

THE USE OF DSS OPTIMAL FOR THE CONDITIONS OF MOUNTAINS FORESTS - CASE STUDY

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Introduction

Mathematical programming is a useful tool to seek an optimal solution for the harvest scheduling problem. In spite of all existing papers, there is still missing well analysed and tested scheduling approach for different type of management in the conditions of central Europe such as shelterwood system (Marušák et al. 2015b). Small-scale shelterwood system is widely used in Czech forest practise. Schematic principles are presented in the Table 1 and Figure 1.

Period	cut	strip											← Slope	
		1	2	3	4	5	6	7	8	9	10	11		12
1	1	P							P					
	2	R	P						R	P				
	3	F	R	P					F	R	P			
2	4		F	R	P				F	R	P			
	5			F	R	P				F	R	P		
	6				F	R	P				F	R	P	
3	7					F	R	P				F	R	
	8						F	R					F	
	9							F						F

P – preparatory cut; R – removal cut; F – final cut

Tab. 1. Theoretical allocation and cutting progress of 3-phase shelterwood system (updated Konoshima et al. 2011)

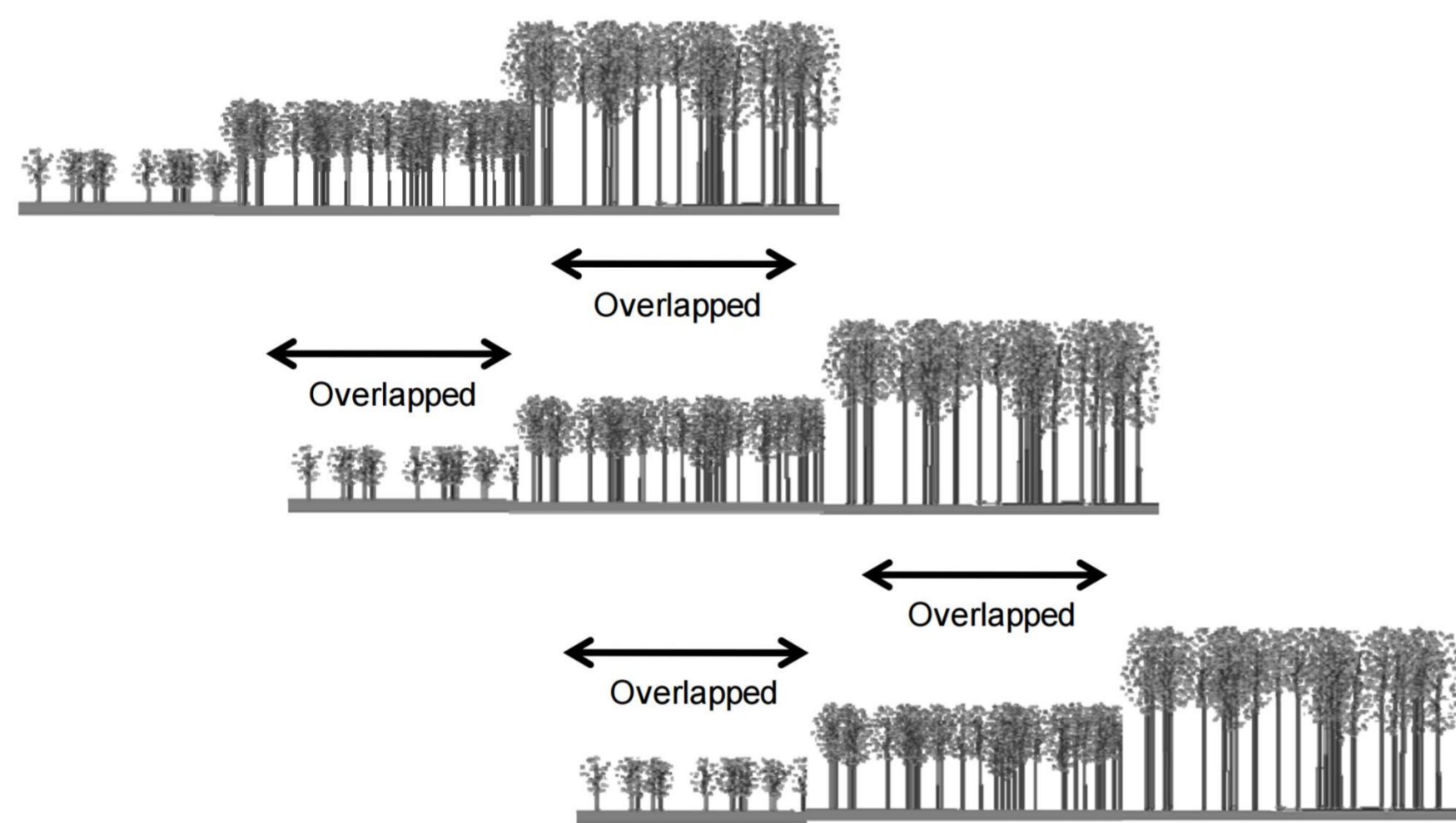


Fig. 1. Overlapped strips (Konoshima et al. 2011)

Material and methods

To solve the proposed problems, the updated version of forestry decision support system (DSS) Optimal (Marušák et al. 2015a), which include all necessary constraints, was used. The managed mountain forests were selected for the study purpose. Cut sequences are the most important constraints. The objective function is harvested volume maximization.

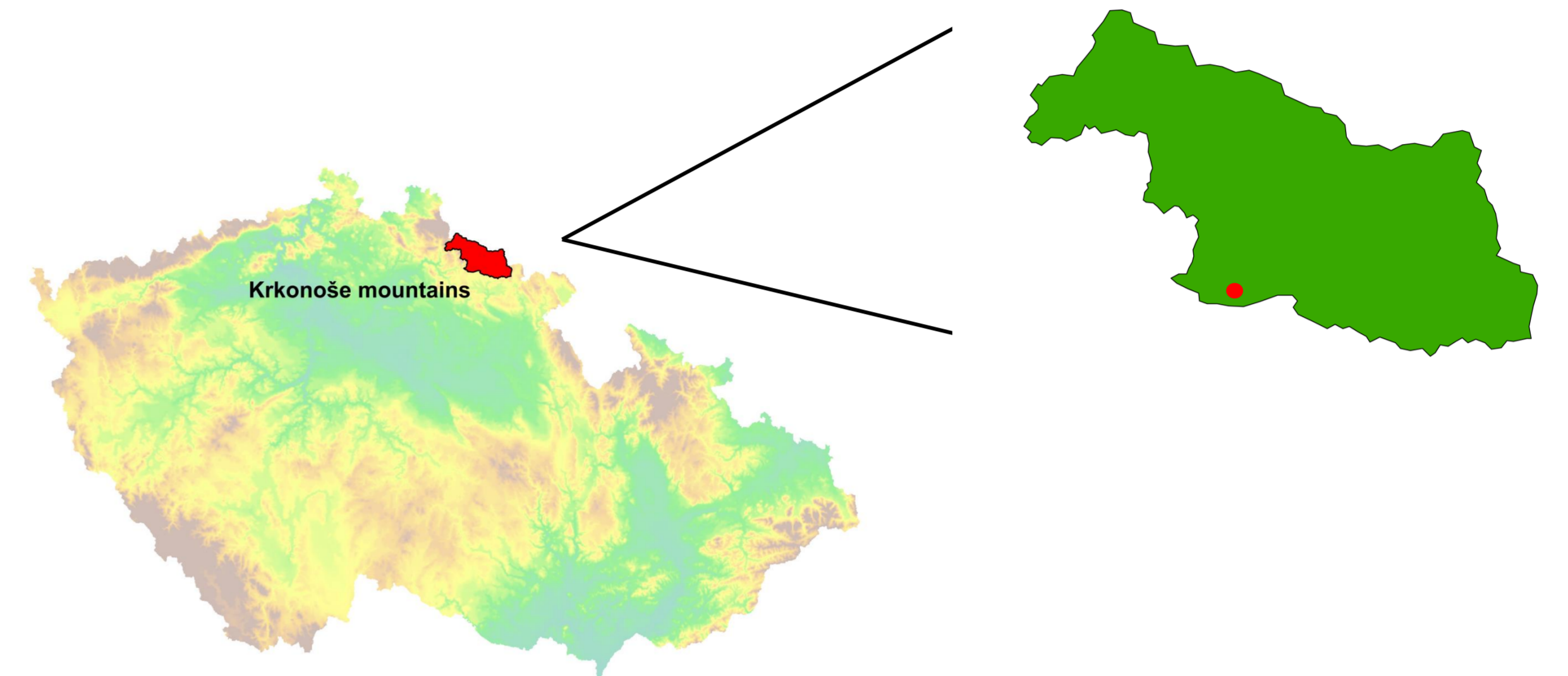


Fig. 2. Location of analysed forest management unit

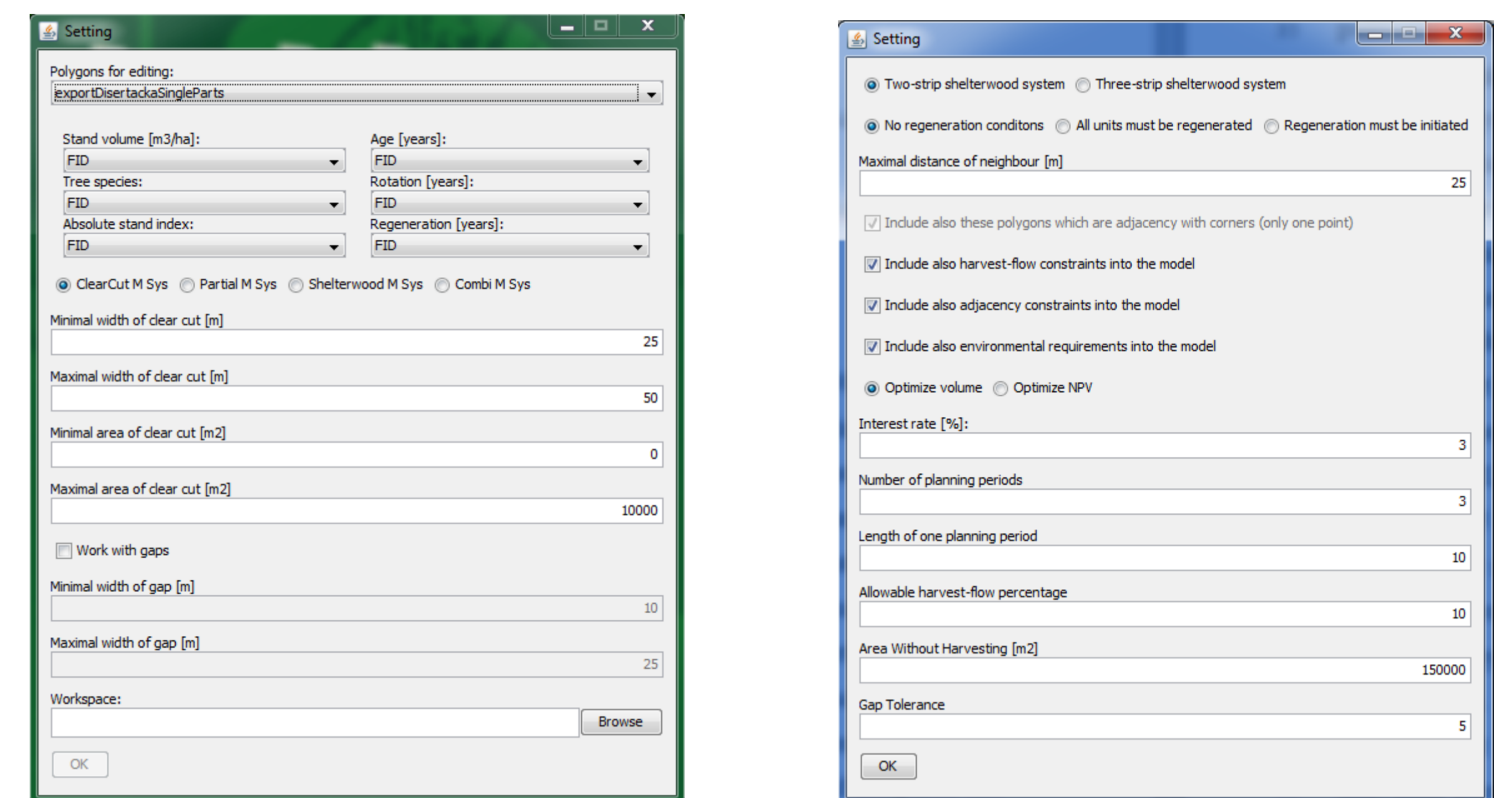
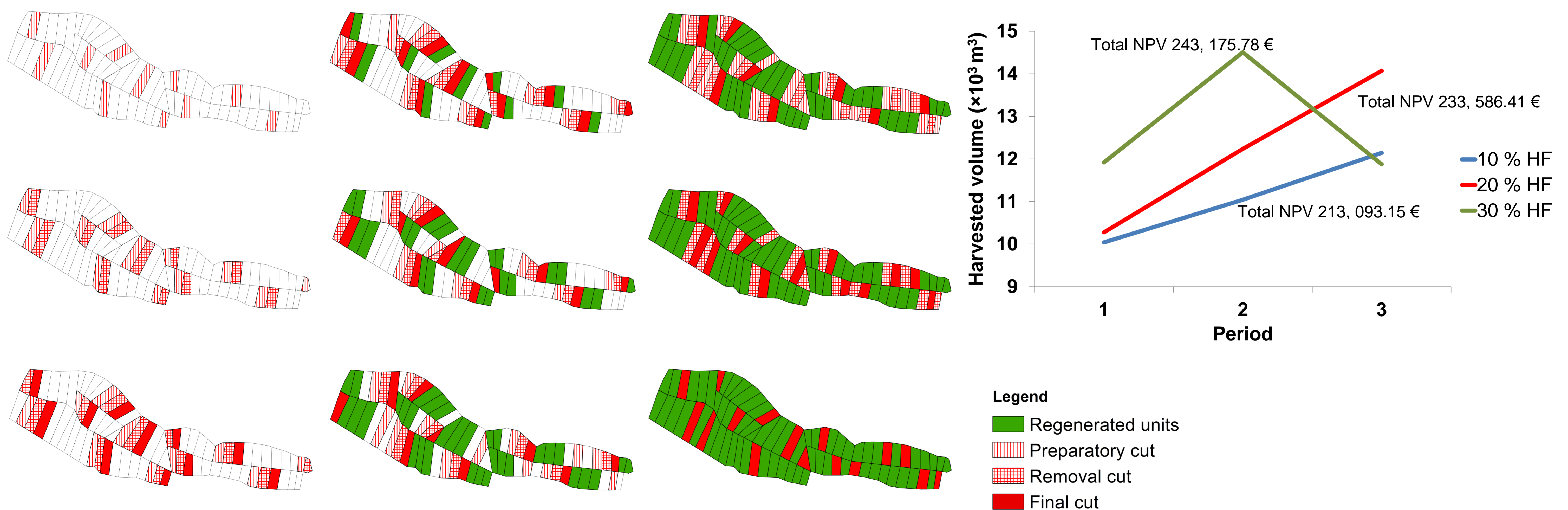


Fig. 3. Setting parameters in DSS Optimal (Marušák et al. 2015a, Vopěnka et al. 2015)

Results

The graphical results for small-scale 3-phase shelterwood system over 3 ten-years periods are presented below.



References

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