From Impact Chains to Decision-Support: Designing CRISP, a Climate Risk Planning Tool for Agri-Food Systems

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Abstract

Systematically integrating climate risk considerations into development planning remains a persistent challenge, particularly where a lot of information needs to be gathered and practical, accessible tools and databases are lacking. Existing climate risk assessment approaches are often complex, resource-intensive, or not designed for specific sectoral contexts. To address this gap, the Climate Risk Planning and Managing Tool (CRISP), a web-based platform designed to structure and present existing climate risk knowledge in a format accessible to practitioners for early-stage project design and decision-making was developed.

CRISP is centred on a modular Impact Chain framework that visually plots how climate Hazards interact with Exposure and Vulnerability factors leading to cascading Impacts mitigated by Adaptation Options. Covering 23 agri-food systems, these expert-validated Impact Chains are embedded in a flexible, transparent and interactive platform designed for usability. Rather than generating new data, CRISP curates and organises dispersed information from scientific and policy sources, guiding users in formulating context-specific adaptation strategies.

The platform provides end users with interactive Impact Chain visualisations, featuring content selection, automated report generation, and embedded instructions, as well as a searchable repository of over 1200 additional resources for climate risk screening. In addition, the platform offers programmatic access to Impact Chain data through a CRISP knowledge graph built leveraging semantic technologies. This graph is structured according to the conceptual design, data structuring methodology, and technical architecture of CRISP illustrating how Impact Chains can serve as a bridge between high-level climate risk concepts and concrete planning needs. By improving access to structured climate risk knowledge, CRISP supports evidence-based and practicable climate adaptation planning in the agricultural sector.

Data availability: All data supporting the findings of this study are openly available. The CRISP platform is accessible at https://crisp.eurac.edu.

The platform's codebase, ontology specification, data input templates, raw Impact Chain data, and user guides are available through the CRISP git repository (https://gitlab.inf.unibz.it/crisp-kg), ensuring full reproducibility and transparency. All materials are released under a CC-BY 4.0 open-access license.

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Introduction

Systematically integrating climate risk considerations into development planning requires more than access to climate data; it demands structured, context-relevant information that links Hazards to Vulnerabilities, potential Impacts and Adaptation options. While several climate risk assessments and decision-support-tools exist [1,2], many remain difficult to operationalise during the early phases of project design, particularly in settings with limited regional and thematic knowledge. A key bottleneck lies not only in the availability of information, but also in the challenge of compiling, organising and presenting existing knowledge in a way that helps understanding the climate risks and enable informed decision-making.

Impact Chains—conceptual models that trace the causal pathways from climate-related Hazards through Exposure and Vulnerability factors to potential Impacts and Adaptation Options—offer a promising framework for addressing this challenge. They can elucidate critical linkages in complex systems, support the development of adaptation hypotheses, and guide targeted data use. However, consistent and scalable operationalisation of Impact Chains has remained difficult, especially outside of academic or expert-driven contexts.

This paper introduces the Climate Risk Planning and Management Tool (CRISP), a digital platform designed to operationalise the Impact Chain approach for agri-food systems. CRISP compiles and standardises expert knowledge into a set of predefined Impact Chains. These are made accessible to end users through an interactive web interface. Programmatic access and data reuse are supported through a queryable knowledge graph, structured according to the CRISP ontology and compliant with Semantic Web and Linked Open Data principles [3]. The platform integrates a curated repository of over 1,200 external resources, including journal articles, reports, books and guidelines, enabling users to explore topics in greater depth.

By combining structured knowledge representation with user-friendly digital interfaces, CRISP demonstrates how existing information can be transformed into a practical decision-support tool. The objective of this paper is to describe the conceptual foundation, methodological development, and technical implementation of the CRISP platform, highlighting its potential to enhance climate risk screening and adaptation planning across diverse agricultural contexts. Specifically, we present (i) the ontology and data structure underlying the tool, (ii) the literature and expert-based process used to populate the database, and (iii) the platform architecture and functionality that support climate risk screening for agricultural systems.

Materials and Methods

Project Context and Objectives

Agriculture and food systems are among the sectors most severely affected by climate change yet systematically integrating climate risk considerations into the planning and implementation of agricultural and rural development projects and policies remains challenging [4]. Project planners and managers often lack the resources, time and technical expertise required for sound climate risk and vulnerability assessments, while the rapidly expanding knowledge base on climate change, adaptation and mitigation makes it increasingly difficult to identify and evaluate the most relevant information. Recognising this gap, the German Development Agency (GIZ) commissioned the development of CRISP as a freely available, sector-specific tool that would enable project planners and managers in the agricultural and food systems sector to conduct a time- and cost-effective initial climate risk screening without requiring deep prior expertise. The tool was conceived as a practical entry point for projects seeking to mainstream climate action in line with countries' Nationally Determined Contributions (NDCs) and National Adaptation Plans (NAPs), and to articulate adaptation hypotheses that could guide project design from early planning stages onwards. Building on previous work that successfully applied the Impact Chain approach — particularly the GIZ Vulnerability Sourcebook and its successor, the Climate Risk Sourcebook [5,6] — the project aimed to operationalise this established methodology within an accessible, interactive platform tailored to agri-food contexts.

Impact Chains

Impact Chains (ICs) provide a structured framework for representing climate-related risk within socio-ecological systems. They visualise the causal sequence from Hazards through Exposure and Vulnerability to potential Impacts, helping to identify and prioritise critical Risk factors and Adaptation options [6]. For example, a drought Hazard may decrease soil moisture and affect farmland (Exposure), while factors such as limited irrigation or smallholder resource constraints (Vulnerability) can amplify crop yield reductions (Impact), prompting responses such as irrigation infrastructure or crop diversification strategies (Adaptation). By explicitly linking these components, ICs serve as a foundation for operational climate risk assessments and decision-support tools.

Initially developed by Eurac Research for assessing climate Vulnerability in Alpine regions, the IC approach was later expanded in collaboration with GIZ to support broader vulnerability assessment frameworks [5–7]. ICs are also embedded in ISO 14091:2021, a standard that provides stepwise guidelines—both qualitative and quantitative—for assessing Risk and Vulnerability in climate Adaptation planning [8].

Beyond their development origins, ICs have been applied in national Adaptation planning and scientific studies, often through participatory modules that co-produce Impact Chains with stakeholders, enhancing local relevance, legitimacy, and usability [9,10]. For example, ICs have informed climate risk assessments for mountainous communities in Tajikistan and Kyrgyzstan [11]. They have also been employed in national-level Vulnerability assessments, such as those conducted by the German Umweltbundesamt, demonstrating their applicability for policy-relevant decision-making [12]. These participatory and applied uses are crucial for integrating local knowledge into structured risk assessments and ensuring that Adaptation strategies are contextually appropriate.

By embedding ICs within the CRISP platform, our approach builds on this established methodological lineage—enhancing consistency, interpretability, and operational utility across diverse agri-food systems.

Farming Systems Typology as Organising Framework

To ensure contextual relevance and global applicability, the platform adopts the farming systems framework developed by Dixon et al. (2001) [13]. Dixon and colleagues developed a highly pragmatic approach to a typology, finding an appropriate balance between variables that allow broad farming system types to be delineated while not focussing on excessive detail that could complicate comparison at regional and global levels [13]. One example is Robinson et al. (2011) who provide a global classification of livestock-based farming systems, but this has very little information on cropping [14] Accordingly, we used the Dixon et al. (2001) classification, which was updated for Africa in 2020 [13].

The Dixon classification system delineates 72 distinct farming systems world-wide, and CRISP currently includes data for 23 of these systems, covering sub-Saharan Africa (SSA), South Asia (SA), East Asia Pacific (EAP), Latin America and the Caribbean (LAC), and the Middle East and North Africa (MENA). These 23 systems provide both contextual framing for the literature review and a navigational structure for the platform interface, both described below. Table 1 lists CRISP's current coverage by region and farming system. The systems chosen in each region were those that contain the highest percentages of the agricultural population. Some 71% of SSA's agricultural population are located in the seven systems shown; for LAC, SA, EAP and MENA, this coverage is 61%, 80%, 85%, and 62%, respectively. **Error! Reference source not found.** provides an overview of the location of the farming systems under consideration.

Table 1 Regional distribution and farming system coverage within the CRISP platform, based on the global farming systems typology by Dixon et al. (2001).

Region	Number of Farming Systems	Farming Systems Covered
Sub-Saharan Africa	7	Agropastoral; Cereal–Root Crop Mixed; Highland Perennial; Highland Temperate Mixed; Maize Mixed; Pastoral; Root Crop
Latin America and Caribbean	6	Coastal Plantation and Mixed; Dryland Mixed; Forest-Based; High Altitude Mixed (Central Andes); Irrigated; Maize–Beans
South Asia	3	Rainfed Mixed; Rice; Rice–Wheat
East Asia and Pacific	4	Coastal Artisanal Fishing; Lowland Rice; Temperate Mixed; Upland Intensive Mixed
Middle East and North Africa	3	Dryland Mixed; Highland Mixed; Rainfed Mixed

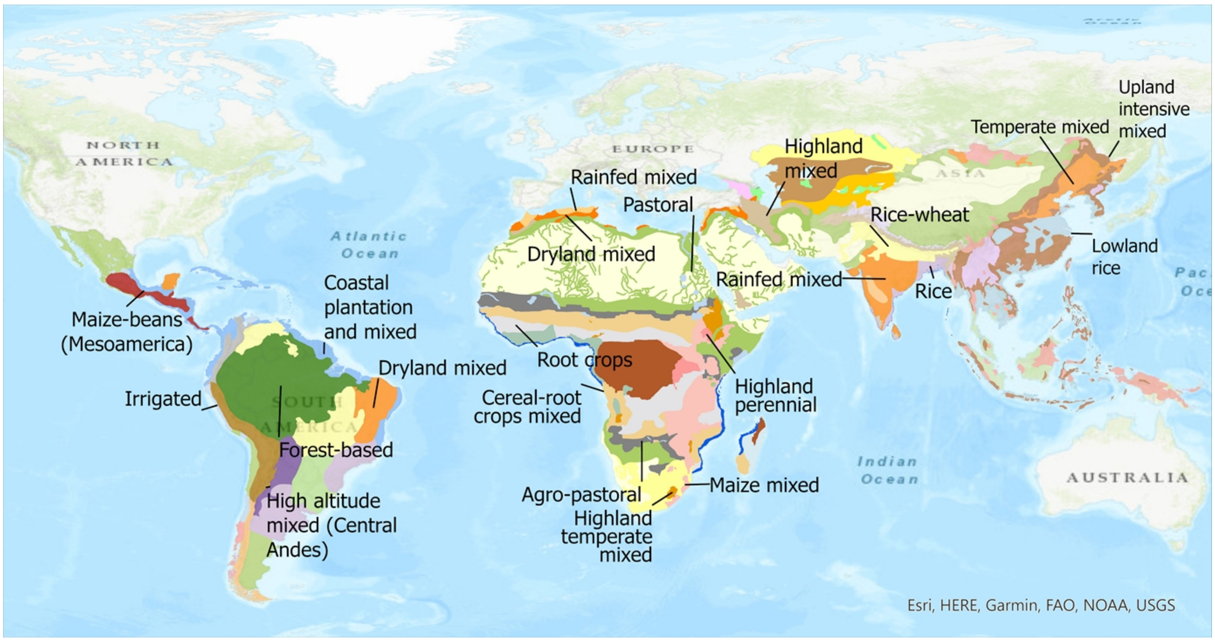

Fig. 1 Map showing the Dixon farming systems highlighting the 23 classes represented in the CRISP tool. (Data source: FAO, 2001)

Ontology Development

A domain-specific ontology was developed to formally represent the data managed in CRISP, starting from the core components of climate risk and their interrelationships. The ontology defines six principal classes: Hazard, Exposure, Vulnerability, Impact, Adaptation, and Risk. These are linked through specified relationships that enable structured reasoning and querying.

Implemented using the Web Ontology Language (OWL), the ontology ensures semantic interoperability, internal consistency and alignment with external linked knowledge sources. It also supports the standardised data input format used throughout the knowledge compilation process. Fig. 2 illustrates the conceptual structure of this ontology, including the causal pathways and contextual elements underpinning the CRISP Impact Chains.

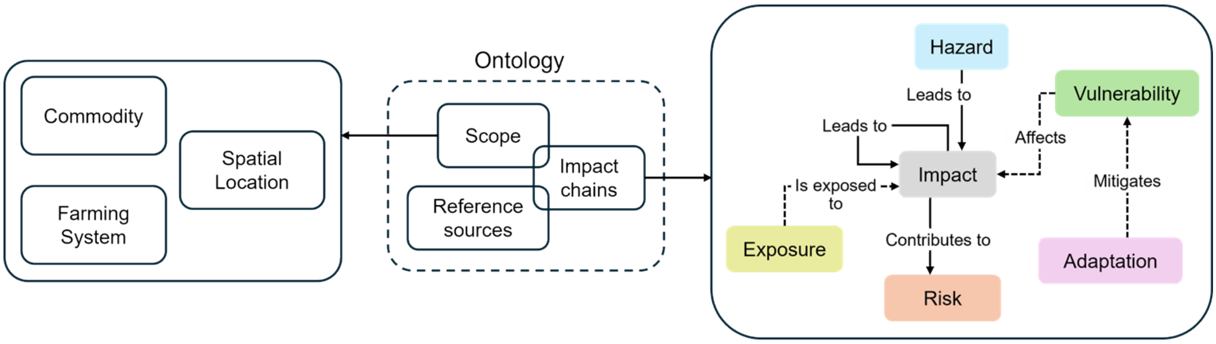

Fig. 2 Conceptual structure of the CRISP ontology showing key relationships among climate risk components.

Literature Review, Data Extraction and Database Compilation

A structured literature review was conducted to identify and synthesise existing evidence on climate risk pathways across 23 selected farming systems. The extensive review drew primarily on peer-reviewed scientific articles, complemented by authoritative assessment reports, and selected grey literature addressing climate Hazards, associated Impacts, Vulnerability factors and Adaptation measures. Each source was screened for relevance to one or more of the farming systems, with emphasis on empirical studies published within the past decade. Where systems were underrepresented in recent scholarship, seminal or older studies were also included to ensure sufficient coverage.

A desktop-based search strategy was employed, combining keywords such as *climate change*, *climate hazards*, *impact*, and *climate risk* with the names of the farming systems and their regional contexts. Key global and regional references included the IPCC Fifth and Sixth Assessment Reports (AR5 and AR6), World Bank country-level vulnerability datasets, and outputs from the CGIAR programme on Climate Change, Agriculture and Food Security (CCAFS) [15,16]. Foundational references on the farming systems included *Farming Systems and Poverty* by Dixon et al. (2001) [13], which provides a global typology, and the more recent, Africa-focused volume *Farming Systems and Food Security in Africa* [17].

Information was extracted using a standardised protocol designed to ensure comparability across sources and farming systems. All relevant data were systematically annotated, with sources clearly attributed. The data were coded according to predefined ontology categories (Hazards, Impacts, Vulnerability factors, Exposure, and Adaptation options) and linked to the appropriate farming system. To enhance consistency, each entry was further tagged using a controlled taxonomy of themes, for example, an observed drought-related Impact could be categorised as *biophysical* and tagged as affecting *water* and *soil*, while an Adaptation option such as *improved crop varieties* could be tagged under *crop management* and categorised as *human capital*. Additionally, connections between factors were annotated with descriptive metadata and source attribution. This approach provided a consistent structure for integrating diverse evidence, facilitated transparent attribution of sources, and allowed for the resulting Impact Chains to be navigated and queried in a harmonised way across the 23 systems.

Each resulting Impact Chain underwent expert validation by specialists in the corresponding farming systems and regions. This process was carried out through virtual workshops, complemented by the use of a standardised input template to capture structured feedback and additional insights.

The validated and coded information was subsequently compiled into the CRISP database through an iterative process involving content validation, ontology mapping, and expert review. The compilation process took approximately 22 months; each template underwent an average of four revision cycles, documented through version tracking in the CRISP Git repository. This iterative approach ensured the internal consistency, completeness, and transparency of the final CRISP database (Table 2).

Table 2 Example Structure of the CRISP Data Input Template

Field name	Description
Farming system	Name of the farming system, aligned with the global Farming System framework (e.g., Highland Temperate Mixed, Irrigated, Rainfed Mixed).
Commodity	Main crop or livestock commodity relevant to the Impact Chain (e.g., maize, wheat, livestock).
Spatial location	Geographic scope of the system (region, subregion, countries, ISO codes, and, if applicable, subdivisions).

Hazard	Specific climate-related hazards affecting the system (e.g., drought, increased temperatures, strong winds).
Exposure	Elements exposed to the hazard (e.g., land area under cultivation, affected populations, infrastructure).
Vulnerability factor	Socioeconomic or environmental factors that increase vulnerability (e.g., poverty, degraded soils, limited market access).
Impact	Documented or anticipated consequences of the hazard, based on the exposure and vulnerability context (e.g., yield loss, livestock mortality).
Adaptation options	Suggested or existing adaptation strategies to reduce climate risk (e.g., irrigation infrastructure, crop diversification, insurance mechanisms).
Reference source	Citation(s) supporting the chain elements, from peer-reviewed articles, reports, or grey literature.
Confidence level (optional)	Qualitative indication of confidence in the knowledge (e.g., low, medium, high) based on literature robustness or expert consensus.
Notes / comments	Additional context or internal notes for expert use or clarification.

Platform Architecture and Technical Implementation

CRISP was developed as a modular web-based platform integrating structured data storage, semantic technologies, and an interactive user interface. The system architecture was designed to ensure transparency, scalability, and reproducibility while maintaining accessibility in low-connectivity environments.

The **backend** builds on the idea of organizing all data into a knowledge graph by wrapping a relational database through a semantic layer. The database provides a mature and scalable solution to efficiently store structured information on climate risks and adaptation options. The semantic layer, implemented through a virtual knowledge graph engine, exposes the database content as a Semantic Web-compliant RDF knowledge graph structured according to the classes and relationships of the CRISP ontology. Following Semantic Web practices, the knowledge graph is accessed via SPARQL queries formulated using the same domain terms of the ontology familiar to experts, and answered also accounting for information inferable via reasoning over the ontology, overall enabling flexible and transparent exploration of the database content [18]. To facilitate reproducible installation and future scalability, we opted for a containerized deployment of all backend components.

The **frontend** aims at providing a browser-based web interface that for end users to explore Impact Chains interactively, perform predefined or custom queries, and generate automated reports. We opted for a single page application design where frontend navigation and rendering logic operate entirely in the browser, minimizing interactions with the backend and overall optimising performance and responsiveness in diverse connectivity contexts. Together, these backend and frontend choices form a coherent architecture that bridges complex semantic data management with intuitive user interaction.

Platform Monitoring

To assess user engagement, we opted for implementing a privacy-compliant, usage monitoring system. Its goal is to collect anonymised data on visits, query usage and interaction patterns and, based on that, to provide informative dashboards to gain insights into platform usage. To preserve users' privacy, the system operates on already available server-side information such as HTTP request logs, user agent strings, and coarse-grained IP-derived geolocation data. No cookies or third-party tracking services are employed, and no sensitive data (including IP addresses) are stored, overall ensuring compliance with the General Data Protection Regulation (GDPR).

Results

Overview of the compiled evidence base

As of December 2023, the CRISP knowledge base includes structured information for 23 farming systems spanning Sub-Saharan Africa, South Asia, East Asia and the Pacific, Latin America and the Caribbean, and the Middle East and North Africa. Each system is linked to Impact Chains derived from literature.

A searchable repository enables users to identify relevant resources by topic, region, or system component, facilitating deeper exploration beyond the Impact Chain structure.

Across the 23 farming systems, CRISP currently includes 23 annotated Impact Chains linking 19 hazard types to 92 vulnerability types and 140 adaptation measures. Each entry is coded according to the five ontology categories (hazard, impact, exposure, vulnerability, adaptation) (Table 3).

Table 3. CRISP content statistics. For each type of entity in CRISP (Factor, Link), three number of occurrences are reported: (i) total, summing occurrences over the 23 Impact Chains; (ii) average per Impact Chain; (iii) distinct, considering an entity present in multiple Impact Chains just once.

Entity Type	Number of Occurrences		
	Total, sum over ICs	Avg. per IC	# Distinct over ICs
Factor	1901	83	367
Adaptation	601	26	140
Exposure	36	2	2
Hazard	167	7	19
Impact	565	25	108
Risk	60	3	6
Vulnerability	472	21	92
Link	5336	232	2612
Exposes	79	3	12
Leads To	1767	77	839
Mitigates	822	36	464
Commodity	83	4	48
Bibliographic Resource	1394	61	1231

Across systems, water scarcity and heat stress emerged as the most recurrent climate hazards. Adaptation responses were dominated by agronomic and technological measures, while socio-institutional adaptations were less frequently documented, suggesting an evidence gap regarding governance and capacity-building interventions [4].

Platform Structure and Functionality

The CRISP platform (https://crisp.eurac.edu) enables interactive exploration of climate risk Impact Chains across 23 farming systems.

The platform architecture resulting from the design rationale discussed earlier is shown in Fig. 3, which also covers the monitoring system. Data are compiled using a standardised Excel-based input template, stored in a PostgreSQL/PostGIS relational database, and exposed as a virtual knowledge graph through Ontop and the SPARQL endpoint it provides. Access to this endpoint is mediated (cached) by a Nginx web server that also hosts the files of the frontend, which is a React single page application running in end users' browsers; 3rd party applications as well can access CRISP data via SPARQL. Server-side logs resulting from users' interaction are collected and aggregated via a Fluent Bit log stream processor, whose results are stored in another PostgreSQL database and exposed as interactive dashboards via Grafana. This modular architecture supports efficient data retrieval, rapid response times and observability.

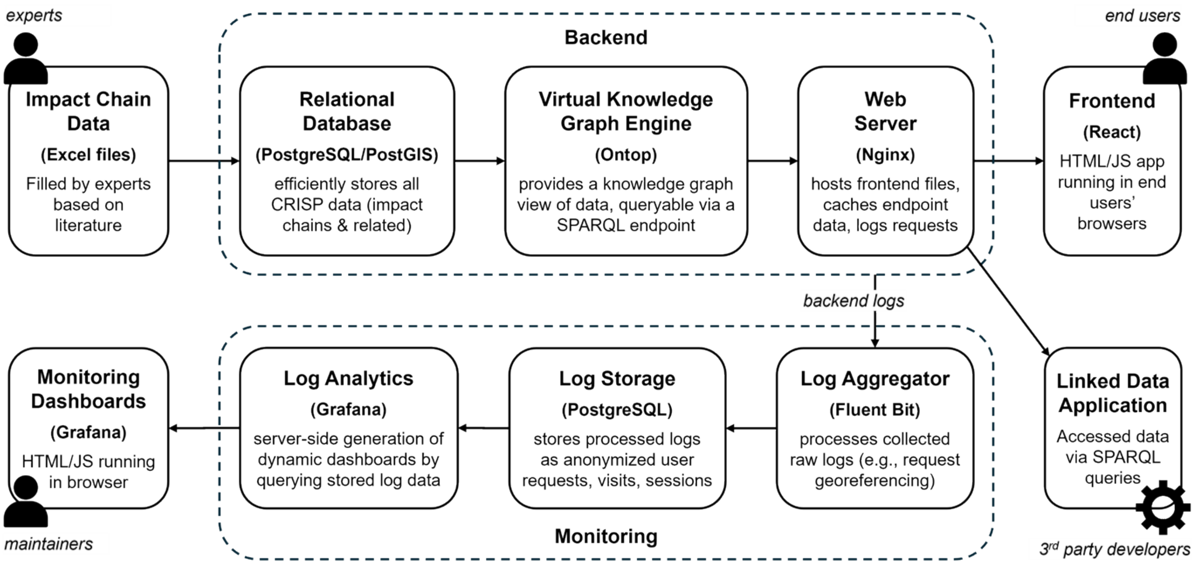

Fig. 3 System architecture of the CRISP platform.

The CRISP platform' s frontend enables end users to browse Impact Chains by farming system, and to visualise interconnected climate risk factors. Fig. 4 shows a screenshot of the frontend resulting from an end user selecting factor (node) "Reduced crop productivity/failure" in the impact chain for the agropastoral system of Sub-Saharan Africa, showing linked Hazard, Vulnerability and Adaptation factors. A table-based visualization is also available. Users can browse factors and links, show their details and references, and export a PDF report of all/part of an Impact Chain.

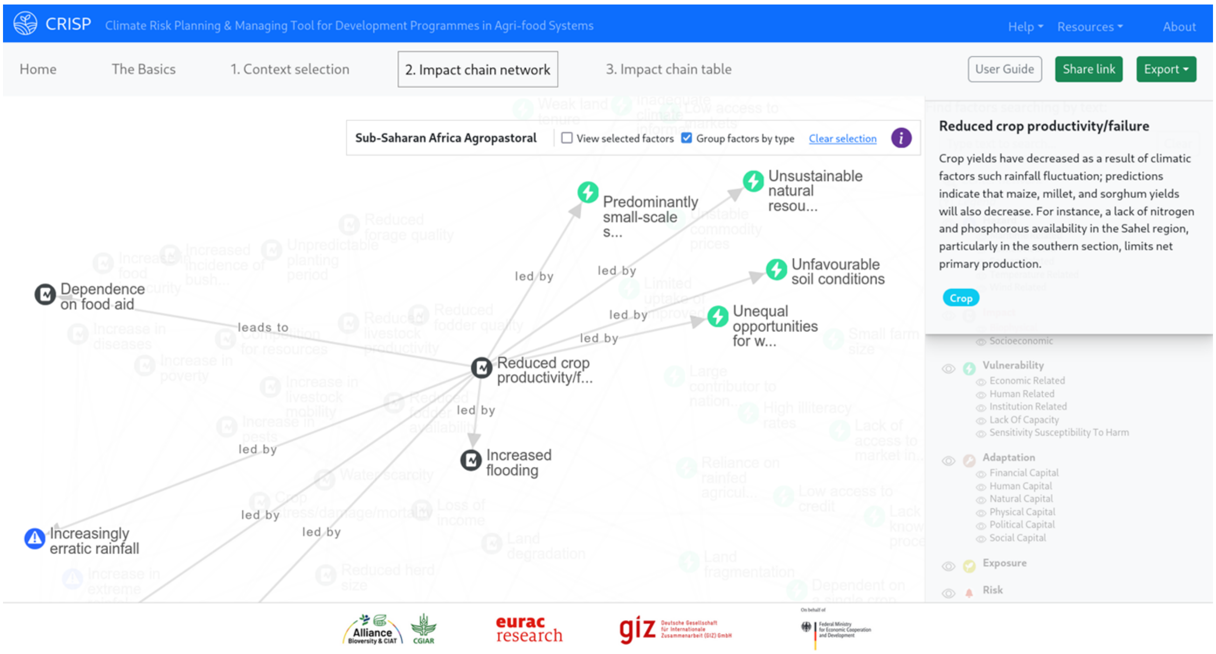

Fig. 4 Interactive graph-based visualization of an Impact Chain

Besides interaction through the frontend, the system allows any technical user or 3rd-party application to evaluate arbitrarily complex SPARQL queries over CRISP data. A web form where to test SPARQL queries is also provided, as show in Fig. 5 with an example SPARQL query that spans through all Impact Chains to list Adaptations that can mitigate Vulnerabilities leading to Impact "Reduced crop productivity/failure".

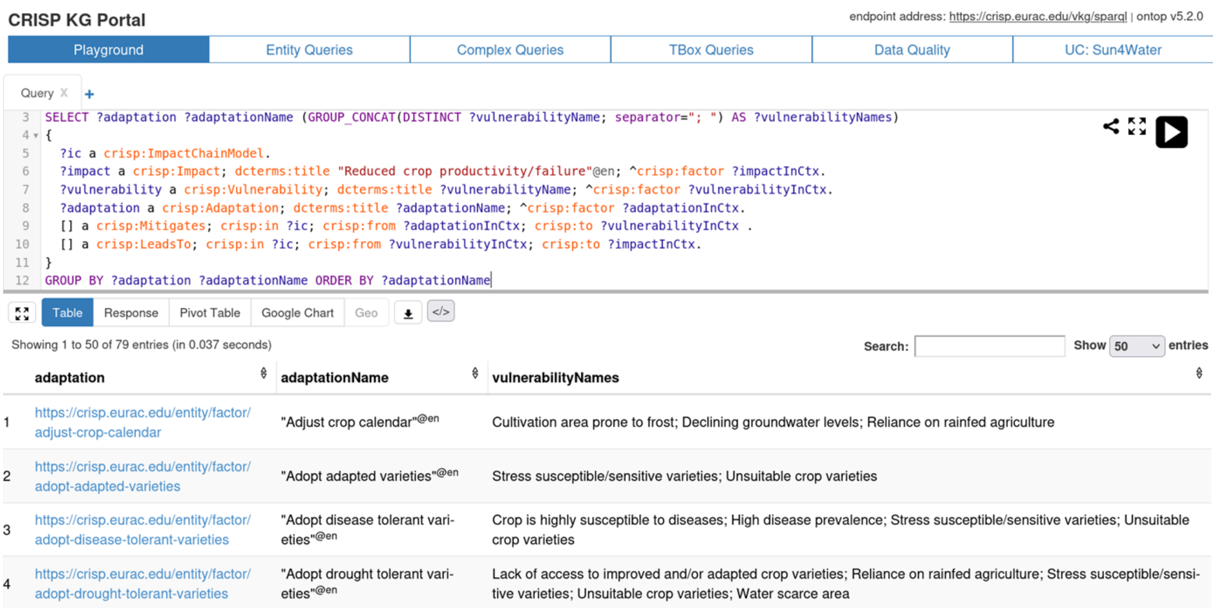

Fig. 5 Example of querying the CRISP knowledge graph using SPARQL

Ontology-Driven Knowledge Representation

CRISP's semantic framework ensures consistency and interoperability across all data components. The ontology defines key classes—Hazard, Exposure, Vulnerability, Impact, Adaptation, and Risk—and specifies relationships among them, enabling complex queries across diverse datasets.

This semantic foundation allows users to explore climate risk pathways interactively. For example, a user examining flood-related Risks in a specific farming system can trace associated Vulnerabilities and Adaptation strategies through ontology-based filters, ensuring scientifically consistent and context-specific results.

Platform Use and User Feedback

Between September and December 2024, the platform recorded 879 visits from 86 countries, with the highest engagement observed in Sub-Saharan Africa. The Agropastoral farming system received the most frequent visits, accounting for 37 sessions.

Usage data indicate that most interactions involved visualising Impact Chains and navigating across multiple systems within a single session. This pattern suggests that the platform supports comparative exploration and informs early-stage project design.

The platform was introduced to practitioners and development project staff through conference presentations, including a session at the SNRD Africa Conference in November 2021.

Discussion

The CRISP platform demonstrates how existing climate risk knowledge can be transformed into a structured, interactive decision-support tool for the agricultural sector. By operationalising the Impact Chain approach within a semantic, web-based environment, CRISP bridges the gap between high-level climate risk concepts and the practical needs of development practitioners.

Three contributions emerge from this work:

1. **Structured Knowledge Representation:** The use of ontologies ensures consistency, transparency, and scalability in representing climate risk information. This approach facilitates integration with external datasets and future expansion to additional farming systems or hazards.

2. **Practical Decision-Support:** By providing pre-structured Impact Chains, a searchable resource repository, and automated reporting capabilities, CRISP reduces the technical barriers associated with conventional risk assessments [1,2]. Users can rapidly identify relevant hazards, vulnerabilities, and adaptation options without requiring extensive expertise or stakeholder engagement at initial planning stages.

3. **Global Applicability with Contextual Flexibility:** Coverage across 23 farming systems demonstrates the platform's relevance for diverse agro-ecological and socio-economic contexts. The modular architecture allows future expansion, including incorporation of participatory data collection and region-specific adaptation knowledge.

Two main limitations should be acknowledged. First, reliance on existing literature may underrepresent locally specific vulnerabilities or informal adaptation practices not captured in peer-reviewed sources [10]. Second, the current version focuses on early-stage qualitative screening; future integration with quantitative risk and economic analyses would further enhance decision-making relevance.

Moreover, the compilation of each Impact Chain required substantial expert effort, with an average of four revision cycles over the 22-month period. Future expansion to additional farming systems will therefore require dedicated resources for literature review, expert engagement and validation

Future development will address these gaps by incorporating participatory validation workshops, expanding geographic coverage, and linking CRISP to complementary tools for climate risk assessment. These improvements will support more nuanced, context-sensitive adaptation planning and broaden the platform's utility across scales and sectors.

Conclusion

This study introduced the Climate Risk Planning and Managing Tool (CRISP), an open-access web-based platform designed to facilitate the systematic integration of climate risk considerations into agricultural development planning. By structuring expert knowledge into standardised Impact Chains and embedding this information within a semantic, interactive framework, CRISP enables users to visualise, query and interpret complex climate risk pathways across 23 farming systems worldwide.

The platform's modular architecture, ontology-driven knowledge representation, and integrated resource repository collectively enhance the accessibility and usability of climate risk information. These features support evidence-based decision-making at early project design stages, particularly in contexts where technical capacity or locally available data may be limited.

Looking ahead, future development will focus on three priorities:

1. **Geographic and Thematic Expansion**: Incorporating additional farming systems, climate Hazards, and Adaptation Measures to broaden applicability.
2. **Participatory Validation**: Integrating local knowledge through stakeholder workshops to complement literature-based evidence and improve contextual relevance.
3. **Enhanced Analytical Capabilities**: Linking CRISP to quantitative risk assessment tools and economic analyses to inform more detailed adaptation planning.

By bridging the gap between high-level climate risk concepts and practical decision-support needs, CRISP represents a scalable, adaptable tool for strengthening climate resilience in the agricultural sector.

Supporting information

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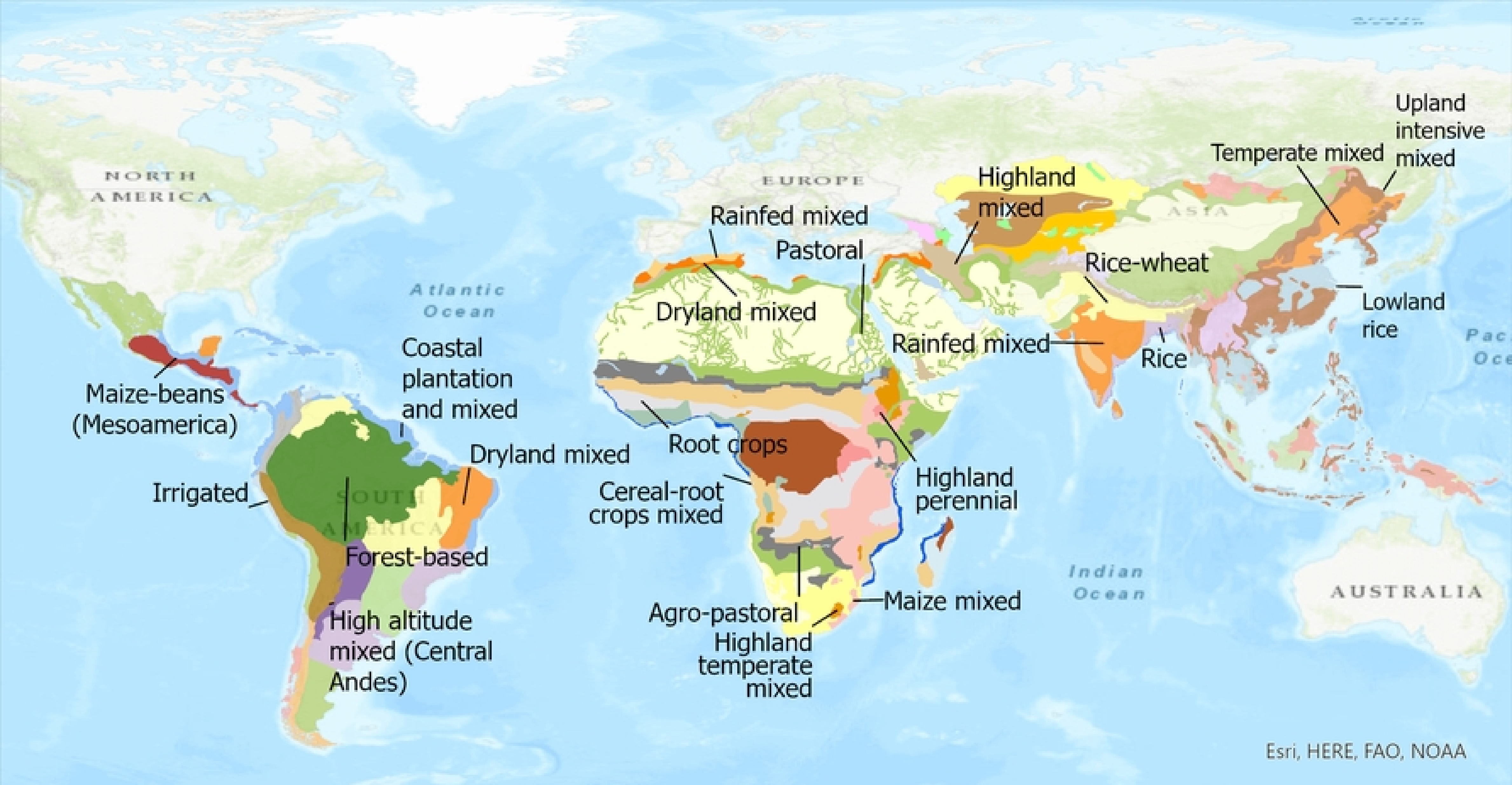
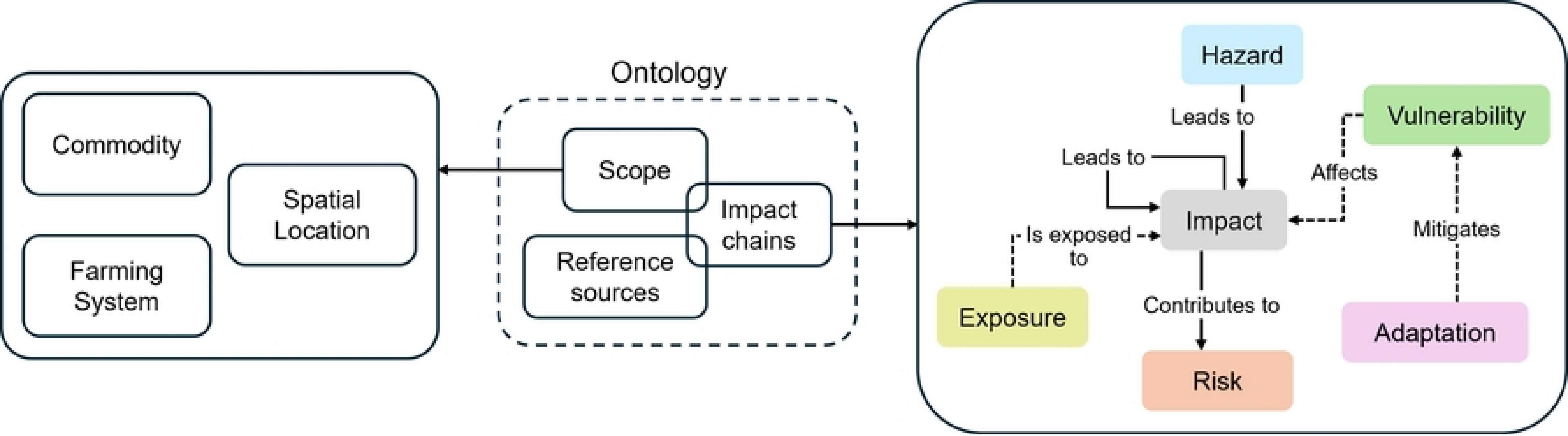

NORTH AMERICA
EUROPE
ASIA
Atlantic Ocean
Indian Ocean
AUSTRALIA
SOUTH AMERICA
Maize-beans (Mesoamerica)
Coastal plantation and mixed
Dryland mixed
Irrigated
Forest-based
High altitude mixed (Central Andes)
Rainfed mixed
Pastoral
Dryland mixed
Root crops
Cereal-root crops mixed
Agro-pastoral
Highland temperate mixed
Maize mixed
Highland perennial
Highland mixed
Rainfed mixed
Rice-wheat
Rice
Temperate mixed
Upland intensive mixed
Lowland rice
Esri, HERE, FAO, NOAA

Figure 1



Commodity
Spatial Location
Farming System
Ontology
Scope
Impact chains
Reference sources
Hazard
Leads to
Vulnerability
Leads to
Affects
Impact
Is exposed to
Mitigates
Exposure
Contributes to
Adaptation
Risk

Figure 2

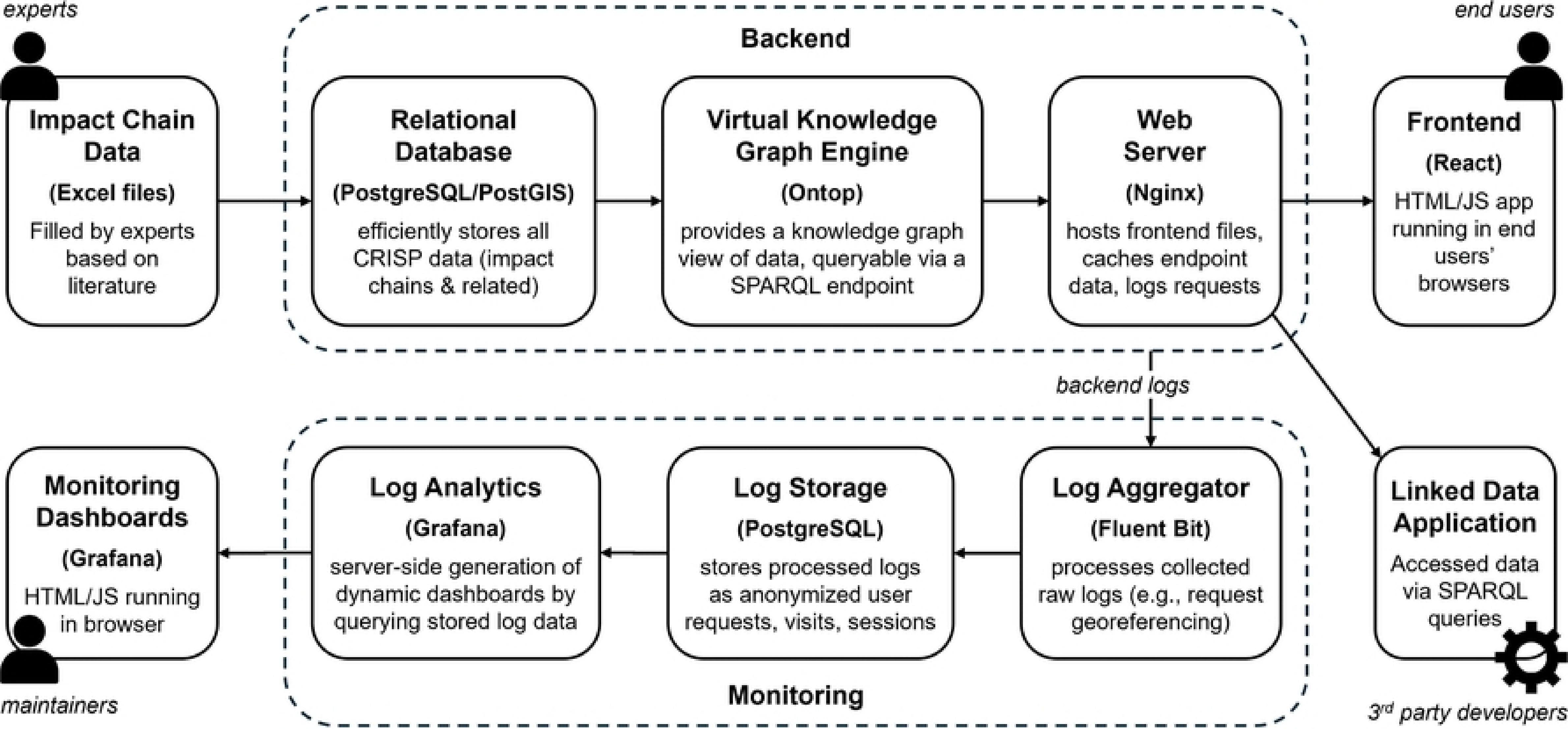
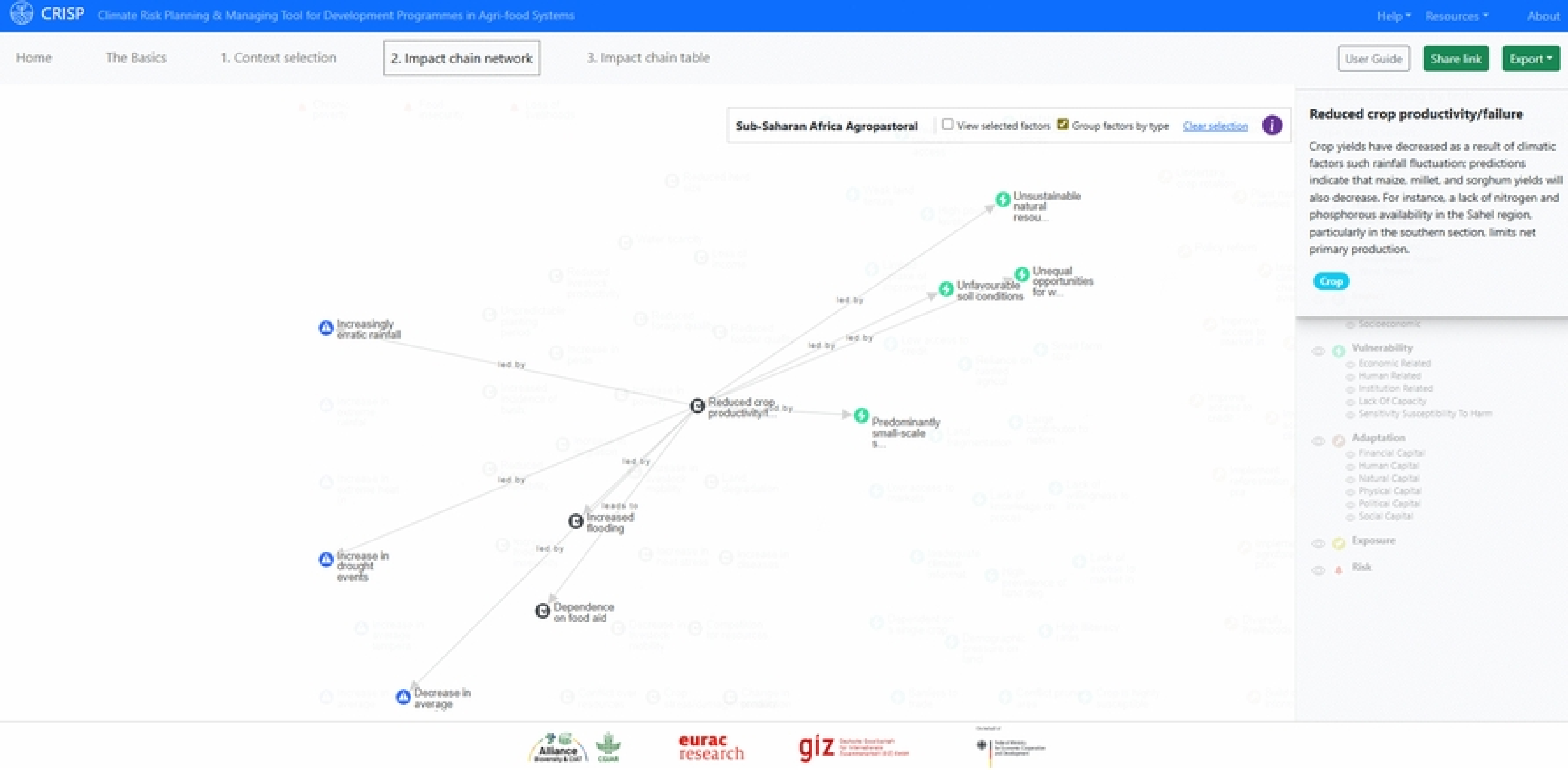

experts
end users
Backend
Impact Chain Data
(Excel files)
Filled by experts based on literature
Relational Database
(PostgreSQL/PostGIS)
efficiently stores all CRISP data (impact chains & related)
Virtual Knowledge Graph Engine
(Ontop)
provides a knowledge graph view of data, queryable via a SPARQL endpoint
Web Server
(Nginx)
hosts frontend files, caches endpoint data, logs requests
Frontend
(React)
HTML/JS app running in end users' browsers
backend logs
Monitoring Dashboards
(Grafana)
HTML/JS running in browser
Log Analytics
(Grafana)
server-side generation of dynamic dashboards by querying stored log data
Log Storage
(PostgreSQL)
stores processed logs as anonymized user requests, visits, sessions
Log Aggregator
(Fluent Bit)
processes collected raw logs (e.g., request georeferencing)
Linked Data Application
Accessed data via SPARQL queries
maintainers
Monitoring
3rd party developers

Figure 3



CRISP
Climate Risk Planning & Managing Tool for Development Programmes in Agri-food Systems
Help
Resources
About
Home
The Basics
1. Context selection
2. Impact chain network
3. Impact chain table
User Guide
Share link
Export
Sub-Saharan Africa Agropastoral
View selected factors
Group factors by type
Clear selection
Reduced crop productivity/failure
Crop yields have decreased as a result of climatic factors such rainfall fluctuation; predictions indicate that maize, millet, and sorghum yields will also decrease. For instance, a lack of nitrogen and phosphorous availability in the Sahel region, particularly in the southern section, limits net primary production.
Crop
Unsustainable natural resou...
Unequal opportunities for w...
Unfavourable soil conditions
Increasingly erratic rainfall
Reduced crop productivity/f...
Predominantly small-scale s...
Increased flooding
Increase in drought events
Dependence on food aid
Decrease in average
led by
leads to
Vulnerability
Economic Related
Human Related
Institution Related
Lack Of Capacity
Sensitivity Susceptibility To Harm
Adaptation
Financial Capital
Human Capital
Natural Capital
Physical Capital
Political Capital
Social Capital
Exposure
Risk
eurac research
giz

Figure 4

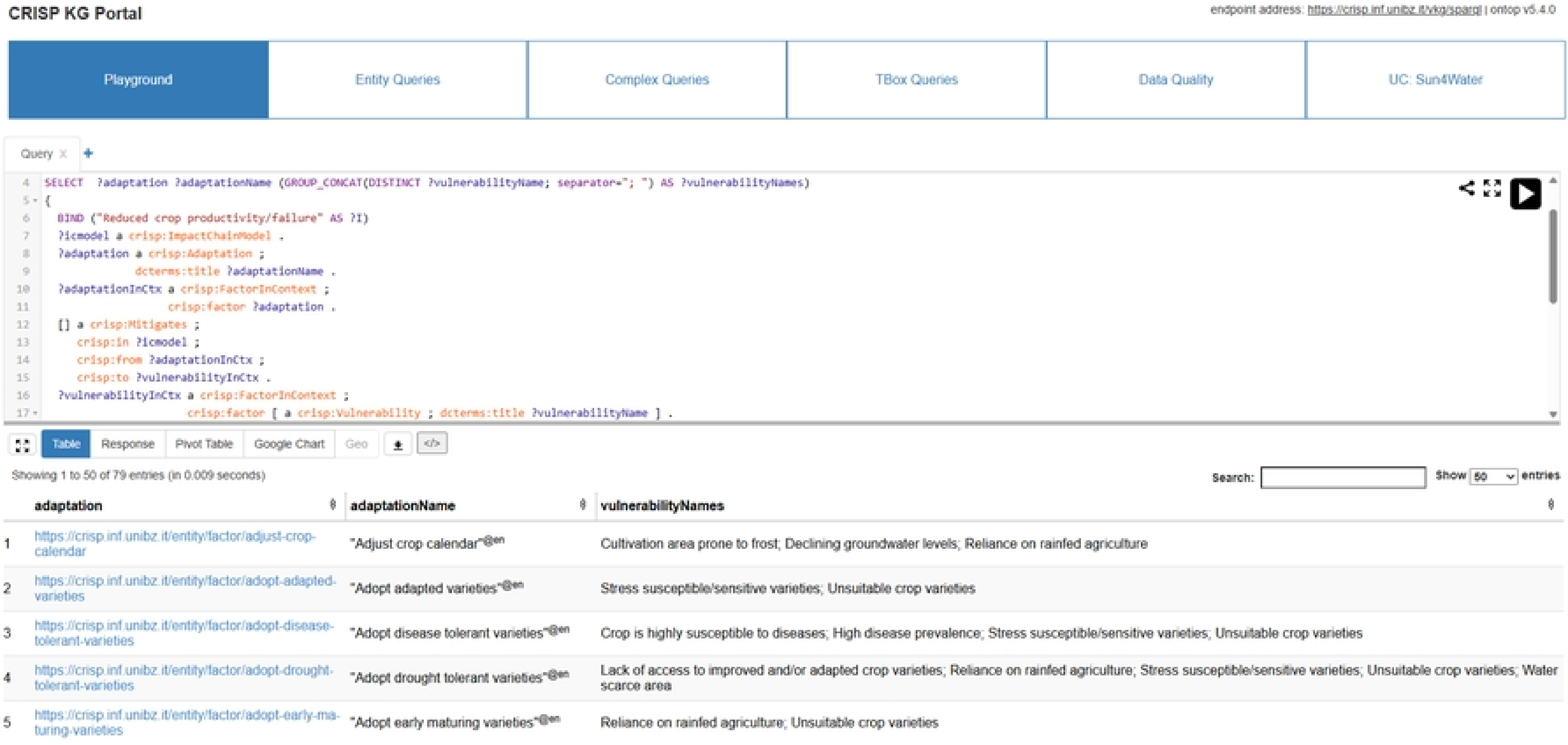

CRISP KG Portal
endpoint address: https://crisp.inf.unibz.it/vkg/sparql | ontop v5.4.0
Playground
Entity Queries
Complex Queries
TBox Queries
Data Quality
UC: Sun4Water
Query
SELECT ?adaptation ?adaptationName (GROUP_CONCAT(DISTINCT ?vulnerabilityName; separator="; ") AS ?vulnerabilityNames)
{
BIND ("Reduced crop productivity/failure" AS ?I)
?icmodel a crisp:ImpactChainModel .
?adaptation a crisp:Adaptation ;
dcterms:title ?adaptationName .
?adaptationInCtx a crisp:FactorInContext ;
crisp:factor ?adaptation .
[] a crisp:Mitigates ;
crisp:in ?icmodel ;
crisp:from ?adaptationInCtx ;
crisp:to ?vulnerabilityInCtx .
?vulnerabilityInCtx a crisp:FactorInContext ;
crisp:factor [a crisp:Vulnerability ; dcterms:title ?vulnerabilityName] .
Table
Response
Pivot Table
Google Chart
Geo
Showing 1 to 50 of 79 entries (in 0.009 seconds)
Search:
Show 50 entries
adaptation
adaptationName
vulnerabilityNames
1 https://crisp.inf.unibz.it/entity/factor/adjust-crop-calendar "Adjust crop calendar"@en Cultivation area prone to frost; Declining groundwater levels; Reliance on rainfed agriculture
2 https://crisp.inf.unibz.it/entity/factor/adopt-adapted-varieties "Adopt adapted varieties"@en Stress susceptible/sensitive varieties; Unsuitable crop varieties
3 https://crisp.inf.unibz.it/entity/factor/adopt-disease-tolerant-varieties "Adopt disease tolerant varieties"@en Crop is highly susceptible to diseases; High disease prevalence; Stress susceptible/sensitive varieties; Unsuitable crop varieties
4 https://crisp.inf.unibz.it/entity/factor/adopt-drought-tolerant-varieties "Adopt drought tolerant varieties"@en Lack of access to improved and/or adapted crop varieties; Reliance on rainfed agriculture; Stress susceptible/sensitive varieties; Unsuitable crop varieties; Water scarce area
5 https://crisp.inf.unibz.it/entity/factor/adopt-early-maturing-varieties "Adopt early maturing varieties"@en Reliance on rainfed agriculture; Unsuitable crop varieties

Figure 5