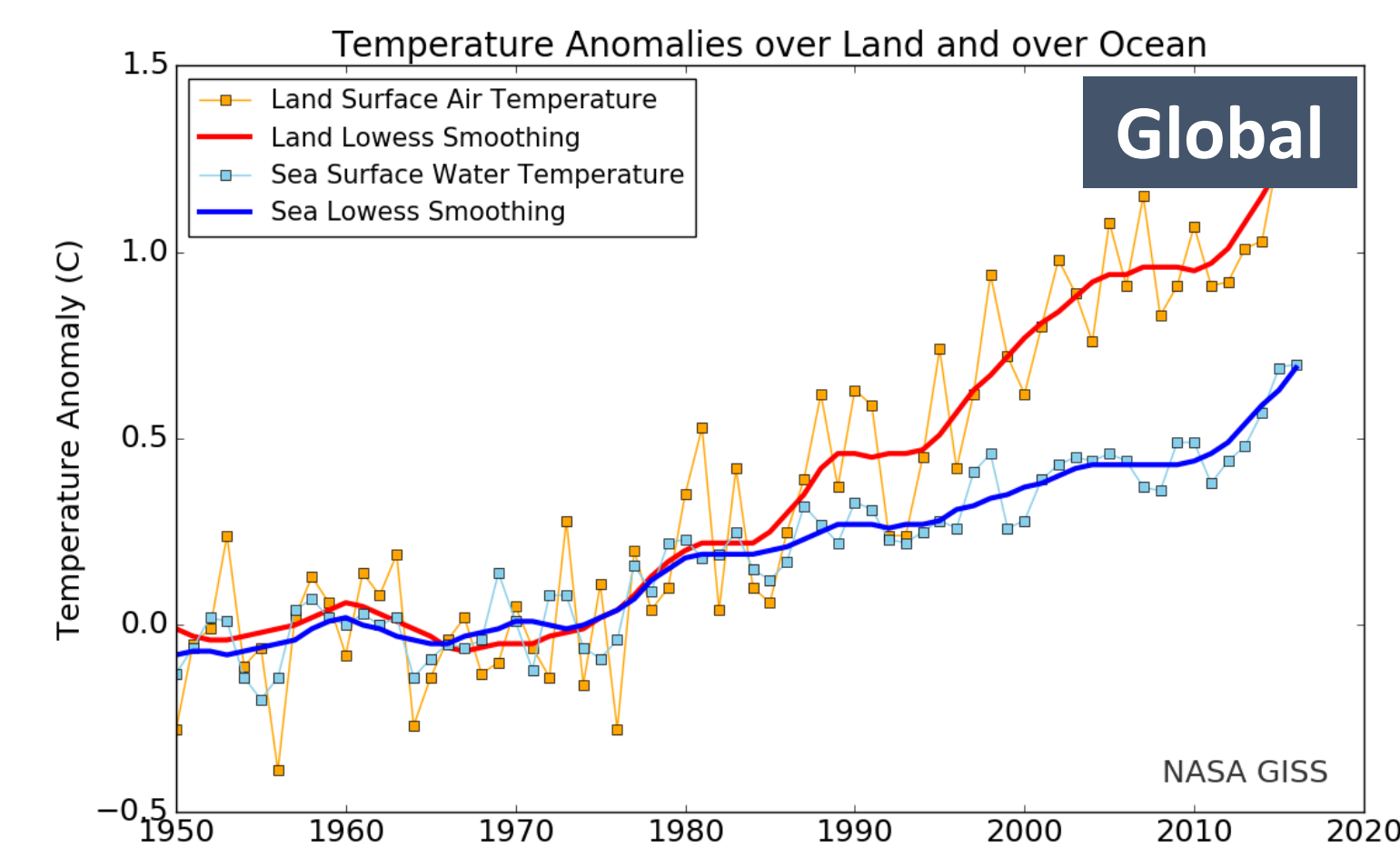


Figure 2: Temperature Anomalies over Land and over Ocean (Source: NASA, <https://go.nasa.gov/2oTPq2e>)

For the federal state of Saxony-Anhalt, there are **increasing demands** on the use and cultivation of land in order to ensure the efficiency of agricultural production and the sustainable protection of soil resources. The **agricultural sector** of Saxony-Anhalt is classified as **particularly sensitive** to the influences of climate change.



Figure 3: Drought on farmland in Saxony-Anhalt (Source: own photograph)

Concept & Workflow

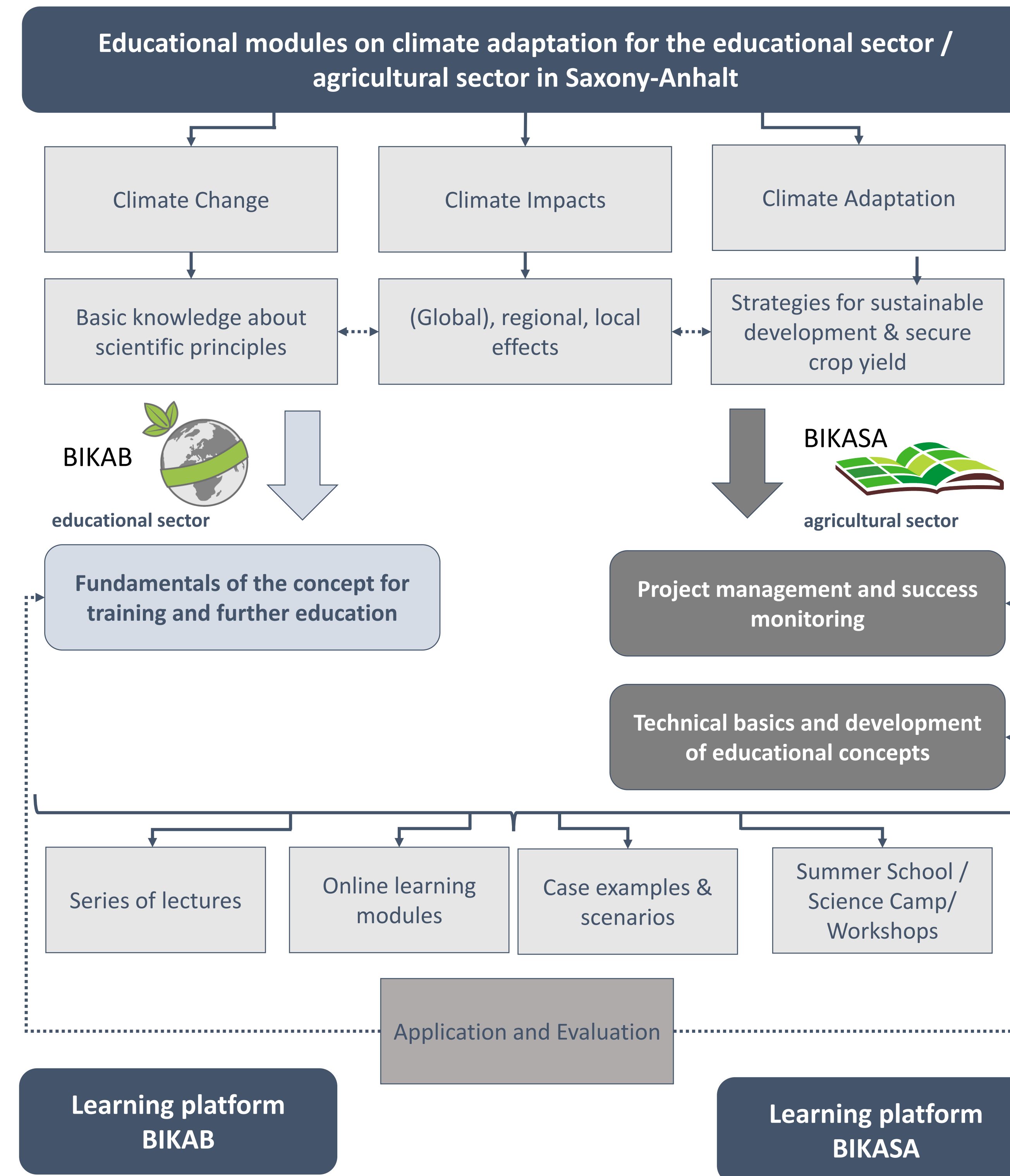


Figure 4: Schematic illustration of the concept and workflow of BIKAB and BIKASA (Source: own diagram)

Data & Methodology

The BIKAB / BIKASA learning platform is set up in cooperation with the **OpenSource-WCMS Drupal** and the central **e-learning platform ILIAS** of Martin Luther University. Therefore the wide product spectrum of **ESRI** (ArcGIS Pro, ArcGIS Online) for data processing and creation of interactive story maps is used. In addition, further open source applications are used to generate the BIKAB / BIKASA geoservices (e.g. PostgreSQL/PostGIS Databases, Geoserver, R-based developments). Besides that, learning contents, methods, models and geovisualizations are implemented from **research projects** such as **GEOVLEX** (www.geovlex.de) or **WEBGEO** (www.webgeo.de). The interoperability with existing applications and data is ensured via **interfaces**. Processed basic geodata, **remote sensing data**, data from **field investigations** and teaching materials (about water, soil and climate in dry regions in Central Germany) as well as additional reference data are provided and further processed for the needs of BIKASA / BIKAB.

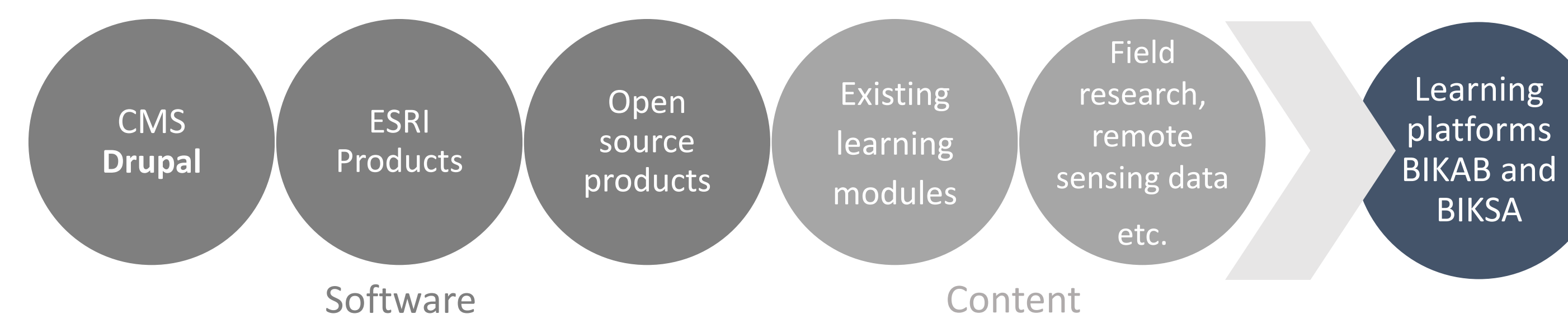


Figure 5: Schematic illustration of the software and content used for establishing the learning platforms BIKAB and BIKASA (Source: own diagram)

Results

Figure 6: Online learning platform BIKAB and BIKASA, Screenshot of learning module "viticulture" in BIKAB (Source: <https://bit.ly/2S99QTS>)

Conclusion / Outlook

The project aimed to raise **awareness** among pupils, students and teachers regarding **regional and local effects of climate change** with resulting climate impacts and required adaptation strategies. The platform offers a tool **for individual learning** under the consideration of **previous knowledge** on the topic of climate change and the usage of e-learning tools in geography lessons, vocational schools and at universities. The e-learning tools are designed in such a way that the topics can be **transferred to other dry regions in Germany** and that the didactic and methodological concepts can be adopted for **other problematic areas**.



Figure 7: Students at the PC, as an example of a learning room (Source: <https://bit.ly/2N4943w>)