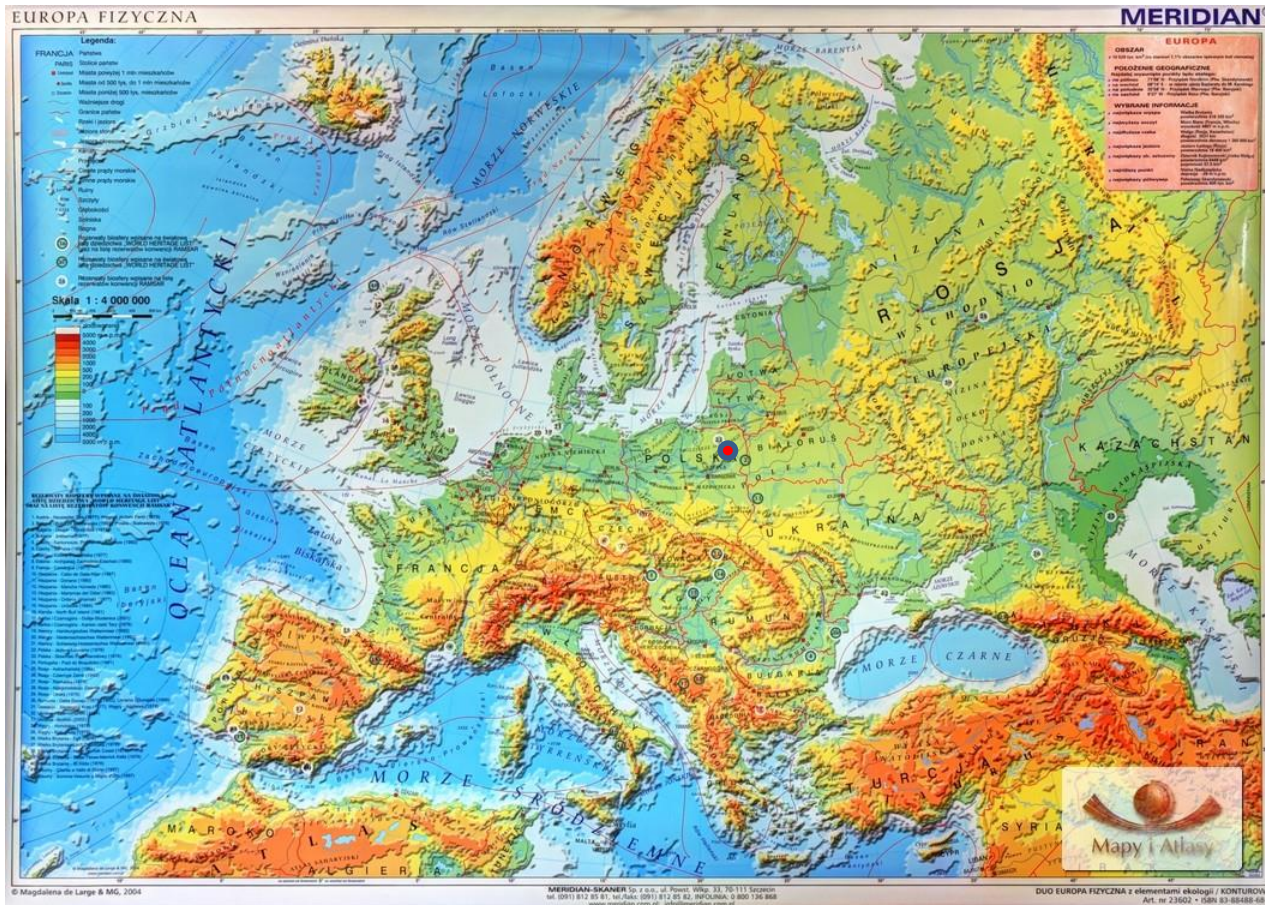


Timber harvesting methods in Eastern European countries

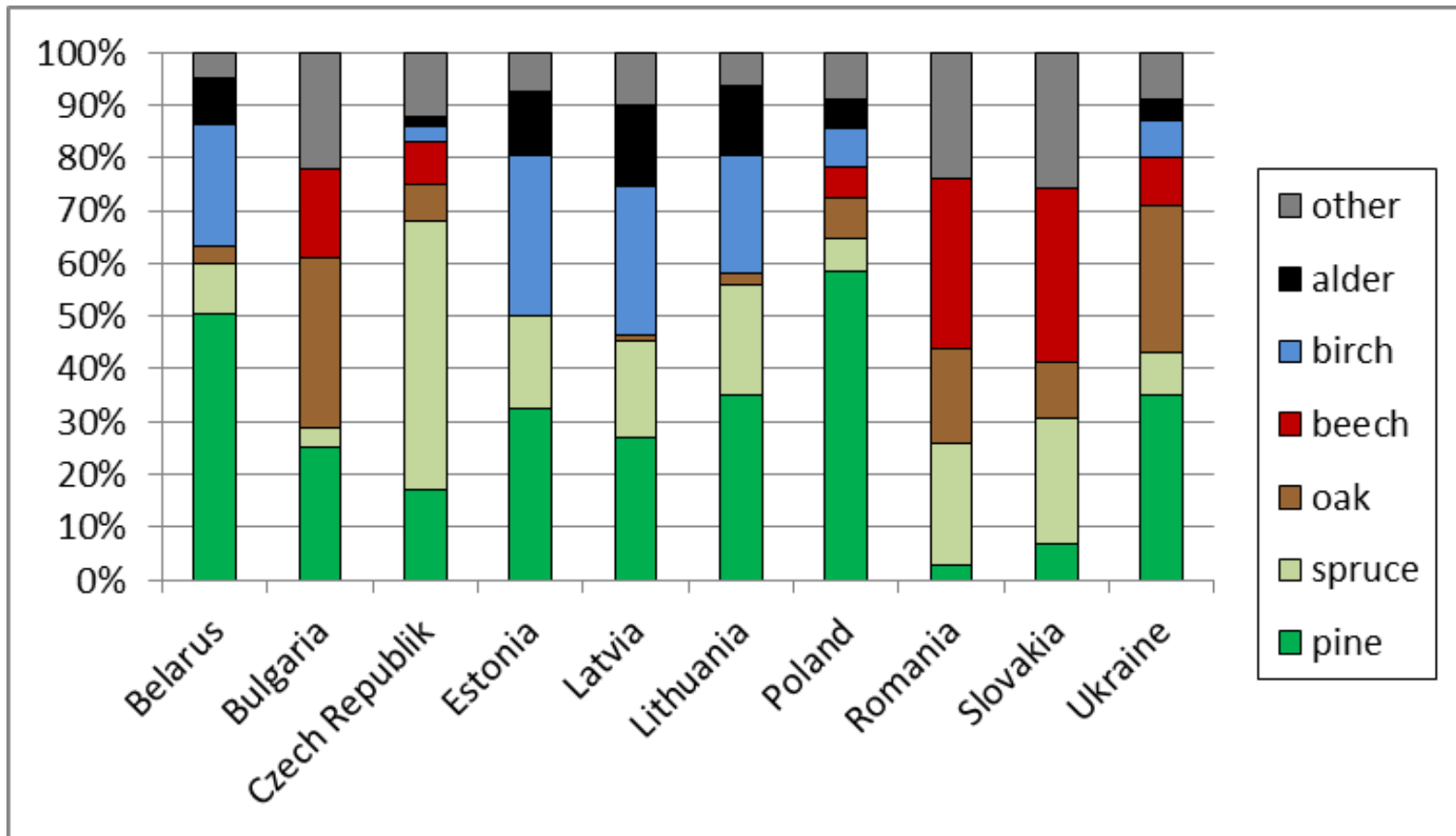
Tadeusz Moskalik, Warsaw University of Life Sciences - SGGW



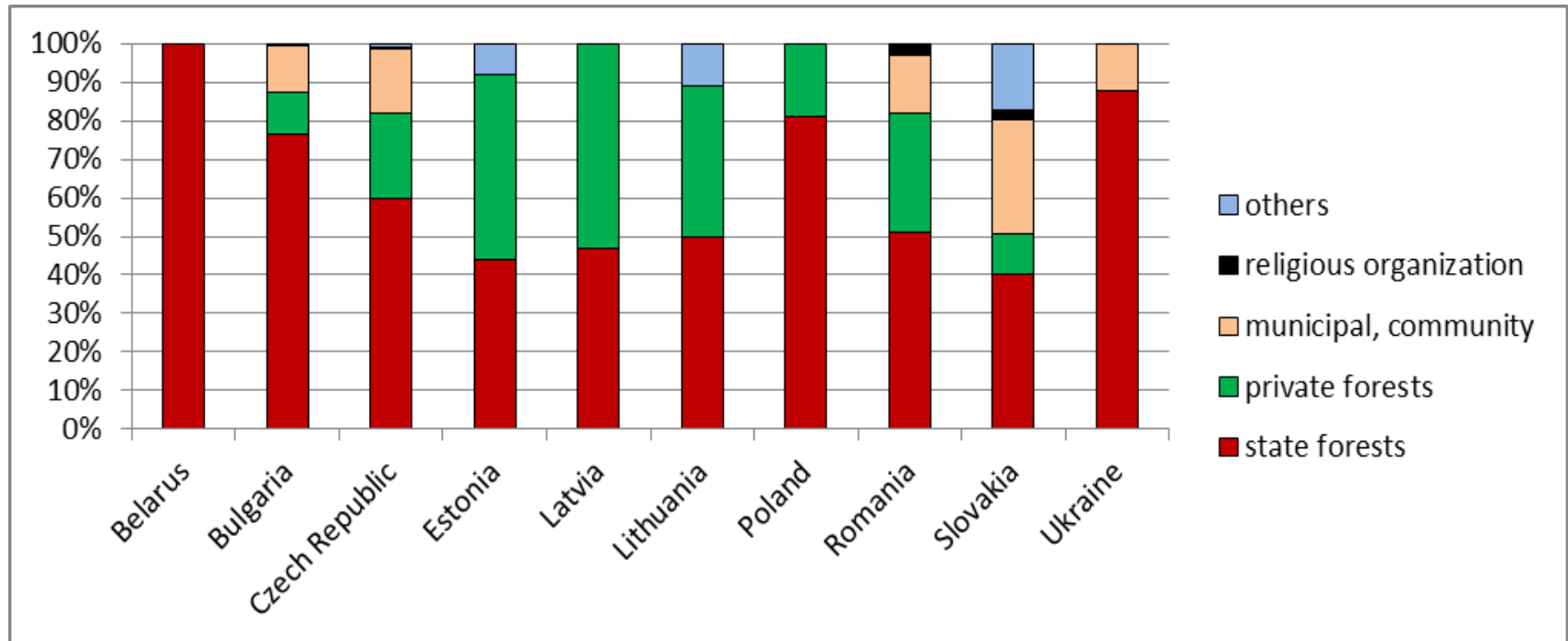
Forest area and cover in Eastern European countries

Country	Forest area, thousand ha	Forest area available to supply wood, %	Forest cover in 2015, %	Change in forest cover from 1990 to 2015, %
Belarus	8,633.50	75.0	42.5	10.7
Bulgaria	3,774.70	57.9	37.4	16.9
Czech Republic	2,597.18	86.3	34.5	1.5
Estonia	2,231.95	89.3	52.7	1.3
Latvia	3,356.00	93.9	54.0	5.9
Lithuania	2,180.00	88.3	34.8	12.3
Poland	9,197.90	87.7	29.4	6.2
Romania	6,520.00	67.4	29.8	7.2
Slovakia	1,941.52	92.0	41.0	0.7
Ukraine	9,657.00	54.1	16.7	4.4

Tree species structure in the Eastern European countries



Forest ownership structure in the Eastern European countries



Roundwood production and the timber trade in the Eastern European countries analysed (FAO 2016)

Country	Production, thousand m ³	Production per capita, m ³ /person	Export, % of production	Import, % of production
Belarus	19,550	2.10	11.1	0.1
Bulgaria	5,570	0.76	9.7	0.6
Czech Republic	15,476	1.47	31.9	15.8
Estonia	12,600	9.57	21.9	1.8
Latvia	12,597	6.29	30.4	10.3
Lithuania	7,351	2.49	23.2	4.6
Poland	40,565	1.05	6.6	6.5
Romania	15,068	0.75	2.2	6.7
Slovakia	9,417	1.73	31.1	8.2
Ukraine	18,300	0.43	18.8	0.1

Estonia

Mechanized harvesting dominates. Over 95% of final fellings are made by harvesters (up to 100% in state forests); thinning operations - over 80%



220-250



300-350



1000

Latvia

It is estimated that about 70% of wood is cut by using the fully mechanized CTL method; 30% by chainsaws (mostly for thinning and low valued deciduous stands).



312



1024



281

Lithuania

Chain saws, forwarders or agricultural tractors with self-loading trailers are used in the highly mechanized harvesting of the CTL method in Lithuania. Recently, timber harvesting by chainsaws is being replaced with harvesters.



90



170

Belarus

Tree-length (TL) and cut-to-length (CTL) methods are applied in Belarus to harvest wood. The typical TL system - chainsaws for felling and delimiting, and a cable skidder for extraction; the typical CTL system - chainsaws for felling, delimiting and cross-cutting (or harvester), and a forwarder for extraction.



160
+72



250
+52

Poland

About 98% of the work associated with timber harvesting and extracting is carried out by private companies. The sortiment method dominates in mature stands, with the use of chain saws for cutting trees and skidders or agricultural tractors for wood extraction. In younger stands, the CTL method is used, as well as agricultural tractors with self-loading trailers.



530



700



1500

Czech Republic

The tree-length method dominates (71%), with the use of chainsaws for felling and delimiting, as well as skidders and agricultural tractors fitted with winches. 29% is harvested in a fully mechanized manner with the use of harvesters and forwarders.



500



800



Slovakia

Wood in Slovakia is harvested mostly by subcontractors. Chainsaw work is still most commonly used in felling operations – ca. 95%.



ca. 10

Extraction



45%



37%



8%



8%



2%

Ukraine

About 83% of logging operations are performed with state forests technical equipment. Two methods of harvesting dominate: in lowlands – chainsaw and agricultural tractor with a trailer/winch or skidder; in the Carpathians – chainsaw-cable system-skidder). Wood is transported to the customer mainly as logs of 2–4 m in length (82–87%).



ca. 10

Romania

Timber harvesting operations rely heavily on the use of motor-manual tree felling and processing followed by skidding, carried out mostly by Romanian-produced wheeled winch skidders (98%).



2%

Extraction



96%

4%

Bulgaria

Cutting and delimiting are done with chain saws. There are only single harvesters, forwarders and cable cranes (about 10 skylines are still in use).

Extraction



60%



40%

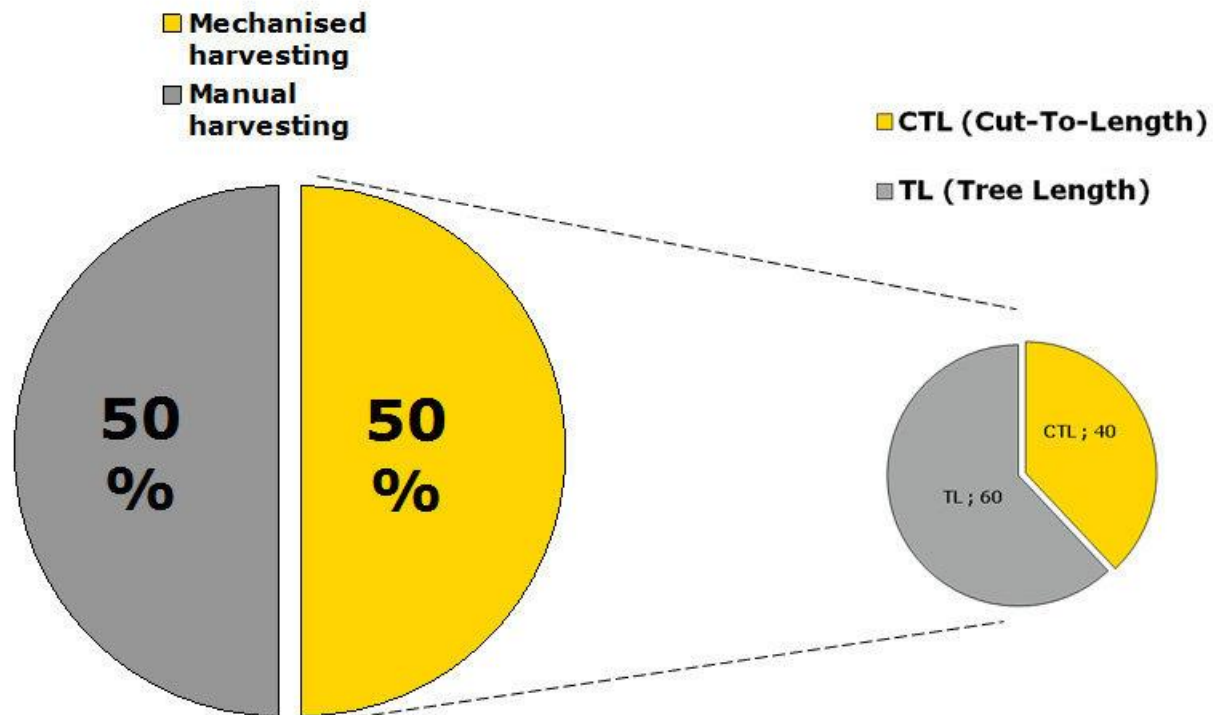
Timber harvesting methods applied in each analysed country

Harvesting method	Average distance between skid rails (m)	Mechanization degree	Transported wood	Belarus	Bulgaria	Czech Republic	Estonia	Latvia	Lithuania	Poland	Romania	Slovakia	Ukraine	
H-F	20	Fully mechanized	Short wood <6m	■		■	■	■	■	■	■	■		
C-H-F	>20	Highly mechanized		■		■		■				■		
C-F	20			■	■	■	■	■	■	■	■			
C-TT	20			■	■	■	■	■	■	■	■	■	■	
H-CC	20			■										
C-H-CC	>20			■									■	
C-O-H-F	>30	Partially mechanized												
C-OT	20			■							■	■		
C-O-F/TT	>20			■			■					■	■	
H-TW/S	20	Highly mechanized	Long wood >6m				■	■		■				
C-TW/S	>20			■	■	■	■	■	■	■	■	■	■	■
C-CC	>40			■	■							■	■	■
C-O-TW/S	>20	Partially mechanized		■	■	■						■	■	■
C-O	>20			■	■	■			■	■	■	■	■	
Frequency of usage:				■	very often		■	often		■	rarely			

Explanation of the abbreviations:

H – Harvester; F – Forwarder, C – Chainsaw; O – Horse; OT – Horse with a trailer; S – Skidder;
 TW – Agricultural tractor with a winch; TT – Agricultural tractor with a trailer; CC – Cable crane

Timber harvesting in the world



Work productivity of timber harvesting in different forest conditions depending on the level of the process of mechanization

Cutting category	Volume of cut trees, m ³	Work productivity, m ³ /h			
		Technological operations (Felling-delimiting-bucking)		Extraction 300 m	
		Tree-length method (TL) Chainsaw	Cut-to-length method (CTL) Harvester	Tree-length method (TL) Skidder	Cut-to-length method (CTL) Forwarder
Early thinning	0.06-0.08	0.5-1.1	4.4-5.6	4.2-5.3	4.6-5.4
Late thinning	0.18-0.32	0.7-1.5	8.6-16.1	6.3-14.2	8.8-15.1
Clear cut	0.32-0.57	1.8- 4.3	19.8-32.1	13.7-16.3	16.5-17.9

Conclusions

The social and economic changes, which began in the countries of Eastern Europe in the early 1990s, led, among other things, to the restitution or privatisation of forests. Of the countries analysed, only Belarus, Ukraine and Poland have not introduced such changes.

Conclusions

All of the analysed countries have public companies that manage national forests. These companies entrust most of the field work of harvesting and extraction to private contractors. This work is carried out by the state only in Ukraine and Belarus. The owners of private forests harvest timber primarily with their own equipment.

Conclusions

In recent years, we have seen a dynamic growth in the use of the cut-to-length method using a harvester and forwarder to harvest wood. This applies especially to the Baltic countries. The leader in this respect is Estonia, where over 95% of final felling and over 80% of thinning operations are performed by harvesters. The lowest level of mechanization of logging processes is in Bulgaria, Romania, Slovakia and Ukraine.

Conclusions

The tree-length method is still dominant in all countries of Eastern Europe, with the exception of the Baltic countries. This method, in most cases, is based on using chainsaws and skidders or agricultural tractors with self-loading trailers. In mountainous regions, cable yarding systems are also used.