

Development and Use of the ForestDSS Semantic Wiki

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www.ForestDSS.org



Structure of the presentation

(1) Basics about the Semantic Web Technology:

Insight in semantic technologies Semantic wiki basic concepts

(2) The development process of the forestDSS Wiki

Aim Development process Overview of the system

(3) Using the forestDSS wiki How to?... Examples of queries

(4) Conclusion



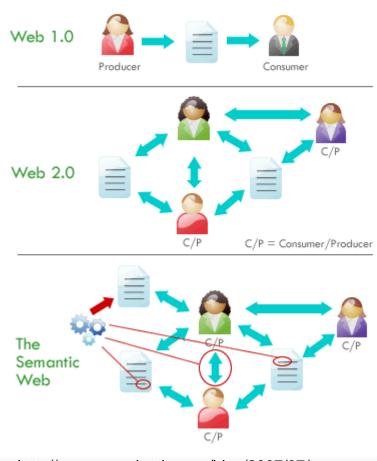
(1). Semantic Web Technology

The semantic web is about



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making computers behave (or 'think') more like humans.



http://www.experientia.com/blog/2007/07/

Cooking analogy:

Think of each website where you put your content as a big cookpot.

You might throw a carrot into one pot and tag it 'carrot', and into another you might put some spaghetti and tag it 'pasta'. Computers are fine with this kind of input.

But... what computers can't do yet is understand that the thing you called 'carrot' is a root vegetable and ... that you are making minestrone soup.

It also doesn't know that you have another pot simmering, and that there's pasta in there.

This kind of thinking **requires context**, and an **ability to see the big picture**

that is, to know what's in each pot, and to understand that you're making dinner. That's all that data-meshing is; it's about applying meaning to information from different sources. It means being able to ask your computer everything...





Benefits of semantic technologies

- In a specific domain:
 - promote a common understanding
 - share meaning
- Make the content not only readable by human beings but also by machines
 - enhancing the search capabilities (semantic search)
- Import/export knowledge in a standardised way across systems
- Integrate knowledge in a larger entity (e.g., Linked Data Cloud / the Web of Data)



Semantic wiki technologies



is a free software open source wiki package, originally used for Wikipedia



extension of MediaWiki ...



Main elements of semantic media wiki

1. Wiki page

basic unit of a wiki, simple and advanced editing features

2. Categories and properties

wiki content organisation & page content formalization

3. Semantic search

query the wiki content

4. Wiki forms

Building up pages assuring systematic and Consistent use of properties



1. Wiki page: basic unit

- Shared knowledge about a concept
- Text + resources (e.g., images)
- Formatting > highlight important aspects (bold), list of items, table
- Structure > organise the content of a wiki page in sections; e.g.: =header of main level=
- Hyperlink > link to other wiki pages or outside of the wiki; e.g.: [[main page]] [[http://www.forestdss.org]]

page discussion

Wiki markup quick reference

To make changes to an article, click **Edit** at the top of an article, make your edits, and then click **Save page**. Your edits are now visible to anyone who visits the page. If you have more information to add or need to correct a mistake, make another edit. Do not be afraid - you cannot accidentally make permanent deletions. All previous versions of an article are saved under **View history** and contributors can revert to an earlier version by simply clicking **undo**.

Provided below are shortcuts to frequently used wiki markup that will help you when you edit Wikipedia articles.

Description	What you type	What you get
Italic	''italic text''	italic text
Bold	'''bold text'''	bold text
Section headers	==Heading Text==	Heading Text
	===Heading Text===	Heading Text
	====Heading Text====	Heading Text
Link to another Wikipedia article (Internal link)	[[William Shakespeare]]	William Shakespeare
Link with another displayed title	[[William Shakespeare Shakespeare]]	Shakespeare
Link outside Wikipedia (External link)	[http://www.whitehouse.gov White House website]	White House website
Bulleted list	* Bulleted list ** Bulleted list	 Bulleted list Bulleted list
Numbered list	# Numbered list ## Numbered list	 Numbered list Numbered list
Image with caption	[[File:Example.png thumb Caption text]]	Caption text
Your signature for Discussion page		Username (talk) 19:50, 6 August 2010 (UTC)
Reference	<ref>[http://example.org Example.org], additional text.</ref>	Page text. ⁽¹⁾
	<references></references>	Example.org, additional tex

2. Category and property: organization of wiki pages

¥

Category

Classification of wiki pages Markup: [[Category:category name]] Example: [[Category:DSS]] ... means: the wiki page belongs to the



category DSS

Formalisation of some specific aspects of the content of a wiki page (basically single words or combinations thereof)

Property

Markup: [[property name::value]]

Example: [[has country::Sweden]]

... means: the wiki page is characterised by the fact that it is related to Sweden







2. Category and property: also correspond to wiki pages

Category

List of all wiki pages tagged with the category

Example: DSS

Pages in category "DSS"

The following 55 pages are in this category, out of 55 total.

Α

AVVIRK-2000

- Agflor
- С

D

- CONES
- ClimChAlp

MONTE

M cont.

- MatrixGen
- Mesta
- Monsu
- MyTestDSS

Ν

NorFor

Property

List of all wiki pages tagged with the property

Example: has country

Pages using the property "Has country"

Showing 25 pages using this property.

Α

AVVIRK-2000 + ① Norway + Actor Network Theory provides a suitable lens for exploring both technical and human aspects of DSS institutionalization in the forestry domain + ① Agflor + ① Portugal + Austria-Improving forestry extension services for small-scale private landowners + ①

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3. Semantic search:

3.1. semantic queries to select wiki pages

Example with category:

[[Category:DSS]]

Result: all DSSs, respectively a list of all wiki pages with the category "DSS"

N

Example with property:

[[has country::Sweden]]

Result:

all wiki pages related to Sweden, respectively a list of all wiki pages with the property "has country" and the value "Sweden" for this property

K

[[Category:DSS]] [[has country::Sweden]]

 $\mathbf{\Lambda}$

Result:

all DSSs related to Sweden, *respectively* a list of all wiki pages with the category "DSS", as well as the property "has country" and the value "Sweden"



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3. Semantic search:

3.2. semantic sub-queries to search across interconnected wiki pages

Markup: [[property 1.property 2::value of property 2]]

Select all wiki pages with property 2 and the target value(s) of property 2
 Select all wiki pages with property 1 and at least a selected wiki page of step

1 as value of property 1

Precondition: value type of property 1 is wiki page

Indirect search: instead of searching for a country name, the search focuses on the characteristics of a country

Example: [[has country.has forest area::>1000000 ha]]

V

Result: All wiki pages related to a country whose forest area is larger than 1'000'000 ha, *respectively* all wiki pages with the property "has country" with a value that points to a wiki page, which has the property "has forest area" and a value for this property that is higher than 1'000'000 ha.

3. Semantic search:

3.3. Narrow down sub-queries results by using categories

Example Category: Example with properties: [[Category:DSS]] [[has country.has forest area::>1000000 ha]] \mathbf{V} Result: Result: all wiki pages related to a country whose all wiki pages with the forest area is larger than 1'000'000 ha category "DSS" V N [[Category:DSS]] [[has country.has forest area::>1000000 ha]] Result:

All DSS related to a country whose forest area is larger than 1'000'000 ha. All wiki pages with the category "DSS", as well as with the property "has country" with a value, which points to a wiki page that has the property "has forest area" and a value for this property that is higher than 1'000'000 ha



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4. Wiki forms: Systematic and Consistent use of properties

- Properties can be integrated on wiki forms
- Wiki forms can be related to categories
- Thus, all wiki pages of the same category can be edited with the same properties thanks to the wiki form
- In other words, properties can be allocated to a category through a wiki form, which gives categories a central role in semantic wikis

page discussion edit with form edit history delete Edit DSS: WIS.2						
Wiki quality control						
Flag: 👩 💿 N/A 🔘 red 🔘 yellow 🔘 green						
 Name, responsible organisation and 	contact person					
Full name: 🕜	Sustainable Forest Management D					
Acronym: 👩	WIS.2					
Contact person for the Wiki: 🔞	Christian Rosset					
Contact e-mail for the Wiki: 🔞	christian.rosset@bfh.ch					
Software identification Software (name of the detail wiki	i page): 🥑 WIS.2.Software					

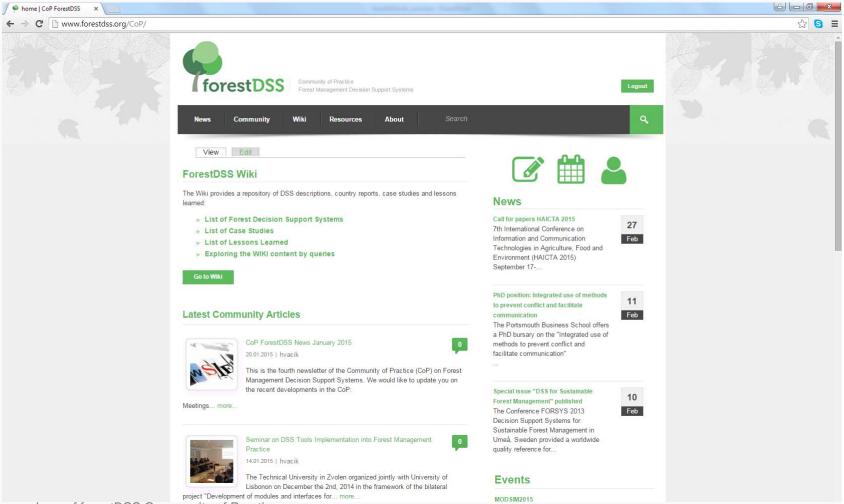


(2). The development process of the forestDSS Wiki



www.forestDSS.org/wiki

Aims at promoting a common understanding about Decision Support Systems for Sustainable Forest Management, as well as at sharing knowledge about DSSs to improve efficiency and effectiveness of forest management.



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Who are potential users of our information?

- Researchers
 - Identify important research needs
- Developers (IT specialists)
 - Identify what DSS capabilities already exist
 - Find useful development tools / methods
 - Learn about development best practices
- Analysts (IT specialists)
 - Identify useful DSS
 - Learn about using DSS in decision processes

- Resource managers, regulators
 - See potential for DSS use
 - Learn about using DSS in decision processes
- General public
 - How they are involved in decision making
 - Perceptions of results / outcomes
- Policy makers
- Interest groups



Wiki development process

FORSYS	COST ACTION	Forest DSS CoP			
2011	2012	2013	2014		
Started with MediaWiki for DSS descriptions based on a template. Collect DSS descriptions based on literature review Outreach to DSS developers	Elaboration of a list of properties to describe DSSs with a single form (start of Semantic MediaWiki) New core elements such as Case Study, Lessons	New system modeling approach: dynamic process for creating wiki forms for core elements Wiki querying -> Frequently Asked Questions			
usive use by members of forestDSS Comm	Learned and Country Report; Elaboration of a single wiki form for each core element	Improve que Update/exte context			



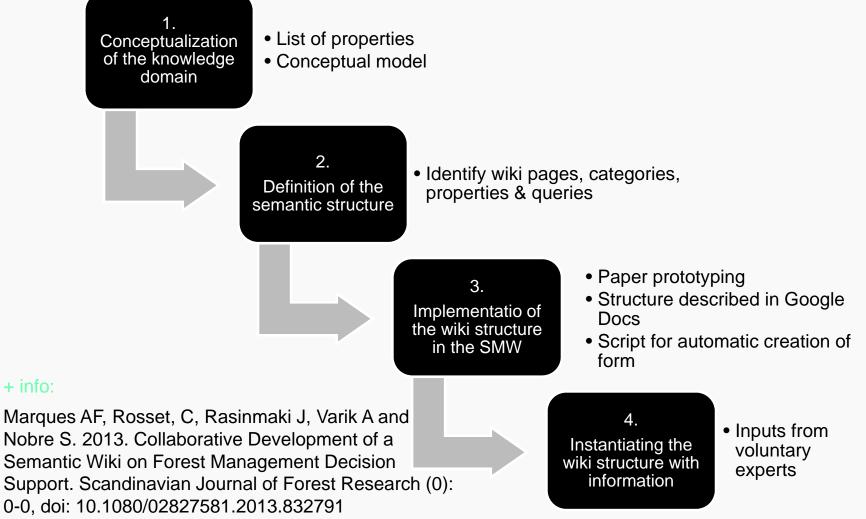
Main features of the development process

- Participative:
 - Workshops during COST FORSYS meetings (Thessaloniki 2011, Leuven 2011, Zvolen 2012, Porto 2012*, Brussel 2013*) *only WTF (WikiTaskForce)
 - Skype for meetings in-between
 - Google Drive platform especially for collaborative work on the property list
 - ConceptMe to design the FORSYS wiki system about its main categories
- Basically bottom-up approach with regular top-down phases to consolidate
- Limited resources

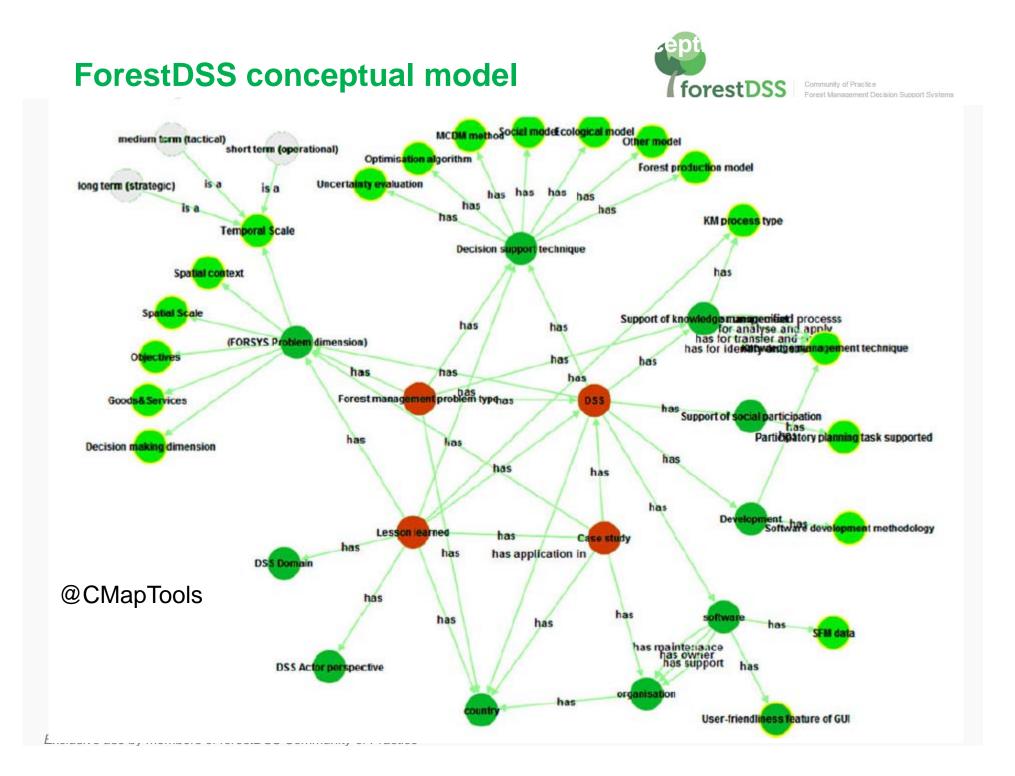


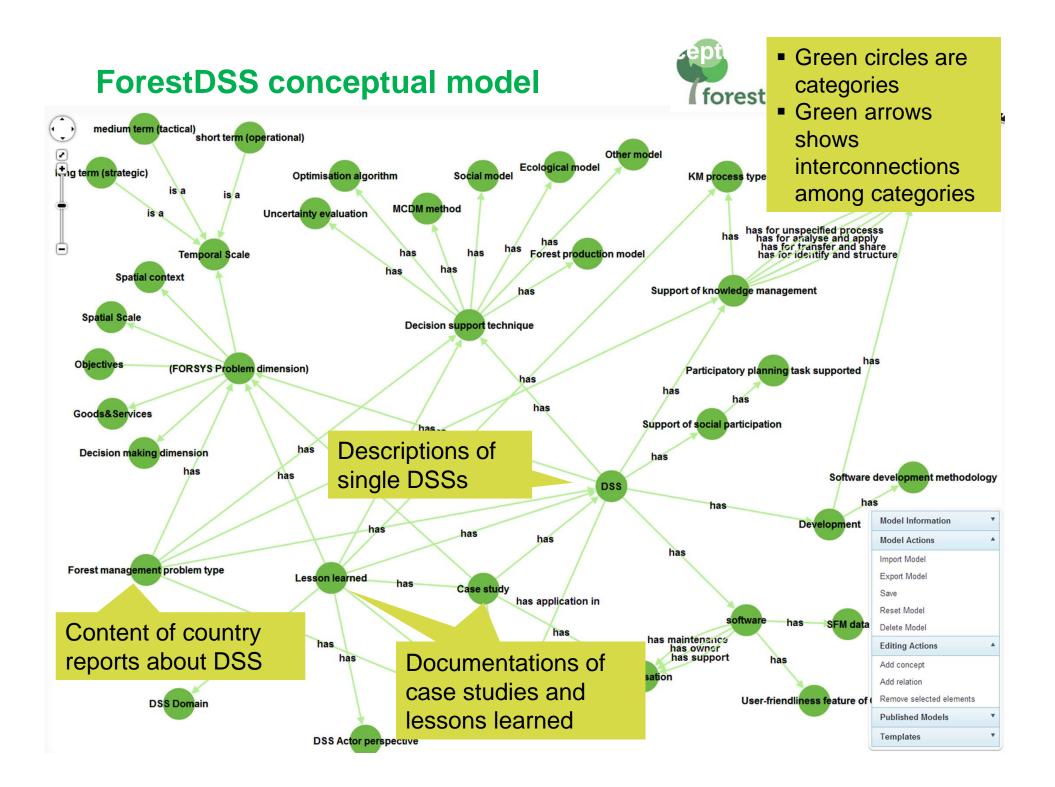


New "system modelling" approach for wiki design



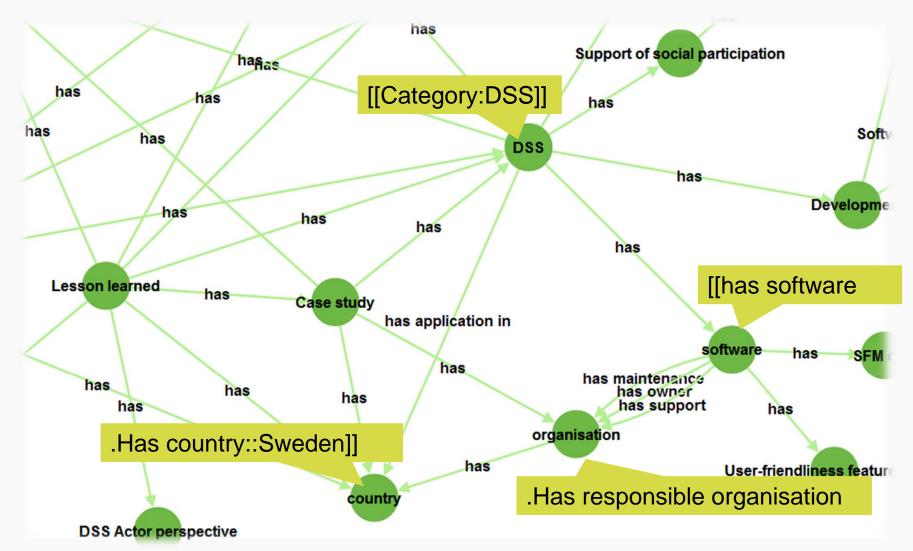
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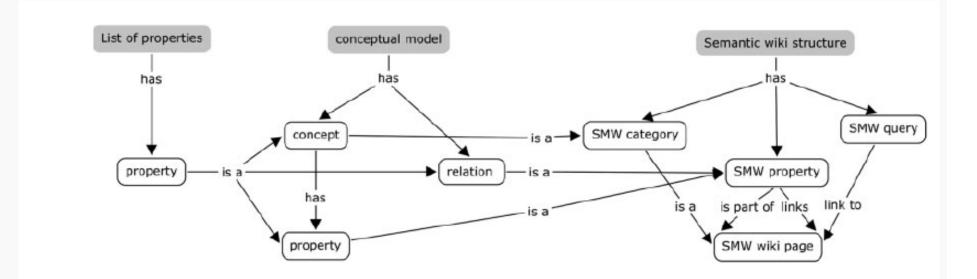
[[Category:DSS]][[has software.Has responsible organisation.Has country::Sweden]]

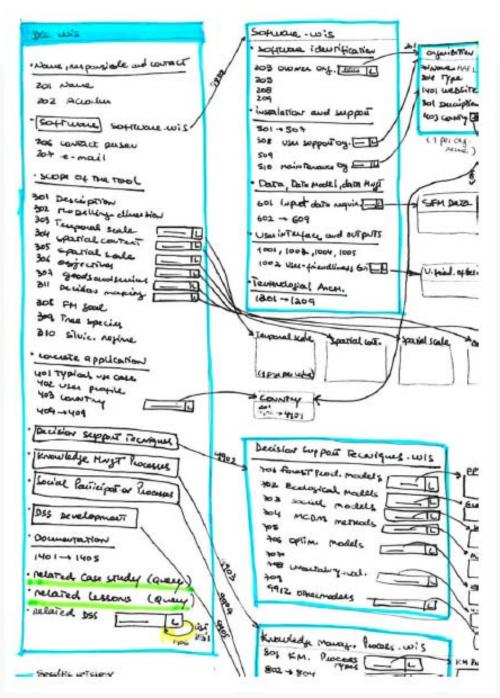


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Identify wiki pages, categories, properties & queries







Paper prototyping

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Structure described in Google Docs

🔥 Wiki - Google Drive 🛛 🗙 🔲 forsys_semanticwiki_prop 🗙 🔪

https://docs.google.com/spreadsheet/ccc?key=0Asyd9WwNSfLpdGdkR1RwMX UzdIJSOWR0bXJoVnF2cVE&usp=drive_web#gid=0

	A	B	c	D	E	F	G	
1	Prope ID	a Target form	Criteria	Property	Туре	Value	Metadata	Tool
2			Wiki quality control					
3	101	DSS;Case	Wiki quality control	Flag	String	red; yellow; green	FORSYS classification with respect to the quality of	d
4			Name, responsible organisati					
5	201	DSS;Case	Name, responsible organisatio	Name	String		Name of the Decision Support Tool; Case study	
6	202	DSS	Name, responsible organisatio	Acronym	String		Acronym of the Decision Support Tool	
7	203	DSS;Case	Name, responsible organisatio	Responsible organisation	String			
8	204	DSS;Case	Name, responsible organisatio	Type of the owner organization	String	person; team; community; forest enterprise; forest contract	Can have more than one owner in cases of multiple	-
9	205	DSS	Name, responsible organisatio	Institutional framework	String	research prototype (R&D project); research prototype (stud	Institutional framework regarding the tool developm	e
10	206	DSS;Case	Name, responsible organisatio	Contact person for the Wiki	String		18 - 275 - 19 -	
11	207	DSS;Case	Name, responsible organisatio	Contact e-mail for the Wiki	String			
12	208	DSS	Name, responsible organisatio	Contact person for the DSS	String			
13	209	DSS	Name, responsible organisatio	Contact e-mail for the DSS	String			
14		(Hadao)	Scope of the tool					
5	301	DSS;Case;Lesson	Scope of the tool	Description	Text		Brief description of the Decision Support Tool	
16	302	DSS	Scope of the tool	Modelling dimension	String	Economical indicators; Forest indicators; Ecological indica	Nature of the indicators produced as the output of the	ne
17	303	DSS;Case;Lesson	Scope of the tool	Temporal scale	String	long term (strategic); medium term (tactical); short term (op	Temporal scales supported by the system	
18	304	DSS;Case;Lesson	Scope of the tool	Spatial context	String	spatial with neighbourhood interrelations; spatial with no n	Spatial problem types supported by the system	
19	305	DSS;Case;Lesson	Scope of the tool	Spatial scale	String	regional/national level; forest level; stand level	Spatial scales supported by the system	
20	306	DSS;Case;Lesson	Scope of the tool	Objectives dimension	String	single objective; multiple objectives	Number of objectives supported by the system	-
21	307	DSS;Case;Lesson	Scope of the tool	Goods and services dimension	String	market non-wood products; market wood products; market	Types of goods and services supported by the syste	er
22	308	DSS	Scope of the tool	Forest management goal	String	afforestation management; biodiversity evaluation; biomas	Forest and ecosystem management goals addresse	e
23	309	DSS	Scope of the tool	Supported tree species	String		List of the species addressed by the tool (can have	n
24	310	DSS	Scope of the tool	Supported silvicultural regime	String	even-aged; uneven-aged/natural regeneration; uneven-aged	Silvicultural system is a planned program of silvicul	tu
25	311	DSS;Case;Lesson	Scope of the tool	Decision making dimension	String	single decision maker; more than one decision maker/stak	Number of decision makers supported by the system	n
28			Concrete application					
27	401	DSS	Concrete application	Typical use case	String		examples; how many forest fires can be handled sir	n
28	402	DSS	Concrete application	User profile	String	Non-industrial private owners; forest owners associations;	Types of target user groups	
29	403	DSS;Case;Lesson	Concrete application	Country	String	Afghanistan: Albania; Algeria; American Samoa; Andorra;	List of the countries where the tool is used (can hav	e
30	404	DSS	Concrete application	References about examples of application	String			
81	405	DSS	Concrete application	Number of users	String	0; <=3; <=10; <=30; <=100; >100	Total number of users	
32	406	DSS	Concrete application	Number of real-life applications	String	0; <=3; <=10; <=30; <=100; >100	Number of known implementations in real life proble	et
33	407	DSS	Concrete application	Utilisation in education: kind of utilisation (dem	String	no; presentation/demo; used by students	Utilisation in education, such as presentation / demo	0
34	408	DSS	Concrete application	Utilisation in research projects: references	String			1
35	409	DSS	Concrete application	Tool dissemination	String		How does the team (or yourself) ensure the proper t	tra

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	202	DBS		Name, resp	onsible organisati	x Acronym	Steing			Acconym of the Decisi	ion Support Tool	
	205	DSS Case				Responsible organisation	Sming					
4	204	DSS Case				or Type of the owner organization	String		brest anterprise, brest contract			
8	205	DBS				institutional hamework	Sting	research prototype (R&D)	oroject), research prototype listud	Institutional Partwater	k regarding the tool developm	e
10	206	D55 Case		Name, Iesp	crisible organisati	x Contact person for the Wiki	String					
66.	207	DBI3 Case		Name, resp	onsible organisati	o Contact a-mail for the Wiki	String					
4	208	C05				a Contact person for the DSS	Sting					
18	209	098				e Contact e-mail for the DSS	terro					
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18	301	D63.CaseLess		buspe of the	e toși	Description	Test			Brief description of the	e Decision Busport Tool	
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σ.	305	D55 Case Less	18	boope of the	+ 1041	Temporal scale	Sting	long lerre (strategic), me		Temporal scales sup-	ported by the system	
	304	D55 Cate Lass	et	Scope of the	e tooi	Spatial context	time	spatal with neighbourn		1.04	supported by the system.	
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22	306	C65 Case Less		Boope of the	e toci	Objectives dimension	Sting	single objective, multiple			a system	
21	307	DSS Case Less		Scope of the	e 1001	Goods and services dimension	Deving	market non-wood produx			~4 8/58	é
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28	402	065		Concrete ad		User profile	Sting	Non-industrial private own	ers, forest owners associations,	Types of target uper g	POLON	
28	400	D05 Case Leon	*	Concrete ap	splication	Country	thing	Atchanistan Albania Alos	eta: American Samoa; Andona.	List of the countries w	fiere the bol is uses	
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=	406	088		Concrete ap		Number of real-the applications	String	0 +=3 +=10 +=30 +=100			rementations in real 29 proble	
10	407	015		Concrete ap		Utilisation in education, kind of utilisation (dem	(String)	ns presentation/demit; us	ed by students	Utilisation in educatio	n, such as presentation / demo	1
34	406	098		Concrete ap		Utilisation in research projects: references	thing					
*	409	098		Concrete ad	plication	Tool desemination	Sting.			How does the tears of	r yourself, ensure the proper t	£



Script for automatic creation of

forms

Available at https://github.com/jrasinma/semanticbot

ge Discussion	Read View form View source View history Search Go Search
Edit DSS: WDS	
You do not have permission to edit	t this page, for the following reason:
The action you have requested is I	imited to users in the group: Users.
— Wiki quality control ———— Flag: 🕑 💿 N/A 💿 red 💿	yellow 💿 green
— Name, responsible organisatio	n and contact person
Full name: 📀	Wood Flow system
Acronym: 🕑	WDS
Contact person for the Wiki	Alexandra Marques
Contact e-mail for the Wiki:	elexandra.s.marques@inescporto.pt
 Software identification ——— 	
Software (name of the detail	I wiki page): 🥹 WDS.Software
- Description	
Description: 📀	
Modelling scope: 🕢	Economical indicators
	Social indicators

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Main topics related with DSS components and Architecture (COST FORSYS WIKI 2012)

- Data, data model and data management
- Models and methods, MBMS, decision support techniques
- Support of knowledge management process
- Support of social participation
- User interface and outputs
- Technological architecture, integration with other systems



(1). Using the forestDSS Wiki



How to?... Create or edit a new page?

There are many ways... one of the simplest:

- 1. Login
- Write the name of the page in the search box and click GO 2.
- 3. On the search results, click in "create the page in the wiki"
- 4. On the new page: edit content using the wiki form and free text, then save

	Search results for "WDS" - x estdss.org/wiki/index.php?search=WDS&go=Go&title=Special%3ASearch	Login 🕸 🖬 🖬
forestDSS	Special page Search results	Alexmarques Talk Preferences Watchlist Contributions Log out
 » Main page » Recent changes » Random page Tools » Upload file » Special pages 	WDS Search Content pages Multimedia Help and Project pages Everything Advanced There were no results matching the query. Create the page "WDS" on this wiki!	
	Privacy policy About forestDSS Disclaimers	II overend by Semantic Semantic MediaWiki

+ information in: http://www.forestdss.org/wiki/index.php?title=DSS_description_Handbook



How to?... Do a new query?

- Login 1.
- On the Menu (left side of the page), select tools -> Special pages -> Semantic search 2.
- 3. Write down the semantics as described above, Click on Find Results

Alexmarques CoP Forest	Semantic search ×		ogin	
← → C 🗋 www.for	restdss.org/wiki/index.php?title=Special:Ask		Jugin	☆ 🕒 =
Kecent changes Recent changes Random page Tools Upload file Special pages	Special page	Alexmarques Tells Sea Additional data to display (add one property name per line)	eferences Watchlist	Contributions Log out
	Privacy policy About forestDSS Disclaimers			Heal By CloWiki

+ information in: http://www.forestdss.org/wiki/index.php?title=DSS_description_Handbook

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Some examples of queries

Which DSSs were developed by a team of at least 5 people?

➤ CONES, EFIMOD, EMDS, EcologicalSiteClassification, LEaRNForME, PYL, ProgettoBosco, SIPAFIT, TestDSS

[[Category:DSS]] [[Has DSS development.Has development team size::>5]]



Some examples of queries

Which DSSs support the process of evaluating options?

CONES, ClimChAlp, EFIMOD, EMDS, FORFUN, Heureka, MyTestDSS, PEB, PLANFLOR, PYL, WIS.2

[[Category:DSS]] [[Has support for social participation.Has participatory planning task::Evaluating options]]



Some examples of queries

Which DSSs support the process of evaluating options at forest and strategic level?

► EFIMOD, EMDS, Heureka, PEB, PLANFLOR, WIS.2

[[Category:DSS]]

[[Has support for social participation.Has participatory planning task::Evaluating options]]

[[Has temporal scale::Long term (strategic)]]

[[Has spatial scale::Forest level]]



(4) Conclusions

Achievements so far

- Repository of DSS descriptions, country reports, case studies and lessons learned about DSSs, ...
- ... as well as interconnected articles about focused topics

Potentialities for further developments:

- ConceptMe: consolidated map of the FORSYS Wiki content + engineering and reverse engineering of FORSYS Wiki
- User-friendly query interface
- Interconnection with other wikis

Challenges to face:

- Publicity of the platform, FORSYS Wiki reflex
- Motivate enough people to contribute
- Ensure the quality of the content
- Ensure the maintenance and further developments of the system