Background Study for an International Forest Products Price Information System

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Executive Summary

Background and aim of the study

The global recognition of access to relevant information and markets as enabling conditions for the development of a sustainable forest sector poses a challenge of an improved data provision from private and public sectors. In a region where private ownership and management of forest predominate, this challenge becomes daunting as the need for better understanding the motivation of private landowners arises. The profitability of private forestry can have a profound effect on forest management practices, and vice versa. This profitability depends on prices private landowners receive from timber sales. To obtain better timber prices, the knowledge of timber markets and prices is essential for private landowners to make timber sales and forest management decisions. Tremendous international efforts have been made to provide right price information at the right time. However, there is still more to be done to improve data coverage, quality and accessibility. This awareness led the European Forest Institute and the UNECE/FAO Forestry and Timber Section to conduct a study in 2010-2011 to evaluate possibilities for improvement of international forest products price information.

The objectives of the study were:

- To investigate the potentials of improving data coverage and quality of forest products price series, and
- To depict best options for data collection and dissemination.

Methodology

After a review of relevant literature on information management and the UNECE/FAO price database, metadata schema was developed based on the Dublin Core Metadata Initiative. The schema was used a guide to search for price information websites in the UNECE region, Australia, Japan and New Zealand. The available information resources were analyzed in connection with data governance and data quality. From the gathered information resources, a forest products price information portal was developed to facilitate a quick user-friendly search for price information resources in the study region countries.

Two separate surveys were conducted: one with the Joint Forest Statistics Questionnaire national correspondents in the study region and the other with the UNECE Team of Specialist on Forest Product Marketing, forest products marketing experts, and participants at the 2010 Scandinavian Society of Forest Economics conference held in Denmark, as well as the EFI researchers.

Results

Data governance

Six modes of access were identified. Of the 247 information resources analyzed, more than half had public access. The two next important modes of access were subscription and organization members only, accounting for 18% and 6% respectively. These resources were created by 11 types of organizations. Timber merchants accounted for 32% of the available information resources. The majority of their resources have public access (95%). The consulting firms accounted for 12% of the information resources, of which 63% requires subscription. National forest and statistical agencies accounted for a combined share of 17% of information resources. More than three-quarters majority have public access.

Data quality

Regionally, more than half of the information resources (247) were found in Europe (66%), followed by North America (19%), Commonwealth of Independent States (12%) and Asia-Pacific (3%). Seventy-five percent of information resources provide price information domestically and 25% internationally. Forty countries were searched for price information. Of these, 30 countries had price information. The United States accounted for 13% of the resources, followed by France (12%) and Russian Federation (11%). The information resources were categorized into price data (84%) and price related information, and the former subdivided into price series and spot prices. Twenty-three price series were identified and 4 relational price databases. A forest products price information portal was developed based on the available information resources. The portal has basic and advanced search features.

Data collection process, maintenance and constraints

In most countries, national agencies (forestry or statistical services) request collection of roundwood prices through a survey administered to forest industry companies and/or forest owners. There is no official collection of domestic forest products prices. The data collection process and maintenance are fraught with constraints relating to methodology, data providers and resources. The methodological constraints are most serious, which relate to sampling method, product definitions, and data quality.

Users' experience and preferences

The price data are used for different purposes such as academic research (61%), consulting services (15%) and other purposes (24%), including lobbying, roundwood sales, market information service, benchmarking and presentation. On the role of the UNECE/FAO in forest products price provision, about 71% of respondents agreed that it should collect and store forest products prices. The rest (29%) preferred UNECE/FAO to provide links to websites reporting forest products prices. For the mode of dissemination of price information, the respondents' preferences are as follows: online database (76%), electronic bulletin (12%), printed report (6%) and other mode (6%), which is a combination of the first and second mode.

ConclusionsIn the region few countries have a forest products marketing information system (FPMkIS), which is a basis for price data collection, processing and dissemination. The data governance and data quality will improve across and between countries when more countries establish FPMkIS and use similar methodology in data collection, processing and reporting. In most cases, official sources are the best option, as they are committed to quality criteria of official statistics, as expressed in the Statistical Code of Practice of the EU. The main constraints of data collection and maintenance include: Methodological problems relating to sampling method, product definitions, and data quality;

- The unwillingness of data providers in some countries;
- National statistical agencies are lacking sufficient funding and trained staff to engage in data collection, processing and maintenance; and
- The lack of advanced tools (software or system) and trained staff for data processing and maintenance.

Recommendations

For national FPMkIS

- Further study of the existence, use and description of a FPMkIS in the UNECE and Asia-Pacific regions;
- The EU should assist member countries to develop a FPMkIS. This will allow various stakeholders to make informed decisions, reduce transaction costs and make the EU timber sector transparent;
- Special attention should be given to the EU member countries in transition to market economy as more work is required there; and
- Having provided assistance, the EU may oblige member countries to report on a regular basis forest products price information.

For international forest products price database

For the development of an international FPPD, we recommend the following:

- Creating a pilot FPPD based on countries that already have a FPMkIS and price series, especially roundwood prices;
- Defining product grades with internationally agreed standards;
- Harmonizing measurement units, roundwood assortments, ownership categories etc.;
- Learning from the experiences of Agricultural marketing information systems which are well developed in many countries as well as at the international level; and
- Learning from the experiences of Baltic-Nordic Forest Statistics Group regarding data collection, processing and dissemination.

Data collection involving different stakeholders

The study recommends the following:

- A workshop to bring together different stakeholders to discuss how to motivate forest owners and forest industry companies to provide needed data on a regular basis;
- At the national level, governmental agencies (national forest/statistical service) should provide incentives to data providers;
- At the international level, governmental agencies should collaborate to harmonize product definitions, measurement methods and grades so that product price can be compared. In this process, governmental agencies need facilitation from the UNECE/FAO; and
- The UNECE/FAO should provide incentives to the private sector to provide market information. To this end, the experience of the International Tropical Timber Organization's fortnight market information report is worthy of learning.

August 2012

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List of Abbreviation

EFI	European Forest Institute
EFTA	European Free Trade Area
EU	European Union
FAO	Food and Agriculture Organization
FOWL	Forests and other wooded land
FPMkIS	Forest products marketing information system
FPPD	Forest products price database
JFSQ	UN-ECE FAO Eurostat ITTO Joint forestry sector questionnaire
MCPFE	Ministerial Conference for the Protection of Forests in Europe (currently known as “Forest Europe”)
MkIS	Marketing information system
NIPF	Nonindustrial private forest owner
OEF	Observatory for European Forest
SFM	Sustainable forest management
UFFTS	UNECE/FAO Forestry and Timber Section
UNECE	United Nation Economic Commission for Europe
USDA	United States Department of Agriculture

1. Introduction

1.1 Background

The sustainable development of the forest sector has received increasing attention at regional, national, and international levels. In 2005, the Fifth Session of the United Nations Forum on Forest recognized that the access to relevant information and markets are enabling conditions for the development of a sustainable forest sector[1]. In Europe, sustainable forest management (SFM) largely depends on the forest management practices of private landowners[2] since they own and manage the largest overall area of forests and other wooded land (FOWL). In a recent report by the United Nations on private land ownership in Europe, for 23 countries responding to the survey, private landowners account for half of FOWL, and in 11 countries 83% of FOWL is owned by nonindustrial private forest (NIPF) owners[3]. The socio-economic function of SFM was identified as a serious concern at the international workshop "Mobilizing Wood Resources" held in January 2007, where participants proposed the need for better understanding the motivations of private landowners which may affect wood production and mobilization[4].

In addition, the level of profit from forestry activities can influence and be influenced by forest management behaviour, resulting from prices received from timber sales. Thus NIPF owners' knowledge of timber markets and prices is essential for them to effectively participate in timber sale transactions and SFM in most European countries. At the international level, the knowledge of forest products prices is essential for regional/international timber trade. The international reporting of forest product prices typically takes place with private and public sector entities gathering international forest products price data and reporting them in a variety of ways to stakeholders. International forestry consulting firms also collect and provide timber and forest products price data for a fee. In the public sector, the UNECE/FAO Forestry and Timber Section has been gathering forest products price series since 1960[5]. It published the Timber Bulletin quarterly until it became, due to resource constraints and a change of focus, a single annual issue. In 1994 a special issue of the Timber Bulletin[6] was devoted to improving roundwood price statistics and specifications. In 2001, the Timber Bulletin was replaced by a downloadable Excel® database which is found on the UNECE/FAO website. In tandem, the FAO published import and export unit prices through the publication "Forest Products Prices" from 1970 to1992. Since these prices can be deduced from online trade statistics (ForesSTAT) by the FAO. The UNECE/FAO uses the data compiled in a number of ways. For example, the UNECE/FAO

[1] United Nations Forest Forum, 'Discussion Paper Contributed by the Farmers and Small Forest Landowners Major Group' (presented at the United Nations Forum on Forests Fifth Session, New York, 2005).
[2] MCPFE, 'State of Europe's Forests 2003', 2003.
[3] Franz Schmithüsen and Franziska Hirsch, *Private Forest Ownership in Europe*, Geneva Timber and Forest Study Papers (Geneva: United Nations, 2010).
[4] United Nations, 'Mobilizing Wood Resources: Can Europe's Forests Satisfy the Increasing Demand for Raw Material and Energy Under Sustainable Forest Management?' (Geneva, 2007).
[5] UFFTS, 'Prices - Forestry and Timber - UNECE', 1960, http://www.unece.org/forests/output/prices.html.
[6] United Nations, 'Special Issue: Roundwood Price Statistics and Specifications' (New York and Geneva, 1994), Volume XLV, No. 7 edition.

uses the price series in short- and long-term timber market outlook studies at regional and international levels. Examples of broader scope studies are the Forest Products Annual Market Review and European Forest Sector Outlook Studies also conducted by the UNECE/FAO.

Despite these efforts, there is still a significant need for improvement in the collection and timely dissemination of accurate forest products price information. The current price series maintained by the UNECE/FAO is constrained by the timeliness of reporting, product and country coverage, and an adequate internet-based user interface.

1.2 Study objectives

Cooperation and coordination among a diverse set of stakeholders at the national and international levels are essential for developing a systematic and comprehensive forest products sector price collection and reporting system. The EFI and the UNECE/FAO conducted a study in 2010–2011 to evaluate possibilities for improvement of international forest products price information. The study's specific objectives are to: 1) investigate the potential for improving coverage and quality of forest products price series and 2) propose options for data collection and dissemination of an improved system. The first objective relates to data governance and data quality of forest products prices, and the second to institutional arrangements for collecting price information and systems/technology involved in processing and dissemination of price information.

1.3 Methodology

Initially, a review of the literature was conducted in areas including information management and existing related price reporting systems in the forest and agricultural sectors. The UNECE/FAO price database was the starting point. The meta descriptors from this database were used to adapt the Dublin Core Metadata Initiative (DCMI) schema[7]. The retained metadata schema was used to describe websites reporting price and price-related information in the UNECE region as well as in Australia, Japan and New Zealand. It was hoped that some sort of a forest products market information system (FPMkIS) existed in each country in the study region. The available information resources were examined in connection with data governance and data quality. The former was assessed from the aspect of who accesses and owns the information sources, while the latter focused on the usability of data in terms of availability of the information sources.

In addition to identifying websites reporting price and price-related information, two surveys were conducted. The first survey with the JFSQ national correspondents focused on data collection process in various countries, constraints associated with data collection and maintenance, and ways to improve both data collection and maintenance. The response rate was 18% (15 out of 85 respondents. However, only 11 countries provided complete responses. The second survey with forest product marketing specialists focused on users' experience, satisfaction and preferences of online forest products price databases. In this survey, questionnaires were sent to UNECE/FAO Team of Specialists on Forest Products Marketing (now Team of Specialists on Sustainable Forest Products), forest products marketing experts at various universities worldwide, participants in the 2010 Scandinavian

[7] 'Dublin Core Metadata Initiative (DCMI)', March 15, 2010, http://dublincore.org/.

Society of Forest Economics conference held in Denmark, and EFI researchers. The response rate was 19% (40 out of 207 respondents). The complete responses from both surveys were analyzed.

1.4 Scope and Data limitations

This study focused on websites reporting price information in the UNECE region and in these countries: Australia, Japan and New Zealand. The following products were included in price reporting searches: sawlogs, fuelwood, pulpwood, sawnwood, wood pellets, veneer, wood based panels (veneer, plywood, particle board and medium density fiberboard (MDF)), and pulp and paper. Where ever applicable the species from which the products were made were noted.

The main limitations of the study included data unavailability, data incompleteness and language inconsistencies. Website reporting for forest products price information did not exist in some countries such as Macedonia where statistics on forest products prices are not collected. For some websites, information on some metadata elements was not available. It was also difficult to search for and extract metadata from some non-English websites reporting price information. Google® Translate was very helpful in some cases but could not help in other cases, especially when detailed document about the site was in PDF file format.

2. Forest information systems

2.1 Existing systems at national and international levels

EFI conducted a series of studies in the 2000s on information and information systems of the European forest sector. The study "*Forest Products Statistical Information Systems*"[8] focused on commodity coding, definitions and methodology relating to the collection of forest products production and trade statistics in the EU and EFTA. Statistical sources on forest resources in 15 EU member states and 4 EFTA was the focus of the study "*European Information and Communication Systems*"[9]. The need arose for a linked network of European forest information services, which was the focus of the study "*Towards a European Forest information System*"[10]. The study "*International Information in the European Forest Sector*"[11] focused on demand for and supply of information about the forest sector at the international level. This study suggested that the demand for raw price data was sufficiently met. However, the demand for processed data, its statistics, graphics, and reporting was found to be only partially met. In 2007 the UNECE/FAO survey found few countries in Europe to possess FPMkIS[12].

[8] Wardle, Brusselen, and Michie (2003)
[9] R. Päivinen and Michael Köhl, *European Forest Information and Communication System*, Technical Series 17 (Joensuu, 2005).
[10] Schuck et al. (2007)
[11] P. Wardle et al., 'International Information on European Forest Sector' (2008).
[12] L. Farquharson, 'Forest Products Market Information Systems in the UNECE Region', 2007, http://www.unecefaoiufro.lsu.edu/ebusiness/documents/2007July/SC_025.pdf.

2.2 The Forest products marketing information system

2.2.1 Definition

A Forest products marketing information system (FPMkIS) is a framework for market data, including price data collection and management. Optimally, a consistently structured FPMkIS should exist in each UNECE country to facilitate the collection, processing, storage and dissemination of forest products price information for various stakeholders. It would serve as a basis for establishing an international forest products price database (FPPD). It should be noted that standard forest products marketing textbooks[13] deal with the subject at the firm level.

At country level, the first definition of FPMkIS was proposed in the UNECE/FAO survey by Farquharson[14] as follows:

"An interactive database that allows information about market activity for timber industries, wood products, pulp & paper, non-wood forest products and forest policies."

The above definition of a FPMkIS has a broad scope (forest, non-forest and forest policy) and is restrictive in terms of specific components. However, a full-fledged marketing information system (MkIS) has four components: internal records, marketing intelligence, marketing research and a marketing decision support system[15]. Thus, there is a need for a definitional extension to capture every component and requirement of FPMkIS. In this study, a FPMkIS is defined as

A formalized and systematic structure that captures the concerted efforts of timber growers, forest industry companies and national forest/statistical agencies to gather, analyze, process, compile and distribute relevant marketing and market information.

2.2.2 Application of a FPMkIS in Europe

The development of a MkIS for the forest sector has received less attention in contrast to efforts made in developing agricultural MkIS [16,17,18] and non-timber forest products MkIS[19].

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13 Heikki Juslin and Eric Hansen, *Strategic Marketing in the Global Forest Industries*, 2003 Update. (Corvallis: Authors Academic Press, 2003).

14 Farquharson, 'Forest Products Market Information Systems in the UNECE Region'.

15 Philip Kotler, *Marketing Management: Analysis, Planning, Implementation, and Control*, 9th ed. (Prentice Hall College Div, 1999).

16 Vasant P. Gandhi, 'A Decision-Oriental Market Information System for Forest and Agro-Forest Products in India', in *AFITA 2002: Asian Agricultural Information Technology & Management. Proceedings of the Third Asian Conference for Information Technology in Agriculture.* (presented at the AFITA 2002: Asian agricultural information technology & management. Proceedings of the Third Asian Conference for Information Technology in Agriculture, Beijing, China, 26-28 October, 2002, Beijing, China, 2002), 578–585.

17 A.R. Babu, Y.P. Singh, and R.K Sachdeva, 'Establishing a Management Information System', in *Improving Agricultural Extension. A Reference Manual* (Rome: FAO, n.d.), http://www.fao.org/docrep/w5830e/w5830e0k.htm#chapter%2018%20%20%20establishing%20a%20management%20information%20system.

18 I.M. Crawford, *Marketing Research and Information Systems*, 4th ed., Marketing and Agribusiness Texts (Rome: FAO Regional Office for Africa, 1997), http://www.fao.org/docrep/W3241E/W3241E00.htm.

19 Abwoli Y. Banana, 'Non-timber Forest Products Marketing: Field Testing of the Marketing Information System Methodology', in *Domestication and Commercialization of Non-timber Forest Products in Agroforestry Systems* (FAO, 1998), http://www.fao.org/docrep/w3735e/w3735e28.htm#P7_0; FAO, 'Marketing Information Systems for Non-timber Forest Products', http://www.fao.org/docrep/005/ac692e/ac692e00.htm.

According to the 2007 UNECE/FAO survey[20], a FPMkIS exists in few UNECE countries such as Finland, Germany[21], Lithuania, Latvia, Slovakia, Sweden, and Switzerland. A 2007 study by Glavonjic reported the development of FPMkIS in Bosnia and Herzegovina and Serbia[22].

2.2.3 Functional and non-functional requirements of FPMkIS

In light of this study's definition of FPMkIS, the proposed functional and non-functional requirements of an extended FPMkIS will be described in this section. Functional requirements include services, tasks or function of the system, and non-functional include constraints and quality aspects. The starting point is the analysis of stakeholders (and their interests) of the system (See details in Annex 1. Stakeholder analytic framework). The Use Case diagram is a useful tool for capturing functional requirements of a system. The diagram provides an overview of the system: its functions (or use cases) and actors[23]. **Figure *1*** presents a proposed use case diagram for a FPMkIS at the national level. The system focuses on the upstream part of the wood supply chain, including raw wood materials and primary processed products. Thus, actors or stakeholders (e.g., forest owners, sawmills, etc.) are identified and their desirable goals (or use cases) are also identified. The user-goal relationship represents an instance of a use case. Thus, it is instructive to describe these use cases along with potential users or actors (single or generic) that have a stake in them.

Use case 1 – Forge Cooperation among Stakeholders: To bring about cooperation among primary data providers, namely timber growers and forest industry companies. In this regard, national forest/statistical agencies have an important role.

Use case 2 – Assess Wood and wood products Demand: To provide a demand level of raw wood material and wood products. Timber growers, wood processors, academia and consulting firms need to know the demand level in order to make timber sale, purchasing, and research decisions.

Use case 3 – Assess Reliable Supply: To ascertain continued availability of raw wood materials or semi-finished timber products. This information is useful for sawmills, pulp mills, paper mills and furniture companies.

Use case 4 – Analyze Market Development: To provide market trends, opportunities, threats, etc. Wood processors, academia and consulting firms have a significant stake in this function.

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[20] Farquharson, 'Forest Products Market Information Systems in the UNECE Region'.

[21] The ZMP (The Central Market and Price Reporting Unit for Agriculture, Forestry and food) ceased its operation on April 30, 2009 (see www.zmp.de for details**).**

[22] Branko Glavonjic, 'Marketing Information System - Case of Serbia' (presented at the Third annual Regional Wood Products Marketing Seminar, Sarajevo, Bosnia and Herzegovina, December 7, 2007), http://www.unece.org/timber/workshops/2007/sarajevo/Presentations/4banko_glavonjic.pdf.

[23] Ned Florencio Kock, *Systems Analysis & Design Fundamentals: A Business Process Redesign Approach* (Sage Publications, Inc, 2006).

Use case 5 – Monitor Price: To monitor price information for various forest products. To this end, the users with main stake are timber growers, wood processors, government agencies, academia, and consulting firms.

User case 6 – Retrieve Information: To satisfy the information needs of academia, wood processors, and consulting firms, information must be accessible and structured in a useful way.

Use case 7 – Manage the System: To analyze, plan, implement and maintain the system. This concerns national forest/statistical agency.

Use case 8 - Disseminate Information: To make relevant information available in a timely manner to national stakeholders, especially timber growers and forest industry companies.

Use cases 1, 6 and 8 are non-functional requirements. Use cases can be subdivided into sub-use cases or sub-systems. For example, the use case “Monitor Price” could have sub-use cases, such as “Record Product Name”, “Record Product Type”, “Record Quantity”, “Record Product Grade” and “Record Product Price” to form a price subsystem.

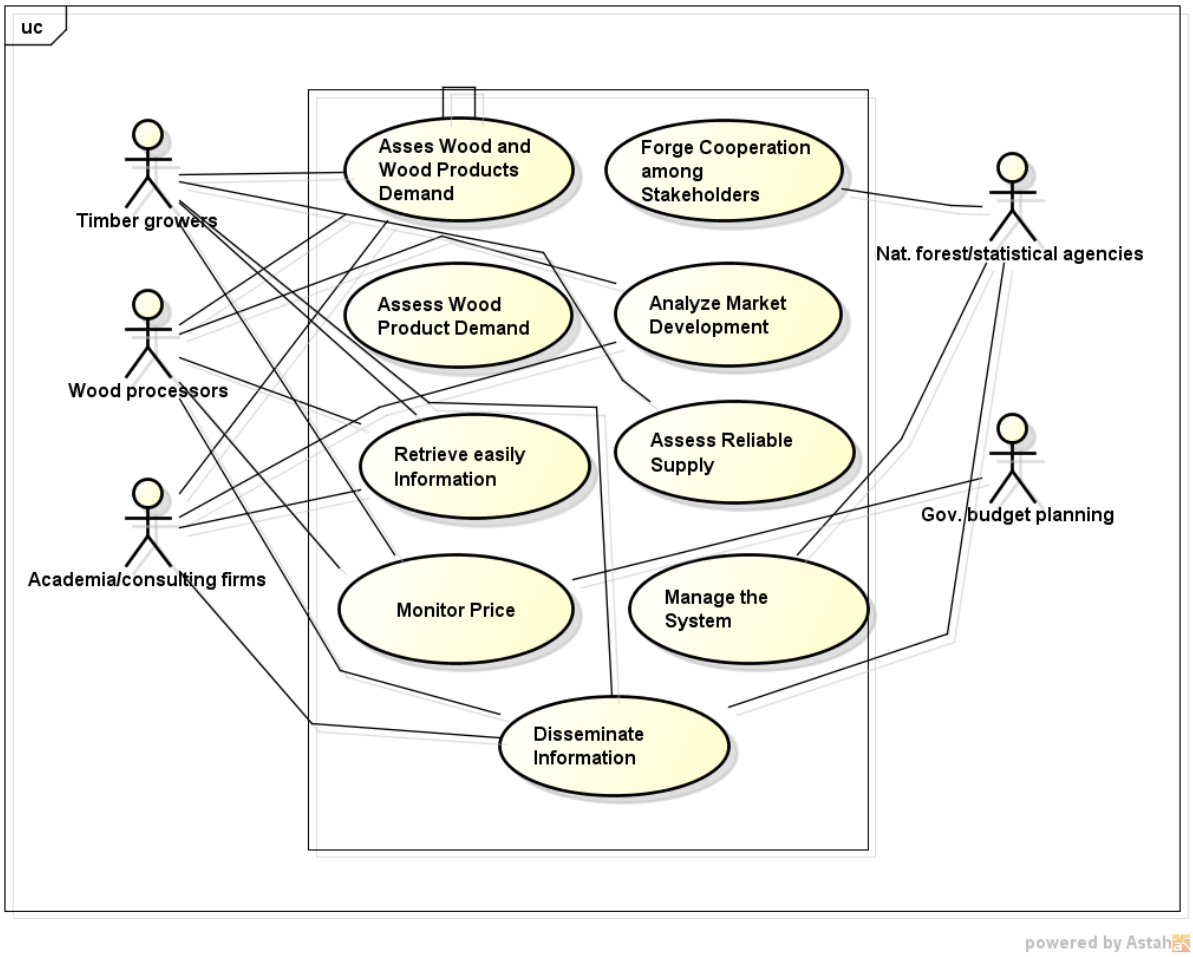

Figure 1. A use case model of FPMKIS.

3. Forest products price information resources

3.1 Introduction

Information resources include websites that report prices and price related information on forest products in the UNECE region and in selected Asia-Pacific countries (Australia, Japan and New Zealand). These resources were categorized into two groups: (1) websites that report price data (price series or spot prices) and (2) websites that report price related information, including market development, market analysis, and forest products trade statistics. It should be noted that the information resources are not exhaustively identified (only those obtained within the time frame of the study).

3.2 Data governance

In an organization or enterprise, data can be treated as an asset[24]. As such, they should be governed, i.e. who controls and directs aspects, such as data ownership and accountability, data access, data handling and data quality levels in order to make it valuable. In this study, we describe data governance in terms of data access and organization type (i.e. who controls or has ownership over a resource).

3.2.1 Data Access

Access relates to user rights, such as who will have contact to a resource, what user can access, when and where to access a resource? In this study the information resources had various modes of access, including public, subscription, members only, limited use (i.e. only some data can be accessed or full data for a limited time), requiring purchase, and free registration. More than half of the information resources identified had public access (**Figure *2***). The next frequent mode of access was subscription (18%).

3.2.2 Organization type

The organization type refers to who creates, owns and manages the resource. Different organizations established information resources (**Figure *3***) and with various access rights (**Table 1**). Timber merchants accounted for 32% of the available information resources. These companies provide retail price information on timber and timber products. The majority of their resources have public access (95%). The consulting firms accounted for 12% of the information resources, of which 63% requires subscription. Forest owner organization's share stood at 9%, of which 59% has public access and 23% with access restricted to organization members.

The share of forest industry organization was 7%, of which 39% has access restricted to members and 33% with public access. National forest and statistical agencies accounted for a combined share of 17% of information resources. More than three-quarters majority have public access. Marketplace and publication industry accounted for 8% and 7% of information resources, respectively. Access to marketplaces is mainly public and by subscription (each 42%). Publication industry is mainly accessed by subscription (56%). Wood manufacturer and university department accounted for 4% and 3% of information resources, respectively.

[24] Steve Sarsfield, *The Data Governance Imperative* (IT Governance Ltd, 2009).

Access to the resources of both is mainly public (89 and 88% respectively). International organization accounted for 2% of information resources. These have public access.

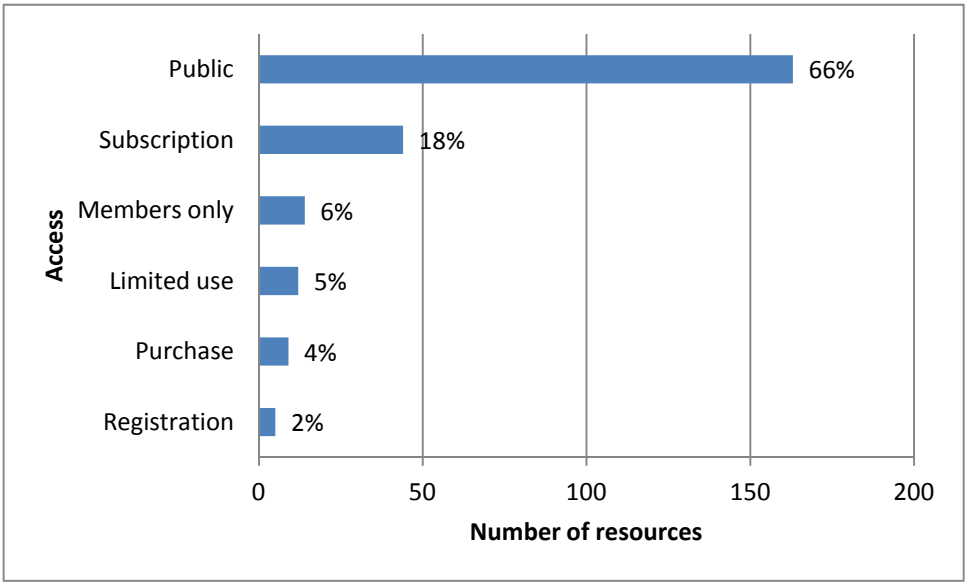

Figure 2. Price information resources by access.

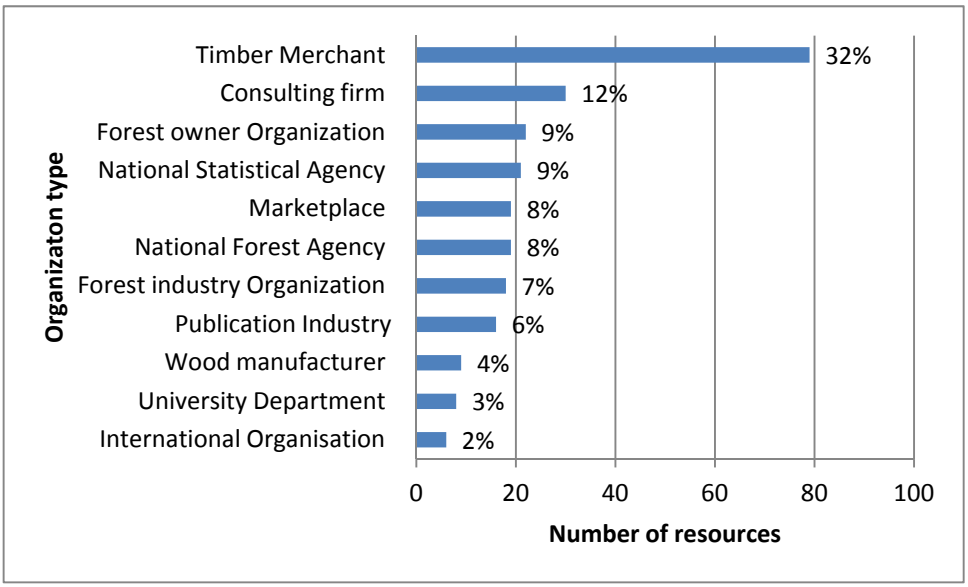

Figure 3. Price information resources by organization type.

Table 1. Access right across organization type.

Organization type	Access						
	Subscription	**Members Only**	**Registration**	**Purchase**	**Limited Use**	**Public**	**Total**
Consulting firm	19	..	1	2	1	7	**30**
Forest industry Organization	4	7	..	..	1	6	**18**
Forest owner Organization	..	4	..	3	2	13	**22**
International Organization	..	..	..	..		6	**6**
Marketplace	8	1	..	1	1	8	**19**
National Forest Agency	1	2	1	..	3	12	**19**
National Statistical Agency	2	..	..	..	..	19	**21**
Publication Industry	9	..	..	..	3	4	**16**
Timber Merchant			2	2	1	74	**79**
University Department	1	..	..	..	..	7	**8**
Wood manufacturer	..	..	..	1	..	8	**9**
Total	**44**	**14**	**4**	**9**	**12**	**164**	**247**

3.3 Data quality

Data governance regulates data quality which has many dimensions such as content (accuracy), structure (data integrity), time and availability[25]. We explored the data quality of the information resources in this study in terms of data coverage (i.e., availability of data) by region, market area and country.

3.3.1 Availability by region

By region, we mean the location of the information resources. **Figure *1*Figure *4*** shows the availability of information resources by region. The bulk of the information resources is found in Europe (66%), followed by North America (19%), CIS (12%) and Asia-Pacific (3%). The same trend continues for the availability of price data and price related information by region (**Figure *5***). Europe and North America accounted for 52% and 17% of price data and price related information, respectively.

3.3.2 Availability by market area

Market area refers to a country, group of countries or area within a country to which price data or price related information applies. **Figure *6*** presents the availability of information resources by market area. Apparently, the availability of information resources at the national level is largest (63%), while at the international level stands at 25%, and at the sub regional level at 13%. The same trend is seen when the information resources translate into price data and price related information (**Figure *7***).

[25] Danette McGilvray, *Executing Data Quality Projects: Ten Steps to Quality Data and Trusted Information* (Morgan Kaufmann, 2008).

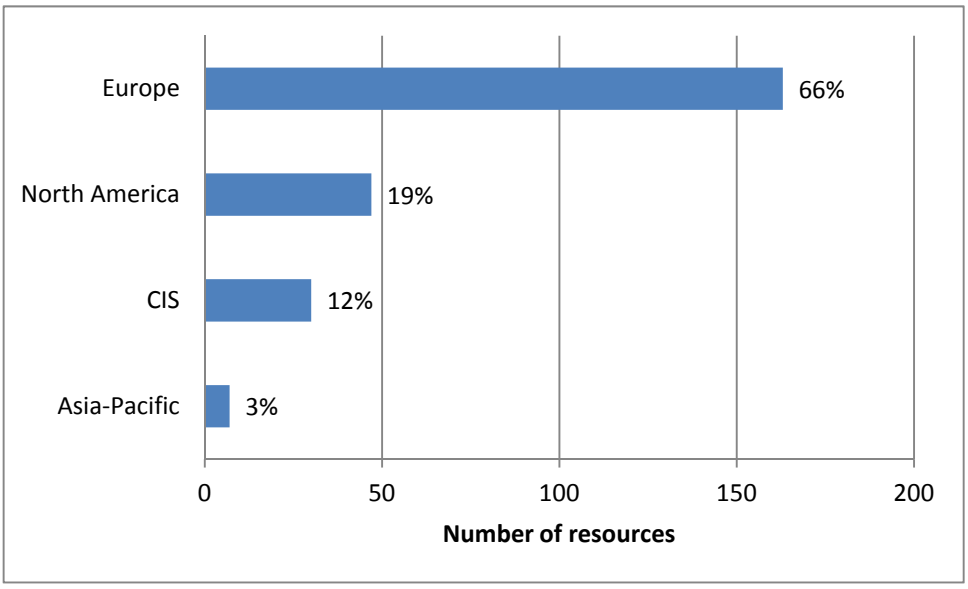

Figure 4. Price information resources by region.

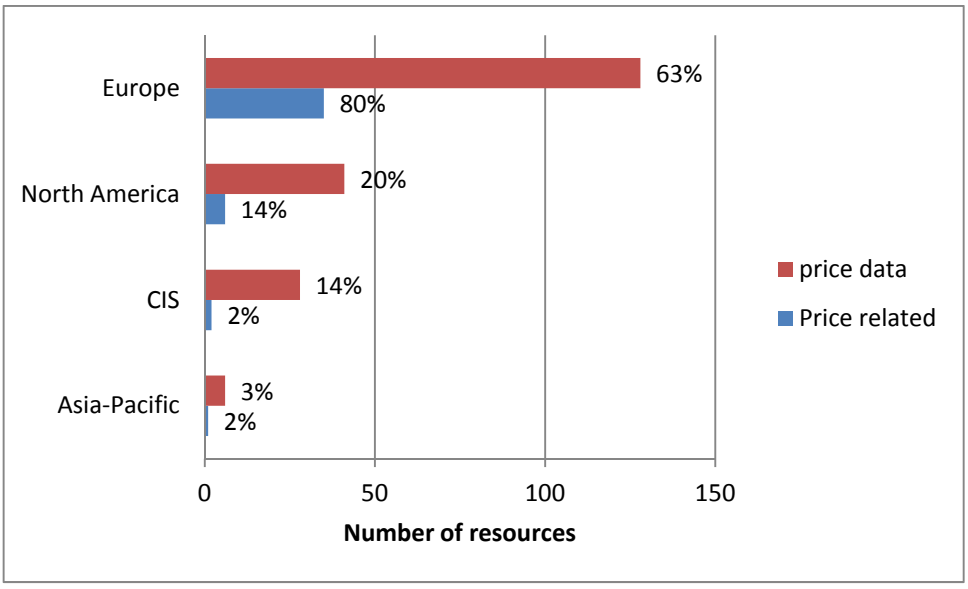

Figure 5. Breakdown of information resource by region.

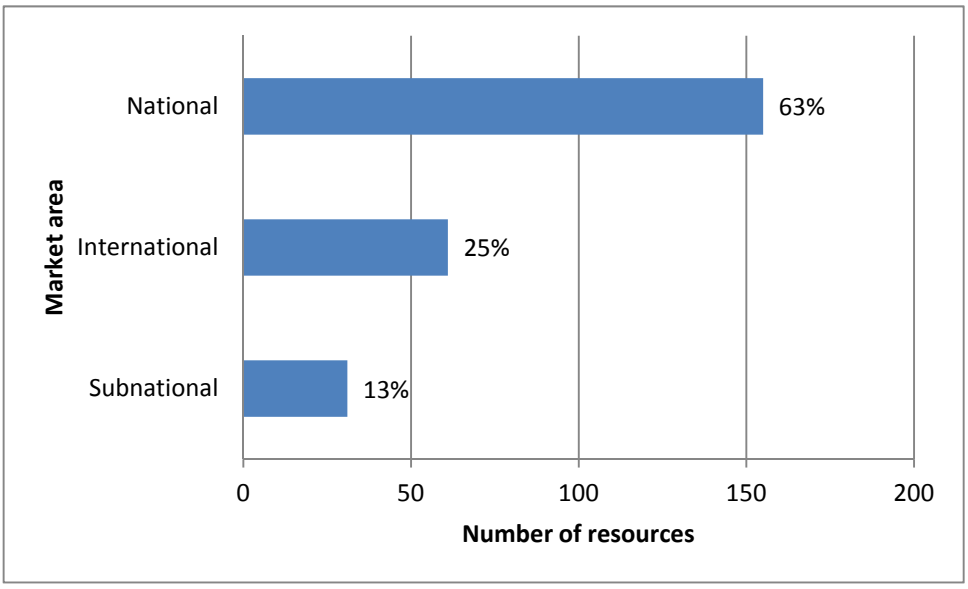

Figure 6. Price information resources by market area.

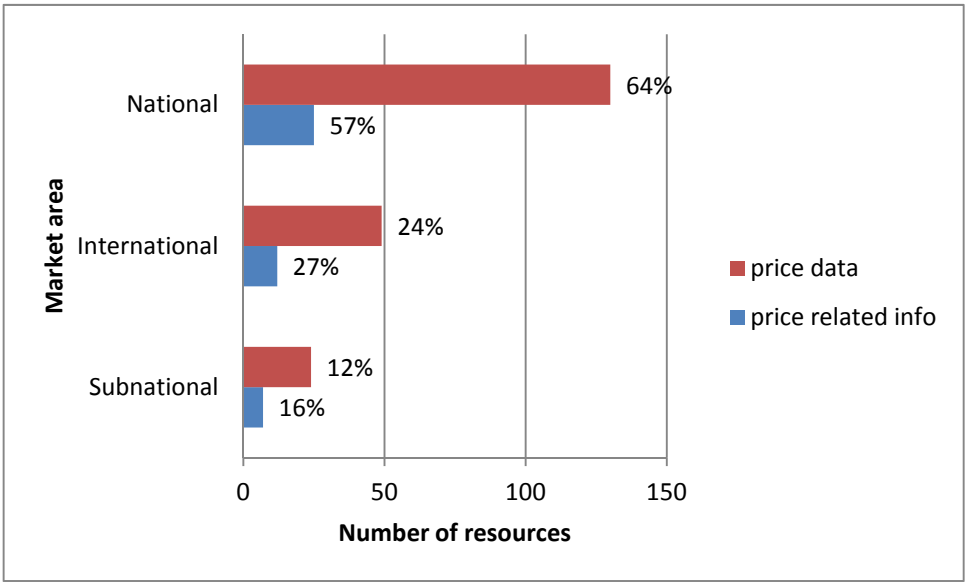

Figure 7. Breakdown of information resources by market area.

3.3.3 Availability by country

Information resource availability by country is presented in **Figure *8***. United States accounted for 13% of the resources, followed by France (12%) and Russian Federation (11%). Four countries have resources more than 20 but less than 30. These include Germany (7%), Canada (6%), Czech Republic (6%), and Sweden (5%). The rest (23 countries) has information resources less than or equal to 10. This study did not find information resources in Albania, Bosnia and Herzegovina, Bulgaria, Greece, Iceland, Macedonia[26], Portugal[27], Spain, Serbia,

[26] Macedonia does not have official statistics on forest products.

and Ukraine. These countries (Cyprus, Georgia, Malta, and Turkey) were not searched because of limited time or language problem.

3.4 Grouping information resources

3.4.1 Introduction

Price data constituted 82% of the total information sources (247 records). It can be subdivided into price series and spot price data (see Annex 2. Breakdown of price information). In this study focus is on price series because they could be used to develop an international relational price database.

3.4.2 Information availability of price series

Based on the dataset of this study, 23 price series resources were identified. **Figure *9*** shows the availability of price series. United States accounted for 35% of the series, followed by France and Canada accounting for 13% individually. Finland and Poland individually accounted for 9%, and the rest (5%) is evenly shared by Belgium, Czech Republic, Germany, Lithuania and Switzerland.

3.4.3 Information resources as relational databases

This section highlights information resources that are relational database because it is one of the best practices in data management. The study found only 17% of the price series (i.e. 4 resources) that are relational databases. Two of which are found in the United States, and one each in Finland and Poland. The databases are briefly described below.

- **Extension Forestry in Vermont price database**

This site provides a quarterly stumpage price data in Vermont, United States of America. It is maintained by the University of Vermont and has public access. The price series start from 1981 to 2007.

- **Metinfo price database**

The website reports roundwood prices, mainly on a monthly basis, in the Baltic Sea region. It is maintained by the Finnish Forest Research Institute. The price database contains roadside roundwood prices from Finland, Sweden, Estonia, Norway and Lithuania. The price series start from 1995.

- **Monitor e-drewno price database**

This price database contains roundwood prices obtained from timber sales from Polish State Forests. Monitor e-drewno is maintained by Drewno (**www.drewno.pl**). The users are mainly companies who paid for subscriptions. The price series start from 2009.

- **Southern Forest Resource Assessment price database**

The data are projections of softwood and hardwood timber price indices, from 1995 to 2039, developed using the Sub regional Timber Supply Model. It is maintained by the Southern Research Station of USDA Forest Service.

[27] In Portugal there is a forest information system on wood, cork, resin and pinecone. However, the system is not current in use because of lack of funding (http://cryptomeria.afn.min-agricultura.pt/enenquadramento.asp).

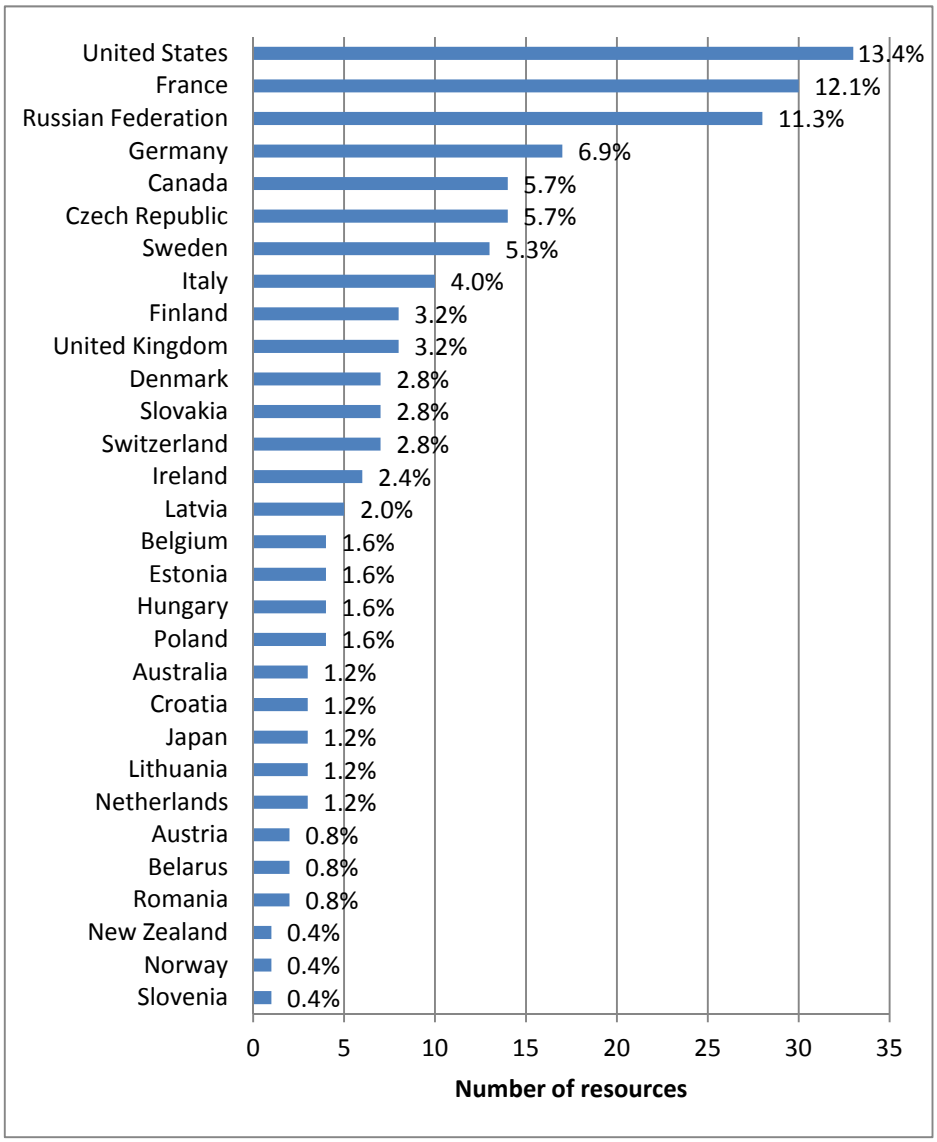

Figure 8. Price information resources by country.

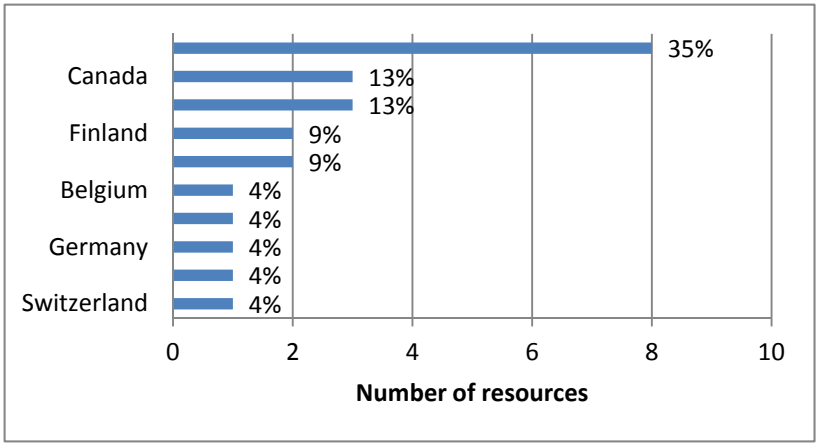

Figure 9. Availability of price series by country.

3.5 Development of price information Portal

3.5.1 Introduction

The information resources were described using the metadata schema retained in this study (Figure 10). The metadata elements filled with gray are original DCMI elements. These resources were used to develop a portal to provide quick and easy access to them. The portal allows basic search (one search criterion) and advanced search (one or combined criteria) capabilities. In the next section, the functional requirements of the price portal are presented and discussed.

3.5.2 Functional requirements of price information portal

The requirements (functional and non-functional) of the portal are displayed in **Figure *10***1. The only non-functional requirement corresponds to use case “Give Feedback”. The use cases can be broadly divided into two groups: information retrieval and data management. There are two main actors: data users and administrator. To satisfy their information needs, general users can search and retrieve information from the portal. They can provide feedback which can be a suggestion of missing website that should be included in the portal or general comments on the improvement of the portal. The portal maintainer will manage the portal database and perform these activities on a regular basis, such as storing, adding and updating data.

3.5.3 Organization of price information portal

The information resources are organized by product category, geographic region, market area, and organization type. These menus can be used to locate an information resource whose meta-information can be displayed partially or completely.

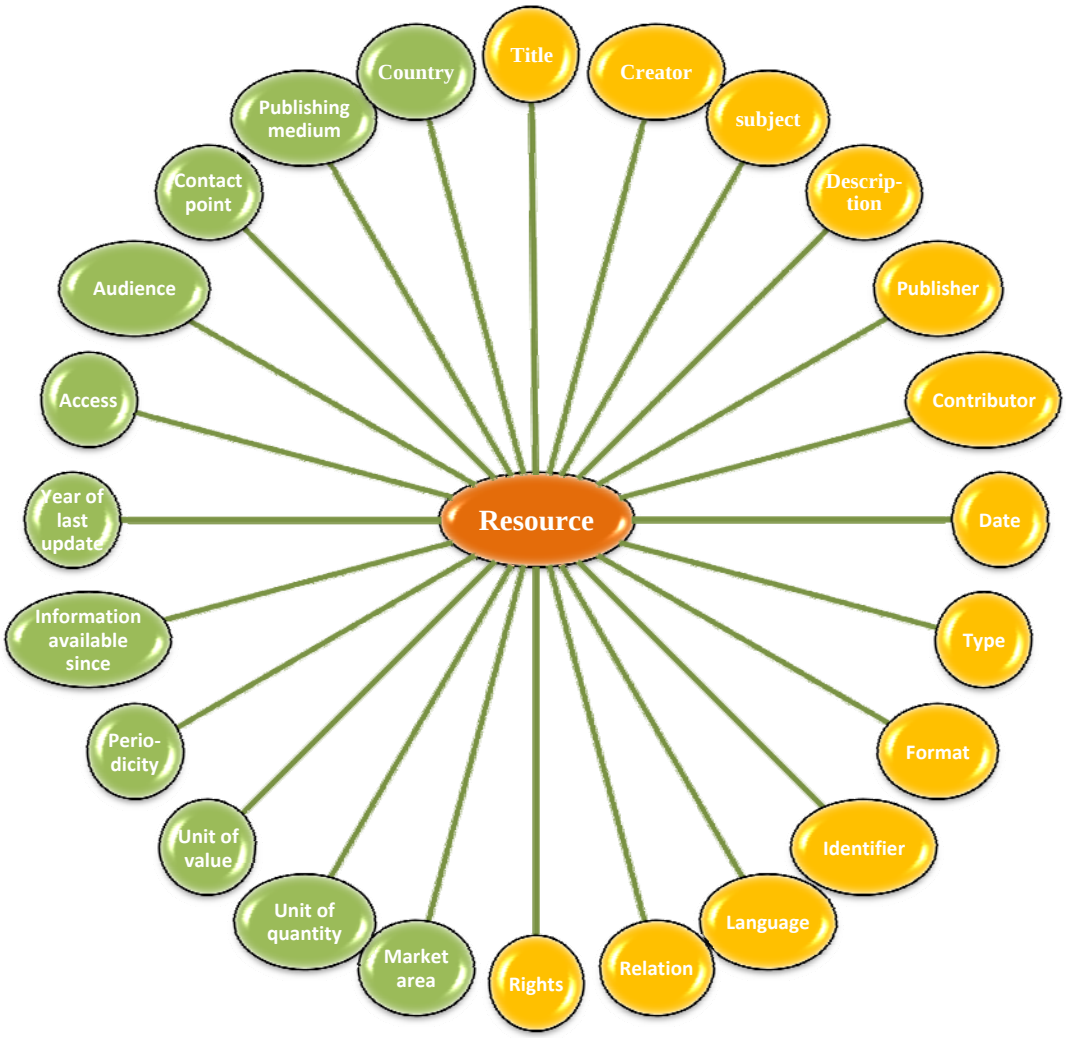

Figure 10. Metadata schema used in the study.

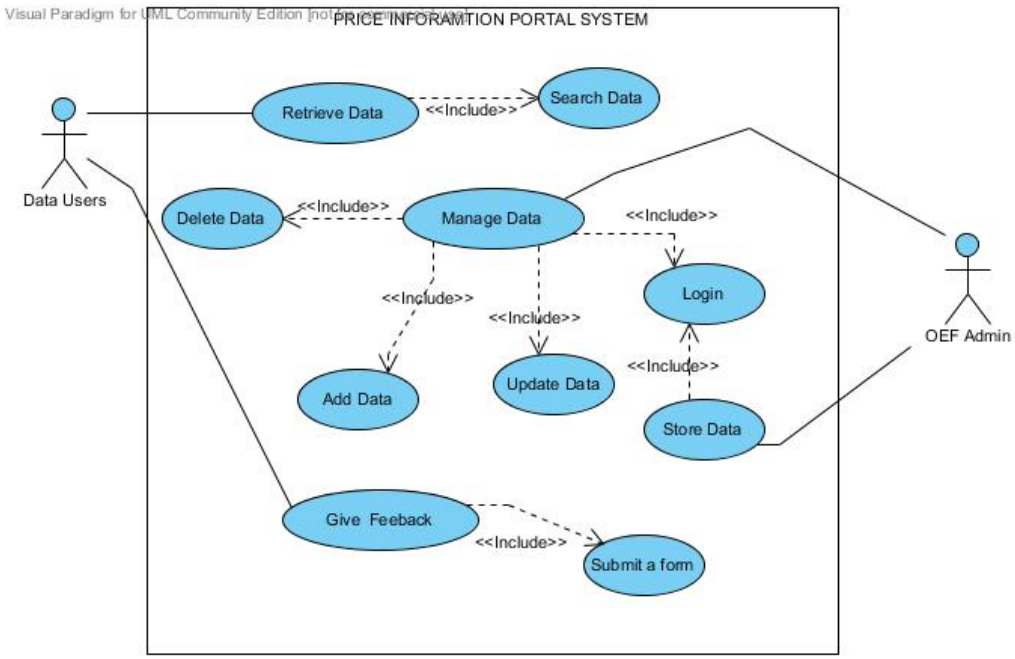

Figure 10. Use case model of price information portal.

4. Data collection process, constraints and improvements

4.1 Data collection process and maintenance

The survey with JFSQ national correspondents aimed at finding out, in relation to data collection and maintenance, who does what and how. These aspects are not completely and consistently clarified across respondents. In most countries, national agencies (forestry or statistical services) request collection of roundwood prices through a survey administered to forest industry companies and/or forest owners. Finland and Netherlands indicated that prices are collected on a voluntary basis. There is no official collection of domestic forest products prices. However, total values and unit prices (import and export) of forest products in foreign trade are collected by the customs authorities. There is no official system for collecting and processing data on forest products prices in Serbia. However, university department and companies are involved in data collection.

4.2 Constraints and improvements of data collection and maintenance

The respondents indicated a wide range of constraints and improvements of data collection and maintenance. These are classified under three headings: methodology, data providers and resources (**Table 2.** Constraints and improvements indicated in the survey**Table 2**). The constraints (and improvements) relating to methodology predominate. These relate to sampling method, product definitions, and data quality. Those relating to data providers (forest owners and sawmillers) highlight their unwillingness to provide price information. Resource constraints highlight the lack of staffing and funds to collect, process and maintain price data.

5. User experience, satisfaction and preferences

5.1 Prior use of online price websites

The respondents were asked about data retrieval from online price databases or websites. The study found 33 respondents (83% of total respondents) having prior use of online price databases or websites. The rest had not used either. The price data collected from those websites were used for different purposes: academic research (61%), consulting services (15%) and other purposes (24%) such as lobbying, roundwood sales, market information service, benchmarking and presentation.

Regarding the accessibility (ease of search and retrieval) of those online price databases or websites, measured on a scale from very difficult to very easy, 36% of the respondents could not say whether the sites were easy or difficult from user point of view. For those respondents who perceived an ease in search and retrieving information, 18% respondents reported that the websites were easy and 24% reported very easy. On the other hand, those that perceived difficulty with accessibility, 15% of respondents reported that the websites were difficult and 6% reported very difficult.

Serviceability refers to the extent the gathered data meet users' need. Over half of the respondents (55%) reported being satisfied and 9% being very satisfied with the data they

gathered from those websites. Twenty-seven percent was neither satisfied nor unsatisfied. The unsatisfied group (9%) translated into 6% being unsatisfied and 3% being very unsatisfied.

Table 2. Constraints and improvements indicated in the survey.

	Constraints	Improvements
Methodological problems	• Application of predetermined definition of specific forest products (Switzerland). • Forest products assortments do not have enough details, only divided into coniferous and non-coniferous (Bosnia & Herzegovina). • Data coverage excludes small and medium-sized sawmills (Finland). • Sampling problem which calls into question the reliability of data (France). • Discontinuity of data collection (Serbia). • Mixing pricing i.e., one price of 1 m^3 represents different sorts and qualities of wood (Slovenia). • The forest products are not accurately defined and their average prices are not well calculated (Spain) • Control of the quality of the statistics (Sweden)	• To harmonize the theoretical product definitions and the trade usages applied in practice (Switzerland). • To include more detail (e.g. roadside and delivery pries) of forest products assortments, especially for logs where the differences in prices are significant depending on product grades and wood species (Bosnia & Herzegovina). • To increase data coverage by including small and medium-sized sawmills (Finland). • To improve the reliability of data by intervention of public statistical services (France). • To improve data collection by making data collection somehow obligatory or to seek forest owner and industry associations' support (Serbia). • To assure the quality of data is by receiving data from the most important companies and also some smaller companies (Slovenia). • To define a good and consistent methodology, shares methodologies and harmonized results in different countries (Spain). • To evaluate the current method and consider a change of method in the near future (Sweden).
Data providers	• No obligation of forest and forest industry companies to provide data to public agencies responsible for data collection and analyses (Croatia). • Unwillingness of data providers to provide accurate answers to very sensitive questions (France). • Companies are unwilling to provide price information (Netherlands, Serbia). • Untimely submission of data by raw data providers (Slovakia).	• To oblige enterprises to provide data on a regular basis (Croatia). • To involve national statistical service to improve the willingness of data providers (France). • To make data collection an EU obligation (Netherlands). • To make data collection legally binding at the national level (Serbia). • To improve data collection by asking from data providers for less data but more valuable data (Slovakia).
Resources	• Lack of advanced tools (software, system) to maintain the data or to monitor prices and volumes of wood energy (Finland). • Lack of funds needed for collecting the data. (France, Netherlands, Spain). • No database for timber and timber products (Croatia).	• To maintain data and to monitor wood energy prices and volumes, more advanced tools are needed (Finland, Serbia). • To provide necessary funding and staff to do the work (France, Netherlands). • To establish a computer database for forestry and wood processing market (Croatia).

5.2 Contents of a price database

The respondents were asked about topics (things of interest) to include or exclude from a forest products price database. The majority of respondents accepted the inclusion of the following topics: products, product groups, product grades, species, species group, country of origin, reporting agency in country of origin. However, the respondents' approval rating for product grades was the lowest (60%), and 33% of respondents were unsure of its inclusion. This may imply that product grades do not have an agreed definition and standards across timber industries and countries. Thus, its inclusion in a forest products price database is problematic. In addition to the above topics, the respondents indicated for inclusion in a price database the following topics: production and traded volumes by country, moisture content of firewood whether or not transportation costs are included, measurement method, time/time period of data, product dimension, and type of price (e.g. delivery, stumpage, roadside, etc.), and other macro data such as energy prices, construction activities, interest rates, exchange rate, and prices of substitutes of forest products.

5.3 Role of intergovernmental organization

For a successful implementation of international forest products price database, the role of an intergovernmental organization such as UNECE/FAO and FAO is crucial. The respondents were asked about which role UNECE/FAO should play. Nearly 71% of respondents agreed that it should collect and store forest product prices. The rest (29%) preferred UNECE/FAO to provide links to websites reporting forest products prices.

5.4 Mode of dissemination

All things considered, how data can be disseminated in a timely fashion to users has an implication for its value. Users prefer a certain mode of dissemination to satisfy their information needs. In this regard, the respondents' preferences are as follows: online database (76%), electronic bulletin (12%), printed report (6%) and other mode (6%), which is a combination of the first and second mode.

6. Conclusions and recommendations

6.1 Conclusions

6.1.1 Potential for improved data governance, quality and coverage

In the UNECE region few countries have a FPMkIS. As more countries develop it, data governance and data quality will improve across and between countries. Official sources are in most cases the best option, as they are committed to quality criteria of official statistics, as expressed in the Statistical Code of Practice of the EU.

While there are considerable information resources on forest products price in the UNECE and Asia-Pacific regions, there are still some countries that don't have these resources available at all. Only a minority of the information resources has price series data (including very few relational price databases). The official price information concerns mostly roundwood prices. There is no official collection of domestic forest product prices.

6.1.2 Data collection, constraints and improvements

Data collection process differs among countries surveyed. The main constraints of data collection and maintenance include methodological problems, unwillingness of data providers and lack of resources of data collection. The methodological problems differ among countries. Thus, there is a need to develop and use a consistent methodology in data collection and processing in order to have comparable price data across countries.

The unwillingness of data providers in some countries could be improved by providing incentives or a policy measure (i.e., obligatory data collection) at the national level. In both cases, forest owner and industry organizations can play a role of facilitator. These organizations, however, are absent in some countries in transition to market economy.

National statistical agencies are lacking sufficient funding and trained staff to engage in data collection, processing and maintenance. Constraints of data maintenance include the lack of advanced tools (software or system) and trained staff. Thus, national statistical agencies need more advanced tools and trained staff.

6.1.3 Options for an international data collection and maintenance

For reliable and regular data provision on forest products prices, a system such as a FPMkIS is required in reporting countries. The private sector and JFSQ correspondents should be involved in data collection and dissemination to international organisations like UNECE/FAO. The former could play an important role in collection, processing and dissemination of forest products price data. The latter has the best potential to organize roundwood price collection and dissemination at the national level. Roundwood and forest industry product prices should be stored and maintained in a relational online database allowing easy retrieval of data.

6.2 Recommendations

6.2.1 For national FPMkIS

This framework is essential for market information which are needed by different stakeholders. This study recommends further study of the existence, use and description of a FPMkIS in the UNECE and Asia-Pacific regions.

The EU should assist member countries to develop a FPMkIS. This will allow various stakeholders to make informed decisions, reduce transaction costs and make the EU timber sector transparent. Special attention should be given to the EU member countries in transition to market economy as more work is required there. Having provided assistance, the EU may oblige member countries to report on a regular basis forest products price information.

6.2.2 For international forest products price database

A national FPMkIS can serve as sources for an international FPPD. Regional price monitoring systems, such as "Roundwood Prices in the Baltic Sea Region", maintained by METLA in Finland can be a source, as well. For the development of an international FPPD, we recommend the following:

1. Creating a pilot FPPD based on countries that already have a FPMkIS and price series, especially roundwood prices;
2. Defining product grades with internationally agreed standards;
3. Harmonizing measurement units, roundwood assortments, ownership categories etc.;
4. Learning from the experiences of Agricultural marketing information systems which are well developed in many countries as well as at the international level; and
5. Learning from the experiences of Baltic-Nordic Forest Statistics Group regarding data collection, processing and dissemination.
6. Data collection involving different stakeholders

We also recommend a workshop to bring together different stakeholders to discuss how to motivate forest owners and forest industry companies to provide needed data on a regular basis. The role of governmental agencies (national forest/statistical service) is crucial as they are facilitators at the national and international level. At the national level, they should provide incentives to data providers. Efforts should be employed to show the benefits of free market information to all actors involved in the Roundwood markets. Market transparency can lead to increased wood supply and gains for all players on the market.

At the international level, governmental agencies should collaborate to harmonize product definitions, measurement methods and grades so that product price can be compared. In this process, governmental agencies need facilitation from the UNECE/FAO. This could provide incentives to the private sector to provide market information. To this end, the experience of the International Tropical Timber Organization’s fortnight market information report is worthy of learning. Obviously there are priority and resource limitations involved in doing so.

Annexes

Annex 1. Stakeholder analytic framework

Stakeholder group	Characteristics	Problems (needs, interest)	Potential	Involvement
Primary stakeholder				
Forest owners	Derive income from forests	Lack relative information on timber prices	Can provide information on timber prices	Primary beneficiary, main actor in data collection
Forest industry companies	Derive income from wood processing	Lack relative information on timber and timber product prices	Can provide information on timber and timber products prices	Primary beneficiary, main actor in data collection
Universities	Have education and research objectives	Access to reliable and relevant price data	Experience in use of price data	Primary beneficiary, might advise on product definitions and groupings
Secondary stakeholders				
Forest owner organizations	Provide advice and service to its member	Business secret of its members	Can assist its members in data collection	Might Support or resist data collection from its members
Forest industry organizations	Provide advice and service to its member	Business secret of its members	Can assist its members in data collection	Might Support or resist data collection from its members
National forest /statistical agency	Implement national forest policy, research and collect report forest statistics	Lack of resources or incentives to data providers	Can facilitate data collection at national level	Support data collection at national level
Tertiary stakeholders				
Forest professional groups	Have professional mission	Development of forest industry and timber market	Knowledge of industry	Can promote awareness of the need for data
Intergovernmental organizations	Have regulatory/facilitating mission	Medium- and long-term planning	Can marshal political support	Can assist to get political support; can be a partner to implement a price database

Annex 2. Breakdown of price information

	Total information resources (a)	Price data (b)	Price related info (c)	Price series (d)	Spot prices (e)	Relational database (f)	Price data, % of total resources	Price related info, % of total resources
Australia	3	2	1	0	2	0	0.8	0.4
Austria	2	2	0	0	2	0	0.8	0.0
Belarus	2	2	0	0	2	0	0.8	0.0
Belgium	4	3	1	1	2	0	1.2	0.4
Canada	14	11	3	3	8	0	4.5	1.2
Croatia	3	3	0	0	3	0	1.2	0.0
Czech Republic	14	12	2	1	11	0	4.9	0.8
Denmark	7	6	1	0	6	0	2.4	0.4
Estonia	4	4	0	0	4	0	1.6	0.0
Finland	8	6	2	2	4	1	2.4	0.8
France	30	18	12	3	15	0	7.3	4.9
Germany	17	14	3	1	13	0	5.7	1.2
Hungary	4	4	0	0	4	0	1.6	0.0
Ireland	6	6	0	0	6	0	2.4	0.0
Italy	10	8	2	0	8	0	3.2	0.8
Japan	3	3	0	0	3	0	1.2	0.0
Latvia	5	3	2	0	3	0	1.2	0.8
Lithuania	3	3	0	1	2	0	1.2	0.0
Netherlands	3	2	1	0	2	0	0.8	0.4
New Zealand	1	1	0	0	1	0	0.4	0.0
Norway	1	0	1	0	0	0	0.0	0.4
Poland	4	4	0	2	2	1	1.6	0.0
Romania	2	2	0	0	2	0	0.8	0.0
Russian Federation	28	26	2	0	26	0	10.5	0.8
Slovakia	7	7	0	0	7	0	2.8	0.0
Slovenia	1	0	1	0	0	0	0.0	0.4
Sweden	13	12	1	0	12	0	4.9	0.4
Switzerland	7	4	3	1	3	0	1.6	1.2
United Kingdom	8	5	3	0	5	0	2.0	1.2
United States	33	30	3	8	22	2	12.1	1.2
Total	**247**	**203**	**44**	**23**	**180**	**4**	**82.2**	**17.8**

Column (a) = (b) +(c); Column (b)= (d) +(e) + (f)

Annex 3. Questionnaire of the study

A. Questionnaire for JFSQ correspondents

Instructions:

Please provide best responses to the survey, which will take approximately 15 minutes. When you start the survey and would like to continue later, please click on the Save Page and Continue Later button. In case you would like to withdraw from the survey, please click on the Exit Survey button. When you finish the survey, please click on the Click To Finish Survey button, which will appear on the last page. Your survey responses will be strictly confidential and data from this research will be reported only in the aggregate. Your information will be encrypted and will remain confidential. QuestionPro.com, which provides this service, does not have access to your contact information as well as your responses. All questions are required so that you cannot forget to provide an answer to a question. In case you don't have a good response, please write NO RESPONSE. Please complete the survey by September 15, 2010. If you have questions at any time about the survey, please contact Ibrahim Favada at +33 3 83222624 or by email at: ibrahim.favada@efi.int.Thank you very much for your time and support. Please start with the survey now by clicking on the Continue button below.

1. **Please describe the main data collection process of forest product prices in your country.**

2. **What are the main constraints in collecting data?**

3. **What are the main constraints in maintaining data?**

4. **How to improve data collection?**

5. **How to improve data maintenance?**

B. Questionnaire for researchers

Instructions

Please provide best responses to the survey, which will take approximately 15 minutes. When you start the survey and would like to continue later, please click on the Save Page and Continue Later button. In case you would like to withdraw from the survey, please click on the Exit Survey button. When you finish the survey, please click on the Click To Finish Survey button, which will appear on the last page. Your survey responses will be strictly confidential and data from this research will be reported only in the aggregate. Your information will be coded and will remain confidential. QuestionPro.com, which provides this service, does not have access to your contact information as well as your responses. All questions are required so that you cannot forget to provide an answer to a question. In case you don't have a good response, please write NO RESPONSE. Please complete the survey by September 15, 2010. If you have questions at any time about the survey, please contact Ibrahim Favada at +33 3 83222624 or by email at: ibrahim.favada@efi.int.Thank you very much for your time and support. Please start with the survey now by clicking on the Continue button below.

1. Please indicate web addresses (URLs) of websites that provide price information on forest products in your country (One address per row).

2. Please indicate offline sources of information on forest products prices in your country.

3. Have you ever gathered forest products price data from an online database or website?

Yes (__)
No (__)

4. If yes, please indicate the web address (URL) of one website or database.

5. Please indicate the purpose for which you gathered forest products data.

For academic research (__)
For consulting (__)
Other (Please specify) (__)

6. How can you describe the accessibility of the site you mentioned above (Question 4)? Click to see definition.

Very difficult	Difficult	Neutral	Easy	Very easy
❑	❑	❑	❑	❑

7. Please explain (Your choice in Question 6):

8. How can you describe the serviceability of the site you mentioned above (Question 4)? Click to see definition?

Very Unsatisfied	Unsatisfied	Neutral	Satisfied	Very Satisfied
❑	❑	❑	❑	❑

9. Please explain (Your choice in Question 8):

10. What are the main strengths and weaknesses of the website you mentioned above (Question 4)?

11. Please indicate which topics are necessary to include or exclude from a forest products price database:

	Exclude	Not Sure	Include
Products (logs, veneer, etc.)	❑	❑	❑
Product groups (e.g. roundwood, sawnwood, etc.)	❑	❑	❑
Product grades	❑	❑	❑
Species (Pine, spruce, etc.,)	❑	❑	❑
Species groups (coniferous and non-coniferous)	❑	❑	❑
Country of origin	❑	❑	❑
Reporting agency in country of origin	❑	❑	❑

12. In your opinion, what other topics are necessary for inclusion to the price database but not listed above?

13. For example, please query and retrieve data using FAO PriceSTAT database. Unfortunately, there are no price data for forest products. So, you can select any agricultural product. Are you satisfied with the query and retrieval features?

Yes (__)
No (__)

14. What other user friendly features would you like to suggest?

15. What should UNECE Timber Section do with forest products prices?

Collect and store forest products prices. (__)
Simply provide links to where the prices can be found. (__)

16. In your opinion, which mode of dissemination is the best for an improved international forest products price database?

Online database (__)
Electronic Bulletin (__)
Reports (printed) (__)
Other (Please specify) _____