Interoperability Arrangements

-- from syntactic to semantic interoperability --

The University of Tokyo

Center for Spatial Information Sciecne

Ryosuke Shibasaki

For Social Needs

Cooperation with Earth Observation Plans

Satellite data

Earth observation data
Collection/ quality management

Cooperation with International Research Center

Integrated Information

data

Integration method

Centralized Data Integration & Fusion

①data archive, storage, integration
②data assimilation, visualization, mining
③design for database schema
④data collection and distribution
⑤sensor data fusion

Core System

Integration of Distributied Data

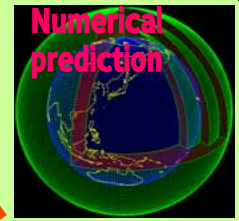
①constriction of ontology registry
②service by ontology registry
③distributed DB for agriculture
④distributed DB for satellite data

Integrated Information

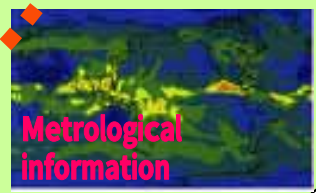
Prediction needs

Dispersed use

Integrated use of data



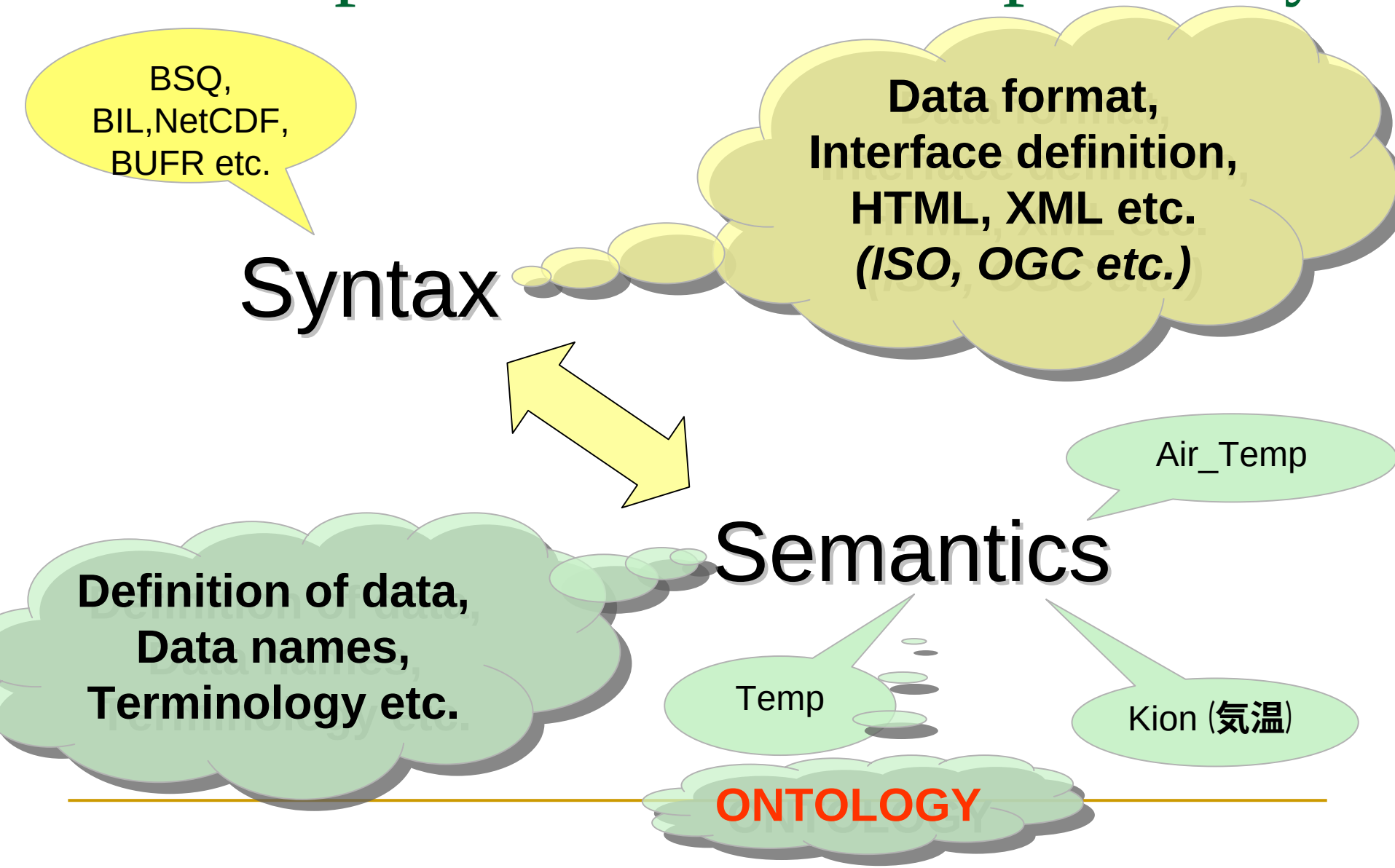
Cooperation with International Organizations



Cooperation with International Organizations

Create new Knowledge for Earth System Science

Two aspects of data interoperability



What is Ontology?

Philosophical word

The branch of metaphysics that deals with the nature of being

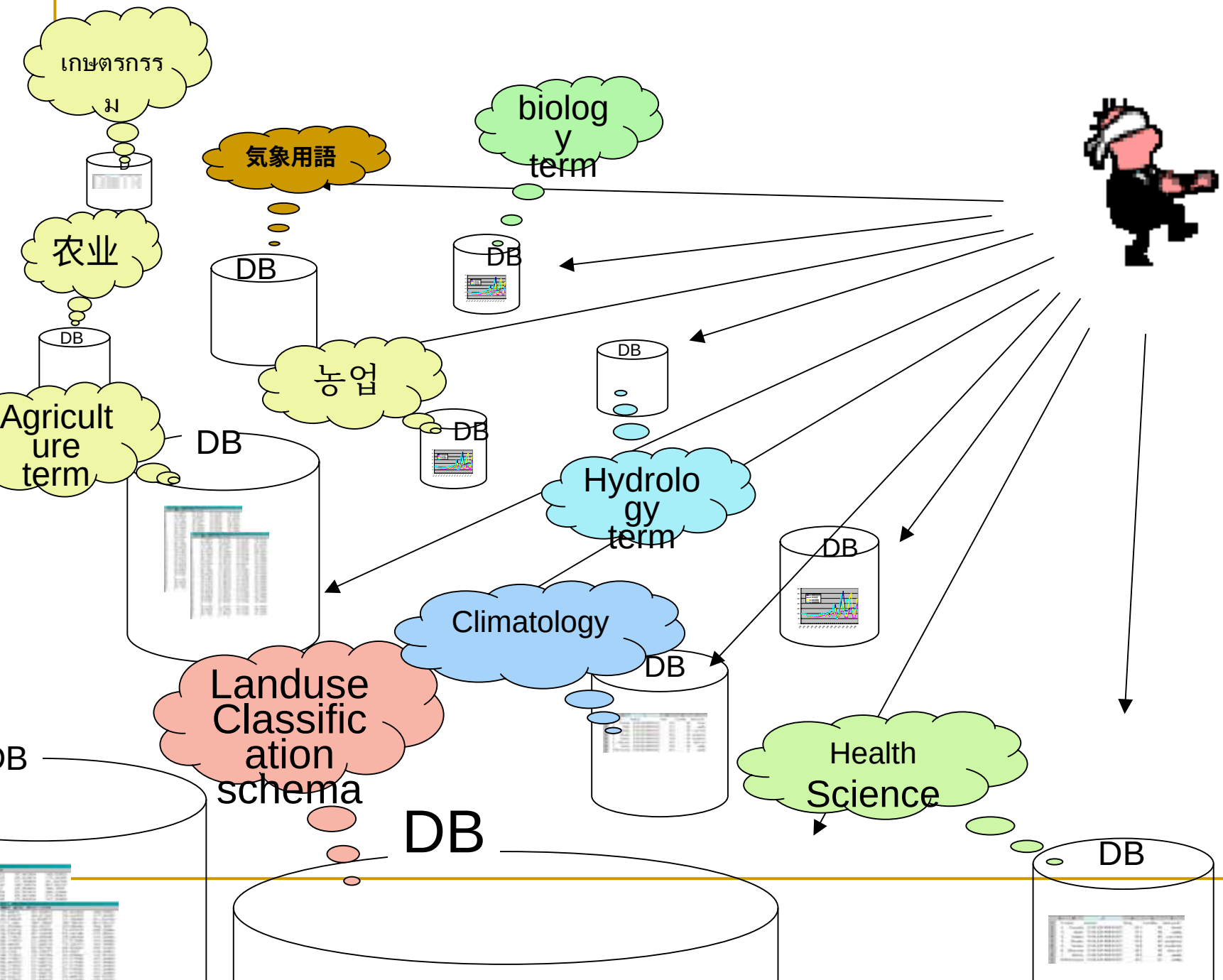
In the context of knowledge sharing

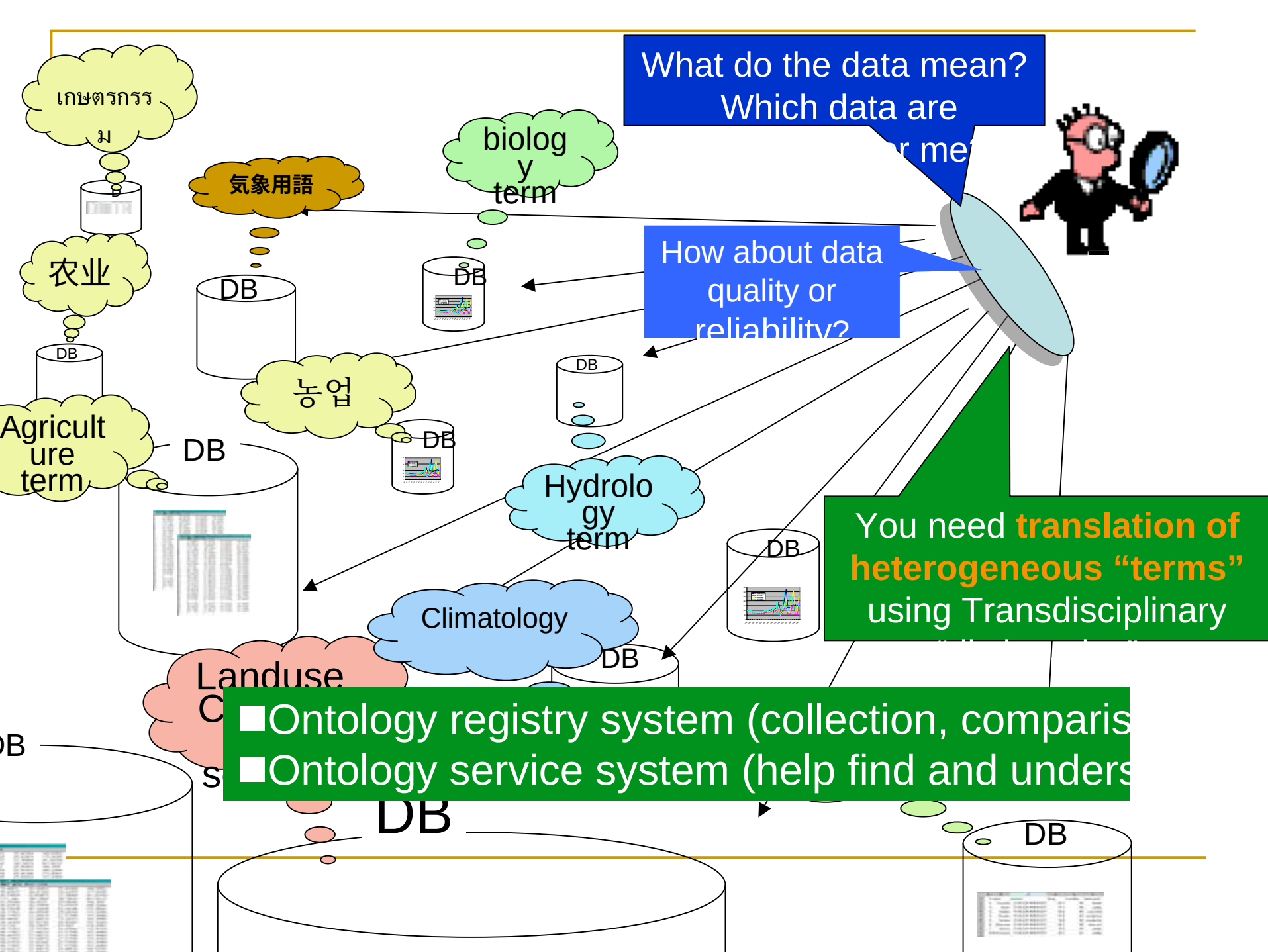
The term ontology to mean a *specification of a conceptualization*.

That is, an ontology is a description of the concepts and relationships that can exist for an agent or a community of agents.

This definition is consistent with the usage of ontology as set-of-concept-definitions, but more general.

And it is surely a different sense of the word than its use in philosophy.


เกษตรกรรม
DB
农业
DB
Agriculture term
DB
気象用語
DB
DB
biology term
DB
농업
DB
DB
Hydrology term
DB
Climatology
DB
Landuse Classification schema
DB
Health Science
DB
DB


What do the data mean?
Which data are
How about data quality or reliability?
You need translation of heterogeneous “terms” using Transdisciplinary
Ontology registry system (collection, comparis
Ontology service system (help find and unders
เกษตรกรรม
農业
Agriculture term
気象用語
biology term
농업
Hydrology term
Climatology
Landuse
DB

Use of Ontological Information

Landuse data schema

Climate data schema

Land use model

Socio Economic data schema

Hydrology data schema

Agriculture data schema

Population data schema

Health data schema

Crop Yield data schema

Based on dictionary of various fields, data model, or name space.

Data integration by intermediation of Ontology

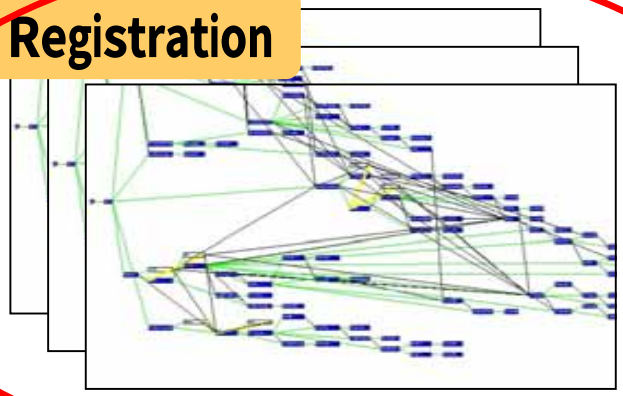
Based on Gazetteer, Land use schema, Maps.

Ontology from Dictionary

Geographic Ontology

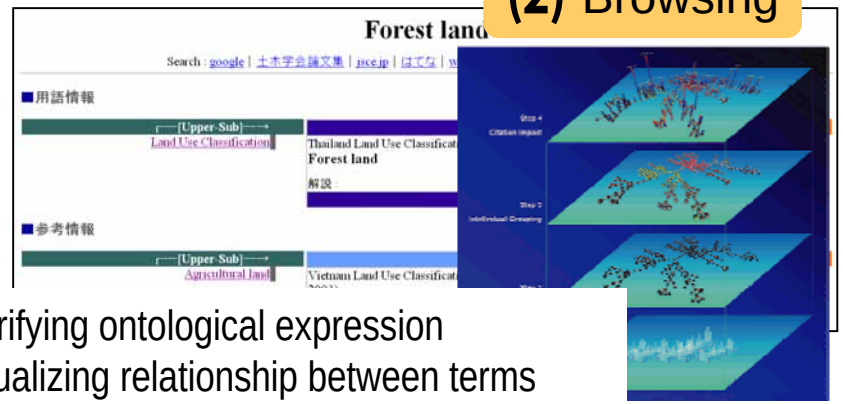
Framework for ontological information

(1) Registration



Correction and registration of Ontology

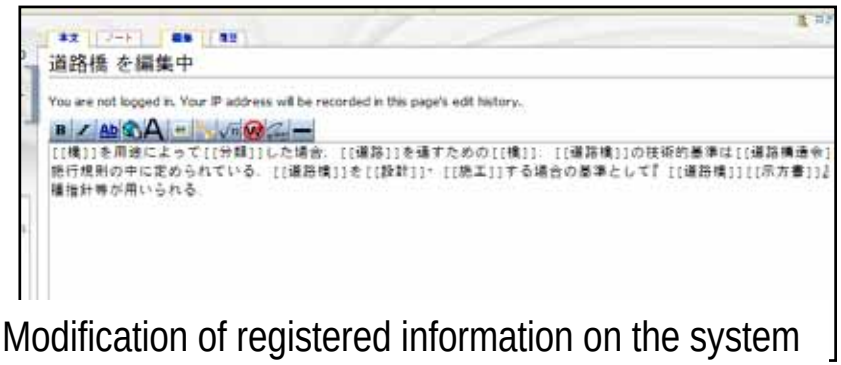
(2) Browsing



Clarifying ontological expression
Visualizing relationship between terms
➔Providing reference information to users

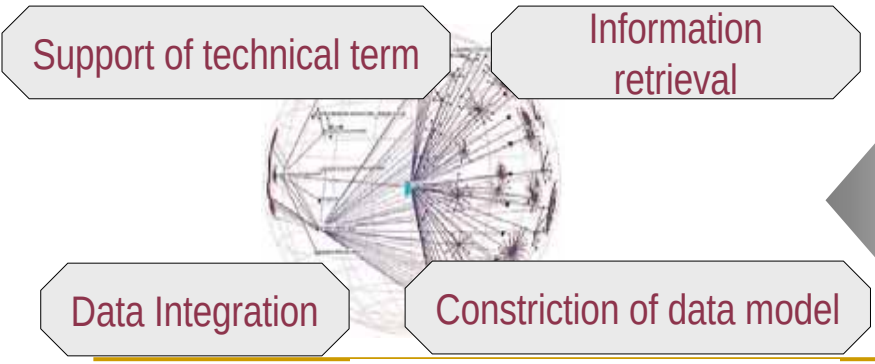
Created ontology is registered to the system again.

Ontology Registry System



Modification of registered information on the system
➔newest information

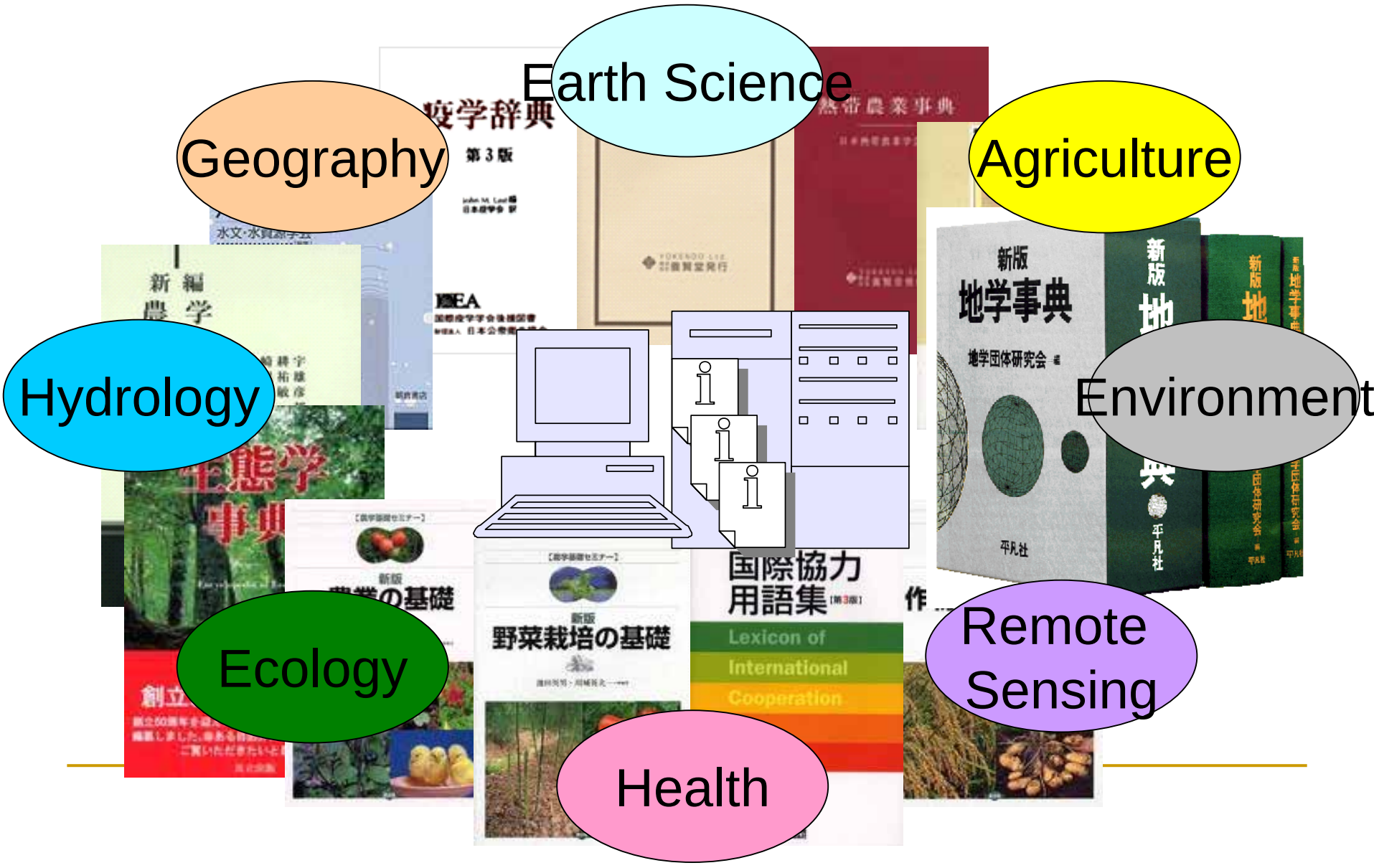
(3) Modification



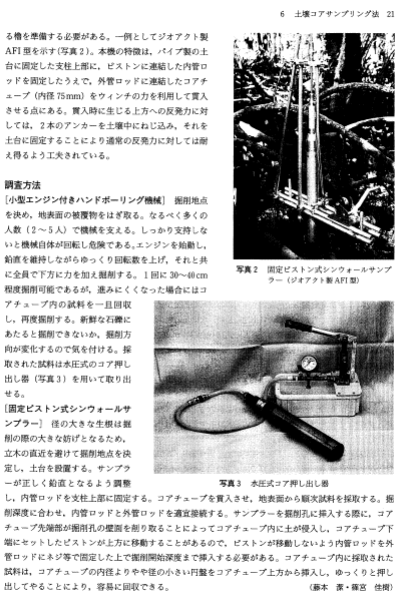
Providing integrated ontology
Utilizing as knowledge

(4) Utilization

Data collection from existing dictionaries



Digitize from paper dictionaries



6　土壌コアサンプリング法　21

る機を準備する必要がある。一例としてジオアクト製APIⅡ型を示す（写真2）。本機の特徴は，パイプ製の土台に固定した支柱上部に，ピストンに連結した内管ロッドを固定したうえで，外管ロッドに連結したコアチューブ（内径75mm）をウィンチの力を利用して貫入させる点にある。貫入時に生じる上方への反発力に対しては，2本のアンカーを土壌中にねじ込み，それを土台に固定することにより通常の反発力に対しては耐え得るよう工夫されている。

写真2　固定ピストン式シンウォールサンプラー（ジオアクト製API型）

調査方法

［小型エンジン付きハンドボーリング機械］　掘削地点を決め，地表面の被覆物をはぎ取る。なるべく多くの人数（2～5人）で機械を支える。しっかり支持しないと機械自体が回転し危険である。エンジンを始動し，鉛直を維持しながらゆっくり回転数を上げ，それと共に全員で下方に力を加え掘削する。1回に30～40cm程度掘削可能であるが，進みにくくなった場合にはコアチューブ内の試料を一旦回収し，再度掘削する。新鮮な石礫にあたると掘削できないか，掘削方向が変化するので気を付ける。採取された試料は水圧式のコア押し出し器（写真3）を用いて取り出せる。

写真3　水圧式コア押し出し器

［固定ピストン式シンウォールサンプラー］　径の大きな生根は掘削の際の大きな妨げとなるため，立木の直近を避けて掘削地点を決定し，土台を設置する。サンプラーが正しく鉛直となるよう調整し，内管ロッドを支柱上部に固定する。コアチューブを貫入させ，地表面から順次試料を採取する。掘削深度に合わせ，内管ロッドと外管ロッドを適宜接続する。サンプラーを掘削孔に挿入する際に，コアチューブ先端部が掘削孔の壁面を削り取ることによってコアチューブ内に土が侵入し，コアチューブ下端にセットしたピストンが上方に移動することがあるので，ピストンが移動しないよう内管ロッドを外管ロッドにネジ等で固定した上で掘削開始深度まで挿入する必要がある。コアチューブ内に採取された試料は，コアチューブの内径よりやや径の小さい円盤をコアチューブ上方から挿入し，ゆっくりと押し出してやることにより，容易に回収できる。

（藤本　潔・篠宮　佳樹）


```
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    xsi:schemaLocation="http://www.mediawiki.org/xml/export-0.3/ http://www.mediawiki.org/xml/export-0.3.xsd"
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        </contributor>
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          </oru:attribute>
        <oru:attribute attr_name="著者">沼田</oru:attribute>
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          <ip>Direct Import</ip>
        </contributor>
        <text>(附着生物)陸水・海水を問わず,底面から突出している岩礁や植物遺体,あるいは水草や大型藻類などの生きている体表面に附着生活を営む生物群(Auf・wuchs).藻類についてはとくに附着藻類率(ペリフィトン)ともいう.附着生物は底生生物*と区別される場合がある一方,周底生生物群系と呼んで,生活の場の違いに従って類別される底生生物中の一群の意に用い
```

Collection of Gazetteer

GEOnet Names Serve

Names Files of Selected Countries

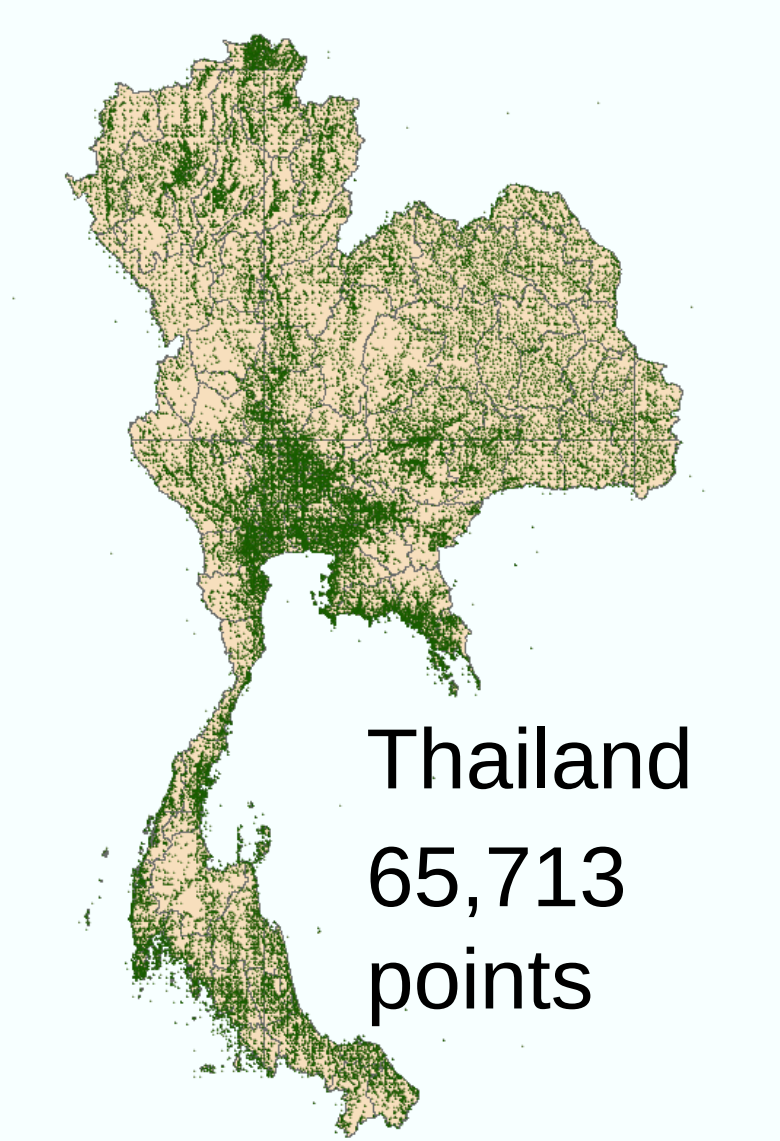
- **Geographic Area of Coverage**: Worldwide excluding the United States and Antarctica
- The files contain names for all types of features
- Description of fields in country files
- Names are in **reading order**
- Data is in **tab-delimited text**, **UTF-8** ISO/IEC 10646 (**UNICODE**) Compliant format
- **Date Generated** indicates when the file was generated from the database
- **Most Recent Modification Date** indicates when any entry in the file was last modified
- **Most Recent Source Date** indicates when the source used to verify the name spelling was published
- Files are in **compressed zip** format
- To download a country, click on its name under the **Country File** column
- **Download a single compressed (zip) file that contains the entire country files dataset - ~190MB compressed, ~760MB uncompressed, generated on 2006-03-01** generated approximately once per month).

The country files are also available on our FTP site. The files have the same name, date, size, and file type.

Index

A B C D E F G H I J K L M N O P Q R S T U V W X Y Z

Country File (compressed zip format, click on country name to download)	Country Code	Date Generated	Most Recent Modification Date	Most Recent Source Date
AFGHANISTAN - [Top] - [GEOnet Home Page]	AF	2006-03-06	2006-03	2006-02
ALBANIA	AL	2005-04-04	2005-03	2003-09
ALGERIA	AG	2006-01-17	2006-01	2005-07
ANDORRA	AN	2004-10-30	2004-05	2000-08



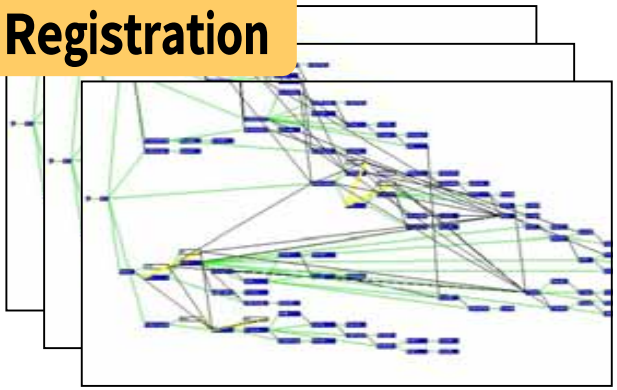
Thailand

65,713 points

- Landuse
- Landmark
- Geography

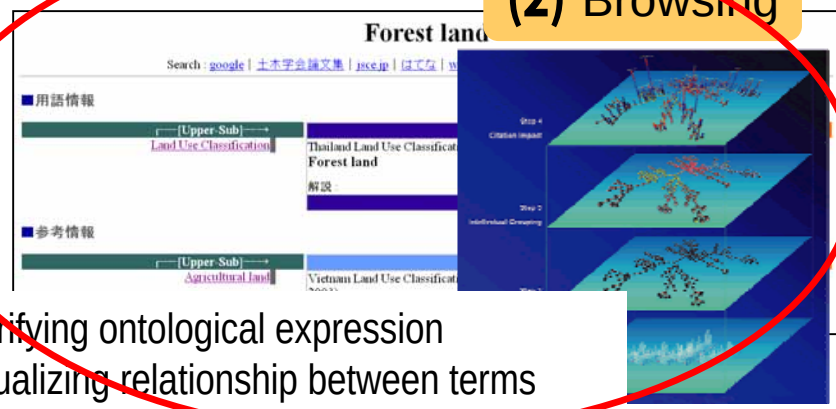
Framework for ontological information

(1) Registration



Correction and registration of Ontology

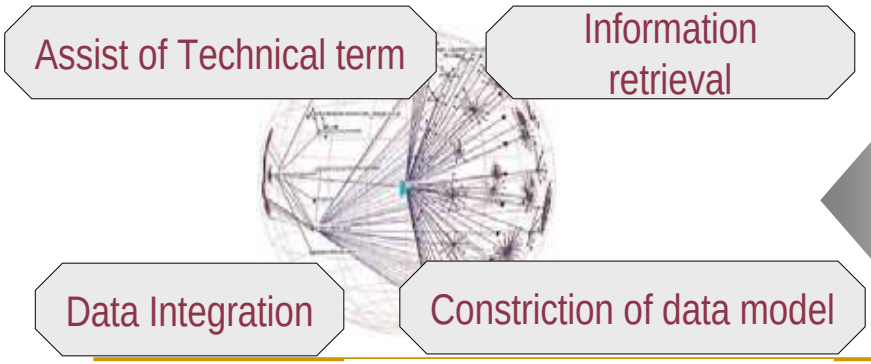
(2) Browsing

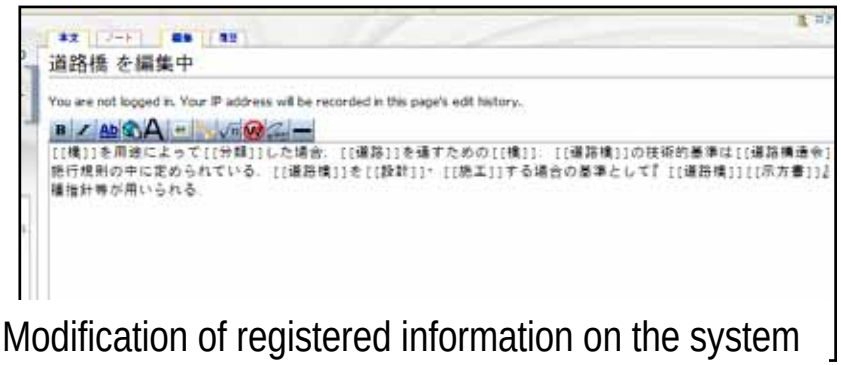


Clarifying ontological expression
Visualizing relationship between terms
➔Providing reference information to users

Created ontology is registered to the system again.

Ontology Registry System





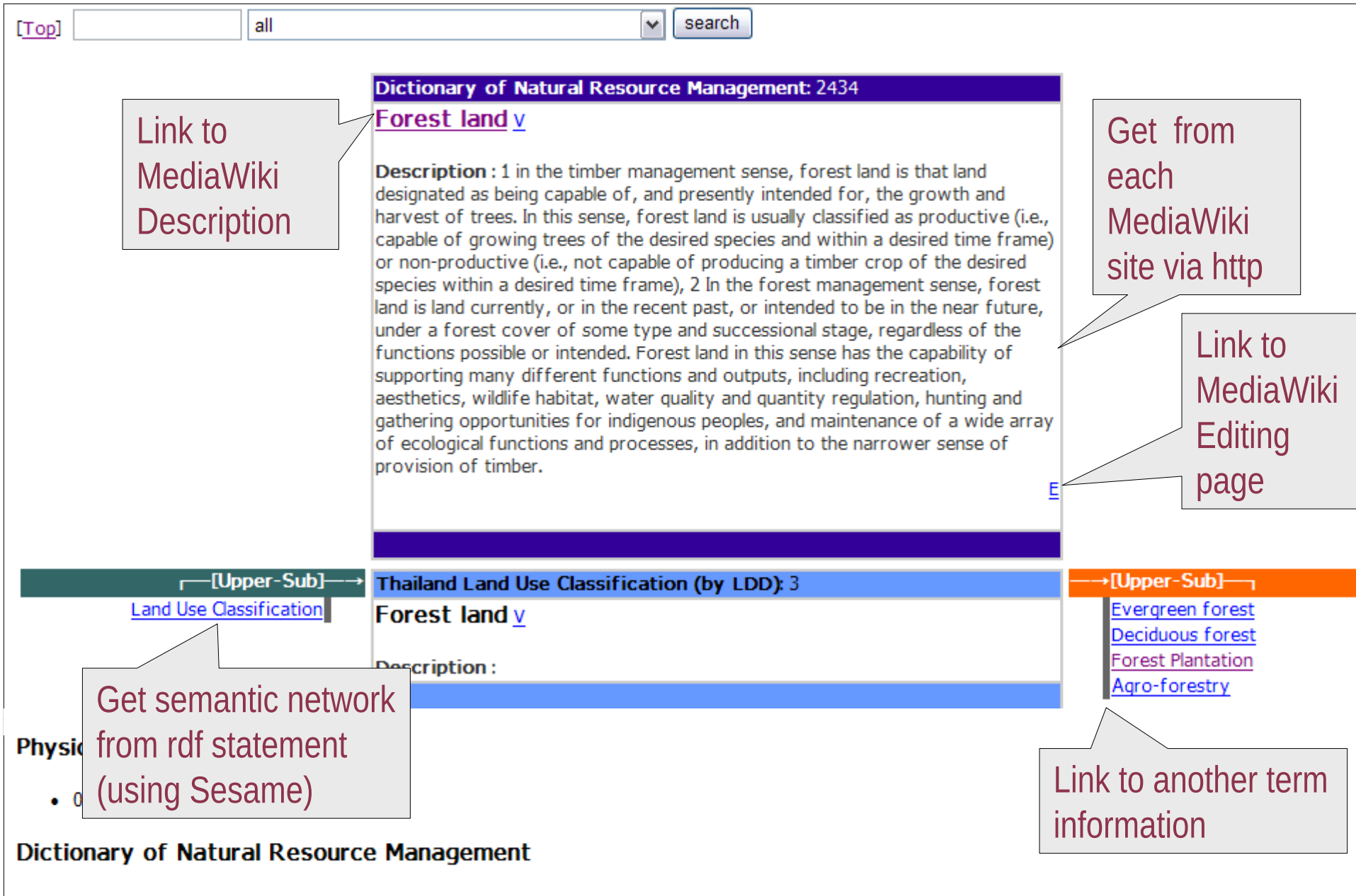
Modification of registered information on the system
➔newest information

(4) Utilization

Providing integrated ontology
Utilizing as knowledge

(3) Modification

Browsing of Semantic Network Dictionary System



Link to MediaWiki Description

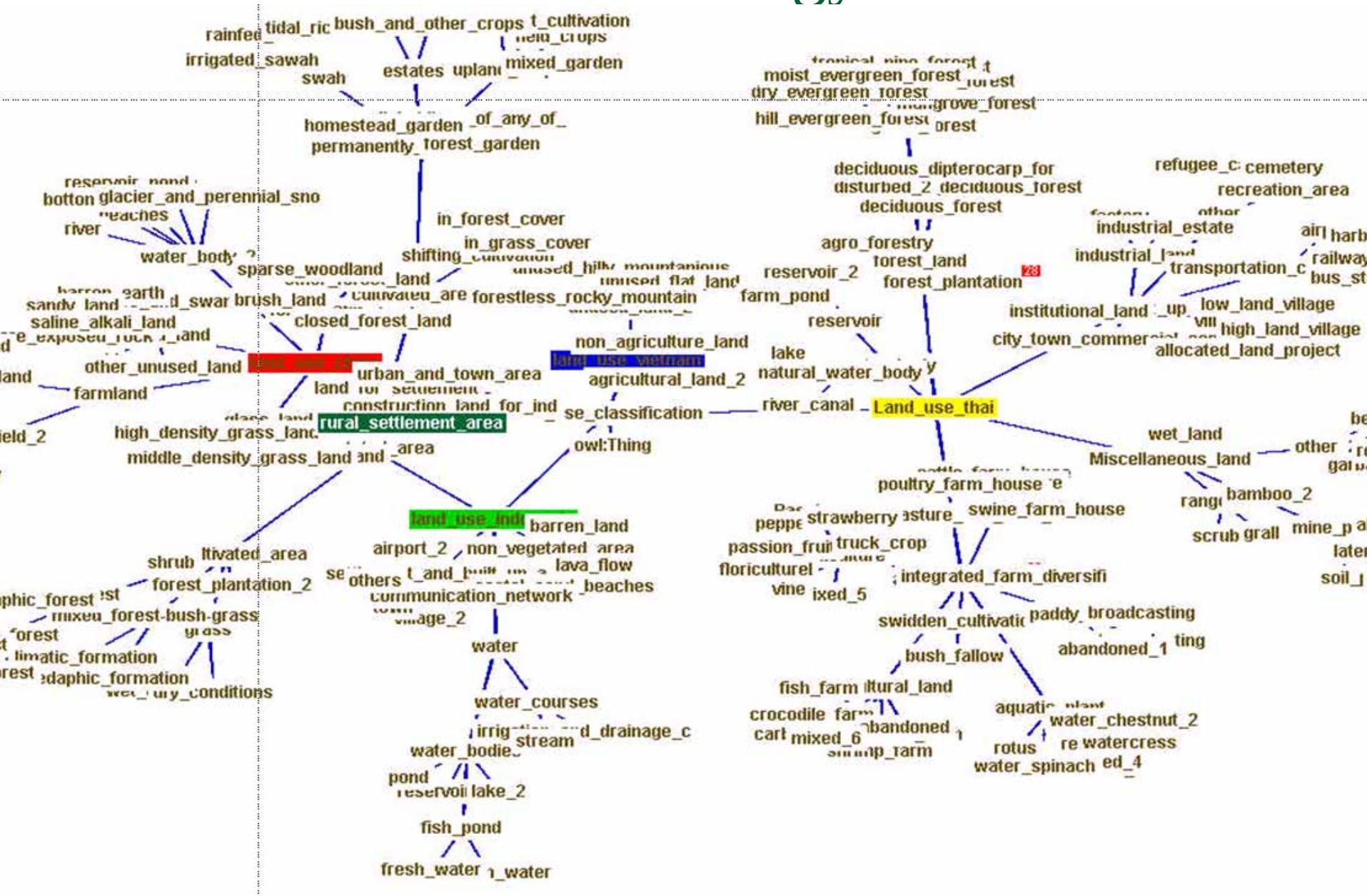
Get from each MediaWiki site via http

Link to MediaWiki Editing page

Get semantic network from rdf statement (using Sesame)

Link to another term information

Visualization of ontology



Framework for ontological information

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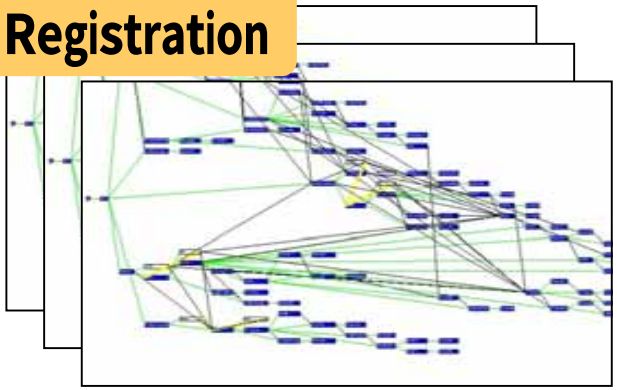

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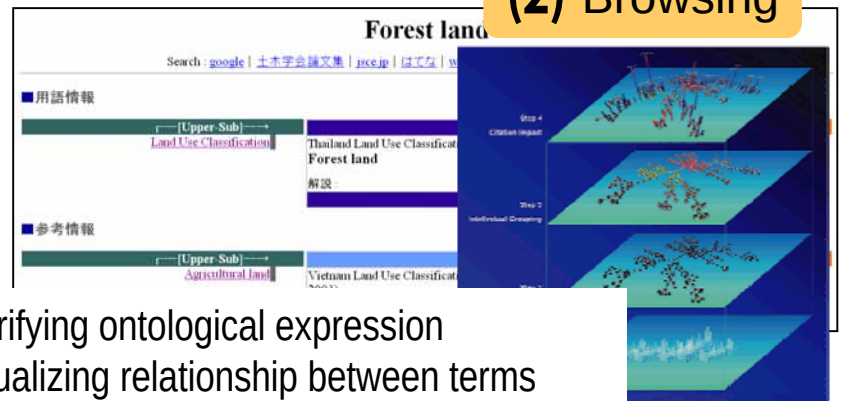

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Visualizing relationship between terms
➔Providing reference information to users

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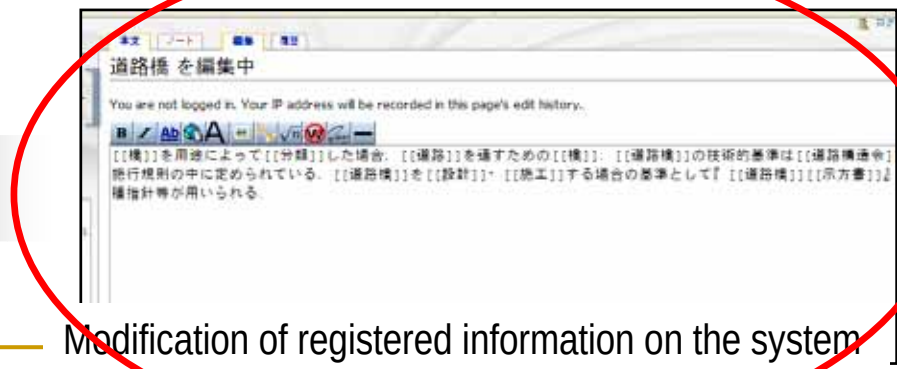
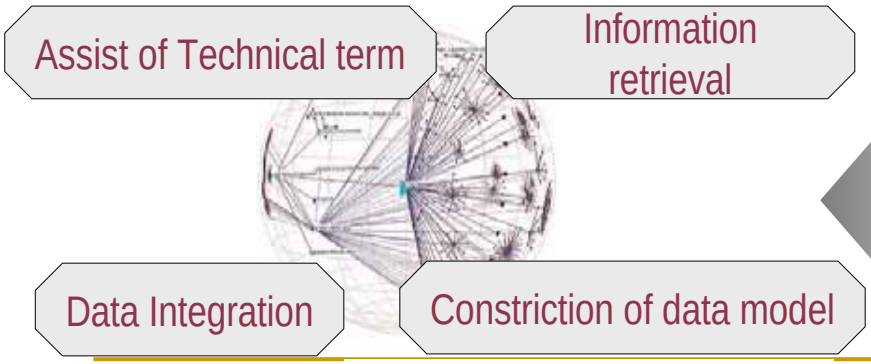


Modification of registered information on the system
➔newest information

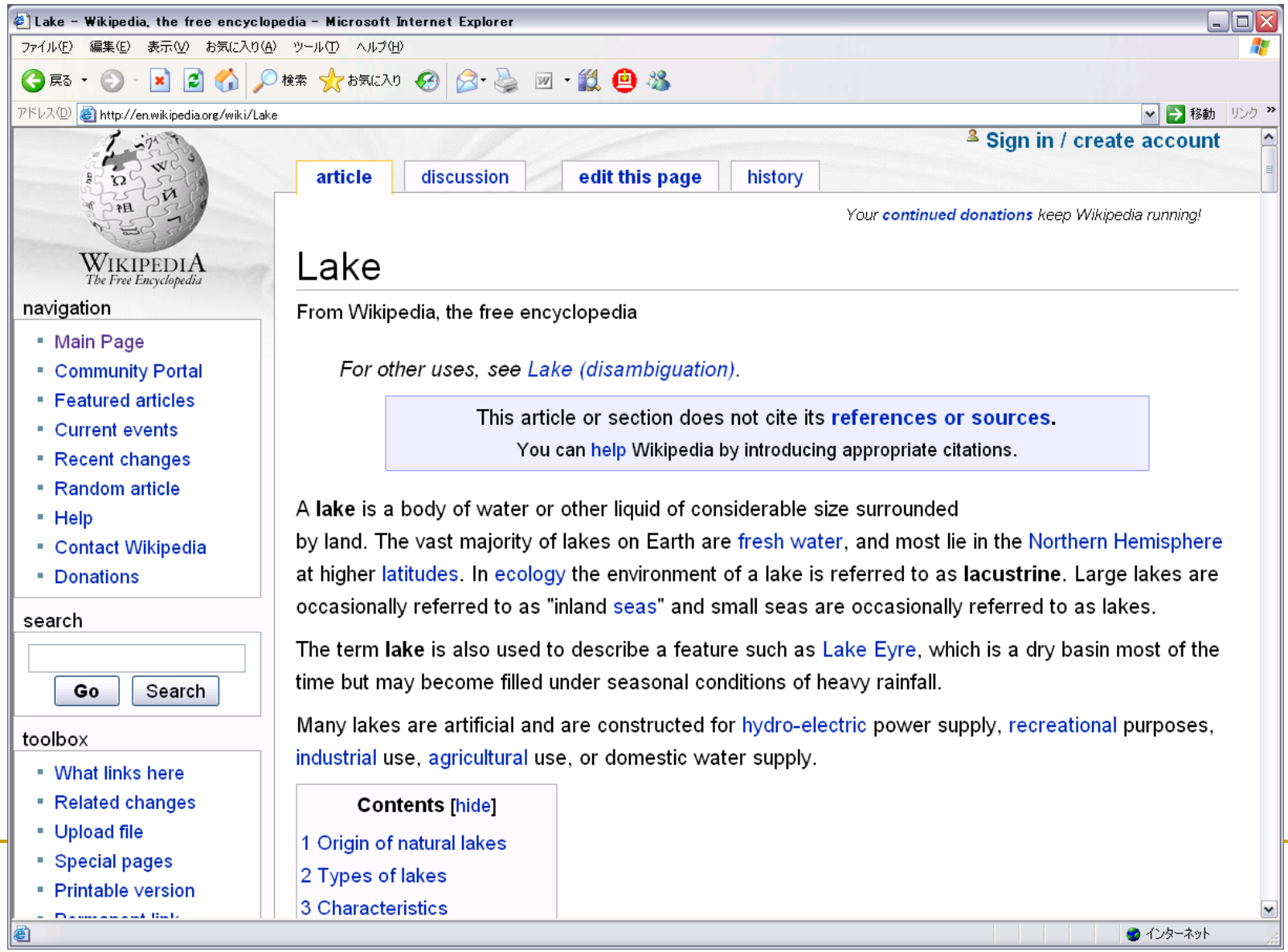
(3) Modification



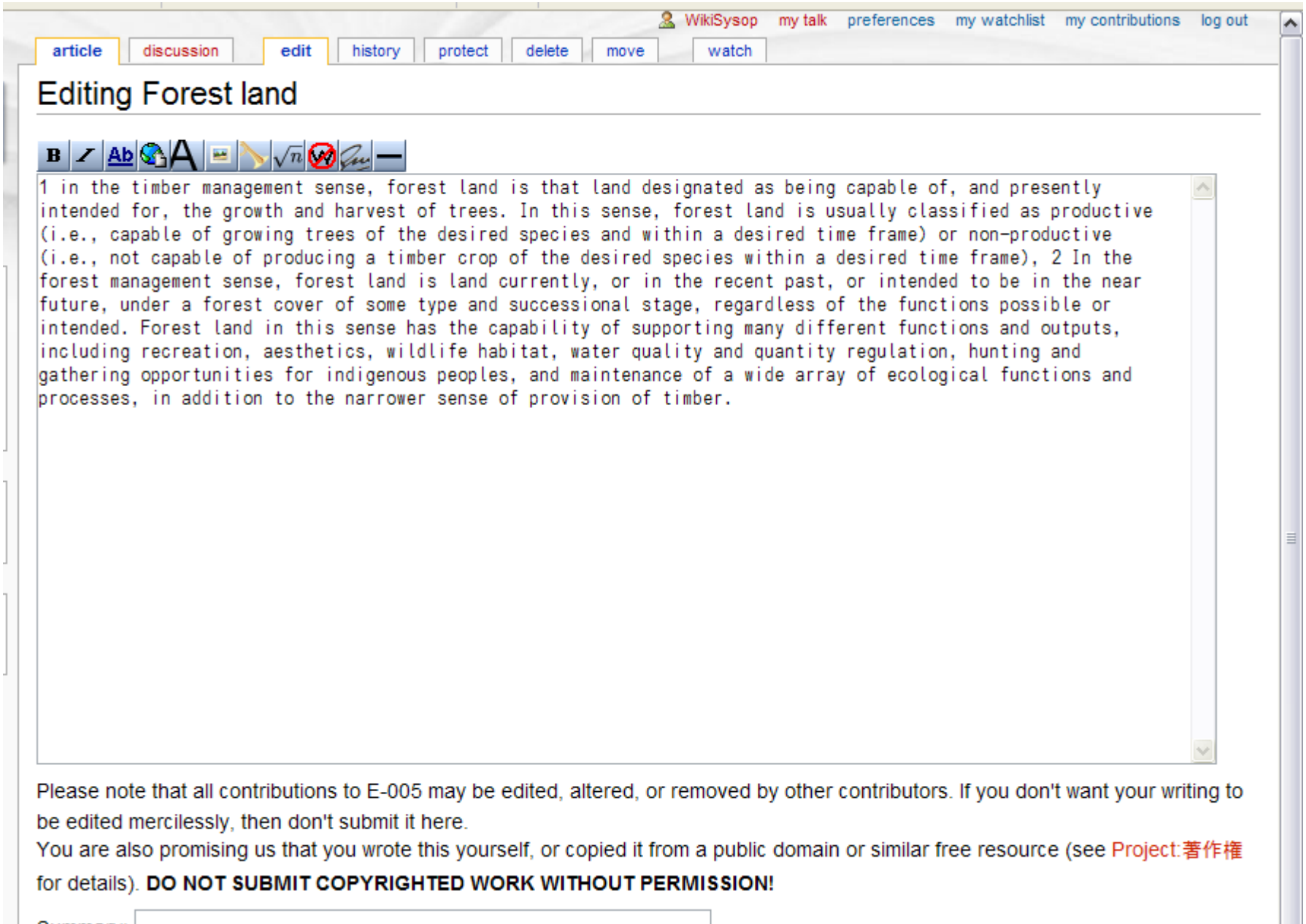
(4) Utilization

Providing integrated ontology
Utilizing as knowledge

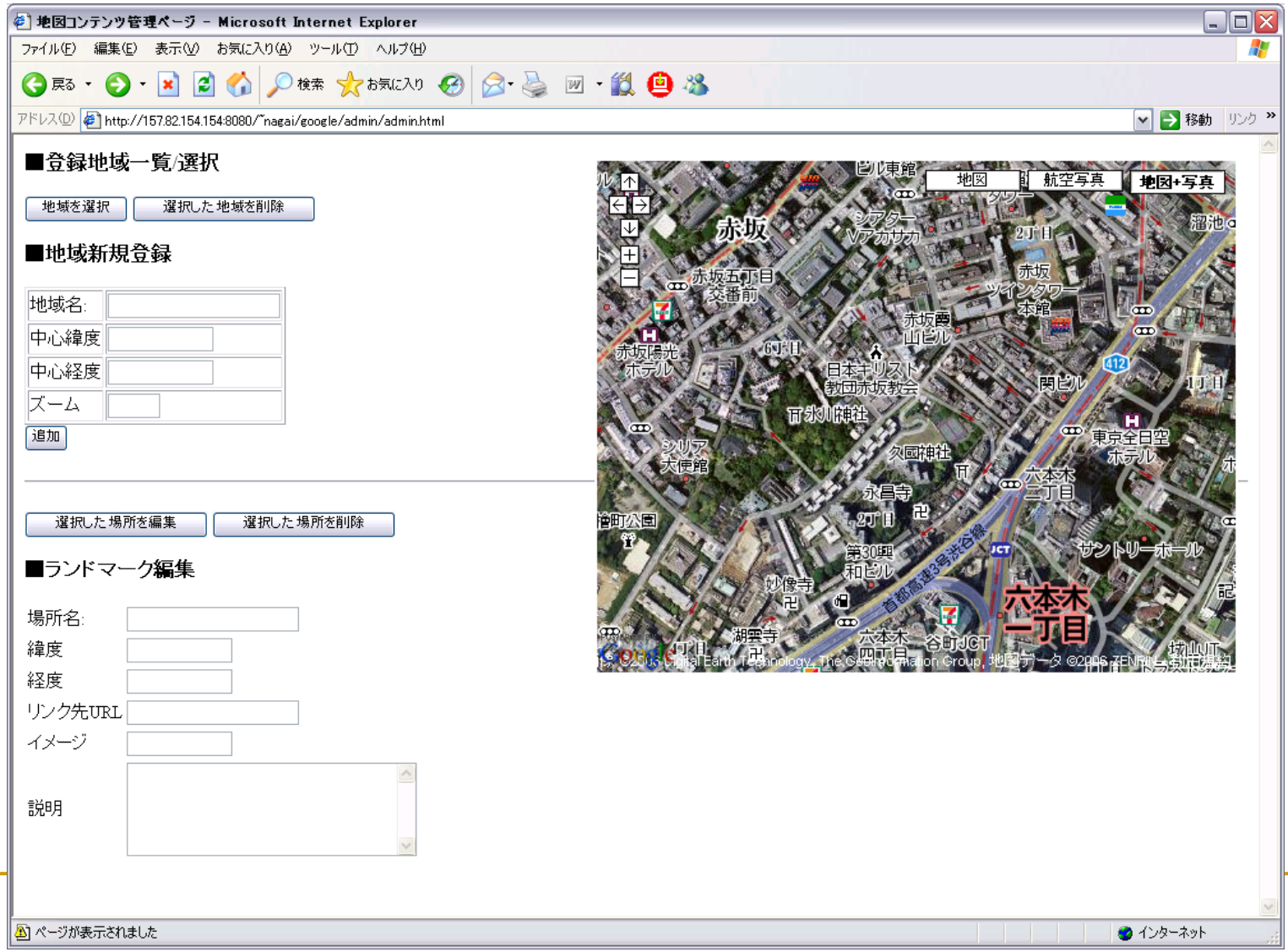
Modification by Wiki



Modification by using MediaWiki



Modification of gazetteer by Google map



Framework for ontological information

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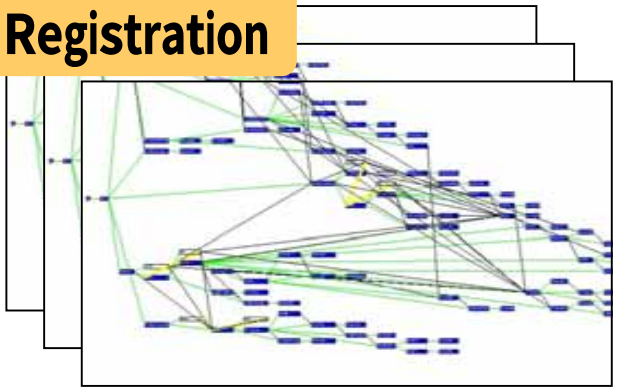

Correction and registration of Ontology

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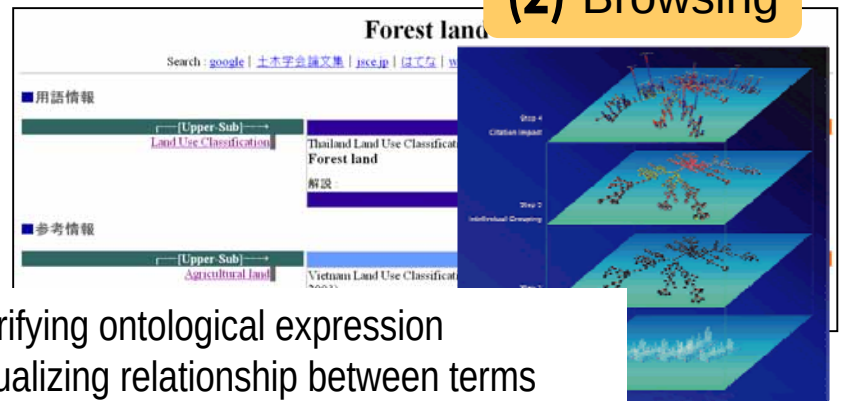

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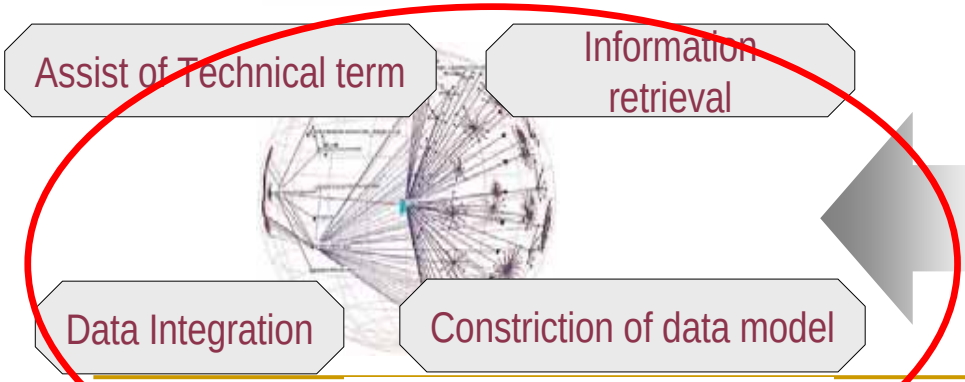


(4) Utilization

Providing integrated ontology
Utilizing as knowledge

Modification of registered information on the system
➔newest information

(3) Modification

Ontology for Land classification

Utilization of OWL (Web Ontology Language)

Land Classification System

- Land Cover Map
- Land Use Map

Different Land classification schemas developed for different purposes

Integration and Fusion by Ontology

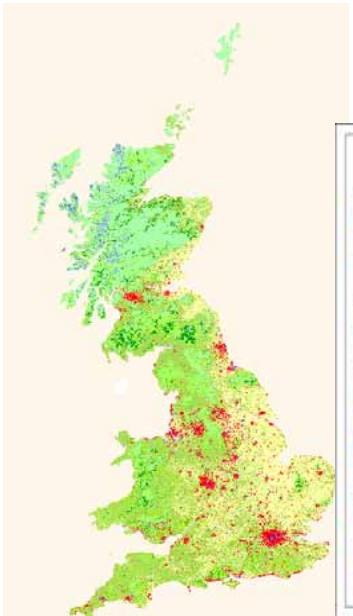
Preparation of land classification DB

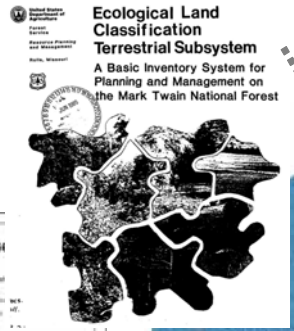
Collection of Land Cover / Land Use Map

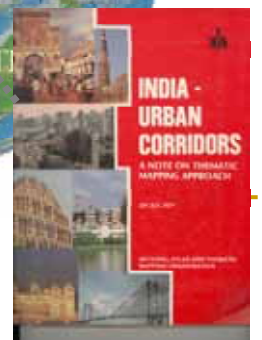
↓

Comparison or mutual referencing by accumulating in DB.

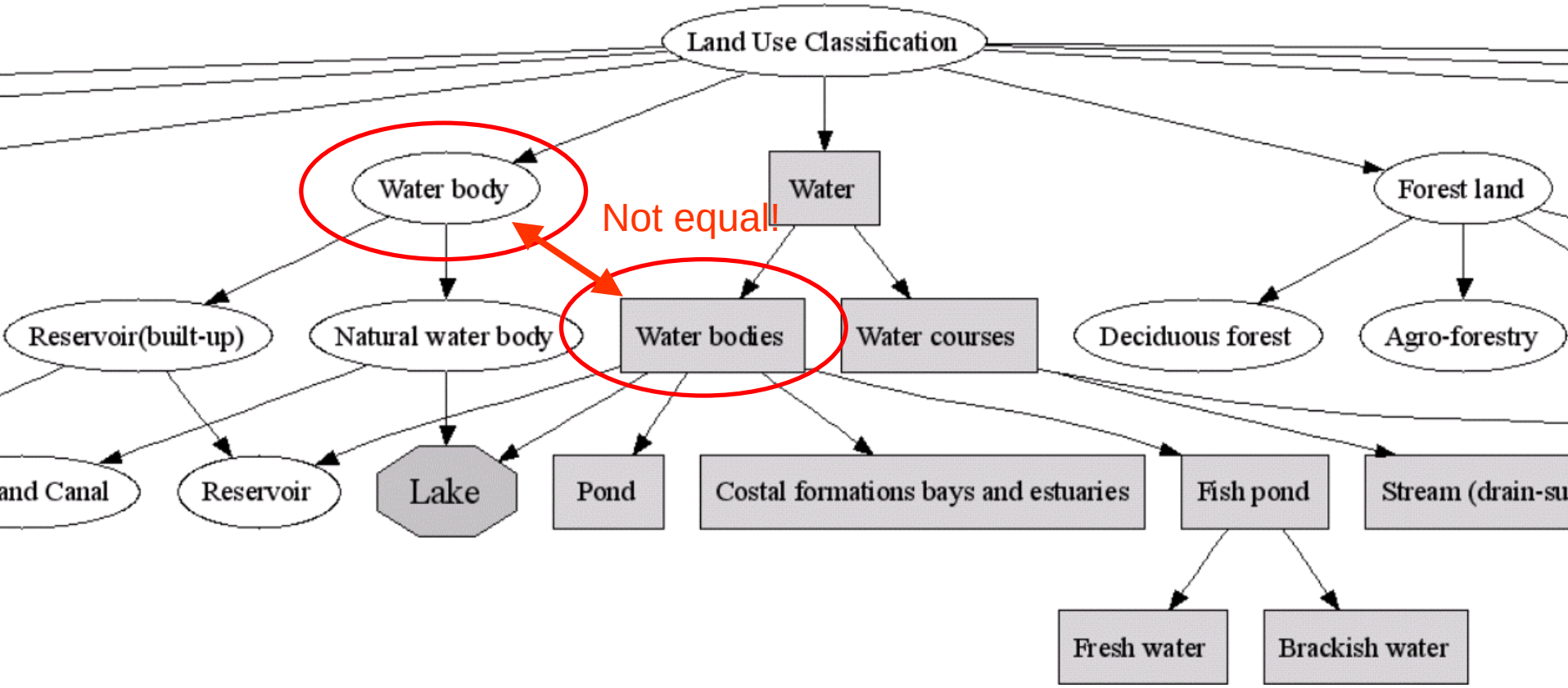
Land Cover / Land Use Map is accumulated in Access







Comparison of land classification

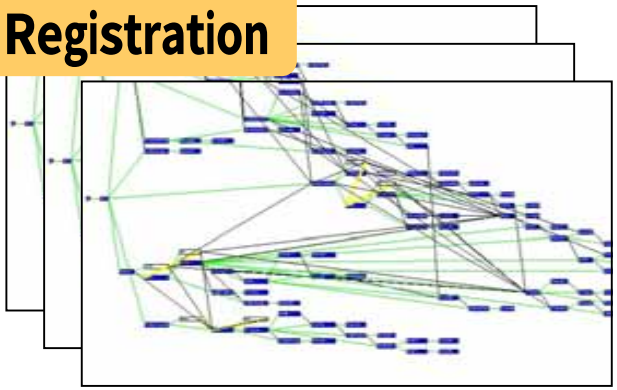


Landuse in Thailand

Landuse in Indonesia

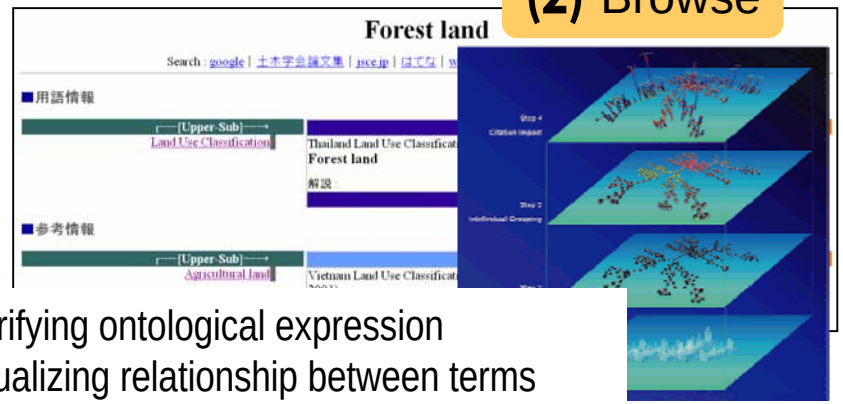
Framework for ontological information

(1) Registration



Correction and registration of Ontology

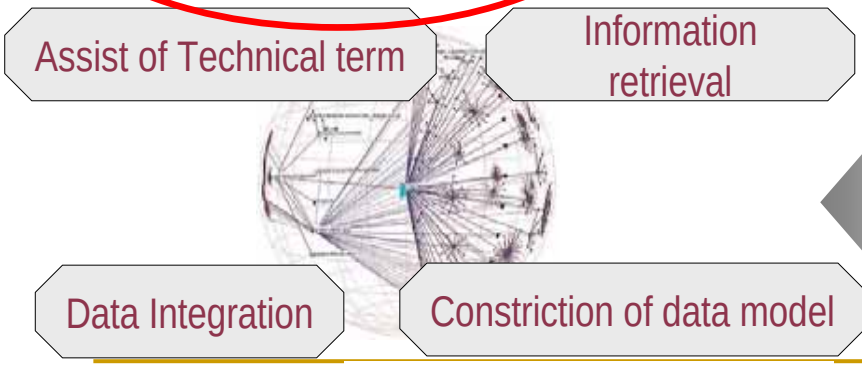
(2) Browse

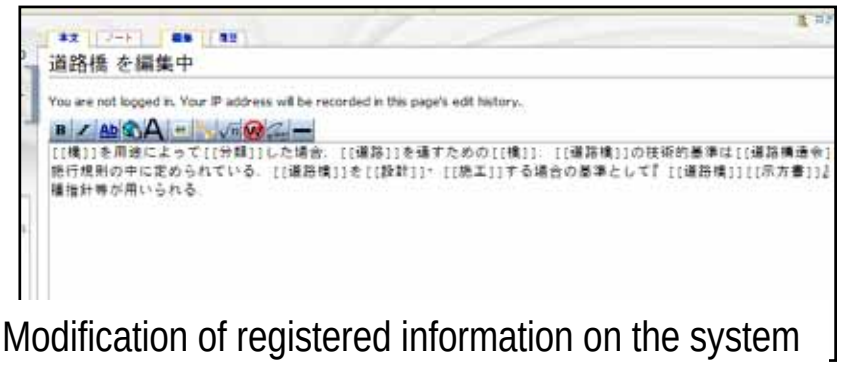


Clarifying ontological expression
Visualizing relationship between terms
➔Providing reference information to users

Created ontology is registered to the system again.

Ontology Registry System





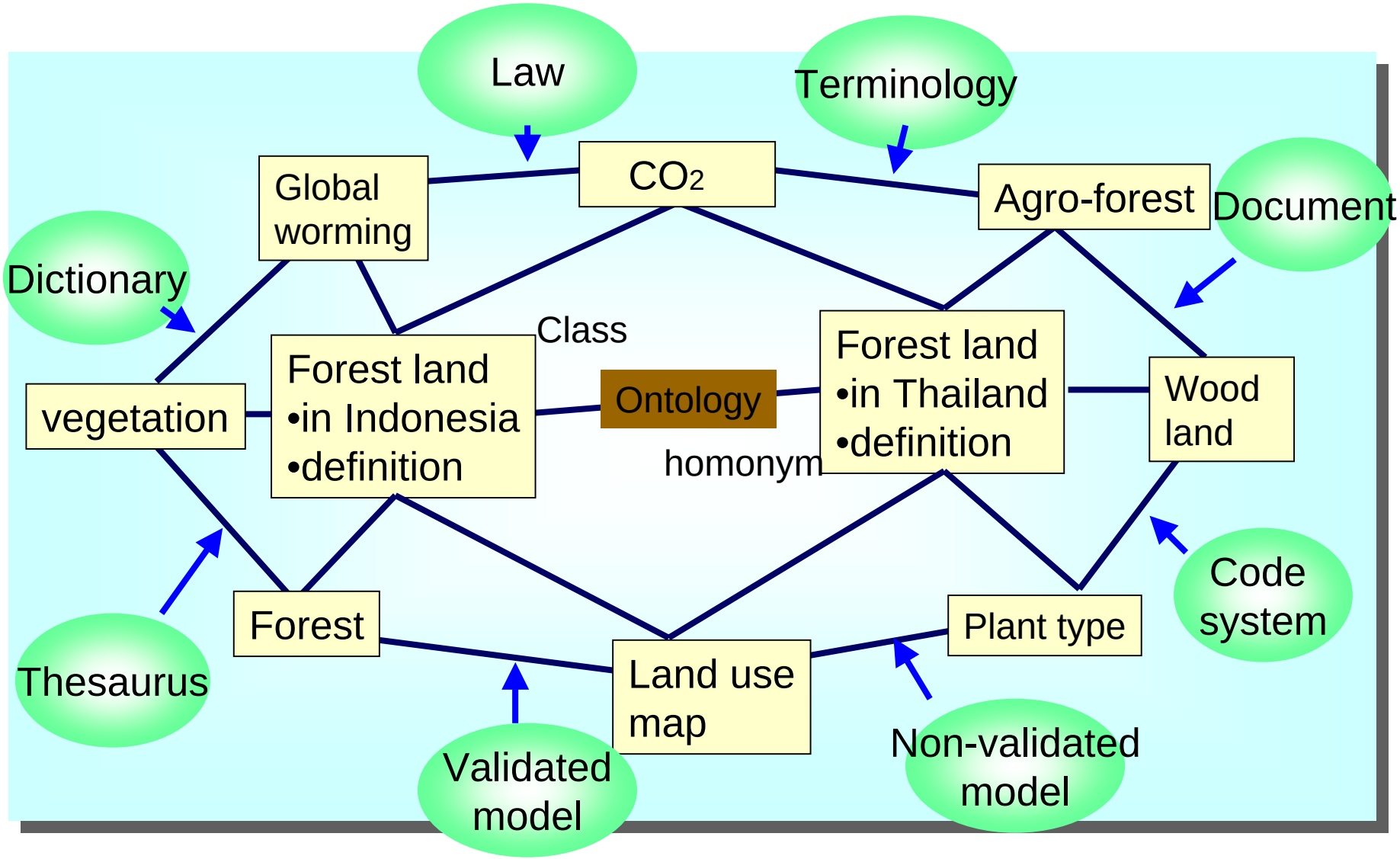
Modification of registered information on the system
➔newest information

(3) Modification

(4) Utilization

Providing integrated ontology
Utilizing as knowledge

Network can grow!



Conclusions

- Semantic interoperability should also be taken care of.
- Cooperation for enriching ontological contents
  - Dictionaries
  - Gazetteers
- Need to provide more sophisticated user support system based on the ontological information
  - Supporting data search in the web
  - Supporting development of data models, metadata etc.