

Milestone 2 – FMM descriptions

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Summary

This report maps Forest Management Models (FMMs) that are applied on 10 Case Study Areas (CSAs) within 9 countries of the ALTERFOR consortium, namely: Germany (2 CSAs), Ireland, Italy, Lithuania, the Netherlands, Portugal, Slovakia, Sweden and Turkey. By doing so, the report serves two primary aims. Internally, it serves the ALTERFOR partners by establishing an overview of prevailing silvicultural practices that will serve as the benchmark descriptions when examining the alternative FMMs at the later stages of the project. Externally, the thorough and systematic mapping of current FMMs might serve any reader interested in approaches to forest management as currently applied under a variety of ecological and socio-economic conditions on the European continent.

The FMM descriptions were elaborated by multidisciplinary research teams in the case countries, based on a structured questionnaire consisting of two main parts: (i) a background description of the historical milestones that lead to the currently dominant FMMs in respective countries and CSAs; (ii) the detailed descriptions of the FMMs, classified according to the most common silvicultural systems. Each FMMs is dissected by the most important silvicultural measures. To the extent possible, the report comments on the extent by which the applied silvicultural measures differ from the forest management ideals prevailing in respective countries.

The descriptions expose a large variety of FMMs applied on different CSAs which to a large extent can be explained by different historical contexts and current socio-economic drivers. The number of the reported FMMs differ from 1 (Italy) to 12 (Lithuania) which can be explained by several factors including the area of a CSA; the actual heterogeneity of silvicultural practices; and the different degrees of aggregating the silvicultural practices within an FMM. According to our mapping, clear felling is the most prominent silvicultural system occupying around 23% of the forest area on all CSAs taken together. Clear felling is followed by uniform shelterwood and non-selective system, occupying 16% and 13% of the total CSA area, respectively.

Contents

I. Forest Management Models (FMMs) description	4
1. Introduction	13
1.1. What is a forest management model (FMM)?.....	13
1.2. Data collection	13
1.3. FMMs in different countries	14
1.4. References.....	17
2. Germany.....	18
2.1. Background and forest history.....	18
2.2. The case study areas	19
2.2.1. Land area and forest cover	19
2.2.2. Tree species.....	19
2.3. FMMs in Germany and in the two CSA	20
2.4. Alternative FMMs.....	20
2.5. FMMs used in the two case study areas.....	21
2.6. Ecosystem services.....	21
2.7. Common for the six FMMs.....	22
2.8. FMM Spruce in large private owned forest	24
2.9. FMM for Spruce in the state forest.....	25
2.10. FMM for beech in state forestry	27
2.11. FMM for Pine, private owner	28
2.12. FMM for Pine, state forestry.....	29
2.13. FMM for Oak, state forestry	31
2.14. References.....	33
3. Ireland	34
3.1. Background and forest history.....	34
3.1.1. Ownership	34
3.1.2. Nature Conservation and Biodiversity Protection non-forested land	34
3.2. The case study area.....	35

3.2.1.	Land area and forest cover	35
3.2.2.	Tree species.....	36
3.3.	FMMs in Ireland and in the Irish CSA	37
3.4.	Ecosystem services.....	38
3.5.	Alternative FMMs.....	39
3.6.	The two Clearcutting systems used in the Irish CSA	39
3.7.	Clearcutting system conifers: Sitka spruce	43
3.8.	Clearcutting system: lodgepole pine.....	44
3.9.	FMM for Nature conservation and biodiversity protection	45
3.10.	References.....	47
4.	Italy.....	49
4.1.	Background and forest history.....	49
4.2.	Ownership	51
4.3.	The case study area.....	52
4.3.1.	Tree species.....	52
4.4.	FMMs in the Italian CSA	53
4.5.	Ecosystem services.....	55
4.6.	The selection system used in the Italian CSA.....	56
4.7.	References.....	62
5.	Lithuania.....	63
5.1.	Background and forest history.....	63
5.2.	General description of CSA	64
5.3.	Tree species in Lithuania and in the CSA	67
5.4.	Generally about FMMs used in CSA and in Lithuania	68
5.5.	Other FMMs used in Lithuania.....	71
5.6.	General information for all FMMs in the Lithuanian CSA	72
5.7.	Medium rotation clearcutting in coniferous forest (spruce) MRCON_C	75
5.8.	Medium rotation shelter-wood/clear cuttings in coniferous forests MRCON_CUS.....	79
5.9.	Long rotation clearcutting in coniferous forest (pine) LRCON_C	82
5.10.	Long rotation uniform shelterwood or clearcutting in coniferous forest LRCON_CUS	85
5.11.	Medium rotation non-uniform shelter-wood in coniferous forests MRCON_NUS.....	87
5.12.	Long rotation uniform shelter-wood in coniferous forests LRCON_US.....	91

5.13. Medium rotation uniform shelterwood clearcutting in deciduous forest MRDEC_US	94
5.14. Medium rotation clear cutting in deciduous (birch and black alder) forests MRDEC_C	96
5.15. Short rotation uniform shelter-wood/clear cutting in deciduous forests SRDEC_CUS	100
5.16. Short rotation clear cutting in deciduous forests (aspen, grey alder) SRDEC_C	104
5.17. Management in special purpose forests.....	107
5.18. Stands with no intervention	110
5.19. References.....	112
6. The Netherlands.....	114
6.1. Historical background of Dutch forest management.....	114
6.2. Forest management approaches in the Netherlands	116
6.3. Dutch Forest management approaches for the ALTERFOR project.....	118
6.4. Sixth Netherlands Forestry Inventory, NBI6	118
6.5. Subsidy Scheme Nature and Landscape SNL	119
6.6. European Forest Information SCENario model SPACE (EFISCEN SPACE).....	120
6.7. FMMs defined for the Dutch forest sector	120
6.8. References.....	121
7. Portugal.....	123
7.1. Background and forest history.....	123
7.1.1. Ownership	127
7.1.2. Nature conservation	128
7.2. The case study area.....	128
7.2.1. Land Area/ forest area proportions	129
7.2.2. Site productivity and tree species.....	130
7.2.3. Forest fires	131
7.2.4. FMMs used in Portugal and in the CSA.....	133
7.3. Mixed eucalypt and maritime pine (FMM1 and FMM2)	135
7.4. Chestnut (FMM3)	139
7.5. Pure eucalyptus stands (FMM4)	141
7.6. References.....	143
8. Slovakia	146
8.1. Background and forest history.....	146
8.1.1. Ownership	148

8.2. Case study area	149
8.2.1. General about the CSA	149
8.2.2. Ownership, Slovakia and CSA	149
8.2.3. Tree species in Slovakia and CSA	150
8.2.4. Growing conditions in the Slovakian CSA	150
8.3. General about FMMs in Slovakia	151
8.4. Other FMMs in Slovakia	152
8.5. FMMs in Slovakian CSA	152
8.5.1. Overview	152
8.5.2. Common for all models	153
8.6. Non-uniform shelterwood systems with broadleaves (FMM no:1-5)	153
8.7. Close to nature management FMM6	162
8.8. Non-uniform shelterwood systems with spruce FMM7	165
8.9. Three FMMs for soil protection, nature conservation and water purification	168
8.9.1. Soil protection model	173
8.9.2. Nature protection model	173
8.9.3. Water purification model	173
8.9.4. Regeneration	173
8.9.5. References	175
9. Sweden	177
9.1. Background and forest history	177
9.2. Ownership	177
9.3. The case study area	178
9.3.1. General description CSA Kronoberg	178
9.3.2. General about FMMs used in Sweden and in the CSA Kronoberg	179
9.4. Other FMMs used in Sweden	181
9.5. FMMs in CSA, Kronoberg	181
9.5.1. Ecosystem services	182
9.5.2. Rotation period	183
9.6. Clearcutting systems intermediate rotation period	186
9.7. Clear cutting system with long rotation period	189
9.8. Clear cutting system with short rotation period	194

9.9. Management of stands with high nature values	197
9.10. Nature conservation with management	199
9.11. Nature conservation without management	200
9.12. References.....	200
10. Turkey.....	203
10.1. Background and forest history.....	203
10.2. The case study area.....	204
10.2.1. Land area and forest cover	205
10.2.2. Tree species.....	206
10.3. FMMs in the country and in the CSA Gölcük	206
10.4. Alternative FMMs.....	207
10.5. FMMs used in the CSA Gölcük	207
10.6. Shelterwood systems with long and very long rotation period.....	209
10.7. Nature conservation with and without management	212
10.8. Two models for coppice	214
10.9. Conversion of coppice to high forest	216
10.10. Clear cutting model.....	217
10.11. References.....	218

List of Tables

TABLE 1 NUMBER OF REPORTED FMMS FOR EACH PARTNER	14
TABLE 2 NAME AND IDENTIFICATION, ALL FMMS REPORTED	14
TABLE 3 FMMS CLASSIFIED IN SILVICULTURE SYSTEMS, NUMBER OF FMMS AND ESTIMATED PROPORTION OF AREA WHERE THEY ARE USED. THE SUM IS NOT 100%, AS ALL ALTERNATIVE FMMS ARE NOT DESCRIBED.....	16
TABLE 4 A GENERAL DESCRIPTION OF FOREST LAND IN THE TWO CASE STUDY AREAS IN GERMANY, AWF IN SOUTHERN GERMANY AND LFN IN NORTH-EASTERN GERMANY.	19
TABLE 5 TOTAL LAND AREA, FOREST AREA, STANDING VOLUMES, PRODUCTIVITY AND OWNERSHIP IN CSA.....	19
TABLE 6 TREE SPECIES, PROPORTION OF TOTAL FOREST AREA	20
TABLE 7 THE SIX MAJOR FOREST MANAGEMENT MODELS (FMMS) USED IN THE GERMAN CSA, THREE IN AWF/BAVARIA AND THREE IN LSN/BRANDENBURG.	21
TABLE 8. ECOSYSTEM SERVICES CONNECTED TO THE FOUR FMMS IN THE TWO CSA IN GERMANY, CSA., AWF AUGSBURG WESTERN FORESTS, IN BAVARIA AND CASE STUDY AREA LSN LIEBEROSE-SCHLAUBETAL-NEUZELLE, IN BRANDENBUR. RANKING OF IMPORTANT ES WITHIN EACH FMM. NO RANKING BETWEEN FMM.....	21
TABLE 9. THE FOREST LAND IN THE CSA EXPRESSED AS FOREST AREA PROPORTION (%) WITHIN PRODUCTIVITY AND MOISTURE CLASSES.	35
TABLE 10. TOTAL LAND AREA, FOREST AREA, STANDING VOLUMES, PRODUCTIVITY AND OWNERSHIP IN THE CSA (BARONY OF MOYCULLEN), COUNTY GALWAY AND IRELAND. SOURCE: FOREST SERVICE (2013). NATIONAL FOREST INVENTORY – REPUBLIC OF IRELAND.....	36
TABLE 11. TREE SPECIES, PROPORTION OF TOTAL FOREST AREA. FOREST SERVICE (2013). NATIONAL FOREST INVENTORY – REPUBLIC OF IRELAND – RESULTS.....	36
TABLE 12. THE THREE MAJOR FOREST MANAGEMENT MODELS (FMMS) USED IN THE IRISH CSA, AND IN IRELAND.	38
TABLE 13. ECOSYSTEM SERVICES CONNECTED TO THE FOUR FMMS IN THE IRISH CSA. RANKING OF IMPORTANT ESS WITHIN EACH FMM. NO RANKING BETWEEN FMM.	38
TABLE 14. TOTAL LAND AREA AND FOREST AREA DIVIDED IN DIFFERENT LAND USES, THE ITALIAN CSA, VENETO REGION AND ITALY.	50
TABLE 15. FOREST AREA OWNERSHIP IN CSA, VENETO PROVINCE AND IN ITALY, FIGURES REFER TO 2005.	52
TABLE 16. THE FOREST AREA IN THE ITALIAN CSA DIVIDED IN PRODUCTIVITY AND MOISTURE CLASSES, %.....	52
TABLE 17. TREE SPECIES, PROPORTION OF TOTAL VOLUME IN THE ITALIAN CSA, VENETO REGION AND IN ITALY.....	52
TABLE 18. THE MAJOR FMMS USED IN THE ITALY AND IN THE CSA. THE TOTAL SUM FOR ITALY IS LARGER THAN 100% DEPENDING ON THE UNCERTAINESS IN THE ESTIMATION.....	54
TABLE 19. ECOSYSTEM SERVICES IN THE ITALIAN CSA. RANKING OF IMPORTANT ES.....	56
TABLE 20. DATA ABOUT LITHUANIA AND THE LITHUANIAN CSA	64

TABLE 21. SITE PRODUCTIVITY $M^3HA^{-1}Y^{-1}$ DIFFERENT SITES, CALCULATED ON ACTUAL DATA FROM STAND INVENTORY IN LITHUANIAN CSA	67
TABLE 22. TREE SPECIES, % OF STANDING VOLUME AND % OF FOREST AREA IN CSA AND LITHUANIA	68
TABLE 23. THE FMM USED IN CSA AND IN LITHUANIA, AND % OF AREA IN CSA, IN STATE FOREST IN CSA AND IN LITHUANIA	69
TABLE 24. ECOSYSTEM SERVICES FOR FMMs IN LITHUANIAN CSA.	71
TABLE 25. MANAGEMENT APPROACHES DISTINGUISHED FOR THE NETHERLANDS, BASED ON DATA FROM THE 6TH NETHERLANDS FORESTRY INVENTORY (SCHELHAAS ET AL., 2014).	118
TABLE 26: FMMs DEFINED FOR THE DUTCH FOREST SECTOR IN THE FRAME OF THE ALTERFOR PROJECT	120
TABLE 27. DATA ABOUT MAINLAND PORTUGAL AND THE VALE DO SOUSA CSA.	127
TABLE 28. TREE SPECIES IMPORTANT IN PORTUGAL AND THE VALE DO SOUSA CSA.	130
TABLE 29. MARITIME PINE SITE PRODUCTIVITY.....	131
TABLE 30. EUCALYPTUS SITE PRODUCTIVITY.....	131
TABLE 31. CHESTNUT SITE PRODUCTIVITY.....	131
TABLE 32. FMMs USED IN THE VALE DO SOUSA CSA, PORTUGAL.....	133
TABLE 33. ECOSYSTEM SERVICES CONNECTED TO THE FOUR FMMs IN THE VALE DO SOUSA CSA. RANKING OF IMPORTANT ES WITHIN EACH FMM. NO RANKING BETWEEN FMMs.	134
TABLE 34. SIZE OF CLEAR-FELLED AREA AT ONE-TIME IN THE VALE DO SOUSA CSA.	134
TABLE 35. GENERAL INFORMATION ABOUT FORESTRY IN SLOVAKIA AND THE SLOVAKIAN CSA.	149
TABLE 36. OWNERSHIP OF FOREST LAND IN SLOVAKIA AND IN THE SLOVAKIA CSA.	149
TABLE 37. FOREST MANAGEMENT CATEGORIES IN SLOVAKIA AND IN THE SLOVAKIAN CSA.	150
TABLE 38. TREE SPECIES DISTRIBUTION IN SLOVAKIA AND IN SLOVAKIAN CSA (PROPORTION (%) OF TOTAL VOLUME).....	150
TABLE 39. PRODUCTION POTENTIAL FOR DIFFERENT TREE SPECIES AND SITE INDEX.	150
TABLE 40. PRODUCTION POTENTIAL FOR DIFFERENT TREE SPECIES MAI.	151
TABLE 41. SUMMARY OF FMMs IN THE SLOVAKIAN CSA, CORRESPONDING SILVICULTURE SYSTEM, COVERAGE, % IN CSA AND SLOVAKIA.	151
TABLE 42. FOREST MANAGEMENT MODELS (FMMs) FOR BROADLEAVES, SOME CHARACTERISTICS AND ES	153
TABLE 43. ECOSYSTEM SERVICES FOR FMM 1-5, RANKING BY FOREST MANAGERS.	156
TABLE 44. ROTATION PERIODS FOR FMM 1-5, "OPTIMAL" AND IN PRACTICAL USED PERIODS.	157
TABLE 45. TREE SPECIES DISTRIBUTION IN FMM1-5 TODAY AND RECOMMENDED.....	160
TABLE 46. NATURAL REGENERATION IN FMM1-5.....	161
TABLE 47. ECOSYSTEM SERVICES FOR FMM 8-10 FOR SOIL PROTECTION, NATURE PROTECTION AND WATER MANAGEMENT.....	171
TABLE 48. CHARACTERISTICS FOR THE THREE FMM FOR NATURE, SOIL PROTECTION AND WATER MANAGEMENT.	171
TABLE 49. TREE SPECIES IN THE THREE MODELS FOCUSING ON NON-WOOD PRODUCTS.	172
TABLE 50. DATA ABOUT SWEDEN AND CSA. GÖTALAND IS ONE OF THE THREE "LARGE" REGIONS IN SWEDEN, COVERING THE VERY SOUTHERN PART. SOURCES: SLU. 2016. SKOGSDATA 2016 (FOREST DATA 2016).	178

TABLE 51. PROPORTION (%) OF FOREST LAND BYU PRODUCTIVITY AND MOISTURE CLASSES ON CSA KRONOBERG. PRODUCTIVITY EXPRESSED AS SITE INDEX (SI) FOR THE MOST PRODUCING TREES SPECIE, NORMALLY SCOTS PINE OR NORWAY SPRUCE.....	179
TABLE 52. TREE SPECIES, % OF STANDING VOLUME IN CSA KRONOBERG, IN GÖTALAND (SOUTHERN "LARGE-REGION" OF SWEDEN) AND IN SWEDEN. SKOGSDATA 2016.	179
TABLE 53. THE FMM USED IN CSA KRONOBERG. THERE IS NO STATISTICS ABOUT USE OF FMM IN THE CSA OR IN SWEDEN, THE FIGURES IN THE TABLE IS BASED ON STATISTICS ON TREE SPECIES OCCURRENCE AS IT IS CLOSELY RELATED TO FMM AND FOR SEED-TREE METHOD, INFORMATION ABOUT REGENERATION METHODS USED.	180
TABLE 54. ECOSYSTEM SERVICES FOR FMM IN KRONOBERG.	182
TABLE 55. LOWEST AGE FOR FINAL FELLING PINE AND SPRUCE DOMINATED STANDS ACCORDING TO FOREST ACT (SFA 2016A). SITE INDEX; DOMINANT HEIGHT AT 100 YEARS; E.G. SITE INDEX SPRUCE (GRAN) G12= HDOM=12M, AT 100 YEARS TOTAL AGE.	184
TABLE 56. DISTRIBUTION OF FOREST AREA IN HIGH, MIDDLE AND LOW PRODUCTION SITES AND ESTIMATE OF PRODUCTION (RIGHT).	205
TABLE 57. TOTAL LAND AREA, FOREST AREA, STANDING VOLUMES, PRODUCTIVITY AND OWNERSHIP IN CSA TURKEY.	205
TABLE 58. TREE SPECIES, PROPORTION OF TOTAL FOREST AREA.	206
TABLE 59. THE MAJOR FOREST MANAGEMENT MODELS (FMMs) USED IN CSA GÖLCÜK, AND THE USE IN THE CSA AND IN TURKEY.	207
TABLE 60. ECOSYSTEM SERVICES CONNECTED TO THE FOUR FMMs IN CSA GÖLCÜK. RANKING OF IMPORTANT ES WITHIN EACH FMM. NO RANKING BETWEEN FMM.	208

List of Figures

FIGURE 1. LAND USE AND FOREST LAND OF MAINLAND PORTUGAL. SOURCE: ADAPTED FROM ICNF, 2013 AND UVA, 2014.....	124
FIGURE 2. MAIN TREE SPECIES IN PORTUGAL. PHOTO: MARIA MARQUES.	126
FIGURE 3. BURNED AREA AND NUMBER OF FIRES IN MAINLAND PORTUGAL (2001-2016). SOURCE: AFN, 2011 AND ICFN, 2016.	126
FIGURE 4. FOREST OWNERSHIP IN PORTUGAL. SOURCE: ADOPTED FROM DGCI, 2006 IN EFN, 2015.	128
FIGURE 5. DISTRIBUTION OF BURNED ARE AND FIRE OCCURRENCES IN THE VALE DO SOUSA CSA (2009-2014). SOURCE: ICNF, 2016B.	132
FIGURE 6. BURNED AREA AND NUMBER OF FIRES IN THE MUNICIPALITIES OF PAREDES, PENAFIEL AND CASTELO DE PAVIA (2001- 2015). SOURCE: ICNF, 2016B.	133
FIGURE 7. MARITIME PINE ROTATION (40 TO 60 YEARS).....	135
FIGURE 8. EUCALYPT ROTATION (40 TO 70 YEARS).	135
FIGURE 9. CHESTNUT ROTATION (40 TO 70 YEARS).	135

Abbreviations used

AWF – Augsburg Western Forest (Germany)
BAU – Business as usual
CC – Clearcutting
CCF – Continuous Cover Forestry
CS – Cultural Services
CSA – Case study Area
DSS - Decision Support System
ES – Ecosystem Services
FMM – Forest Management Model
FPM – Freshwater pearl mussel
FSC – Forest Stewardship Council
FVZ – Forest Vegetation Zone (Slovakia)
IFM – Integrated Forest Management (the Neatherlands)
LCC – Local Case Coordinator
LFN - Lieberose Schaubetal Neuzelle (Germany)
MAI – Mean Annual Increment
MARA Minimum Allowable Rotation Age
NGO - Non-Governmental Organizations
NP – National Park
NWS – Native Woodland Sites
PCT – Pre-Commercial Thinning
PEFC - The Programme for the Endorsement of Forest Certification
SFE - State Forest Enterprise (Lithuania)
SFIMPI - State Forest Inventory and Management Planning Institute, (Lithuania)
WP – Work Package
ZIF Forest Intervention Zones (Zonas de Intervenção Florestal) (Portugal)

1. Introduction

1.1. What is a forest management model (FMM)?

The concept of Forest management models (FMMs) or forest management approaches has met increasing interest in forest literature the last decades (Dunker et al 2012; Hengeveld et al 2012). Foresters have for a very long time discussed silviculture systems, e.g. (Mathews 1989). There is no clear distinction between silviculture systems and FMMs, see (Duncker et al 2012) for a discussion. What is a silviculture system? Mathews (1986, p3) defines it as *“The process by which the crops constituting a forest are tended, removed, and replaced by new crops resulting in the production of stand of distinctive form”*.

Different authors discuss and describe silviculture systems using different approaches, e.g. (Daniels 1979, Fujimori 2001). One way to identify and categorize silviculture systems is based on the origin of trees, from seed or vegetative (suckers or coppice). Another way is the use of trees, if trees are harvested mainly when they reach a mature size or if small dimensions are harvested. The terms high forest and low forest are then often used. Yet another approach is based on the main methods of removing trees. Are all trees removed in one final harvest, a clearcut, or are trees harvested selective in some way? With different terminology and the possibility to combine operations, it is easy to imagine the possibilities for confusion. Classification of silviculture systems result in a large European project in itself.

One common classification contains the following categories: clear-felling, shelterwood, selective and coppice systems (Mathews, 1989, Fujimori, 2001). Each system includes different operations that can be varied and together there is a very large number of combinations.

The use and outcome of silviculture systems are dependent on the environment, the growing conditions and tree species, on economic and social situation as well as legislation. A system used in one part of Europe can in practice be different in another environment. A silviculture system can be described as a toolbox, it includes many activities or tools, used in different phases of the stand development. Such tools are for example soil preparation and thinning, but many of the tools or activities can be used in many systems.

A key concept in the ALTERFOR work is Forest Management Models. Today it is common to talk about Ecosystem Services (ESs) connected to forest. ALTERFOR will scrutinize the possibilities to increase different ESs from forestry. In a first step FMMs will be identified and described.

1.2. Data collection

During autumn 2016 the local case study coordinators described the CSA and the FMMs used. This was done by a questionnaire common for all partners. As a help examples from Lithuania and Sweden were available. The questionnaire had two parts, a general description of the CSA, areas, trees species and more, see appendix part1.

Description of FMMs was done by using a detailed questionnaire, one for each FMM, see appendix part2. The FMMs were classified in one of the groups; Clear cutting systems, Uniform shelterwood systems, non-uniform shelterwood systems, selection systems, coppice systems, or no intervention. Information about the models and to what extent they are used, tree species and important forest management measures were collected. Many questions are divided in two parts; present situation and by LCC recommended situation.

1.3. FMMs in different countries

There is a large variation in the forestry and silviculture in the participation countries. The number of described FMMs used in the CSAs differ considerably, from 12 in Lithuania to one in Italy (Table 1 and Table 2).

Table 1 Number of reported FMMs for each partner

Country	No of FMMs	Total area CSA, ha	Forest area of CSA, ha
Germany, Bavaria	3	120 000	51 600
Germany, Brandenburg	3	60 000	22 200
Ireland	3	77 528	12 511
Italy	1	315	291
Lithuania	12	253 970	88 195
The Netherlands ¹	9	4 154 300	373 500
Portugal	4	14 850	14 474
Slovakia	10	151 768	94 855
Sweden	6	840 000	704 000
Turkey	8	81 808	40 493

¹ Encompasses the entire country.

Table 2 Name and identification, all FMMs reported

Country	FMM name	FMM ID
Germany, Augsburg, Bavaria	CSA: Beech State Forest	
	Spruce Large Private	
	Spruce State Forest	
Germany CSA Librose-Schlaubetal-Neuzelle Brandenburg	Scots Pine Private Forest-	
	Oak Stat Forest	
	Scots pine state forest	
Ireland	Clearcutting conifers	

Country	FMM name	FMM ID
	Clearcutting lodgepole pine	
	Nature conservation and biodiversity protection	
Italy	Selective systems	
Lithuania	Aspen Greyalder Clearcuttning	SRDEC_C
	AspenGreyalder Uniform shelterwood/Clearcutting	SRDEC_CUS
	Birch BlackAlder Clearcutting	MRDEC_C
	Birch Blackalder UniformShelterwood Clearcut	MRDEC_CUS
	No intervention	NOINT
	Pine Clearcutting	LRCON_C
	Pine Uniform shelterwood	LRCON_C
	Pine Uniform ShelterwoodClearcutting	LRCON_CUS
	Special PurpouseForests	SPECP
	Spruce Clearcutting	MRCON_C
	Spruce non UniformSheltrwood	MRCON_NS
	Spruce NonUniform ShelterwoodClearCutting	MRCON_CNS
The Netherlands	NatureForest Broadleaved	
	NatureForest Oak	
	NatureForest Pine	
	NatureForest Conifers	
	ProductionForest Broadleaved	
	ProductionForest Oak	
	ProductionForest Conifers	
	ProductionForest Pine	
Other Forest		
Portugal	MartinePineEucalyptus	
	Eucalyptus Maritime Pine	
	Chestnut	
	Eucalyptus pulpwood	
Slovakia	oak wood provision	I
	oak beech timber	II
	beech timber	III
	fir beech wood and timber	IV
	nature conservation and biodiversity protection	IX
	spruce fir beech timber	V
	spruce fir beech close to nature	VI
	spruce timber	VII
	soil protection	VIII

Country	FMM name	FMM ID
	water purification	IX
Sweden	clearcutting intermediate final	SE1
	clearcutting long final	SE2
	clearcutting short final	SE3
	nature conservation with management	SE4
	uniform shelterwood system final	SE5
	nature conservation withoutr management	SE6
Turkey	clearcutting	
	conversion coppice	
	long shelterwood	
	Medium rotation coppice	
	nature with intervention	
	no intervention	
	short coppice	
	very long shelterwood	

The most common silviculture systems among the FMMs are the clearfelling (13) and non-uniform shelter system (12). Selective systems are not used very often, four FMMs are described as selective models. Coppice is used in 4 models, together with clearfelling system of an admixture in two other models and also one model for conversion from coppice to clerfelling model.

Clearfelling systems and uniform shelter systems both result in even-aged forest, at least for most of the rotation period. These two systems are used in 22 FMMs and an estimated area of 39% Table 6.

Selective systems and non-uniform shelterwood system both result in uneven aged forest. These two systems are used in 16 FMMs and in 4 systems combinations with selective or non-uniform shelterwood systems. Totally 20 FMMs with uneven-aged forest are estimated to cover 33% of the area. Clearfelling systems are used on 23% of the area, and selective systems on 13%, non-uniform systems on 12%, for more information see Table 3.

Table 3 FMMs classified in silviculture systems, number of FMMs and estimated proportion of area where they are used. The sum is not 100%, as all alternative FMMs are not described.

Silviculture system	Nr of FMMs	Estimated cover %, total all CSA ¹
clearfelling	13	23
uniform shelter	9	16
selective	4	13
non-uniform shelter	12	12
more than one selective ²	4	9

coppice	4	7
combination with coppice	2	3
transformation from coppice	1	0.3
no intervention	6	5
not defined (or combination of two or more systems ³)	4	1.5

¹ Not weighted by area of CSA instead assuming each CSA have equal size.

² Selective, two or more systems combined at least one selective resulting in uneven-aged forests

³ Not selective systems

1.4. References

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