Transforming knowledge management for climate action – a road map for accelerated discovery and learning

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Where it all started

Climate change adaptation planning, research and practice.

weADAPT is a collaborative platform on climate change adaptation issues. It allows practitioners, researchers and policy-makers to access credible, high-quality information and connect with one another.

PROVIA Guidance on Assessing Vulnerability, Impacts and Adaptation to Climate Change

CONSULTATION DOCUMENT
Adaptation task
Vulnerability indication

http://www.mediation-project.eu/platform/

You are here: Home / ATN / Appraising vulnerability and impacts / Impacts or capacity / Impact analysis

Vulnerability indication
Vulnerability indication approaches attempt to say something about possible future impacts based on data collected on the current state of the exposure unit, often combined with social system variables representing capacity.

Vulnerability indication approaches face the challenge that the aggregation of indicating variables into a vulnerability index can hardly be supported by theory nor can the results be validated empirically (Hinkel 2011a). Due to the lack of theory, some approaches seek to validate through data generated in interviews and focus groups against the "narratives" of vulnerability present in the literature (e.g. Mustafa et al. 2008). Other approaches use expert judgement, but different experts usually rank dimensions differently (Brooks and Adger 2005). Nonetheless, current work on developing and improving vulnerability indicators to address these issues is ongoing (see e.g. Regions 2020, ClimWatAdapt Project and ESPON project). The difference between impact attribution and vulnerability indication approaches is that the former require data on observed impacts while the latter are only applied in the absence of such data.
The PLACARD project

PLAtform for Climate Adaptation and Risk reDuction

https://www.placard-network.eu/
Who is in the room?

PLACARD IKM Webinar - Collaborative Notes

Participant introductions

Notes:

(1) name, (2) job role, (3) country, (4) your interest in IKM?

Multiple ways to engage

User testing and evaluation of the Connectivity Hub (1) name, (2) sector.
**What we’ll be discussing**

- Key IKM challenges and user needs
- How a *shared* taxonomy can help
- The bigger picture: how this sets the stage for smarter IKM and AI
- A **collaborative** roadmap for getting there

**Objectives**

- To discuss this vision and ways forward
  - What do you think? Did we miss something? What is needed?
- Galvanise support
  - Who wants to work on this?
  - How can we move forward together?
• **Voluminous data** - difficult to explore, organize and analyse vast amounts of data, particularly if there is a lack of structure or a common format or standard.

• **Fragmentation of information** - Knowledge is scattered across multiple platforms, data portals, and websites, though objectives may be similar.

• **Disparate terminologies** - Communities each have their own terminologies which are often discordant.
  – They often use different terms to mean the same or similar things.
  – Results in inconsistency in the way related content is described or understood.
What users need

Users want:

- **enhanced discovery and searchability**, in particular to quickly find related content such as project descriptions, outputs and implementing teams, and to filter and cluster search results according to certain attributes;

- **fewer entry points** between regional, national and international platforms so that they can find content from among platforms rather than searching each site individually;

- **dynamic, responsive systems** that help them find relevant knowledge, for example through automated alerts of new, relevant content, user help desks, and expert request services (automated or not);

- **clarity on language / terminology**
What is a taxonomy?

- Structured set of terms that together describe a topic area
- Provide an overview of the vocabulary used in that subject area, and how terms related to each other
- Can add metadata to terms, e.g. definitions, related terms, notes on term usage (scope notes) and how this has changed
Components of a taxonomy

Term / Concept
Definition
supports understanding
Tagged content
Related Terms / Concepts
useful connections
Tagged content
Components of a taxonomy

disaster

Preferred Label
- disaster

Alternative Labels
- disasters
- emergency

Hidden Labels

Notation

Scope Notes
- UNDRR Annotation: The effect of the disaster can be immediate and localized, but is often widespread and could last for a long period of time. The effect may be local or exceed the capacity of a community or society to cope using its own resources, and therefore may require assistance from external sources, which could include neighbouring jurisdictions, or those at the national or international levels.
- UNDRR: Emergency is sometimes used interchangeably with the term disaster, as, for example, in the context of biological and technological hazards or health emergencies, which, however, can also relate to hazardous events that do not result in the serious disruption of the functioning of a community or society.

Example

Definitions
- UNDRR (2017): A serious disruption of the functioning of a community or a society at any scale due to hazardous events interacting with conditions of exposure, vulnerability and capacity, leading to one or more of the following: human, material, economic and environmental losses and impacts.
How can foresight help to reduce vulnerability to climate-related hazards?

Introduction

The UK Climate Change Risk Assessment 2017 (UKCCRA) policy statement highlights how together - combining approaches to future thinking with strategic analysis - can support the integrated planning of climate change adaptation (CCA) and disaster risk reduction (DRR).

Foresee can be defined as a horizon-scanning approach to help decision-makers explore and prepare for a range of possible futures, consider their implications and shape those futures.

Foresight typically involves systematic and participatory intelligence gathering, and medium- to long-term scenario-building processes to uncover a range of alternative future ideas. For more background on this, see UKCCRA (2017, 2018).

A foresight approach can be a range of methods, tools and formats with a high degree of participation and stakeholder engagement, steering futures developments and integrating into today’s decision-making. For more background on that, see APC (2018).

Elements of foreign science, policy and practice can strengthen CCA and DRR, but with international mechanisms such as the Sustainable Development Goals (SDGs) and the implementation of the global agreements (Paris and Sendai for Europe), national and local action.

Download the full report from the UKCCRA website.

What are the barriers to using foresight in CCA and DRR?
Current issues

- Platforms and websites typically use their own, separate vocabulary or taxonomy
- These taxonomies are not interconnected, they only work within the platform/website
- They use different variations of terms - synonyms
- Few of these taxonomies contain metadata that incorporates definitions and scope notes

Issues we face:
- Voluminous data
- Fragmentation of information
- Disparate terminologies

What users want:
- enhanced discovery and searchability
- fewer entry points
- more clarity on language/terminology

ROADMAP

Shared taxonomy for content tagging
- contains and harmonises all the terms in use to enable linking of relevant content across platforms
- provides metadata that supports understanding
How shared taxonomies help link information & knowledge: the Connectivity Hub
Welcome to the Connectivity Hub, a new "search and discovery" tool that helps users find relevant knowledge and organizations working on climate change adaptation (CCA) and disaster risk reduction (DRR) issues. The Connectivity Hub is a testbed for the use of artificial intelligence (AI) and machine learning to produce new, policy-relevant insights. Read more...

Search

Start typing

Popular searches

flood  infrastructure  vulnerability
migration  health  agriculture

http://connectivity-hub.placard-network.eu
Turning data into knowledge

Keyword:

nature based solutions

Alternate name: Nature-based approaches

Have you also considered?

- ecosystem-based adaptation
- ecosystem services

Actions to protect, sustainably manage and restore natural or modified ecosystems that address societal challenges effectively and adaptively, simultaneously providing human well-being and biodiversity benefits. (Definition adopted at 2016 IUCN World Conservation Congress).

Solutions that are inspired and supported by nature, which are cost-effective, simultaneously provide environmental, social and economic benefits and help build resilience. Such solutions bring more, and more diverse, nature and natural features and processes into cities, landscapes and seascapes, through locally adapted, resource-efficient and systemic interventions. (Towards an EU Research and Innovation Policy Agenda for Nature-based Solutions & Re-naturing Cities - Final Report of the Horizon 2020 Expert Group, European Commission, 2015).

Actions that work with and enhance nature so as to help people adapt to change and disasters. (Nature-based Solutions Initiative).

Scope notes:
‘Nature-Based Solutions’ (NBS), is a relatively new concept introduced specifically to promote nature as a means for providing solutions to climate mitigation and adaptation challenges (Cohen-Schacham et al., 2016, IUCN, 2012). Within Europe, policy-makers have integrated the concept into their current framework programme for research and innovation, ‘Horizon 2020’, providing a new narrative involving biodiversity and ecosystem services aligned with goals of innovation for growth and job creation (European Commission, 2015), and with
Harmonising language

Alternate name: Nature-based solutions

Have you also considered?

- ecosystem-based adaptation
- ecosystem services

Actions to protect, sustainably manage and restore natural or modified ecosystems that address societal challenges effectively and efficiently. Some examples include, but are not limited to, (1) provisioning services such as food or fibre, (2) regulating services such as climate regulation or carbon sequestration, and (3) cultural services such as tourism or spiritual and aesthetic appreciation. (IPCC AR5, WG II Glossary of terms, 2014).

Ecosystem services:

Definitions:
Ecological processes or functions having monetary or non-monetary value to individuals or society at large. These are frequently classified as (1) supporting services such as productivity or biodiversity maintenance, (2) provisioning services such as food or fibre, (3) regulating services such as climate regulation or carbon sequestration, and (4) cultural services such as tourism or spiritual and aesthetic appreciation. (IPCC AR5, WG II Glossary of terms, 2014).

Explore this resource


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Climate Tagger

TURNING DATA INTO KNOWLEDGE
The Hub is an example of what can be achieved by the implementation of a shared taxonomy across multiple platforms and websites.

The Climate Tagger is an example of how such a taxonomy can be implemented, and how technology can help support standardisation.

This is a powerful way of connecting content and promoting understanding:

- It enables us to connect - and find - related content.
- It allows us to analyse the climate action landscape and connections between content: who is doing what and where, what topics/fields are emerging, how issues and approaches are evolving.
- Combined with APIs, this better enables content sharing between platforms.
- Metadata, metadata, metadata...

What is needed:

- Standards for implementation
- Protocols for updating the taxonomy

ROADMAP

- Standards for how tags are applied
- Protocols and governance
Towards Linked, FAIR Data

Linked Data:
❖ Creating an environment of structured and interlinked information that enables powerful searches, such as semantic queries.
❖ The basis of a “Web of Data” (a.k.a. the Semantic Web), wherein all the content across the Web is described and connected to produce a global database.
Requires publication of data in common, standard formats to ensure machine readability and access.

https://www.w3.org/standards/semanticweb/data
https://www.w3.org/DesignIssues/LinkedData.html

“With linked data, when you have some of it, you can find other, related, data”
-- Tim Berners-Lee

© Tim Berners-Lee

Standards in support of Linked Data

ROADMAP
Towards Linked, FAIR Data

FAIR Data: data (content) that is, findable, accessible, interoperable, and reusable.

**Findability:** data and supplementary materials have sufficiently rich metadata and a unique and persistent identifier.

**Accessibility:** metadata and data are understandable to humans and machines. Data is deposited in a trusted repository.

**Interoperability:** metadata use a formal, accessible, shared and broadly applicable language for knowledge representation.

**Reusability:** data and collections have a clear usage license and provide accurate information and provenance.

https://www.nature.com/articles/sdata201618
https://www.go-fair.org/fair-principles/
Beyond taxonomy: Adding value with ontologies

Taxonomy provides a foundation for powerful IKM:
- Basis for keyword tagging, to link related content
- Metadata for supporting understanding
- Related terms for suggesting content

Ontologies add semantic information that provides additional contextual knowledge:
- **attribute characteristics** to a term
  - E.g. designate methods and approaches as “participatory”
- **classify terms** as a particular type of entity
  - E.g. “multi-criteria analysis” is a “decision-support method”
- **describe relationships** between terms
  - E.g. “community-based adaptation” promotes “sustainable livelihoods”
Beyond taxonomy: Adding value with ontologies

Ontologies:

• Allow for various **additional classifications** and defining **multiple relationships** among terms, beyond the simple tree structure of the taxonomy.
• Are a powerful method for deriving **tacit and implicit knowledge** regarding how terms are used and applied.

Most importantly, **ontologies make semantic information explicit** for machines - provide the additional **contextual knowledge** that lays the way for **machines to think more like us**.

Driving infrastructure:

→ ‘smart’ decision-support tools
→ intelligent content recommendation

ROADMAP

**A common ontology framework** for adding semantic information; that outlines the classifications and relationships needed to support enhanced IKM.
Taking IKM to the next level with knowledge graphs

Shared taxonomy
Common ontology
Standardised implementation

The end goal of the roadmap
⇒ a climate action knowledge graph
Knowledge graphs in action

Knowledge graphs are everywhere… Alexa, Siri, Google…
Leveraging the power of AI

Knowledge graphs can power AI applications: They provide the holistic, sophisticated view of their knowledge domains that enables machines to make connections that are intuitive to us. This can support:

❖ Innovative approaches to integrating and communicating knowledge that enhance collaboration and learning
❖ Dynamic, responsive knowledge systems and decision-support tools
❖ New levels of data analysis

https://www.poolparty.biz/events/climate-change-action-through-artificial-intelligence-putting-knowledge-graphs-to-work

Climate Change Action Through Artificial Intelligence: Putting Knowledge Graphs to Work

July 1, 2020 | Webinar | 5:00 pm - 6:00 pm CEST

SAVE THE DATE: 01 July 2020 - 5 pm to 6 pm CEST.

https://www.poolparty.biz/events/climate-change-action-through-artificial-intelligence-putting-knowledge-graphs-to-work
A road map for transforming IKM

❖ Six concrete steps that knowledge and platform managers can take now.

❖ Sixteen steps for the medium and long terms.
The ideas behind the roadmap

A collaborative, pragmatic process that:

- People/groups can join in at different stages, and progress at different speeds
- Enables contributions at different scales
- Recognises and makes use of work to date - helps to connect and give visibility to the many taxonomies and ontologies already available
- Is achievable - it builds on and makes use of existing standards, protocols, technologies and thinking

At its core:

- COLLABORATION
- Equitable visibility and accessibility
- Inclusion of different initiatives, focus areas
- Focus on meeting user needs
The detail - a team effort!

Steps are **led by actor groups**; **addressed as a community**; or undertaken by a **combination of the two**.

**Not a linear process** - activities can be undertaken in parallel and iteratively.

1. Collate and evaluate existing taxonomies and ontologies in relevant focus areas (topic, sector, policy framework).

2. Collate all the different data, knowledge and information types that the shared taxonomy and ontology need to describe and relate.

3. Conduct interviews and hold workshops with stakeholders to further explore the nature of content, terminologies and users’ information and knowledge needs, including the design of IKM systems and knowledge integration.

4. Share, discuss and use outputs from steps 1-3 to explore significant overlaps in terminology and to establish components of a common ontology.
5. Specify a set of (prioritised) core IKM activities that taxonomies, a common ontology, and the resulting overarching knowledge graph should support.

6. Agree on standards for quality assurance, metadata, and governance of the taxonomies, common ontology, and knowledge graph, and make key decisions about their licensing and publishing.

7. Agree on standards for the implementation and use of the shared taxonomies and common ontology to connect relevant content across websites, enable accurate clustering of knowledge for different decision-making contexts and ensure the linked data content pool is of sufficient quality to be useful to users.

8. Develop a governance model that specifies how future changes and enrichments of taxonomies, common ontology and resulting knowledge graph will take place.

9. Develop a common ontology framework to attribute characteristics to terms and describe the relationships between terms.
10. Develop the focus area taxonomies and ontologies based on existing taxonomies and ontologies and their overlaps, the common ontology framework, the terminology used in that area, the content types that need to be described and the needs of stakeholders.

11. Enrich and expand the taxonomies and ontologies through text analysis of documents, websites, and other content to identify new terms for integrating into the taxonomy.

12. Add metadata to the focus area taxonomies to provide a rich base of information on the terms, including definitions and how they are used in different contexts.

13. Analyse overlaps and, where appropriate, link the focus area taxonomies and ontologies to produce an integrated, shared climate action taxonomy and ontology.
14. Implement the integrated taxonomy and ontology in knowledge management systems to produce a knowledge graph of climate action.

15. Continue to enrich and expand the taxonomies, ontologies, and resulting overarching knowledge graph.

16. Regularly test and evaluate the taxonomies, ontologies, and resulting knowledge graph and explore their potential to better support users, including through AI approaches and the development of “smart”, responsive IKM systems.
1. Follow existing good practice principles and standards where possible.

2. Sharing existing taxonomies and ontologies (both formal and informal)

3. Engaging experts to validate and improve taxonomies

4. Adopting and implementing shared taxonomies and ontologies within their websites to tag content with relevant key terms.

5. Developing application programming interfaces (APIs) to support interoperability and content sharing across websites.

6. Promoting awareness of the added value and importance of IKM within and across institutions in supporting knowledge uptake, informing decisions, and enabling powerful analysis using AI approaches.
To achieve the promise offered by IKM requires a shift in thinking about how to approach and undertake IKM. It also requires:

- Widespread **awareness of the value of IKM**, both *within* and *across* institutions.
- **Leadership** from major actors to elevate and progress the agenda.
- **Increased investment** in IKM to build capacity and IKM literacy.
- **Collaboration** on the development and uptake of authoritative, shared taxonomies and ontologies.
- Development and widespread adoption of **IKM standards**.
- Creation of a **governance model** that allows for ongoing evolution.
Success case: AGROVOC

### AGROVOC Multilingual Thesaurus

**entities > policies > environmental policies > climate change adaptation**

<table>
<thead>
<tr>
<th>PREFERRED TERM</th>
<th>climate change adaptation</th>
</tr>
</thead>
<tbody>
<tr>
<td>BROADER CONCEPT</td>
<td>environmental policies (en)</td>
</tr>
<tr>
<td>RELATED CONCEPTS</td>
<td>climate change (en)</td>
</tr>
<tr>
<td>IN OTHER LANGUAGES</td>
<td>Arabic</td>
</tr>
<tr>
<td>1</td>
<td>التكيف مع تغير المناخ</td>
</tr>
</tbody>
</table>

**URI**

http://aims.fao.org/aos/agrovoc/c_1374567058134

**Download this concept:**

RDF/XML TURTLE JSON-LD

Created 7/23/13, last modified 8/29/18
Let’s discuss...

- Do you see the need for linking relevant data across platforms/websites?
- What are the barriers?
- What are the other potential benefits?
  - e.g. building a taxonomy provides opportunity for really thinking what we mean by/how we think about certain terms, e.g. resilience)
- What we can be doing to promote IKM/gain buy-in?
- Where do people want to see this go?
- What taxonomies are already out there?
- How much interoperability is there already?
- What are the barriers to contributing to a linked dataset?
- Are there good examples already out there?
Ways to engage

1. User testing and evaluation of the Connectivity Hub

2. Join specialist working groups on taxonomy development specialist area of interest e.g. EbA, health etc.

3. Join a mailing list / discussion forum on how to transform knowledge management and to explore new funding opportunities, in line with the roadmap

Please let us know how you would like to engage

See Collaborative Notes document
Next webinar

Climate change action through artificial intelligence: putting knowledge graphs to work

Wed 01 July 2020 17:00 - 18:00 (CET)
SEI, SWC, REEEP

Please check the PLACARD website for further details: www.placard-network.eu