

## June 2022 REPORT

# Capitalizing the harvesting and extraction innovation potential sustainably - report on stakeholder workshops

This report summarises the stakeholder workshops that were organised in Finland, Slovenia, Spain, and Sweden to disseminate SMALLWOOD research results and discuss the sustainability and value creation multicriteria rating results.

### Methodology

Following the expert and stakeholder rating exercises, a stakeholder workshop design was compiled to facilitate comparable and impactful stakeholder interaction and collection of useful opinions on innovation uptake and further research work.

The targeted number of stakeholders to incorporate in the workshops was 15-30 per country, and the outcome was eventually 13 on average and 52 altogether (Table 1). The organisers were advised to invite those smalldiameter wood management value network representatives who answered to the rating exercise, in addition to relevant people from forest machinery companies, other forest management associations, public and private forest advisors, and if applicable, forest entrepreneurs' association or chamber of economy, and business incubator or other RDI funding or mediation body.

The workshop concept included presenting the rating exercise results (Figure 1) and encouraging participants to provide comments and questions. For a larger group of participants of an online version of the workshop, use of chat and facilitated breakout rooms was recommended. However, the practicalities were allowed to be flexibly decided according to national circumstances and the number of participants. The main questions to be discussed during the events were: i) how significant does the added value appear to be for the harvesting and extraction innovations in different contexts; and ii) how could the value creation and overall sustainability potential be increased and capitalized in different situations? Timing and size of the conducted workshops varied between countries (Table 1), but comparable overall feedback was nevertheless gathered to guide further activities.

#### Table 1. Stakeholder workshop technicalities.

Country	Timing	Number of		
		participants		
Finland	30 May 2022	4		
Slovenia	15 June 2021	26		
Spain	27 May 2022	10		
Sweden	26 January 2022	12		

### Expert rating, Sweden (+ Stakeholder rating for comparison)

							Stakeholder rating:			
		Average Average		Difference to current		Weighted	Difference to current			
Dimension	Criterion	Welght	Rating	best practice, %		average	best practice, %			
Econ	Operational efficiency	38 %	122,50			22,5				13,6
	Investment payoff	32 %	102,50		2,5	9,4		1	0,7	
1	Harvesting damages	30 %	100,00			0,0				5,0
Ecol	Fire risk	26 %	101,25			1,3				2,9
	Climate benefits	29 %	102,50			2,5	1.0			10,7
	Biodiversity	25 %	100,00		0	0,0	1,0			-5,7
	Ground water	21 %	100,00			0,0				0,0
Soc-cult	Attractive to forest owners	29 %	108,75			8,8	5.6			0,0
	Attractive to contractors	27 %	111,25			11,3				12,1
	Recreational benefits	22 %	93,75		-6,3		5,0			-7,9
	Rural jobs	22 %	106,25			6,3				10,7
Value creation	Business model renewal	32 %	102,50			2,5		-		11,4
	National upscaling	36 %	103,75		3,8	4,6			10,0	
	European unsealing	22.9/	107.50			75				15.7

Figure 1. Expert and stakeholder rating results were presented in the workshops for commenting; an example from the Swedish data.

Organisers of each workshop compiled a report of the discussions, including positive and negative views towards the presented smallwood harvesting innovation candidates (Bracke C16.c harvesting head with boom-corridor thinning; Biobaler and Retrabio) and those reports were used here to summarise the viewpoints raised in the workshops.



### Results

### A) Finland

The participants were interested in the relative improvement of productivity with the boom-corridor thinning method, and they raised into discussion the other methods and harvesting device that also could exhibit comparable improvements (i.e. zone-thinning by Metsäteho and the Risupeto device).

The participants also considered that the Bracke C16.c harvesting head may not be competitive in Finland with larger trees because of the extra cutting in the middle of the stem height due to not including feed rollers. Rather, they thought that there may be a special niche of smaller dense forests where the thinning has clearly been delayed. They pointed out also the fact that the boom-corridor thinning may enable maintaining habitats for game species and fostering uneven-aged forest management. These potential benefits have not been discussed much yet.

The Finnish participants noted that the relative improvement potential is notably higher in the context of Slovenia compared to Finland, where mechanised young stand harvesting is already on a rather mature level. They also noted the more positive view of Swedish stakeholders on the value creation and upscaling potential of Bracke C16.c and wondered whether it relates to the fact that the machine is Swedish and they have had more practical experience that has given them more confidence on its potential. In any case, the participants thought that more practical evidence is continuously needed to foster innovation uptake, both regarding the new harvesting device and the working methods.



#### B) Slovenia

In general, the stakeholders agree that the presented mechanization is economically sustainable. However, some of them see possible issues in finding sufficiently small-diameter tree stands where fully mechanized thinning will be carried out. One of the stakeholders has also identified a high potential to be complemented by other services, such as clearing of energy corridors, and maintenance of vegetation along watercourses and road networks clearing.

Opinions of Slovenian stakeholders on the ecological sustainability of the technology under assessment are divided between those who recognise the positive effects of the new technology and those who are reserved in many cases even opposed to the ecological suitability of the presented harvesting and extraction innovations compared to the conventional harvesting system. In addition, stakeholders collectively supported the idea that the environmental impacts of new technology (including in the context of a long-term assessment) should be further studied. Slovenian experts are traditionally more conservative in the case of implementing fully mechanized harvesting. Furthermore, mechanized harvesting requires a more intensive thinning rate than the conventional system. In Slovenia, the general practice for precommercial thinning is up to 20% of biomass removal, while in the case of Slovenian field trials the average removal of biomass was from 34% (in coniferous stands) to 64% (in broadleaved stands). This fact could also be one of the reasons to oppose the new methods.

A common point in the statements of Slovenian stakeholders is that positive effects on the local community can be expected in terms of job creation and the arrival of new technologies and increased humanisation of work in the forest. At the same time, they point out that the increased intensity of measures makes the forests look altered and less attractive to forest visitors. This could lead to resistance from the public.



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### C) Spain

The Spanish participants considered the operational efficiency of Bracke C16.c and Retrabio to be high, but not that of Biobaler. Biobaler was considered the less interesting machine for both forest owners and contractors. Furthermore, Biobaler was the technology with more difficulties to be implemented and with less business opportunities. Retrabio and C16.c were considered more interesting; however, when they were asked about business possibilities, the valuation went down. C16.c was considered the best machine according to contractors' and landowners' interests and possibilities to be implemented.

In relation to the Spanish trials, a critique raised against mechanized thinning with Bracke C16.c, because the width of the strip-road cannot avoid resprouting of *Quercus pyrenaica* after thinning. Theses stands have historically been managed as coppices and now a management change is demanded by landowners and forest managers. The most agreed silvicultural treatment is conversion treatment to change these mature coppices stands into high forest, and the result of the performed thinning with C16.c may not meet the objectives.

From the point of view of forest industries, the demand for biomass and improved harvesting technologies has increased significantly and there are many forest stands without any type of silvicultural treatments. Only in Castilla y Leon there is a new demand from last years of 800 thousand tonnes for bioenergy. So, any mechanized solution should be taken in account. The challenge is very big and if resprouting clearing is needed three or four years after thinning along strip roads to meet the conversion objectives, it will be done. There is a risk if this type of solution is rejected, the problem of forest and industry will increase year after year. The representative of forest industry understands the challenge of the width of strip roads and they are performing a trial with a narrower machine than Komatsu 911. Another problem is the heterogeneity of criteria between provinces for final tree density after thinning.



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### D) Sweden

In relation to the Swedish trials, a critique raised against boom-corridor thinning with Bracke C16 was that the removed stems were too long, which made the forwarding very inefficient. For example, the forwarder had to be equipped with a grapple saw, and cutting the stems into shorter pieces when loading adds more work tasks for the operator. Furthermore, it was argued that the stands where the method had been tested were not the most appropriate for this particular method since the stem diameter were, according to the SCA representative, in many cases too large (i.e. would have been more suitable for pulp wood).

A participant from Skogforsk mentioned that they have done similar studies with different felling heads and considered the Bracke C16 to be one good option, but depending on the stand characteristics, the various felling heads have their own pros and cons. A problem that was pointed out is that often the market demand and the development of new innovative products is hard to synchronize.

The participant from the forest agency pointed out that early thinnings are bottle-necks in the current management regime, since many forest owners carry out the first thinnings too late. The reason being that they want to increase the stem diameter/volume before carrying out a first thinning. Here the participant saw a great potential for the boom corridor thinning method, if it could encourage forest owners carry out earlier thinnings with acceptable economic results. Thereby, the quality of the following thinnings would also increase.



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Based on the presented results, it was pointed out during the discussion that the productivity of the selective thinning method was surprisingly close to that of boom corridor thinning. An explanation given for this was that also the boom corridor method is to some extent based on deliberate selections by the operator, i.e. the starting point for the corridors are not placed out randomly or every third meter or so. With this in mind, it was suggested that maybe it would be possible to give more flexible instructions to the operators and let them mix methods depending on the stand characteristics.

A comment regarding the results from the stakeholder and expert ratings was that although the differences between the methods may appear to be small, it is still valuable to try to develop this technology further as it may improve forest management in a very critical phase of the forest's development.



At Sveaskog, they have applied harvesting of small diameter trees in some projects and have studied stands that previously have been thinned with the boom-corridor thinning method, and they see no problem with this. However, they wondered if it would be possible to develop the method in such way that it would be possible to carry out boom-corridor thinning with their ordinary harvesters. Both in order to raise productivity in traditional thinning stands, but also so that they could use it in stands with mean diameters that are somewhere between a clearing and thinning stand.

Norra skog have also started to investigate this issue, but has so far not done any trials, since they (or their members) also have quite many stands that are in need of thinning. From their perspective, this boom corridor method seems interesting for such stands where they currently need to do a costly motormanual pre-clearing of undergrowth before doing the actual thinning. The participant said that in these types of stands, conventional felling heads are not as good as Bracke since they will have more problems with the chains. However, a major problem in the northern regions is that the transportation distance to buyers is often too far to make it economically doable. Thus, it is mainly of interest in the areas closest to the heating plants. At least as long as the material only is used for burning. The market demand will be an important factor for future development since new investments in machinery are required if they are to start up this kind of business.

#### Conclusions

The vivid discussions and both positive and critical feedback show that smallwood operations are interesting in all SMALLWOOD partner countries, and the stakeholders are committed to participate in coproduction of knowledge towards more efficient operations and higher value creation. There was a clear view from the workshop participants that smallwood management shall be researched more and developed further.

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