

skim

**Strengthening Knowledge Management
for Greater Development Effectiveness
in the Near East, North Africa,
Central Asia and Europe**



**Central Asia
CLIMATE PORTAL**

Leveraging Semantic Analysis for Faster and Better Systematic Maps and Reviews

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16th February 2021, International Center for Agricultural Research in the Dry Areas (ICARDA)



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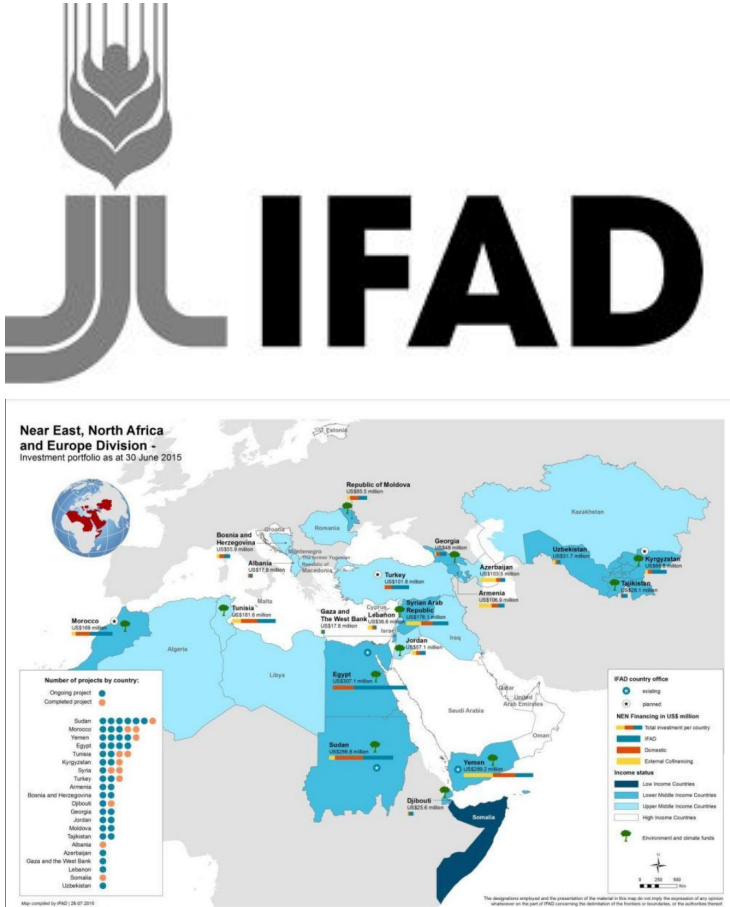
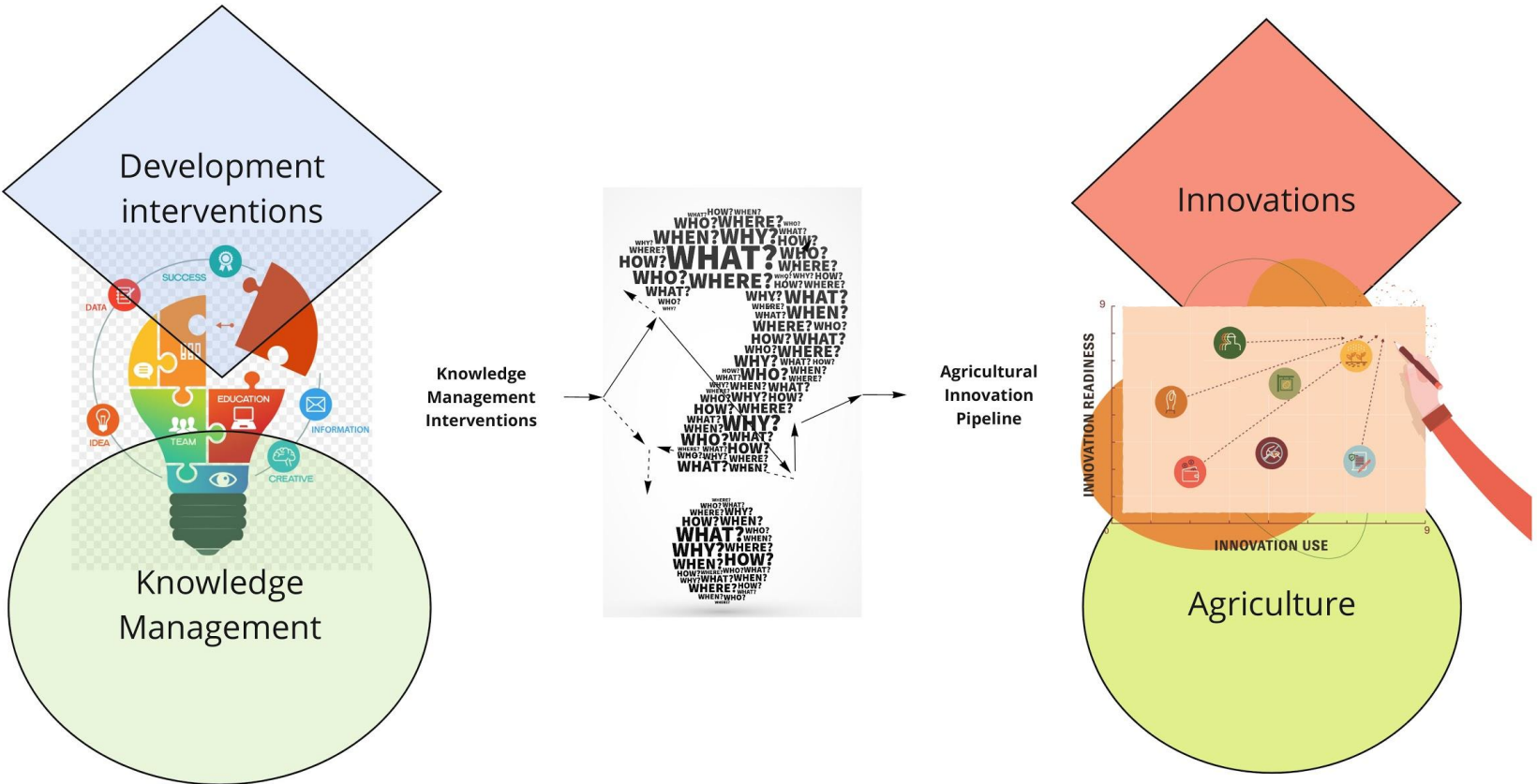


Overview

1. What are Systematic Reviews and Maps?
 - Create knowledge from data and text
 - Support decisions
 - Create learning for the reviewer team and key stakeholders
2. What is Semantic Analysis?
 - Finding meaning from language structures and objects
 - Documents, sections, paragraphs, sentences, words and their combinations
3. A Few Challenges in Human Only Systematic Maps and Reviews
 - Process challenges (Takes time, not scalable, difficult to replicate, insufficient documentation of the learning)
 - Content challenges (Too many publications, overlapping databases, multiple versions, mainstreamed “strategic cloaking”)
 - Political challenges (Dominant industry interest and funding, resistance to science (covid 19, climate change))
4. A Hybrid Approach to Conducting Systematic Maps and Reviews
 - Combining Lexical Database with Expert Pooled Evidence Dictionaries for Queries
 - Metadata Curation Using Academic Reference Management Tools
 - Combining Computer Mapping with Human Audit
 - A Realist Approach Using Computer Aided Evidence Prioritization

A Case Example from SKiM: What Works in Improving Knowledge Management Systems in Low and Middle Income Countries?

Case Study: Knowledge Management



A Hybrid Approach to Conducting Systematic Maps and Reviews

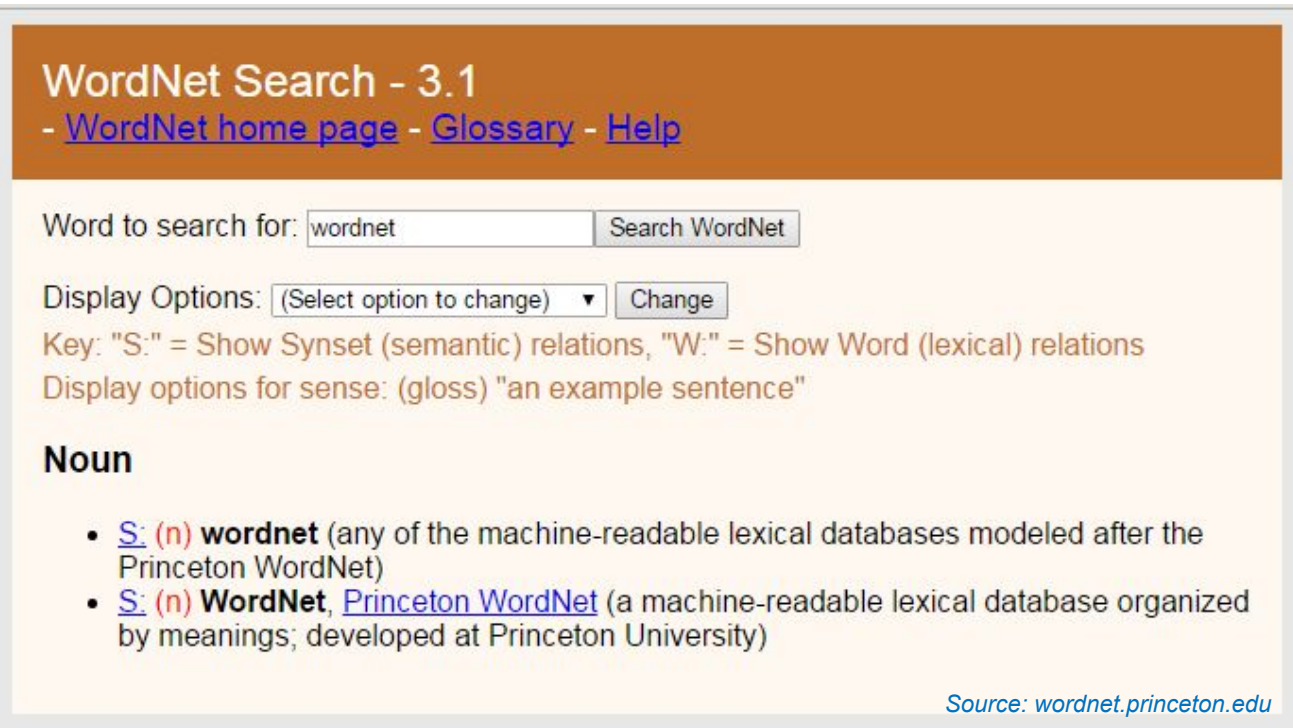
Dictionary + : Combining Lexical Database with Expert Pooled Evidence Dictionaries for Queries



AGROVOC is a controlled vocabulary covering all areas of interest of the Food and Agriculture Organization (FAO) of the United Nations, including food, nutrition, agriculture, fisheries, forestry, environment etc. It is published by FAO and edited by a community of experts.

Source: FAO.org

AGROVOC is a multilingual controlled vocabulary covering all areas of interest to the Food and Agriculture Organization of the United Nations (FAO), including food, nutrition, agriculture, fisheries, forestry and the environment. The vocabulary consists of over 35,000 concepts with up to 671,000 terms in different languages. It is a collaborative effort, edited by a community of experts and coordinated by FAO. (Wikipedia)






WordNet is a lexical database of semantic relations between words in more than 200 languages. WordNet links words into semantic relations including synonyms, hyponyms, and meronyms. The synonyms are grouped into synsets with short definitions and usage examples. WordNet can thus be seen as a combination and extension of a dictionary and thesaurus (Wikipedia)

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But lexica are not sufficient alone !!!
All systematic reviews and maps have
unique elements
Until artificial intelligence software are
good enough, the best we have is
human brain

	Computing wins	<ul style="list-style-type: none">• Input and output• Information processing and memory
	Closely matched	<ul style="list-style-type: none">• Complex movement• Vision• Language• Structured problem solving
	Brain still wins	<ul style="list-style-type: none">• Creativity• Emotion and Empathy• Planning and Executive Function• Consciousness

Source: [becominghuman.ai](#)

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1. Create a dictionary from speciality lexicon (Agrovoc)
2. Update the dictionary with filling the gaps in the speciality lexicon with general lexicon (Wordnet)
3. Collect evidence related to the map or review content from a set of (randomly sourced) experts
4. Analyze the evidence set to identify most common and central words and phrases
5. Update the dictionary with the vocabulary from the evidence set
6. Convert it into query

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Root

Knowledge

Knowledge activities - EXPERT

Knowledge objects - EXPERT

Knowledge types - EXPERT

Context

Spatial context

Country - WORDNET

Countries - AGROVOC

India

Bangladesh

Nepal

Region

South Asia

Continent

Rurality

Other

Recreational areas - AGROVOC

Scales

Ecological

Climatic zones - AGROVOC

Protected areas

Entities - Soil Types - AGROVOC

Anthropogenic soils

Chemical soil types

Climatic soil types

Cultural soil types

Ecological soil types

Genetic soil types

World Reference Base soil types

Lithological soil types

Mineralogical soils

Palaesolic soil types

Physiographic soil types

Structural soil types

Textural soil types

Administrative

Sites - AGROVOC

Physiographic features - AGROVOC

Inland waters - AGROVOC - TO BE FILLED

International waters - AGROVOC - TO BE FILLED

Land cover - AGROVOC - TO BE FILLED

Landforms - AGROVOC

Marine areas - AGROVOC - TO BE FILLED

Ponds - AGROVOC

Wetlands - AGROVOC

Soil morphological features

Temporal context

Year

Search items	Whole word	Case sensitivity	Starting letters
ecological soil	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
bog soil	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
forest soils	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
grassland soil	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
heathland soil	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
marshland soil	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
prairie soil	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
rangeland soil	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
scrubland soil	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
swamp soil	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
virgin soil	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
wetland soil	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Name	Owner	Last modified	File size
20200408 - Scaling Readiness 2nd R...	me	Apr 12, 2020 me	596 KB
Bello 2014 Ag. Extension in Suda...	Akmal Akramkhanov	Apr 13, 2020 Akmal Akramkhanov	791 KB
Edelenbos et al. 2010 Interfaces ...	Akmal Akramkhanov	Apr 13, 2020 Akmal Akramkhanov	300 KB
Hagman and Gilman 2017	me	Apr 12, 2020 me	936 KB
IFAD 2014 Lessons learned on S...	Akmal Akramkhanov	Apr 13, 2020 Akmal Akramkhanov	450 KB
IFAD 2014 Practitioner's guide - L...	Akmal Akramkhanov	Apr 13, 2020 Akmal Akramkhanov	6 MB
IFAD 2016 Approach for SSTC E...	Akmal Akramkhanov	Apr 13, 2020 Akmal Akramkhanov	311 KB
IFAD 2016 Approach Paper Evala...	Akmal Akramkhanov	Apr 13, 2020 Akmal Akramkhanov	560 KB
IFAD 2017 Approach Paper Impa...	Akmal Akramkhanov	Apr 13, 2020 Akmal Akramkhanov	1 MB
IFAD 2018 Approach Paper PPE ...	Akmal Akramkhanov	Apr 13, 2020 Akmal Akramkhanov	756 KB
Iwein et al. 2018 Knowledge refo...	Akmal Akramkhanov	Apr 13, 2020 Akmal Akramkhanov	834 KB
kileu2011.pdf	Emilie Vansant	Apr 16, 2020 Emilie Vansant	210 KB
KM4DJ2221-37.pdf	Emilie Vansant	Apr 16, 2020 Emilie Vansant	179 KB
Mansfield 2015 KM-CAST cap. a...	Akmal Akramkhanov	Apr 13, 2020 Akmal Akramkhanov	38 KB
mugo2012.pdf	Emilie Vansant	Apr 16, 2020 Emilie Vansant	221 KB
oreszczyn2010.pdf	Emilie Vansant	Apr 16, 2020 Emilie Vansant	487 KB

Expert Pooled Evidence

1. Scanned more than 100 people (LinkedIn and ResearchGate)
2. Outreached to more than 30 ppl
3. 9 people (mostly insiders) returned with literature resources
4. About 40 journal articles, book chapters, communication products collected

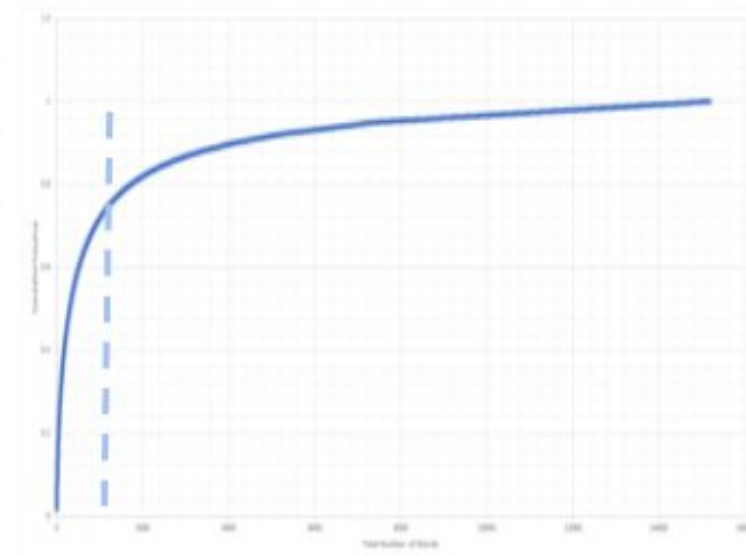
A Hybrid Approach to Conducting Systematic Maps and Reviews

Dictionary + : Combining Lexical Database with Expert Pooled Evidence Dictionaries for Queries



Word	Part of Speech(POS)	Frequency	Cumulative	Word length
knowledge	Common Noun	2799	0.01817957445	9
development	Common Noun	1244	0.02625938531	11
farmer	Common Noun	1157	0.03377412902	6
project	Common Noun	1141	0.04118495233	7
agricultural	Adjective	1036	0.04791379803	12
management	Common Noun	1036	0.05464264373	10
KM	Proper Noun	1003	0.06115715362	2
process	Common Noun	975	0.06748980281	7
innovation	Common Noun	907	0.07338079031	10

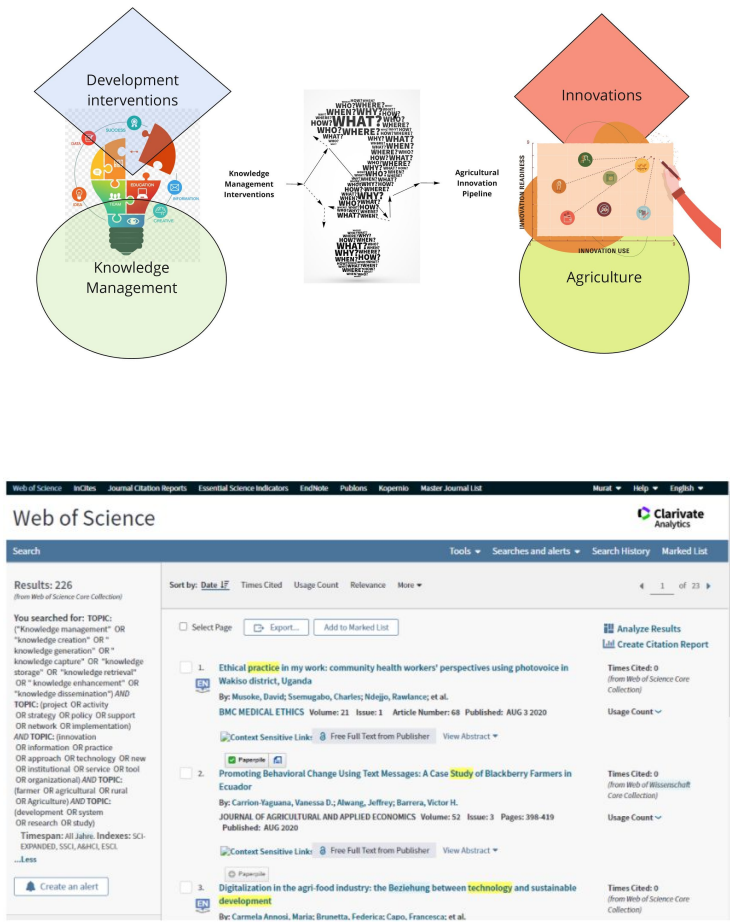
- Text frequency analysis
- Full text
- 304 words corresponding to the 50% of all words



A Hybrid Approach to Conducting Systematic Maps and Reviews

Dictionary + : Combining Lexical Database with Expert Pooled Evidence Dictionaries for Queries

Knowledge Management	Intervention (30)	Innovation (45)	Agriculture (15)	Pipeline (14)
knowledge	project	innovation	farmer	development
management	activity	information	agricultural	system
KM	strategy	practice	rural	research
KMS	policy	approach	agriculture	study
	support	technology	crop	design
	network	new	water	assessment
	implementation	institutional	field	plan
	government	extension	land	paper

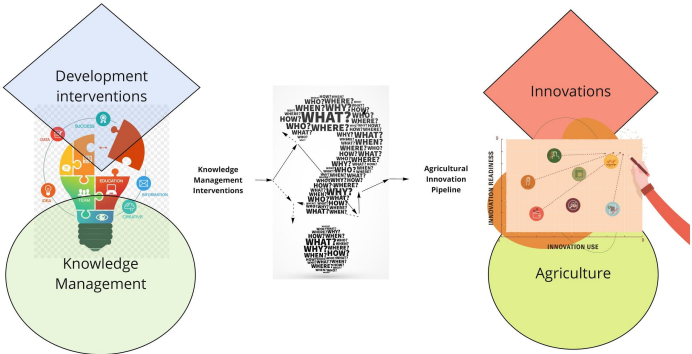


A Hybrid Approach to Conducting Systematic Maps and Reviews

Metadata Curation Using Academic Reference Management Tools



Database Name	Literature Found	Duplicates	Has PDF	Has No PDF	Journal Article	Book	Book Chapter
Scopus	657	55	313	289	312	207	81
WoS	225	78	145	2	116	2	1
AGRIS	290	113	139	38	48	12	2
Pubmed	75	0	72	3	72	0	0
AgEcon	10	0	10	0	4	0	1
Cab Abstracts EBSCOHOST	618	14	433	171	453	0	0
Cab Abstracts OVID	200	16	121	63	180	0	0
Total V2.	1715	556	554	873	837	226	86
Total v3.	2075	276	1233	566	1185	221	85
Overall - Cutpoint	1539	0	1001	538	910	230	90
After Final Curation			936				



A Hybrid Approach to Conducting Systematic Maps and Reviews

Combining Computer Mapping with Human Audit



Document System

de Brauw et al. 2018 - Biofortification, Crop Adoption and Heal

Girard et al. 2017 - Promotion of Orange-Fleshed Sweet Potato I

Hagenimana and Low 2000 - Potential of Orange-fleshed Sweet Pot

Hagenimana et al. 2001 - Enhancing Vitamin A Intake in Young Ch

Hummel et al. 2018 - Sensory and cultural acceptability tradeof

Jongstra et al. 2020 - Iron Absorption from Iron-Biofortified S

Kiarie et al. 2016 - Biochemical relationships involving multip

Lagerkvist et al. 2016 - Nutrition promotion messages - The eff

Lagerkvist et al. 2020 - Predictors of Intention to Integrate B

Levin et al. 2019 - What is the cost of integration - Evidence

Low et al. 2020 - Nutrient-Dense Orange-Fleshed Sweetpotato - A

Malavi et al. 2018 - Good Manufacturing Practices and Microbial

Malavi et al. 2021 - Effect of food safety training on behavior

Mithamo et al. 2020 - Acceptability of a mushroom enriched comp

Mudege et al. 2017 - Women and men farmer perceptions of econom

Mudege et al. 2018 - Correction to - Women and men farmer perce

Mutiso et al. 2018 - Effect of nutrition education and psychoso

Mwanga and Ssemakula 2011 - Orange-fleshed sweetpotatoes for fo

Mwanga et al. 2007 - Release of Two Orange-fleshed Sweetpotato

Mwanga et al. 2007 - Release of two orange-fleshed sweetpotato

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Document Browser: Wanjuu et al. 2019 - Consumer knowledge and attitude tow... (Page 1/7)

..XDictio\Evidence Context\Place Specific\Country\Uganda

moderately." There was a significant relationship between socio-demographics, knowledge about the root, the bread

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DE GRUYTER

Consumer Knowledge and Attitude Towards (OFSP) Pure Bread in Kenya 617

quality of commodities (Popper et al. 2004). The level of consumer acceptability is usually assessed by asking consumers to rate how much they like a product (Menon et al. 2015). A product may be proven to have health benefits but may not be accepted if it is unattractive to consum

versatile ingredient in food processing and culinary arts. In Kenya, the SUSTAIN (Scaling Up Sweetpotato Through Agriculture and Nutrition) project piloted the commercialization of baked products containing OFSP as a major ingredient. A variety of processed products that contain OFSP as the main ingredient such as bread and buns are commercially available. The successful commercialization of these OFSP-based products depends on how well the consumers accept them.

In Kenya, bread is consumed by millions of people of different socio-economic status. The quality of OFSP bread is defined by its characteristics that lead to consumer satisfaction and contentment. The attributes of OFSP bread encompasses nutritional values, functional aspects, sensory properties (appearance, texture, taste, and aroma), chemical constituents and mechanical properties. Various parameters can be used to determine the

Retrieved Segments

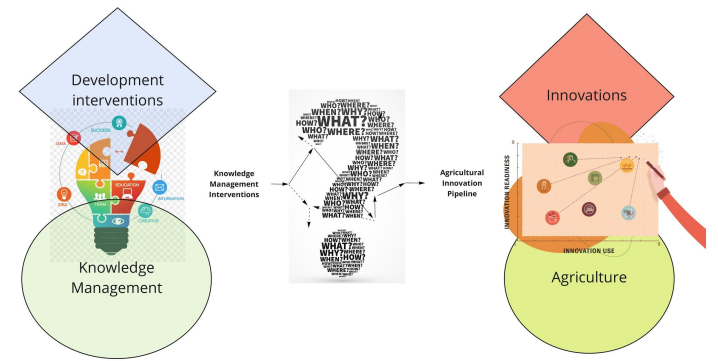
1 coded segment (from 1 document, 1 document group)

Neela and Fanta 2019 - Review on nutritional composition of ora

Prolonged storage of OFSP is usually achieved by drying (sun drying), and during the traditional drying (sun drying) techniques, microbial contamination was reported as the major problem due to the high moisture content of the fresh OFSP. Amajor et al. (2014) reported that OFSP flours can produce by sun drying and milling of the fresh OFSP roots. OFSP flour prepared by milling of dried slices can also utilize as entire flour or as a combined with others. Some of the reported studies on animal or human studies related to the role of OFSP in VAD management are summarized in Table 6.

12 | PRODUCTS FORM OFSP

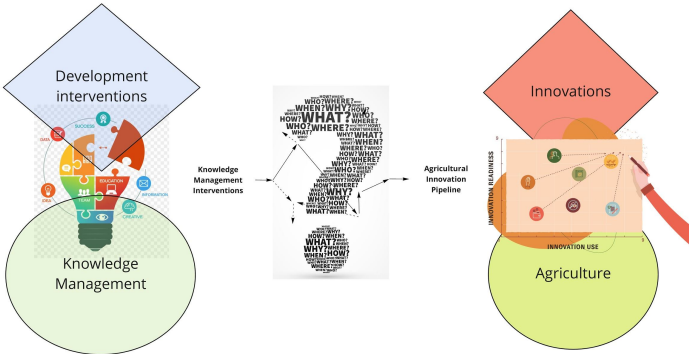
Orange-fleshed sweet potato consumed frequently in family meal



A Hybrid Approach to Conducting Systematic Maps and Reviews

A Realist Approach Using Computer Aided Evidence Prioritization

	Know ledge	Know ledge \Know ledge activi ties	Know ledge \Know ledge objec ts	Cont ext	Cont ext\S patial conte xt	Conte xt\Spa tial conte xt\Co untry	Conte xt\Spa tial conte xt\Re gion	Context\S patial context\Ot her	Cont ext\S patia l cont ext\s cales	Context\S patial context\E cological	Context\Spatia l context\Contin ent
Aabeyir and Kabo-bah 2012 - Experiences in mainstreaming monito	13	8	88	55	73	0	0	0	73	7	4
Aare et al. 2020 - Methodological Reflections on Monitoring Int	86	9	262	24	46	3	0	0	191	11	4
Abee 2006 - Application of criteria & indicators of sustainable	0	0	70	23	7	10	0	0	48	29	0
Abenet Yabowork et al. 2017 - Making CGIAR outputs open and acc	22	15	118	8	27	3	0	0	89	6	2
Abubaker 2019 - Book of Abstracts - 6th International Conferenc	14	7	79	13	14	2	0	0	111	7	3
Abubaker and Abeysinghe 2018 - 5th International Conference on	9	1	597	124	74	94	5	0	2387	96	207
....	19	0	305	31	62	16	1	0	118	5	19



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Thank You



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