CLUSTER ANALYSIS OF THE FOREST AND WOOD BASED INDUSTRIES OF THE CARPATHIAN REGION OF UKRAINE AND RECOMMENDATIONS FOR CLUSTER MANAGEMENT

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SUMMARY REPORT 2008

CONTENTS

EXECUTIVE SUMMARY 4

1. PROJECT BACKGROUND 5
1.1. Project geography 5
1.2. Project objectives 6

2. CLUSTER CONCEPT AND METHODOLOGY 7
2.1. Project implementation stages 7
2.2. Project partners 8

3. FOREST AND WOOD BASED INDUSTRIES CLUSTER OF THE CARPATHIAN REGION OF UKRAINE 9
3.1. Wood resources 9
3.2. Forestry 10
3.2.1. Close to nature silviculture – a forestry management approach that guarantees forest resources sustainability 11
3.3. Wood processing 13
3.3.1. Sawmilling 14
3.3.2. Board manufacturing 15
3.4. Furniture manufacturing 16
3.5. Pulp and paper production 17
3.6. Joinery and carpentry 18
3.7. Non-timber forest products, tourism based on forest ecosystems 19
3.8. Generation of timber energy 20
3.9. Education and research services 21

4. WOOD CONSUMPTION AND VALUE ADDING 22
4.1. Value-added chain formation 22
4.2. Timber market 23
4.3. Wood residue 25

5. FOREST AND WOOD BASED INDUSTRIES CLUSTER OF THE CARPATHIAN REGION OF UKRAINE 26
5.1. General structure and trends in the forest cluster 26
5.2. Regional impact of the forest cluster of the Carpathian region 27
5.3. Investment attractiveness of the forest cluster of the Carpathian region 30
5.4. Strengths and weaknesses, opportunities and threats (SWOT) 31

6. GENDER POLICY ASPECTS OF THE CLUSTER ANALYSIS 32

7. RECOMMENDATIONS 33

This summary report contains updated information about forestry, available resources, potential, links, capacities and labor resources of forest and wood-based enterprises, ecotourism and also about the economic importance of the forest sector not only for the Carpathian region, but also for entire Ukraine.

EXECUTIVE SUMMARY

Cluster analysis of the forest and wood based industries of the Carpathian region of Ukraine has been carried out jointly by the National Forestry Technical University of Ukraine (NFTUU), University of Muenster and by a multitude of Ukrainian partners and stakeholders within the framework of the Swiss-Ukrainian Forest Development Project in Transcarpathia (FORZA).

FORZA is a Swiss-funded, non-commercial technical assistance project carried out under the auspices of the Swiss Agency for Development and Cooperation (SDC) and the State Forestry Committee of Ukraine. The project is implemented jointly by the Swiss Foundation for Development and International Cooperation "Intercooperation", the Educational Forest Center in Maienfeld (EFCM), and numerous Ukrainian partners. The overall goal of the FORZA project is the implementation of sustainable, multifunctional forestry management in the Carpathian region with special emphasis on environmentally sound management and improving the living standards of local people.

The component of "forestry economy and market orientation" is an important part of the project. It encourages the application of economic and market principles in the use, processing and marketing of timber /non-timber forest products in order to optimize the economic returns to the population of the Carpathian region. With this economic focus, FORZA has supported the cluster analysis of the forest and wood-based industries of the Carpathian Region.

For Ukraine, the cluster analysis concept is new, especially when applied to the forest sector. The proposed cluster analysis of the forest sector covers four Ukrainian oblasts of the Carpathian region which border on the European Union states and possess a resource of international, ecological and economic significance as well as are nationally meaningful to society and economy.

The most important findings run as follows:

1.Forest sector has one of the leading roles in the economy of the Carpathian region of Ukraine

2.Forest resources of the Carpathian region of Ukraine have a number of important functions (economic, environmental, social) whose significance is undervalued

3.Strategic development of the forest cluster depends on joint efforts of all the stakeholders at different levels, among which are authorities, business, and community.

These findings led to the elaboration of the following recommendations and guidelines for the stakeholders to be benefited by the entire forest sector in the Carpathian region of Ukraine:

1. To improve the structure and arrangement of the forest cluster of the state or a region in order to stimulate investments into the sphere in the context of sustainable development.

2. To join into unions or federations for cooperation and joint representation of one's interests both outside the state and on the home market within the framework of intensifying globalization processes.

3. To promote the involvement of local communities into the development of the forest cluster of the Carpathian region.

1. PROJECT BACKGROUND

1.1. PROJECT GEOGRAPHY

CLUSTER ANALYSIS is a set of methods to study market entities, characteristics of goods, classification of expenditures etc, for the segmentation of target markets and analysis of distribution channels and their flexibility in order to substantiate the economic efficiency and effectiveness of a sector development

The project geography includes four Carpathian oblasts, namely Transcarpathia, Ivano-Frankivsk, Lviv, and Chernivtsi as shown on the map. The overall area of the region is 56.5 thousand sq.km, or 9.4% of the entire country area. The area of the cluster is populated by about 6.1 million people, which constitutes 13% of the population of Ukraine. Carpathian socio-economic region is well-provided with forest resources. Forests provide resources and raw materials for various fields of economy. They have an anti-erosion, climate, health-improving and environment-protecting function.

Fig. 1. Cluster analysis territory map

As to each separate oblast, a significant scope of data was collected about forest resources, economic entities and markets.

The Carpathian region borders on several member states of the EU (Romania, Hungary, Slovakia and Poland). That's why cluster analysis of the forest industry sector is important for the region rich in natural resources. These resources are of critical importance from an economic and an environmental perspective not only for Ukraine but also for Europe.

Being part of a cluster is an important competitive advantage for enterprises. Clusters help to fill gaps between business, research and resources and ensure effective implementation of know-how. Successful clusters do not only encourage a healthy competition but also result in beneficial cooperation.

"Cluster policy" has become one of the important components of the innovative policy of the EU member-states which is reflected in national reforming programs (Europarliament, 2006).

1.2. PROJECT OBJECTIVES

WHAT IS THE PRIORITY OBJECTIVE OF THE CLUSTER ANALYSIS (CA) OF THE FOREST AND WOOD-BASED INDUSTRIES OF THE CARPATHIAN REGION OF UKRAINE?

It is a comprehensive systematic description, assessment and analysis of the forest and wood based industries cluster of the Carpathian region of Ukraine taking into account such factors as its considerable resource potential, branch structures, economic capabilities, socio-economic importance, existing markets, and potential for sustainable development

THE CA ALSO PURSUES OTHER OBJECTIVES NAMELY:

- Precise and updated assessment of the development of the forest and wood based industries of the Carpathian region of Ukraine and comparing its capacities with those in other Ukrainian regions;

- Updated assessment and professional analysis of the common cluster structures and forestry processes available in the Ukrainian part of the Carpathian region;

- Professional analysis of the individual parameters and framework conditions of the Ukrainian part of the Carpathian region;

- Development of recommendations for the authorities to shape their policies, and for managing agents, investors and other stakeholders to take reasonable decisions.

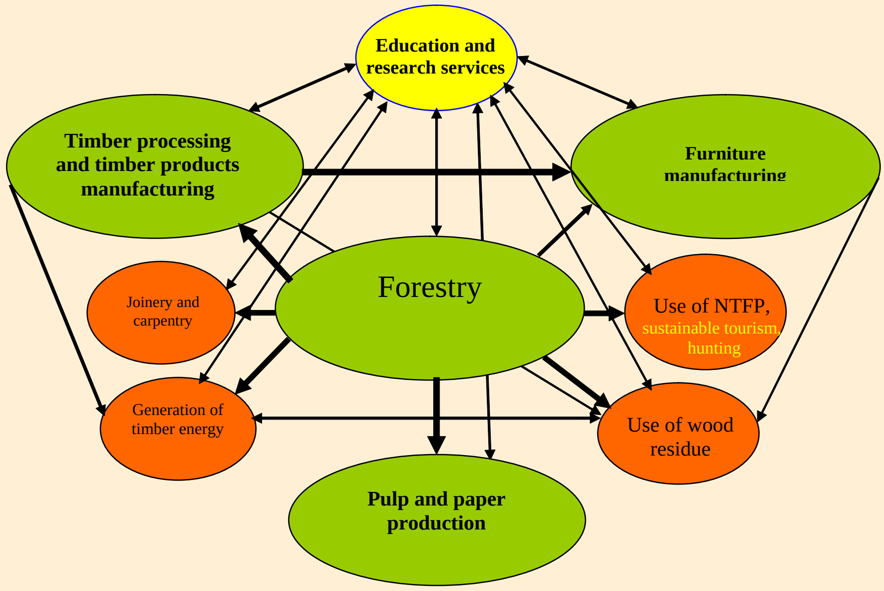


Fig. 2. Chart of the forest cluster of the Carpathian region of Ukraine

Forest resources are at the center of the cluster. The wood and non-timber resources support a range of primary and secondary industry branches such as timber processing, timber products manufacturing, furniture manufacturing, pulp and paper production.

Besides, the development of tourism and hunting, especially in the mountainous areas, is also supported by forest resources. The four main cluster components (forestry, wood processing, timber products and furniture manufacturing, and pulp and paper production) make up approximately 90% of the total sector output, although the potential of value-added processes is not fully realized.

Today, in the Carpathian region of Ukraine there are clear preconditions for the creation of the forest cluster (available resources, all market players, market, processing capacities) which at present are not fully optimized.

2. CLUSTER CONCEPT AND METHODS

2.1. ROJECT IMPLEMENTATION STAGES




The basic concept and methodology for the implementation of the cluster analysis were developed by IIWH and jointly adapted to the Ukrainian context by NFTUU, in collaboration with the FORZA PCU.

THE FOLLOWING STAGES HAVE BEEN IMPLEMENTED WITHIN THE FRAMEWORK OF THE DESIGNED CONCEPT:

2006-2007

Oblast State Administrations of Transcarpathian, Lviv, Chernivtsi and Ivano-Frankivsk oblasts expressed interest and commitment to provide information and human resources for the analysis, and signed respective Memorandum of Understanding.

2007

STAGE 1:

Comprehensive methodology designed jointly with all the main partners, work program drawn up (academic literature review, training seminars with the stakeholders)

2008

STAGE 2

Field data collected and forest sector development assessed; forest industry enterprises concentration identified; information about their relations and cooperation collected (questionnaires for branch enterprises, interviews with experts, national and branch statistics, workshops with the stakeholders)

STAGE 3

Integration of the data and information collected from groups of regional experts and other sources into a common central database at the NFTUU and key questions analysis (current stage of the development of the forest sector of the region and Ukraine and its comparative significance in the national economy; forest sector's development outlooks in the region and each oblast by means of trend-analysis, economic-mathematic modeling, assessment of further development scenarios)

STAGE 4

Interpretation of the findings, formulation of recommendations and preparation of the first draft report based on the key aspects (SWOT- analysis; SPACE- analysis; gender analysis)

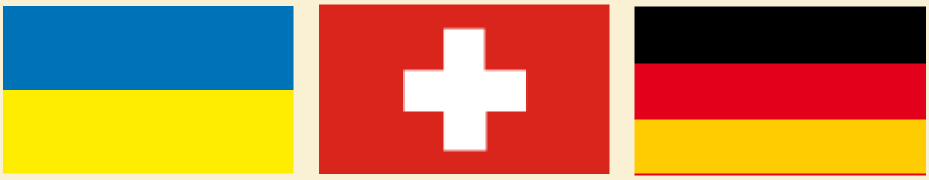
WHAT IS A CLUSTER?

It is a group of industry branches and organizations, interrelated through a sale-buy relationship, and/or which have common infrastructure, customers or staff, and whose interactions add to their competitive advantage

STAGE 5

Dissemination of information and further steps (the final report to be presented to a larger public and be freely available to all the stakeholders; decision-making officials, the pubic and private sector to be informed to be able to take further steps).

2.2. PROJECT PARTNERS



The Cluster analysis has been carried out by a number of Ukrainian and international experts:

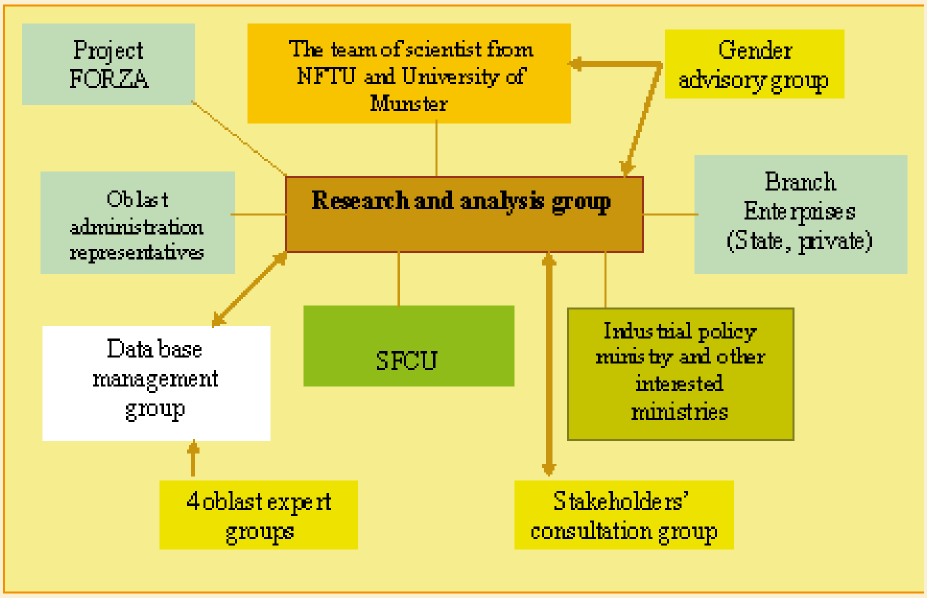


Fig. 3. Partners and participants of the cluster analysis implementation

Fig. 3.a. The participants of cluster analysis implementation are at work

Restrictions in the course of the analysis:

It was extremely difficult to obtain information from official sources, statistics bodies and from the private sector. For this reason, many parameters are based on expert's estimates. These estimates may differ from real figures.

3. FOREST AND WOOD BASED INDUSTRIES CLUSTER OF THE CARPATHIAN REGION OF UKRAINE

3.1. WOOD RESOURCES

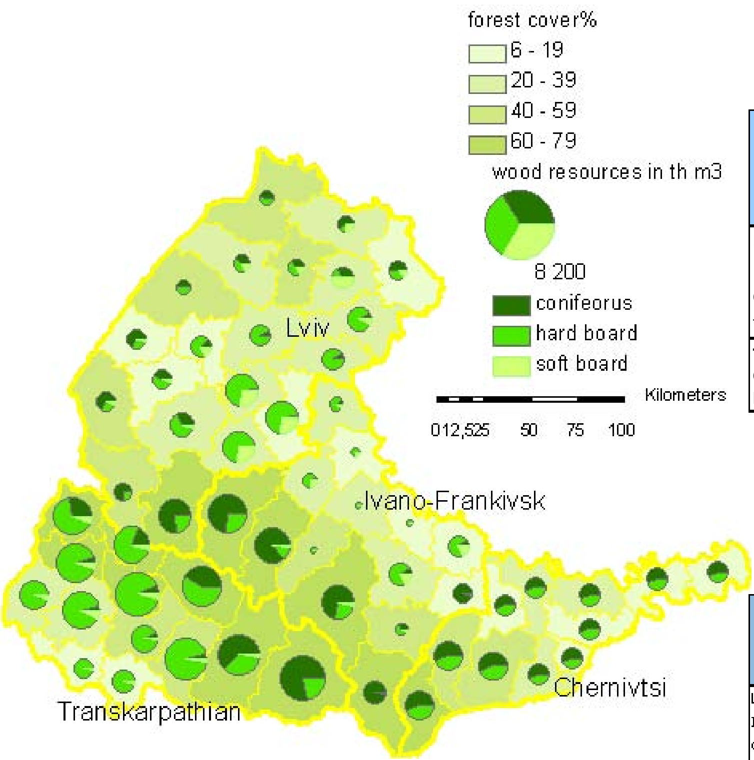


*Fig. 4. Concentration of wood resources in the Carpathian region**

Table 1: General characteristics of the forests of the Carpathian region*

Oblasts	Forest area* [th. ha]	Forest cover* [% of land]	Volume** [mio. m³]	Middle change of supply** [м³/ha]
Lviv	626,4	28,7	132,3	4,0
Ivano-Frankivsk	576,7	41,4	128,5	4,7
Chernivitsky	237,8	29,4	62,6	4,4
Transcarpathia	652,9	51,2	200,0	4,3
Total forest in Carpathian Region	**2 093,8**	**39,3**	**523,4**	**4,3**

Table 2: Harvesting dynamics [mln m³] in the Carpathian region*

Oblasts	2004	2005	2006	2007	Change	[%]	Share of using [%]
Lviv	1,2	1,2	1,3	1,4	0,2	20,1	59
Ivano-Frankivsk	0,9	0,9	1,0	1,1	0,3	30,1	49
Chernivitsky	0,9	0,9	0,9	1,0	0,1	10,3	89
Transcarpathia	1,2	1,2	1,2	1,4	0,1	9,9	55
Total forest in Carpathian Region	4,2	4,2	4,4	4,9	0,2	17,6	63

The forest resources of Ukraine are a mix of both restrictions and potential for the forest sector development. The region's forest resources are the highest in Ukraine.

On average, the forest cover of the area is 39.3% (Transcarpathian oblast – 51.2%, Ivano-Frankivsk oblast – 41.4%, Chernivtsi – 29.4%, Lviv oblast – 28.7%). Overall standing timber stock amounts to 0.52 billion cubic meters.

Average annual growth per 1 hectare of forest land is 4.3 cubic meters, thus the CRU forests produce about 9 million m³ of wood annually. The current harvest (2007) in the region in the forests of the State Forestry Committee of Ukraine amounts to 4.9 mln m³ or approximately 63% of annual growth.

Intensity of wood harvest in the Carpathian region in the forests under the auspices of the State Forestry Committee of Ukraine is about 63%, which is much lower than in other countries, such as Austria, Germany, Hungary, Switzerland, and Sweden where about 75-85% of the annual increment is harvested. This comparison suggests that there is tangible potential to increase wood harvest in the CRU in sustainable ways. It could even be done by using close-to-nature silviculture approaches following the experience of Switzerland. However, such a restricting factor as legislation must be mentioned, since considerable portion of forests is excluded from final felling, and there is a wide network of forest reserves which tend to expand.

* State Forestry Committee of Ukraine, 2008
* Data as of 2002
** Data as of 1996

3.2. FORESTRY

In the CRU there are many different permanent forest users that manage and utilize forest resources. Most of the users are public institutions, while private forest land users are few. An important peculiarity of permanent users are different standards applied to the resource management.

The State Forestry Committee forests are generally considered to be best managed (they fell wood, restore forest resources, as well as cultivate forest areas along with many other steps). Another indicator of forest management is the degree of illegal logging which is difficult to assess.

The figures provided by the SFCU on employment and turnover indicate the magnitude of employment of the forest sector. Most of the forestry activities are currently carried out by or under the supervision of the State Forestry Enterprises, with partial outsourcing of forestry activities to private operators via contracting. Timber is sold to the highest bidder at regular auctions.

Table 3: Trends of the certain indexes of the State Forestry Committee management in the Carpathian region *

Parameter	2004	2005	2006	2007	Trend	[%]
Enterprises	68	69	68	68	0	0
Turnover [bio. UAH]	0,32	0,40	0,48	0,59	0,27	85
Employees	18382	17192	15640	15283	-3 099	-17
Turnover per enterprise [mio. UAH]	5	6	7	9	4	85
Turnover per employee [ths. UAH]	18	23	31	39	21	122
Employees per enterprise	270	249	230	225	-46	-17
Enterprise share of Ukraine [%]	19	19	19	19	0	
Turnover share of Ukraine [%]	20	20	20	22	2	
Employees' share of Ukraine [%]	20	20	19	19	-1	

Table 4: Volume of the illegal harvesting in the Carpathian region

Source of data	Volume [mio. m^3]
State Forest Committee of Ukraine*	0,01
Research of the World bank	0,25-0,3
Experts estimation of project	1,0-1,25

** У лісах Держкомлісгоспу*

Unwarranted illegal felling is defined as timber logging conducted with no official license documents in compliance with the current legislation ("wood-felling pass", or "order"); or with such licenses, but conducted in the wrong place, or felling larger numbers of trees than predefined; also felling species of wood, which are not indicated in the licenses.

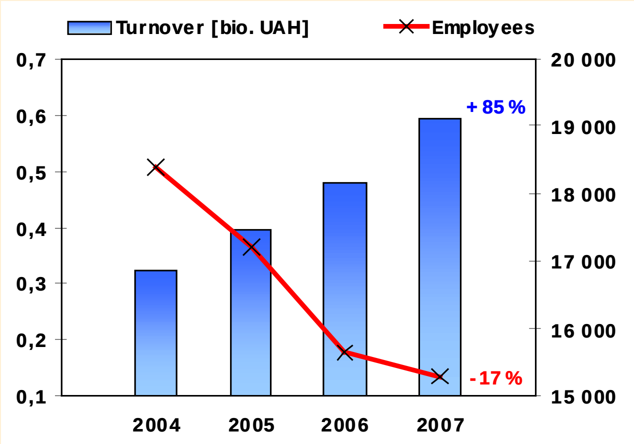


*Figure 5: Forestry trends in the Carpathian region**

Despite increases in harvest volumes there has been a substantial decline in employment. This drop is due to such factors as increased modernization of equipment; also, forest service is outsourcing works to private contractors.

***** State Forest Committee of Ukraine, 2008

3.2.1. CLOSE TO NATURE SILVICULTURE – A FORESTRY MANAGEMENT APPROACH THAT GUARANTEES FOREST RESOURCES SUSTAINABILITY

The Carpathian region requires a new, improved forest management approach, an approach that would perpetuate essential ecological processes through providing goods and services needed by people, both now and in the future.

Close-to-nature silviculture is an approach that maintains forest cover, preserves biodiversity; promotes natural uneven age forests; increases economic effectiveness of the management; improves water flow and water run-off; also allows increasing the recreational and tourist potential and requires comprehensive watershed planning.

An important consideration of the approach is mainly application of selective cuts, low-impact harvest technology, which can range from horses to modern wheel harvesters and cable-crane systems.

Application of close-to-nature silviculture approaches in combination with an optimal road network guarantees sustainable multi-functional forest use. This offers numerous opportunities to improve forest and hunting management of the Carpathian region, as well as helps achieve sustainability in forest resources utilization and international management standards. This management approach will also satisfy certification standards which in turn will facilitate access to European markets. For private sector operators the close-to-nature approach offers new experience and encourages acquiring updated management skills, particularly on harvesting technologies. In general, these are new opportunities for product, works and services volumes growth, efficient training and employment increase in the sector.

Fig. 6. Close to nature forest stand in the Carpathian Biosphere Reserve

The cluster analysis reveals that in the Carpathian region potential area in all categories and age forest groups, where forestry activities can be carried out to gradually transform even-aged pure into uneven-aged mixed multi-layer stands , by means of close-to-nature silviculture methods (conversion cuts) may be up to 40-60 thou ha per year. During the first decade only, forestry may also receive annual benefits of 2-2.5 mln m^3 of wood. Further possible increase in these additional volumes of wood is also possible, especially if age and species stand structure approaches the optimal (target) level, as well as with the increase in average stand stock.

Fig. 7. Structure of the different age forest

Close-to-nature silviculture is a new type of practice which is not being widely implemented in the Carpathian region yet. That is why learning about this method and investing into new technologies is going to create reliable long-term opportunities for the Forestry Departments and private sector.

Fitting out of new road in forest

Table 5. Calculated potential volumes of wood harvesting by means of close-to-nature silviculture methods (conversion cuts)

Oblasts	Total forest covered area (thou. ha)	Total timber stock (mln. m³)	Timber increment per year, total (mln. m³)	Volumes of timber harvesting in 2006 (mln. m³)	Use of timber stock increment (%)	Potential areas for the application of c-t-n silviculture methods, (thou. ha/ year)	Potential total volume available for harvesting by c-t-n silviculture methods (mln. m³/ year)
Lviv	626,4	132,34	2,5	1,27	51	12-18	0,5-07
Ivano-Frankivsk	576,7	160,8 (128,49)	2,7	0,98	36	11-17	0,5-0,7
Chernivtsi	237,8	62,59	1,0	0,88	84	5-7	0,2-03
Transcarpathian	652,9	199,98	2,8	1,21	43	12-18	0,7-0,8
Incl. Nyzhniy Bystryy forest range	4,037	1,183	0,017	0,0057	33	0,1	0,004
Total in the Carpathian region	2093,8	523,4	9,0	4,35	48	40-60	2,1-2,5

Source: forest inventory materials of the Nyzhniy Bystryy forest range of the SE "Khust forest research enterprise" (increase in the stand area by conversion cuts for a 10 years' term – 25%, or 2.0-2.5% annually) with the consideration of tree stand increment and current harvesting volumes.

Application of the modern mobile cable crane on the forest harvesting

3.3. WOOD WORKING INDUSTRY

Wood working in the region has a long established tradition and is an important pillar of the regional economies and includes: sawmill and chip production, production of wooden railway ties, production of wooden floor coating of deck floor and parquetry, production of veneer, plywood, fiber board and particle board, other panels and boards, wood drying, wood impregnation, production of wooden construction frames and joinery products, production of wooden containers.

The importance of the sector in the region in terms of employment and turnover is evident from Table 5 which also illustrates the regional importance of the sector in the context of Ukraine.

If to compare the four Carpathian oblasts in terms of resources and production capacities, Transcarpathian oblast has the highest degree of forest cover. However, the overall trend is that the highest value-added processing is located mainly in the vicinity of the markets rather than resources. It is important to point out that a significant drop in employment results from the introduction of modern technologies, increase in labor productivity, shift of part of capacities into the "shadow". This trend is likely to continue as modernization of the industry, especially in smaller primary processing plants, progresses in response to market demands for more specialized products. Permanent supply of local high-quality raw materials is the priority problem to be settled by all wood processing enterprises.

* State Statistics Committee of Ukraine, 2008

Table 6: Wood working industry trends in the Carpathian region*

Parameters	2004	2005	2006	2007	Trend	[%]
Enterprises	1 451	1 447	1 465	1 443	-8	-1
Turnover [bio. UAH]	1,21	1,54	1,54	1,83	0,62	52
Employees	26 679	23 923	21 813	20 775	-5 904	-22
Turnover per enterpise [mio. UAH]	0,8	1,1	1,1	1,3	0,4	53
Turnover per employee [ths. UAH]	45,2	64,3	70,7	88,1	42,9	95
Employees per enterpise	18	17	15	14	-4	-22
Enterprise share of Ukraine [%]	34	34	35	36	2	
Turnover share of Ukraine [%]	40	41	35	33	-7	
Employees' share of Ukraine [%]	41	39	38	38	-3	

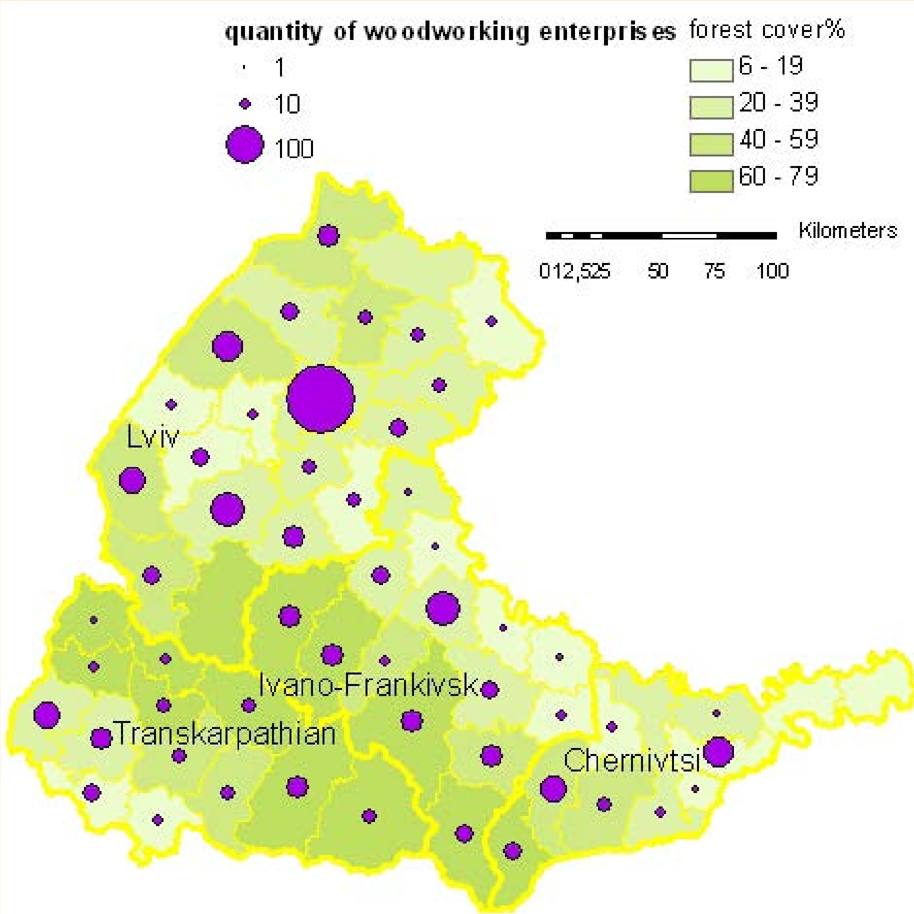


*Fig. 8: Concentration of woodworking enterprises in the Carpathian region**

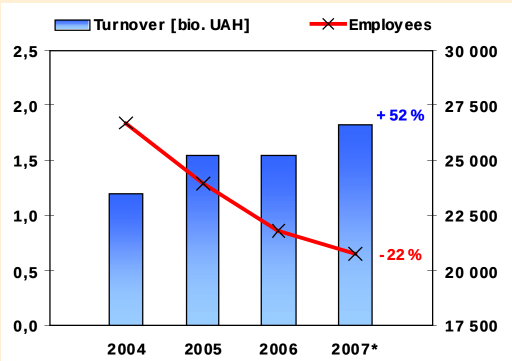


*Fig. 9: Wood working industry trends in the Carpathian region**

3.3.1. SAWMILLING

As of early 2008, about 2000 enterprises (mainly small-scale) were operating in the Carpathian region. The exact number and capacity of enterprises are not known, but regional experts estimate the processing volume at about 2 million m^3 per year which is less than 50% of the overall wood harvested in the region. On average, these small sawmills employ from 5 to 8 persons with an average production capacity of 1000 cub m per year. As Fig. 9 shows, the concentration of sawmills is directly linked to the availability of resources, which is particularly evident in two oblasts – Transcarpathian and Ivano-Frankivsk where there is the largest number of sawmills located in remote mountainous communities where they provide important employment opportunities as well as supply various wood products. Only part of the raw materials overplus (2.9 million cubic meters) undergoes advanced processing. This can be partially explained by the insufficient level of services in processing as well as by unfavorable business environment.

One of the sawmills of the Carpathian region that was subjected to inspection and analysis during the project implementation

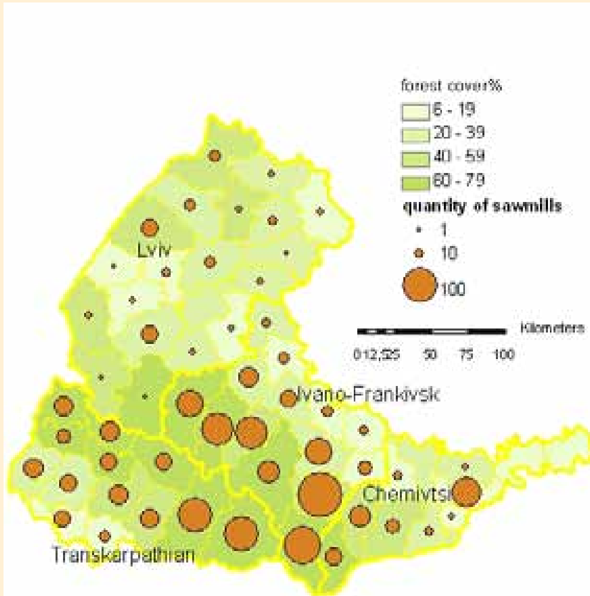


Fig. 10. Concentration of sawmills in the Carpathian region

After the flood in July, 2008 in the Carpathian region of Ukraine, the corresponding law-enforcement and inspecting authorities discovered 530 illegal sawmills (193 in Ivano-Frankivsk obl., 112 – in Lviv obl., 225 – in Transcarpathian obl.) on the territory of the region (as found after monitoring mass media reports in September 2008).

A sawmill is considered illegal if the owner of this sawmill is not registered in the Tax Administration records by the respective activity type, or the one that uses timber obtained illegally.

Small sawmill operators are obviously important for local employment and supply of different products. However, since there is little official statistics about the number and capacity of small sawmill operators, it makes it difficult to accurately assess their development potential and prospects of being integrated into the cluster.

3.3.2. BOARD MANUFACTURING

Other big users of raw wood materials are five board manufacturing enterprises. They use about 1.6 mln m^3 of raw materials annually (as a rule, this is firewood timber for technological needs; its annual harvest volume in the region – 841 thousand cubic meters). They employ about 1500 persons. Rates of output growth in the board industry are the highest in the whole forest cluster of the Carpathian region, which resulted from the introduction of entrance duty on export products and presence of stable demand for wooden board materials.

Table 7: Output of wooden board materials in the Carpathian region**

Output	2004	2005	2006	2007*	Trend	[%]
Polished particle board [ths. m^3]	417	545	620	887	470	113
Laminated particle board [ths. m^2]	21 081	29 529	32 647	40 156	19 075	90
Fiber board [ths. m^3]	12	13	11	13	2	14
Plywood [ths. m^3]	6	7	9	13	6	105

* estimated data

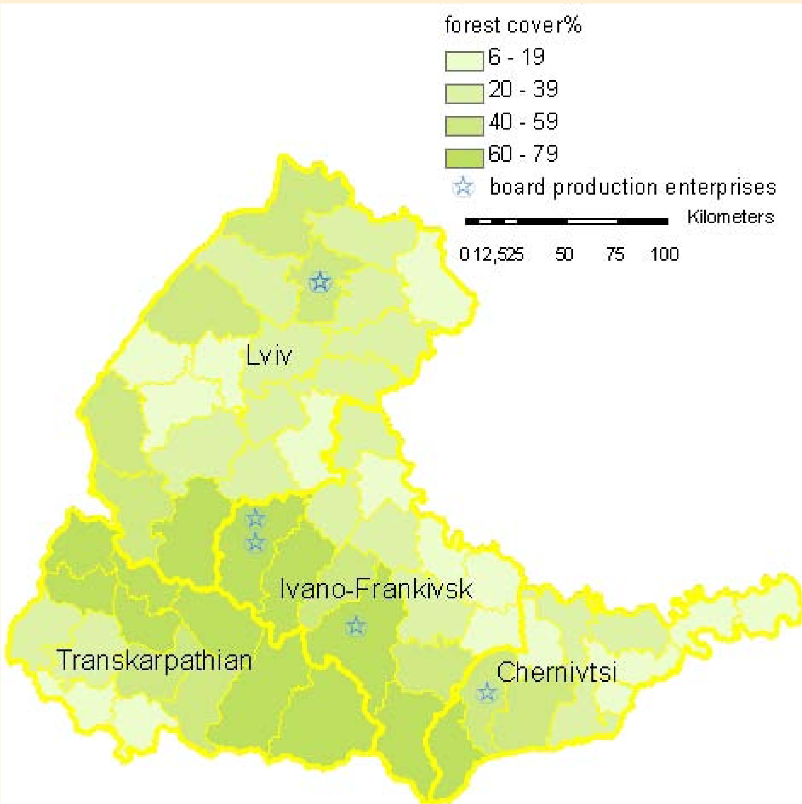


*Fig. 11: Concentration of particle board enterprises in the Carpathian region**

There is an obvious deficit of available raw materials for this industry which is one of the restricting factors for its development.

Transcarpathia is the only oblast that does not have board manufacturing enterprises despite the fact that harvests are high and there is high potential availability of wood residue.

* State Statistics Committee of Ukraine, 2008
** Ministry of Industrial Policy of Ukraine, 2008

3.4. FURNITURE MANUFACTURING

Official statistics report that the Carpathian furniture manufacturing accounts for 14.7% of the total furniture turnover of Ukraine.

As compared to the same indicators in timber products manufacturing (35%) and forestry (22%), this index appears quite low. However, expert estimates suggest that up to 60-65% of furniture products are produced and sold in the shadow which employs an estimated 7500 individuals.

This high incidence of uncontrolled activities is also a reason for insignificant official growth indicators in the furniture industry. It is interesting to note that there is a high degree of prevalence: almost in every district there are furniture production facilities.

About half of furniture enterprises are concentrated in the vicinity of Lviv and Ivano-Frankivsk and the rest are more or less evenly distributed.

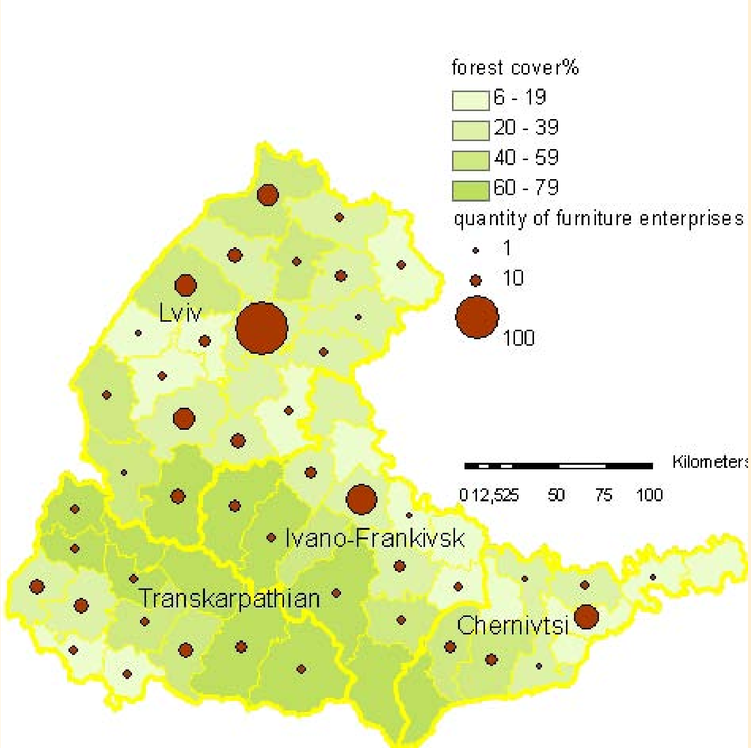


*Fig. 13: Concentration of furniture enterprises in the Carpathian region **

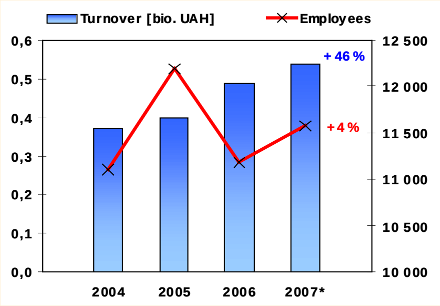


*Fig. 12: Furniture industry trends in the Carpathian region***

Table 8: Furniture industry trends in the Carpathian region**

Parameter	2004	2005	2006	2007	Trend	[%]
Enterprises	381	383	363	357	-24	-6
Turnover [bio. UAH]	0,37	0,40	0,49	0,54	0,17	46
Employees	11099	12 189	11 180	11 570	471	4
Turnover per enterpise [mio. UAH]	1,0	1,0	1,3	1,5	0,5	56
Turnover per employee [ths. UAH]	33,3	32,8	43,8	46,7	13,3	40
Employees per enterpise	29	32	31	32	3	11
Enterprise share of Ukraine [%]	21	21	20	20	-1	
Turnover share of Ukraine [%]	17	15	15	14	-3	
Employees' share of Ukraine [%]	23	23	22	22	-1	

- There are a large number of furniture manufacturers in the region. They are mostly oriented towards producing low-cost furniture which can be supported by the fact that there is low output per 1 employee as compared to other sectors of the cluster.
- The concentration of furniture enterprises is directly related to the density of population in urban centers.
- The high degree of shadow activities can be explained by a high demand for cheap furniture among local population with low income, as well as by unsophisticated technology which requires minimum start-up capital.
- The demand for furniture in Ukraine is ever-increasing, particularly for high quality massive furniture.

* State Statistics Committee of Ukraine, 2008
** Estimated data

3.5. PULP AND PAPER PRODUCTION

Pulp and paper industry includes the production of pulp, paper and also publishing activity.

The pulp and paper production of the Carpathian region of Ukraine is determined by the operational activity of Zhydachiv pulp and paper plant located in Lviv oblast.

The turnover of this sub-branch in Lviv oblast makes up about 80% of the overall turnover in the region. Zhydachiv pulp and paper plant uses up to 410 thousand cubic meters of raw wood annually, out of which 260 thousand m3 of round wood of coniferous species and 150 thousand m^3 of technical raw wood of coniferous species.

However, only 20% of raw materials originate from within Lviv oblast and 80% - from outside the oblast due to well established cluster relations with other resource enterprises of the Carpathian region.

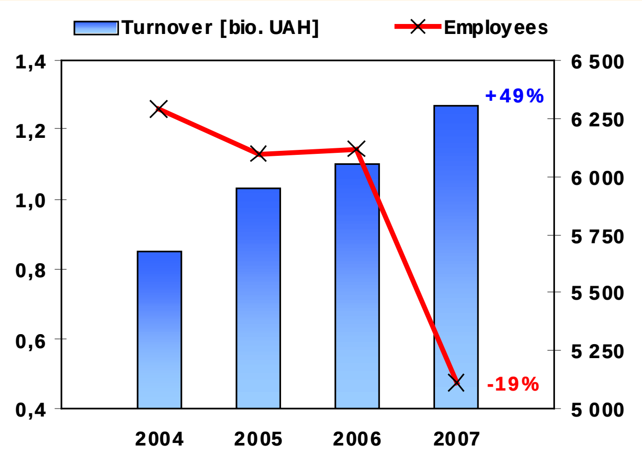


*Fig. 14: Pulp and paper industry trends in the Carpathian region**

Table 9: Pulp and paper industry trends in the Carpathian region*

Parameter	2004	2005	2006	2007	Trend	[%]
Enterprises	74,0	76,0	81,0	82,0	8	11
Turnover [bio. UAH]	0,85	1,03	1,10	1,27	0,42	49
Employees	6290	6096	6118	5115	-1 175	-19
Turnover per enterpise [mio. UAH]	11,5	13,6	13,6	15,5	4,0	35
Turnover per employee [ths. UAH]	135,1	169,0	179,8	248,3	113,2	84
Employees per enterpise	85	80	76	62	-23	-27
Enterprise share of Ukraine [%]	13	14	14	14	1	
Turnover share of Ukraine [%]	24	22	20	19	-5	
Employees' share of Ukraine [%]	23	21	20	21	-1	

- The production of the indicated volume is possible only through the import of raw materials from outside the Lviv oblast.
- Growth in turnover results from a permanent increase in demand for the subindustry products.
- The dynamics of employment reflects the effects of an increase in labor productivity in connection with the introduction of modern technologies in the subindustry.

* State Statistics Committee of Ukraine, 2008

3.6. JOINERY AND CARPENTRY

Joinery and carpentry are components of "Wood working and timber products manufacturing". Dymanic indices of the development of the both branches are of interest from the perspective of the highest level of their integration into internal cluster relations and traditional consumer preferences.

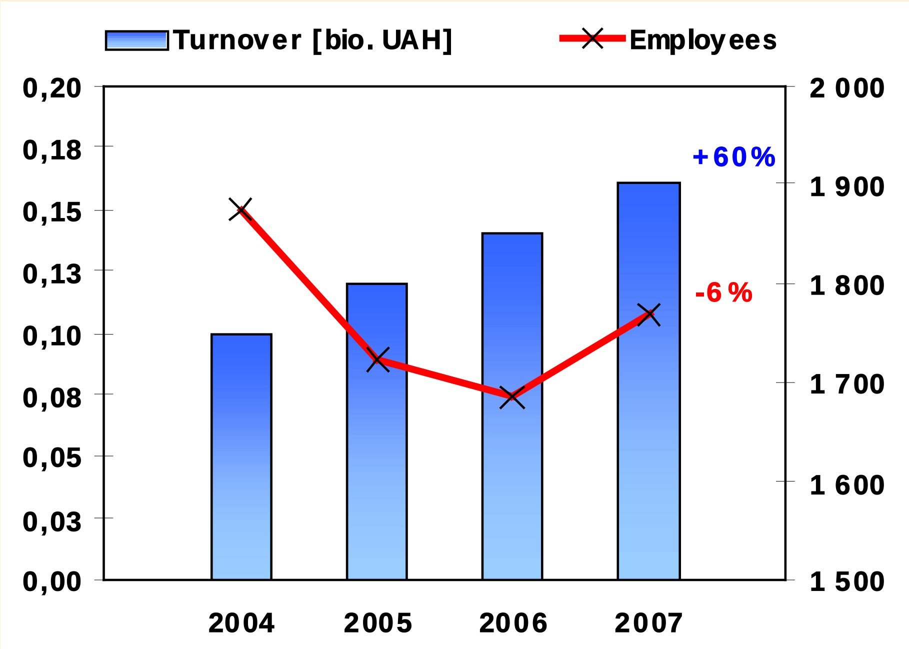


*Fig. 15. Dynamics of production output and employment in joinery and carpentry**

• Replacement of wood with plastic windows and metal doors is one reason for employment fluctuations, a trend that seems to have reversed in the last year analyzed.

• Substantial increase in output production is partially the result of the leveling of factual dynamics by price factor, as well as by sustainable, even though low-speed, growth in demand for wooden joinery (window market of Central and East Europe provides a 2% growth of woodwork annually; this segment is characterized by high quality, durability and environmentally-friendly indicators of products). * *

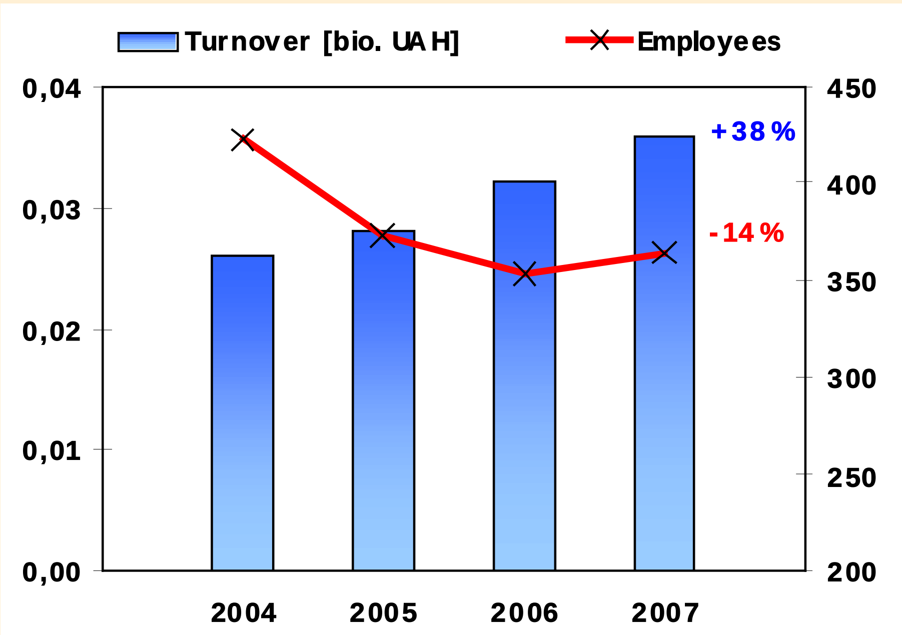


*Fig. 16. Dynamics of production output and employment in parquet manufacturing**

• The employment dynamics reflects the impact of synthetic floor plating market growth; as well as labor productivity growth because of modern technology implementation in the sector

• Stable growth in production output proves unfailing traditional preferences of population for genuine wooden flooring

* State Statistics Committee of Ukraine, 2008
** www.derevo.com.ua

3.7. NON-TIMBER FOREST RESOURCES, TOURISM BASED ON FOREST ECOSYSTEMS

NTFP has considerable resource base for subsistence of rural population, sale and processing. In Transcarpathia, each second mountain rural household member participates in NTFP harvesting. In Transcarpathia, level of use of the mushroom and berry exploitation stock through organized harvesting is only 4.3%, together with harvesting by the local population the level of use is 50-60%***. Therefore, resources are used not sufficiently.

High orientation to export is an evidence of favorable demand – supply situation at external markets and competitiveness of export.

Table 10. Production output and export volumes of NTFP (mushrooms, berries, nuts etc) in the Carpathian region of Ukraine in 2006*

Oblast of Carpathian region	Forest cover, %	NTFP output, million UAH	Share of export, %
Transcarpathia	51,2	37371,3	64,1
Ivano-Frankivsk	41,4	21271,4	51,3
Lviv	28,7	10062,6	40,0
Chernivtsy	29,4	12623,0	65,0
Carpathian region	**39,3**	**81328,5**	**57,9**

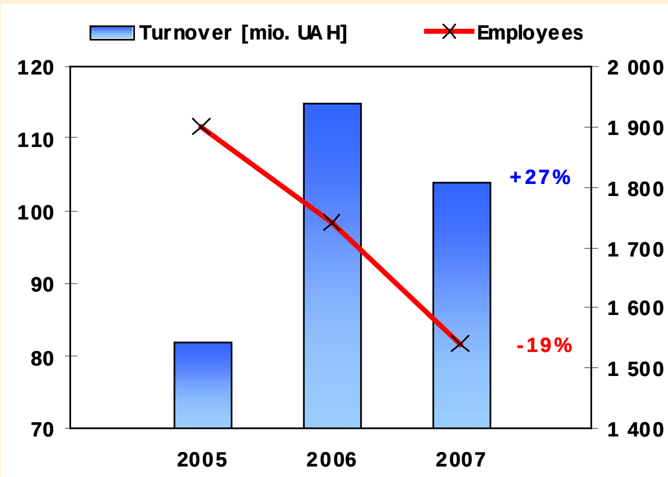


Fig. 17. Dynamics of employment and services output in the sphere of tourism based on forest ecosystems in the Carpathian region of Ukraine **

The scenic beauty of the Carpathian region provides substantial opportunities for the development of tourism. The current lack of suitable accommodation and tourism infrastructure limits this potential. Thus, efforts to increase the quantitative and qualitative services geared particularly towards rural tourism hold great potential for rural development. This would increase employment and revenues for the area. Implications for forest management are the need to preserve the forest functions which are needed for tourism and NTFP.

NTFP resources, along with tourism and hunting, need economic assessment in regards to their commercial value for the regional economy and social economic importance in increasing the level of family incomes of local people.

* State Statistics Committee of Ukraine, 2008
** Data of the State Oblast Administrations of the Carpathian region of Ukraine, 2008
*** Research of FORZA project, 2006

3.8. GENERATION OF TIMBER ENERGY

Carpathian region is an ideal area to focus on the recycling of wood wastes. Currently there is little utilization of substantial volumes of wood residue that results from harvesting and wood processing. Non-utilization of waste does not only mean economic loss to society, but also represents an environmental burden, because these wastes are often disposed of in the vicinity of rivers.

Therefore, it makes sense to encourage the value added processing of wood waste. Some mid size and large size wood processing enterprises utilize their wastes for generating energy, and some waste is sold to the population for heating purposes. In addition, in the Carpathian region there are already producers of fuel briquettes, for which a small domestic market exists. With the increase in prices on alternative energy sources, demand for briquettes and pellets is expected to rise both domestically and internationally. Carpathian region is therefore in excellent position to contribute significantly to these growing wood energy markets. As Table 10 shows, the region's potential to satisfy market demands is very good.

30-40% of the harvested timber residue can be used to satisfy energy needs.

Table 11. Volume of wood waste and residue of the Carpathian region of Ukraine that can be used for satisfying energy demand, mln m³*

Oblasts	2002		2003		2004		2005		2006		2007	
	harvested	for energy demand	harvested	for energy demand	harvested	for energy demand	harvested	for energy demand	harvested	for energy deman d	harvested	for energy demand
Transcarpathia	1,18	0,41	1,11	0,39	1,23	0,43	1,24	0,43	1,21	0,42	1,35	0,47
Ivano-Frankivsk	0,72	0,25	0,80	0,28	0,90	0,31	0,93	0,33	0,98	0,34	1,14	0,40
Lviv	0,86	0,30	0,96	0,34	1,16	0,41	1,17	0,41	1,27	0,45	1,35	0,47
Chernivtsy	0,78	0,27	0,78	0,27	0,89	0,31	0,86	0,30	0,88	0,31	0,98	0,34
Carpathian region	3,53	1,24	3,66	1,28	4,16	1,46	4,20	1,47	4,35	1,52	4,88	1,70

* 1 m3 of residue ≈500 kg. Its heating capacity constitutes 4.0 Mcalories/kg, or 17.0 Mjoules/kg at 8% humidity and 2.5 Mcalories/kg, or 10.0 Mjoules/ kg at 40% humidity, correspondingly.

Demand for wood energy is likely to increase, and Carpathian region could be an important supplier of wood briquettes and pallets.

This value added creation could boost employment, incomes and receipts to the budget, as well as increase demand for domestically produced residue processing equipment for energy needs.

The domestic market of wood waste and residue has not been shaped yet.

The external market of firewood, briquettes and pellets is unlimited.

The use of garden and park wood, as well as used wood can significantly increase the volume of raw materials for energy needs.

Ukraine does not produce equipment for harvesting and grinding lump residue.

* Data calculated on the basis of the materials of the State Forestry Committee of Ukraine

3.9. EDUCATION AND RESEARCH SERVICES

In the region there is a system of educational establishments that specialize in training highly qualified technical workers and engineers. Modern specialized enterprises have their own system of training personnel.

Practically none of the educational institutions in the Carpathian region trains operators for complex technological equipment; there has been a decrease in the interest in working specializations; the material and technical basis of higher educational establishments leaves much to be desired; it is challenging to learn to operate modern technologies for complex professions; insufficient attention is paid to training experts in innovative technologies, equipment and complex processing of raw materials and residue. The local educational system appears to be lagging behind practical accomplishments of modern technologies in the industry.

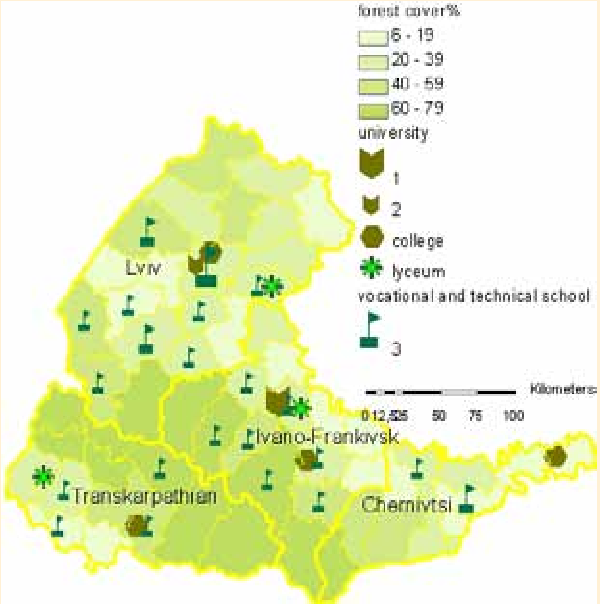


Fig. 18. Concentration of branch educational establishments

Table 12. List of educational establishments that train personnel for the branch *

Name	Number of educational establishments (graduates) in each oblast				
	Transcarpathia	Ivano-Frankivsk	Lviv	Chernivtsy	Total
Higher educational establishments	0 – (80)/5	1/12	2/24	0/7	3/48
Colleges	1 – (300)/8	1/11	1/31	1/12	4/62
Vocational and technical schools	4 – (250)/25	7/23	14/63	3/19	28/130
Lyceums	1 – (20)/5	1/1	2/16	0/3	4/25

In brackets – annual number of graduates. Numerator – number of forestry educational institutions, denominator – total number of educational institutions.

Table 13. List of scientific establishments*

Transcarpathian oblast	
1	Transcarpathian State Specialized Forest Protection Branch
2	National University of Uzgorod
Ivano-Frankivsk oblast	
3	V. Stefanyk Precarpathian National University
4	Ukrainian Research Institute of Mountainous Forestry named after P.S. Pasternak
5	Ivano-Frankivsk State Specialized Forest Protection Branch
6	Ivano-Frankivsk R&D Technological Institute
Lviv oblast	
7	National Forestry Technical University of Ukraine
8	Lviv State Forest Management Expedition
9	Lviv State Specialized Forest Protection Center
10	Lviv Furniture Institute
Chernivtsy oblast	
11	-

* Ministry of Education and Science of Ukraine, 2008

4. WOOD CONSUMPTION AND VALUE ADDING

4.1. VALUE-ADDED CHAIN FORMATION

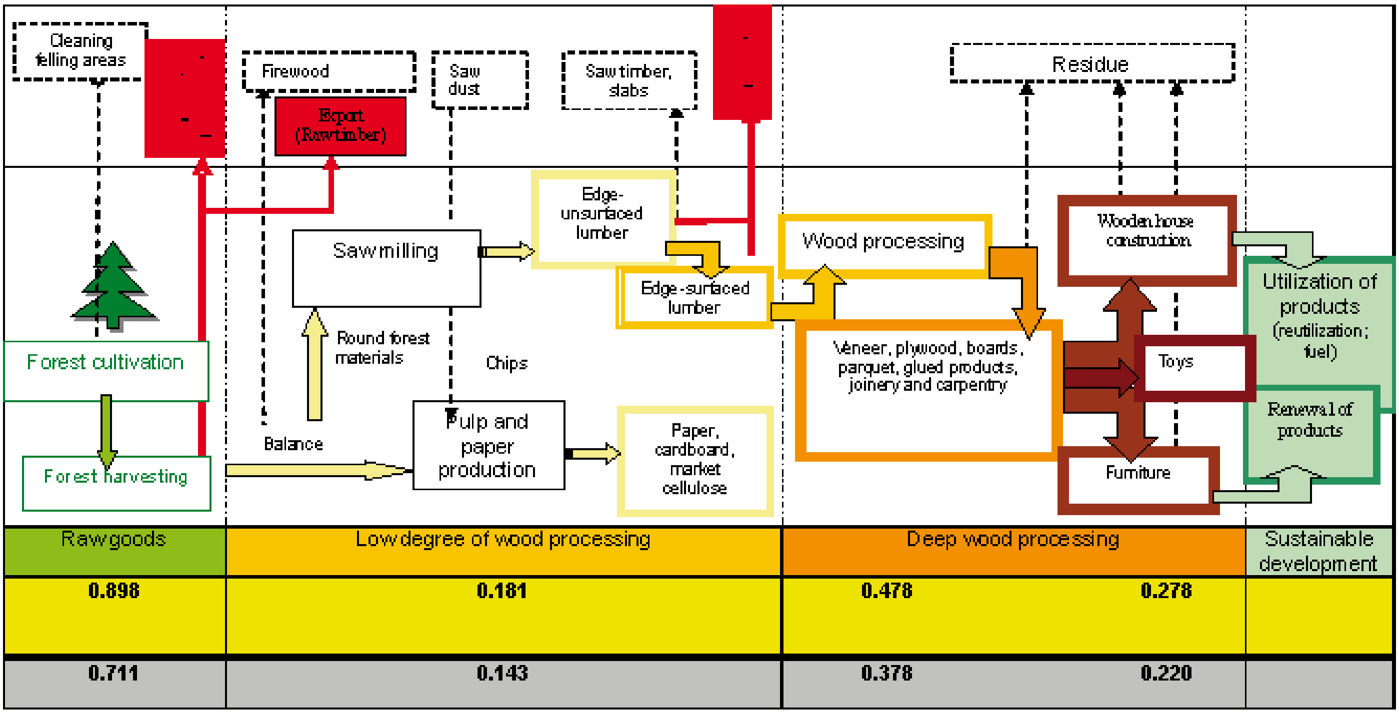


*Fig. 19. Chain of raw wood "path" (added value formation)**

GAV – gross added value per 1 UAH of turnover, UAH (wages, social welfare assignments, pre-tax income)

legal production

"shadow" sector

The difference between added value per 1 UAH of turnover in the legal and "shadow" sectors is equal to direct losses of assignments to the state budget of various levels from each UAH of turnover.

All this substantially decreases state financing of social expenditures and pension fund, as well as reduces budget receipts on the whole. Therefore, the cluster should aim its activities and development primarily at the export of deep wood processing products.

* Based on the data of inspections and questionnaires of basic enterprises in the Carpathian region

4.2. TIMBER MARKET
4.2.1. INTERNAL INDUSTRY CONNECTIONS

THE STATE OF THE BRANCH MARKET CAN BE DESCRIBED BY THE SYSTEMATIC CHARACTER OF DEMAND, ACCESSIBILITY AND SUFFICIENCY OF SUPPLY, LEVEL OF INTER-BRANCH COOPERATION

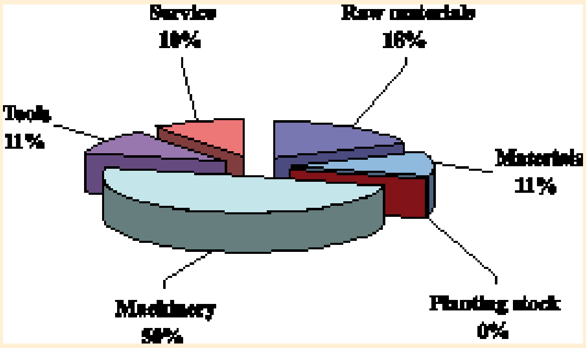


*Fig. 20. Structure of supply of enterprises-suppliers in the forest sector of the region (apart from state lishosps)**

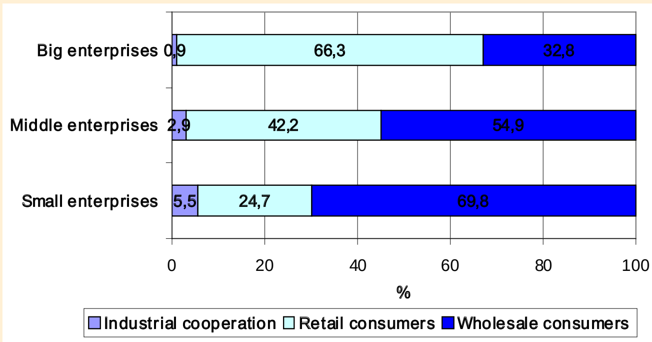


*Figure 21. Selling structure of the regional forest cluster enterprises***

Table 14. Level of internal industry cooperation**

Enterprises / Delivery's structure, %	Forestry	Woodworking	Joinery and carpentry	Furniture	Pulp and paper
Industrial cooperation	7,7	8,9	36,2	—	6,0
Another consumers	92,2	91,1	63,7	100,0	94,0

Equipment and other resources suppliers' network is imperfect and disproportionate, and concentrates around big processing enterprises. Cluster members contact rarely. Industry associations are either absent or exist just on paper.

The above mentioned suggests that costs of holding negotiations and fulfilling contractual obligations could be significantly reduced by establishing close friendly relations, trust and other social contacts that influence entrepreneurs of related social groups that are part of the cluster.

* Catalog of furniture, wood working and forestry suppliers, 2007-2008
** Based on the data of branch enterprises' questionnaires

4.2.2. RAW WOOD EXPORT

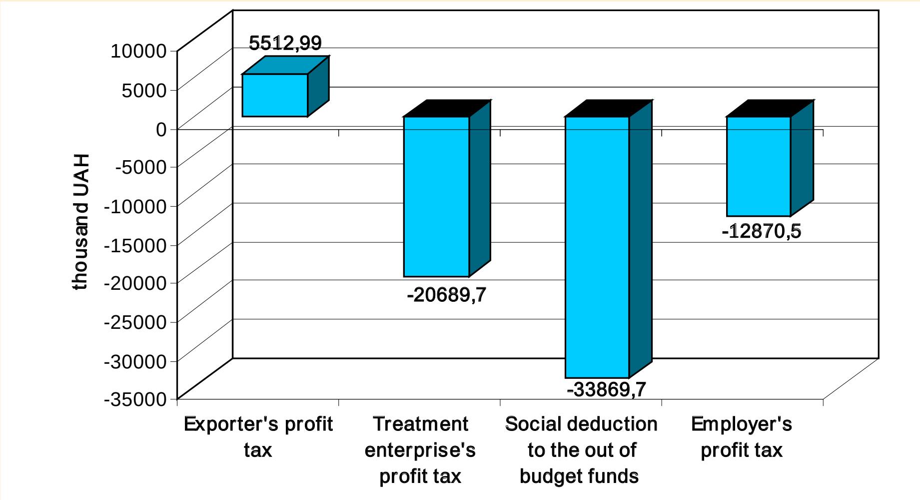


*Fig. 22. General assessment of direct profits and losses caused by raw wood export in 2007 (data of only one customs office of the Carpathian region of Ukraine)**

Raw wood and NTFP exports cause low added value in the forest sector of the region. Radical positive changes in regards to supporting domestic manufacturers and stimulating deep wood processing among them require state regulation at different levels in the context of the economic policy of the whole state and region, in particular.

The geographic location of the oblasts is favorable for export. At the same time, raw wood and NTFP exports cause tremendous losses for the region and the whole state:

- unemployment;
- public relief for the unemployed;
- decline in incomes of state budgets at different levels.

Raw wood export with a customs value of 1 UAH causes 0.644 UAH of direct budget loss in case of joinery production.

* Based on the data of the State Oblast Administrations of the Carpathian region of Ukraine, 2008

4.3. WOOD RESIDUE

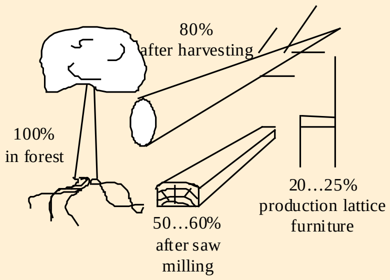


Fig. 23. Use of timber volume

There are no methods of collecting, making an inventory and recycling of wooden articles in Ukraine.

A large amount of wood residue results from the cultivation and exploitation of gardens and park trees. However, there is no methodology of their inventory and useage.

Table 15. Estimated amount of wood residue in 2007

Stages of forest utilization	Amount of residue, thou. m^3 (percentage of overall production)
Forest cultivation:	20-30% of harvesting volumes **974-1461**
Forest harvesting: 4872,6 thou. m^3	20% of harvesting volumes **974**
Total	1948-2435
Primary wood proc essing (overall production output), thou. m^3:	
- veneer - 15	15 - ***(50%)***
- particle board - 911	154,87 -391,73 - (***17-43%***)
- fiber board - 42,5	42,5 - ***(50%)***
- plywood - 32	35 - ***(52-54%)***
- parquet - 0,75	2,25 - ***(75%)***
- saw milling (1/3 of round wood for internal use) - 387,6	166,1 - (***30%***)
Total	415,75-651,75
Timber products manufacturing, m^3:	
- 50% of particle board from the regions + ¼ of the Ukrainian import - 532	80 - ***(15%)***
- saw timber (1/3 of overall production) - 129,2	83,98 - ***(65%)***
- plywood, fiber board, veneer - 9	1,79 - ***(20%)***
Total	165,77
Ready-made products	-
Final total	2529,47 – 3252,47 **52-66,6%** from volume of forest harvesting

***** Державний комітет лісового господарства України, Нормативні документи щодо виготовлення виробів з деревини

5. FOREST AND WOOD BASED INDUSTRIES CLUSTER OF THE CARPATHIAN REGION OF UKRAINE

5.1. GENERAL STRUCTURE AND TRENDS IN THE FOREST CLUSTER

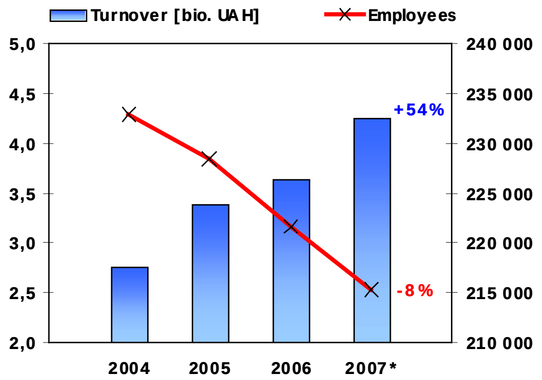


*Fig. 24. Forest cluster trends in the Carpathian region ***

* estimated date

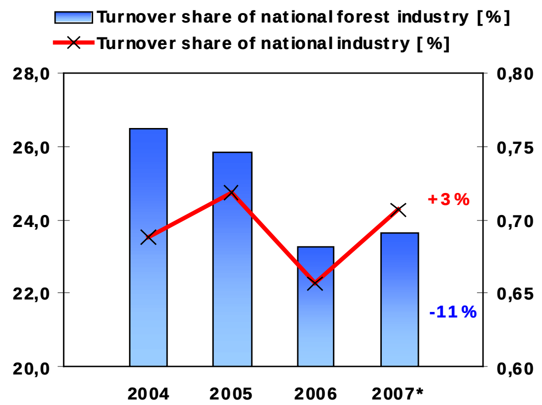


*Fig. 25. Turnover share trends in the Carpathian region***

* estimated date

By the number of enterprises, turnover and employment rates, the forest cluster of the Carpathian region of Ukraine makes up on average about 24% of the forest cluster of Ukraine, which witnesses to the significance of the forest complex of the Carpathian region in the context of analyzing the entire forest complex of Ukraine.

General tendencies towards an increase in the demand for the products of the forest cluster of the Carpathian region and a boost of labor productivity stipulated the following realities over the period from 2004 to 2007:

• turnover of the forest cluster of the Carpathian region increased by 54%;

• employment in the forest cluster of the Carpathian region diminished by 8%.

There's been another positive tendency which is an increase in the turnover share of the forest cluster of the region in the overall turnover of Ukraine (+3%) which can be explained by the growing demand for the forest cluster products. It is important to point out some negative tendencies, too, one of them being a decline in the share of the forest cluster of the region in the turnover of the whole forest complex of Ukraine (-11%) which can be explained by a low level of deep wood processing and slow paces of labor productivity growth in comparison with forest complex enterprises of other regions of Ukraine.

Table 16. Forest cluster of the Carpathian region in the national context, 2007 *

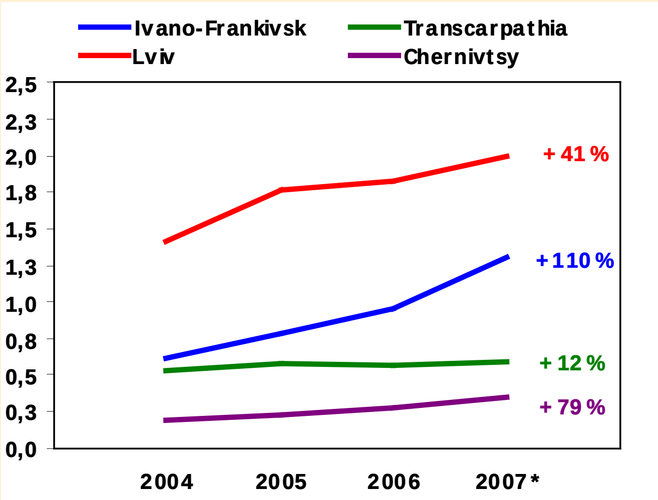
Industry	Key parameters, 2007			Share of national forest industry			Share of national industry		
	Enterprises [total]	Turnover [bio. UAH]	Employees [total]	Enterprises [%]	Turnover [%]	Employees [%]	Enterprises [%]	Turnover [%]	Employees [%]
Forestry	68	0,6	15 283	1,8	3,6	2,4	0,0	0,1	0,2
Wood industry	1 443	1,8	20 775	21,2	8,6	9,6	0,4	0,3	0,2
Furniture industry	345	0,6	10 400	5,1	2,6	4,8	0,1	0,1	0,1
Paper industry	82	1,3	5 115	1,2	5,9	2,4	0,0	0,2	0,1
Total forest cluster of Carpathian region	1 938	4,3	51 573	28,5	19,9	24,0	0,5	0,7	0,6

* State Statistics Committee of Ukraine, Ministry of Industrial Policy of Ukraine, State Forestry Committee of Ukraine
** State Statistics Committee of Ukraine, 2008

5.2. REGIONAL IMPACT OF THE FOREST CLUSTER OF THE CARPATHIAN REGION

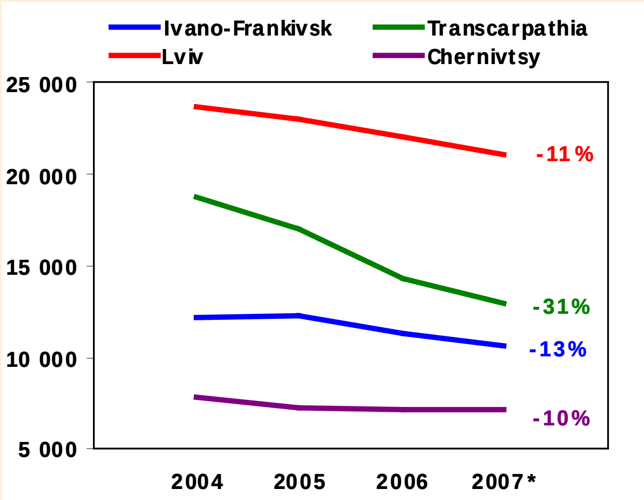
Table 17. Forest cluster of the Carpathian region in the context of the regional economy, 2007*

Oblast	Key parameters, 2007			Share of regional economy		
	Enterprises [total]	Turnover [bio. UAH]	Employees [total]	Enterprises [%]	Turnover [%]	Employees [%]
Lviv	646	2,0	21 028	3,2	11,1	4,6
Ivano-Frankivsk	446	1,3	10 576	5,3	12,3	8,2
Chernivitsky	243	0,4	7 093	4,9	14,8	8,9
Transcarpathia	603	0,6	12 876	7,0	10,0	11,2
Carpathian Region	1 938	4,2	51 573	4,6	11,5	6,6



*estimated data

*Fig. 26. Turnover [bln UAH] trends in the Carpathian forest cluster, 2007 **



*estimated data

*Fig. 27. Employment trends in the Carpathian forest cluster, 2007**

The least intensive growth in the turnover of the forest cluster over the period from 2004 to 2007 among the oblasts of the region is observed in Transcarpathian oblast, while employment in this oblast over the same period of time dropped most. These negative tendencies could be explained by the following factors: disproportion in the forest cluster development in different branches; "availability" of raw materials; low level of deep wood processing; transition into the "shadow" on the part of some employees.

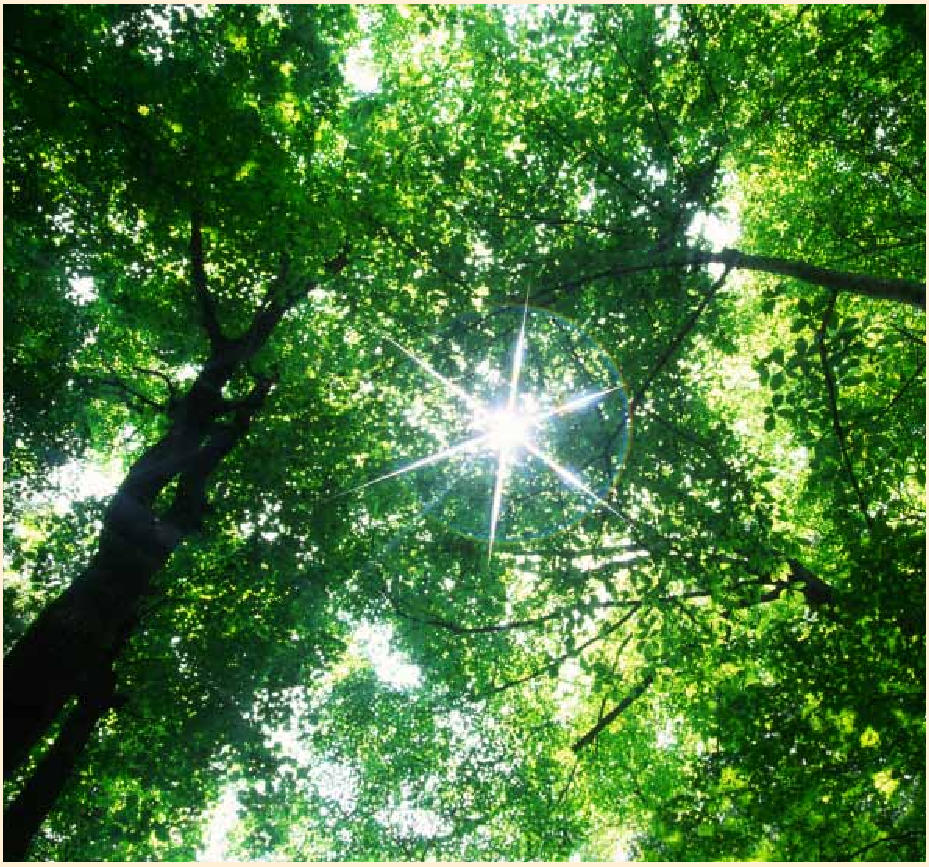
* State Statistics Committee of Ukraine, Ministry of Industrial Policy of Ukraine, State Forestry Committee of Ukraine

5.2. REGIONAL IMPACT OF THE FOREST CLUSTER OF THE CARPATHIAN REGION

Table 18. Carpathian forest cluster benchmarking (Turnover), 2007*

	2004	2005	2006	2007	Change
Ukraine forest cluster share of total Ukraine economy [%]	4,2	4,3	4,3	3,6	-0,6
Carpathian forest cluster share of total Carpathian economy [%]	13,0	12,8	11,0	11,6	-1,4
Carpathian forest cluster share of Ukraine forest cluster [%]	16,5	16,8	15,3	19,9	3,4
Carpathian total economy share of Ukraine total economy [%]	5,3	5,6	6,0	6,1	0,8

The forest cluster is losing in its importance within the overall economy of Ukraine, because other sectors are growing better. However, the regional importance of the Carpathian forest cluster is growing at a faster pace than the regional economy on the whole, which proves that the Carpathians can be competitive as a forest-based industrial region.



* Statistics Committee of Ukraine, Ministry of Industrial Policy of Ukraine, State Forestry Committee of Ukraine

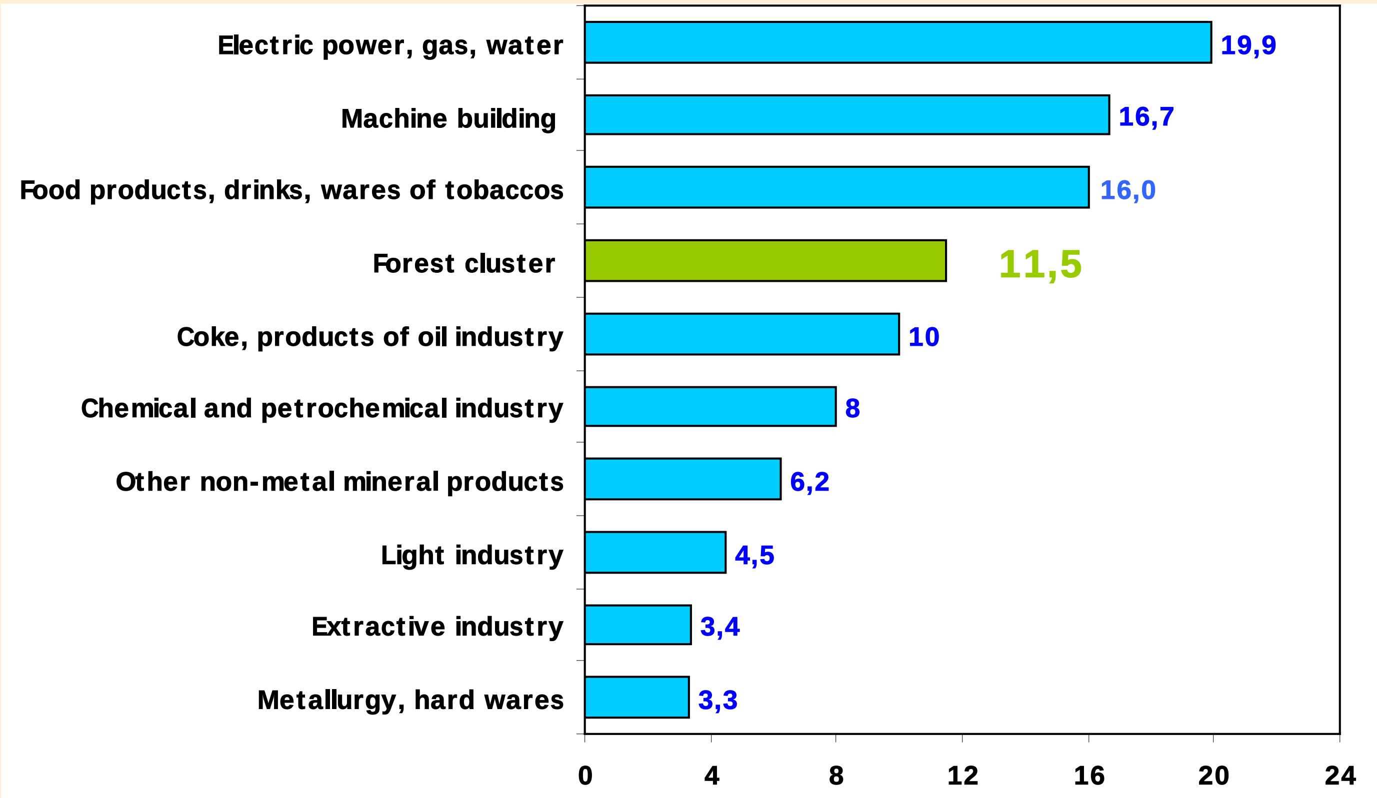


*Fig. 28. Share of turnover (%) in the Carpathian region by branches, 2007**

- The forest cluster of the Carpathian region takes the fourth place in the region by turnover;
- The share of the forest cluster in the overall economy of the Carpathian region is 3.2 times larger than the analogous share in Ukraine;
- The share of the forest cluster of the Carpathian region in the forest cluster of Ukraine is 3.9 times larger than the share of the regional economy in the overall economy of Ukraine.

* Statistics Committee of Ukraine, Ministry of Industrial Policy of Ukraine, State Forestry Committee of Ukraine

5.3. INVESTMENT ATTRACTIVENESS OF THE FOREST AND WOOD BASED INDUSTRIES CLUSTER OF THE CARPATHIAN REGION OF UKRAINE

A comprehensive assessment of the investment attractiveness of the forest and wood based industries of each of the four oblasts of the Carpathian region of Ukraine has been carried out on the basis of forty indices that give a multifaceted picture of the development of forestry, timber products manufacturing, furniture manufacturing and pulp and paper production. The value of the investment attractiveness index is determined by the degree of correspondence of the dynamics of sub-branch development parameters to the dynamics of foreign direct investments.

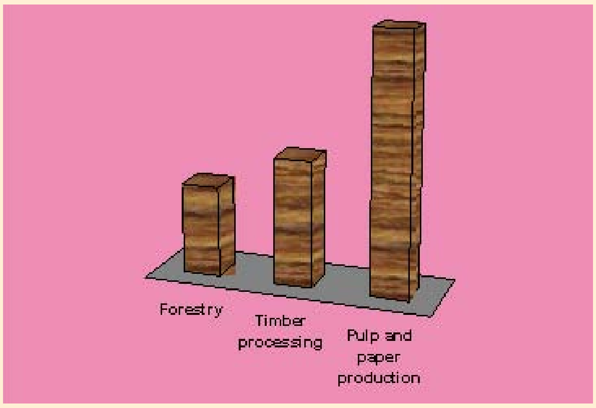


*Fig. 29. Value of the investment attractiveness indices of the forest and wood based industries of Ivano-Frankivsk oblast**

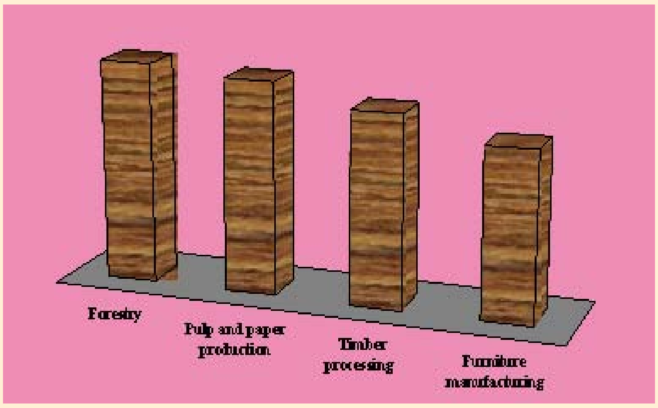


*Fig. 30. Value of the investment attractiveness indices of the forest and wood based industries of Lviv oblast **

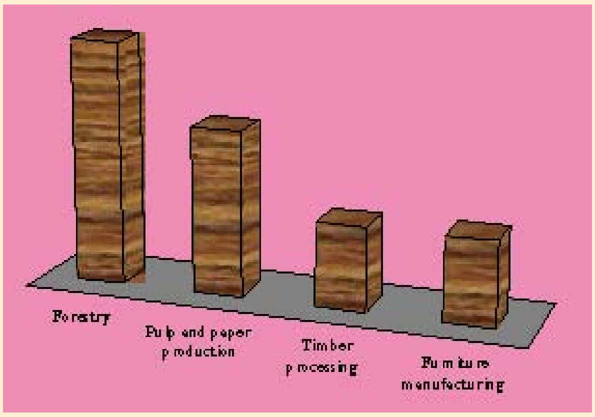


*Fig. 31. Value of the investment attractiveness indices of the forest and wood based industries of Transcarpathian oblast **

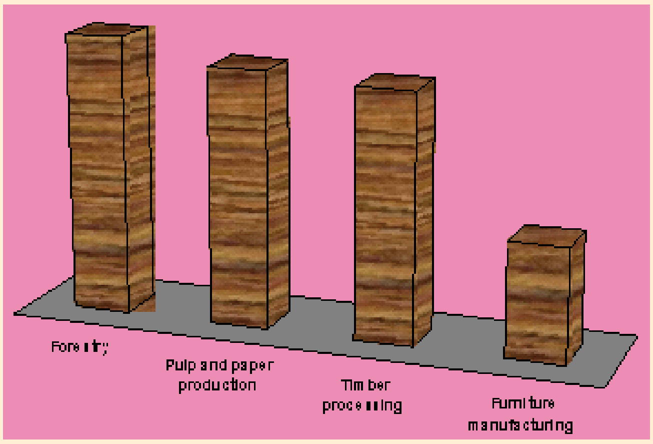


*Fig. 32. Value of the investment attractiveness indices of the forest and wood based industries of Chernivtsi oblast **

In all the oblasts of the Carpathian region of Ukraine, except Ivano-Frankivsk oblast, the value of the investment attractiveness index in forestry is one of the highest, while the value of the investment attractiveness index in furniture manufacturing is the lowest.

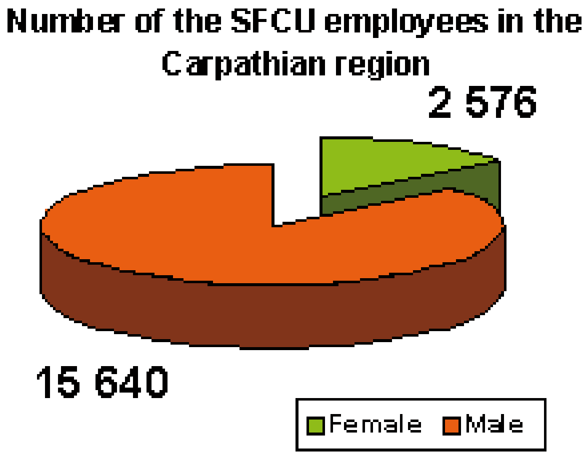
***** based on the survey findings

5.4. STRENGTHS, WEAKNESSES, OPPORTUNITIES AND THREATS (SWOT)

Strengths	**Weaknesses**
➢ Availability of high-quality local raw materials ➢ Available useful forest qualities for the development of recreation, tourism and hunting ➢ Perfect technological skills and good image among consumers ➢ Wide range of products ➢ Diversification of sales markets (region, Ukraine, Eastern Europe, EU) ➢ Most SFCU forests in the Carpathian region have been certified ➢ Sufficient number of higher educational institutions to satisfy demand for engineering and technical workers ➢ Source of employment for the local population	➢ Low level of technological woodworking ➢ Insufficient raw materials ➢ Absence of modern low impact timber harvesting technology (cable cranes, harvesters, forwarders) ➢ Low transport access to forest resources ➢ Training of qualified labor force is not in line with market needs ➢ Poor marketing, low level of products certification ➢ No clear-cut strategy (shortcomings in business planning) ➢ Unsatisfactory level of wood residue treatment ➢ Considerable share of the "shadow" sector ➢ Lack of updated consistent information on the resources of all permanent forest users ➢ Insufficient investments into the production and development of innovative technologies
Opportunities	**Threats**
➢ Customer tastes are changing in favor of genuine wood products (change in the customer mentality ecology wise) ➢ Increasing demand for woodworking products on the domestic and foreign markets ➢ Foreign market partially satisfies demand for timber and timber processing products ➢ Low level of branch monopolization ➢ Increase in the population's solvency ➢ Application of close-to-nature silviculture approaches may increase timber harvesting volumes ➢ Incentives at governmental level (privileged loans, leasing, budget financing) to encourage the use of low impact harvesting equipment ➢ Budget allocations for the construction and maintenance of forest roads ➢ Organization of training programs on enterprises request ➢ Intensive development of green tourism ➢ Boost of the raw materials potential of the cluster by means of wood residue processing	➢ Emerging would-be competitors on the market with higher quality and lower costs of production (consequence of Ukraine having joined the WTO) ➢ Possible changes in government policies concerning the forest sector which will require substantial investments into production (for example, ban on continuous fellings) ➢ Deficit of skilled personnel ➢ High tax pressure ➢ Growing consumer demands ➢ High dependence on demand fluctuations

The elaboration of a general cluster concept and forest sector development strategy at national and regional levels will give a chance to efficiently use the existing strengths and opportunities, counterbalance threats and eliminate weaknesses.

6. GENDER POLICY ASPECTS OF THE CLUSTER ANALYSIS



In general, the findings of the survey of the forest and wood-based industries of the Carpathian region show that the number of men employed in the sector is larger than that of women, even though women in the Carpathian region prevail in numbers. This low indicator of women's employment in the forest sector can be explained primarily by the existing stereotypes while making choices about the future profession. Besides, another important factor comes into play here – receiving equal benefits from professional activities (learning new methods, promotions and career growth, level of wages etc).

Fig 33. GENDER STRUCTURE OF FORESTRY WORKERS OF THE CARPATHIANS REGION OF UKRAINE

The implementation of the gender analysis of the forest and wood-based industries of the Carpathian region has revealed that in order to conduct a high-quality profound analysis of social and economic processes from a gender perspective, there is a need for a well-developed system of quantitative and qualitative indicators that would reflect all the facets of these processes, which is lacking now.

The attempt to outline gender aspects of the forest and wood-based industries of the Carpathian region has confirmed the relevance of the main issues that are topical not only for the four oblasts under research, but also for the whole Ukraine. These issues include first of all:

- providing for equal access and representation of men and women in governmental bodies;
- providing for equal opportunities in social and labor relations;
- developing mechanisms to ensure equal rights and opportunities for men and women.

7. RECOMMENDATIONS

STRATEGY FOR THE DEVELOPMENT OF CLUSTER MANAGEMENT

- Recognize the socio-economic importance and role of the cluster in the regional and national contexts
- Consider the future growth potential of the natural resources-based sector for sustainable regional development in the strategic frontier location
- Establish targeted support programs for intra- and inter-industry cooperation
- Disseminate the cluster analysis findings among the general public

TO THE AUTHORITIES

! Improve the structure and organization of the state and regional forest cluster for stimulating investments in the sector in the context of sustainable development:

- Use the CA findings in the strategic planning of the social and economic development of the regions
- Support regional cluster development initiatives and cluster pilot projects
- Support forest sector reforms in the context of sustainable development and creation of conditions to develop all forms of forest ownership
- Develop programs to stimulate the purchase of low impact timber harvesting equipment and technologies in the industry
- Support the training of qualified personnel to satisfy the cluster needs
- Transition from the practice of expanding natural reserves to the multifunctional use of all forest categories based on close-to-nature silviculture principles
- Develop measures for reducing the scope and preventing illegal felling;
- Develop measures for encouraging value added chain formation through wood residue and timber energy generation
- Create favorable conditions for cooperation between forest cluster players in the Carpathian region
- Stage information campaigns aimed at boosting the awareness among the population of the forest cluster problems and promoting upsides of genuine wood products
- Use the experience of Transcarpathian oblast in applying close-to-nature silviculture methods
- Support the involvement of the private sector into performing forestry activities
- Elaborate special development programs for furthering domestic tourism
- Create favorable investment climate at macro and micro levels

TO BUSINESSES

! Unite into unions or associations for the purpose of cooperation and joint representation of interests outside the country and on the domestic market in the context of persevering globalization processes:

- Develop industrial associations and networks for the coordination and official protection of the sector interests
- Launch pilot forest cluster initiatives (supported by FORZA)
- Establish contacts with the existing cluster initiatives in other countries
- Develop deeper wood processing and optimize production processes in the value added chain formation to find and use untapped potential
- Provide for wood residue recycling
- Certify products to access external markets
- Strengthen contacts between educational institutions, research establishments and branch enterprises (support of special training programs)
- Form a powerful marketing service within the regional cluster for examining market parameters and promoting products
- Improve business culture among market players as a precondition of effective industrial cooperation
- Strengthen cooperation and specialization of enterprises in specific products or services
- Set up specialized enterprises for carrying out works and rendering services for forestry

TO THE COMMUNITY

! Activate the participation of local communities in the development of the forest sector of the Carpathian region:

- Actively participate in the forest resources planning and use, for example, using the experience of two-level planning (within the FORZA project)
- Represent local communities in branch associations
- Provide for public monitoring to prevent illegal felling
- Carry out continuous ecological monitoring during the construction of new and exploitation of the existing branch facilities
- Participate in the development of green tourism in the region

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