

Priorities for Future Harvesting and Logistics Research

EXECUTIVE SUMMARY

The current PGP-industry funded Steep Land Harvesting research programme finishes in mid-2016. Over the last 12 months FFR has been engaging the forest industry in discussions to determine whether the industry wishes to maintain a programme of harvesting and logistics research, and what the nature of that new programme should be. A forest industry survey conducted from September - November 2015 asked respondents to prioritise 45 research projects which had been generated as a result of two earlier research forum workshops. Thirty responses were received from an initial mail out of 185 surveys (16% response rate). The responses were classified into the following categories: forest management companies, forest company investors (FFR consultant and associate members) and forest industry non-investors. The analysis of results showed a consistency in responses regarding the top rated projects among the various sub-groups surveyed.

INTRODUCTION

The current PGP-industry funded Steep Land Harvesting research programme finishes in mid-2016 and it is vital that if the industry wishes to maintain the momentum in harvesting innovation built up over the last few years, that a new programme is developed. Discussions have been held across the forest industry over the last 12 months on the nature of a new harvesting and logistics research programme, through two strategic research workshops held in Rotorua on 26 November 2014, and in Balclutha on 18 March 2015. These workshops enabled forest grower and harvesting stakeholders to discuss current industry issues, needs and gaps and to generate ideas for potential future research projects in harvesting and logistics. The ideas generated at the two workshops were consolidated into a report which formed the basis of a survey to determine forest industry priorities for the research. This report details the results of that industry survey and develops a number of research themes arising from these stated industry priorities into a potential new research programme.

METHOD

Identifying Future Research Opportunities

As a result of two earlier research forum workshops in Rotorua in November 2014 and in Balclutha in March 2015, major industry needs were identified and research projects to address those needs were generated at each workshop. Each proposed research project was documented in terms of the project objective, proposed method and desired outcome. The initial list of 78 projects was reduced to 45 projects, eliminating repetition and consolidating similar projects together.

Determining Industry Priorities for Research

In order to determine industry priorities for the proposed projects a wider consultation process was undertaken to ensure as many industry stakeholders as possible have the opportunity to express their research priorities.

The report detailing the consolidated results arising from the two earlier research forum workshops was circulated to forest grower and harvesting stakeholders across the industry in September 2015.

The distribution list included the 106 industry participants at the workshops, plus all FFR members. The survey, conducted from September - November 2015, asked respondents to prioritise the 45 research projects. In the survey respondents were asked to score each project out of 10 (10=best, 1=worst) for the projects they preferred.

The responses to the survey were analysed to present the consensus on research priorities for forest grower and harvesting stakeholders. The analysis was undertaken by sub-dividing responses into three groups within this sector, major forestry companies only, all responses, and all responses weighted by potential financial contribution to the programme. The potential financial contribution was calculated using the current FFR Harvesting membership fee structure applied to each company’s forest area and volume production. In this way all current forest industry investors (forest management companies, and FFR member consultants and associate members) were included in the weighting.

RESULTS

Industry Representation

Thirty responses were received from an initial mail out of 185 surveys and resulting follow up in November 2015 (16% response rate). A summary of the thirty survey respondents is given in Table 1. The responses represent a cross-section of forest management companies, smaller forest company investors (FFR consultant and associate members) and forest industry non-investors. The list of survey respondents is given in Appendix 1.

Table 1: Forum Attendees

17	Forest Owners/Management Companies
4	Consultants/Government
4	Contractors/Log Traders
3	Industry Association / Training and Education
2	Machinery Manufacturers
30	TOTAL

Overall Responses

Initial analysis of survey returns showed some key points to note:

1. Most (but not all) forestry companies responded.
2. Not all FFR members responded (54% of FFR members).
3. The survey did not cover wood processors, port companies, log transport companies.
4. The response rate from logging contractors was low.
5. Few additional projects were proposed.
6. Not all projects were scored by respondents.
7. Some projects were deemed not research and some were already being done by other groups - primarily in the People/Training area (Need to improve skills and attract more workers into forestry).
8. Collaboration/coordination may be needed for some projects (e.g. FFR/FISC/Competenz/NZFOA).

RESEARCH PROJECT PRIORITIES

A summary of the top ranking projects in order of priority is given in Table 2.

Table 2: RESEARCH PROJECT PRIORITY SCORING

Project Name	Objectives	MAJOR INDUSTRY RESPONSES		ALL RESPONSES		ALL RESPONSES WEIGHTED BY INVESTMENT	
		Ranking	Average Score	Ranking	Average Score	Ranking	Average Weighted
C.1.2 Continue development of remote controlled tree-to-tree harvesting machine	Continue momentum in projects to eliminate manual tree felling on steep slopes ("No worker on the slope")	1	7.9	1	8.1	1	6.0
C.1.3 Totally New Felling Technologies	Develop automation and robotics further to remove worker from danger in high risk forest operations	2	7.8	2	7.8	2	5.9
A.1.2 Log Identification during Processing	To develop individual log ID system for processor head or loader to eliminate manual scaling and log weighing.	3	6.2	3	6.4	3	5.1
B.1.1 Determine industry needs for workforce of the future	Clarify career pathways and determine skills required	4	5.5	9	5.7	5	4.7
A.1.3 Automate JAS Log Scaling Method	Develop an automated log measurement method for calculating log volume	5=	5.4	8	5.7	8	3.7
D.1.1 Safe high productivity workplaces	Managing fatigue to improve safety	5=	5.4	7	5.8	9	3.5

Project Name	Objectives	MAJOR INDUSTRY RESPONSES		ALL RESPONSES		ALL RESPONSES WEIGHTED	
		Ranking	Average Score	Ranking	Average Score	Ranking	Average Weighted
A.2.3 Reducing Log Grade Complexity	Quantify cost benefit of reducing number of log sorts from stump to customer.	7	5.3	4	6.1	6	4.7
A.2.1 Value Chain Optimisation	Optimise supply chain from stump to cut-to-length customer to reduce delivered costs by 25%.	8	5.1	15	5.2	4	4.9

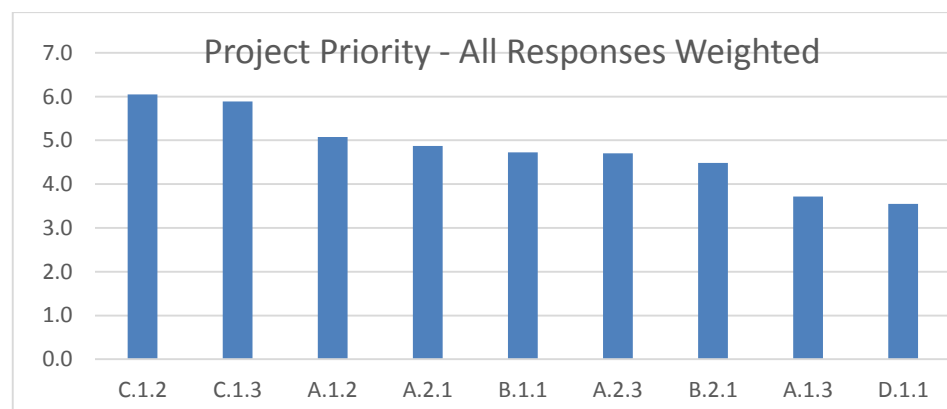


Figure 1: Average Score by Project – All Responses Weighted

The three highest ranking projects were the same projects across all groups of the industry analysed (major forestry companies only, all responses, and all weighted responses). The two highest priority projects are in the Harvesting Technology / Productivity theme (New Technology and Systems). The next area of priority was in the Supply Chain Logistics area (log measurement/data flow and efficiency/process simplification). Other research subjects in the Supply Chain Logistics area such as Log Transport and Port Operations were ranked as low priority by each group in the analysis (major forestry companies only, all responses, and all weighted responses).

TOP RANKING RESEARCH PROJECTS: BY RESEARCH THEME (RANKED BY ALL WEIGHTED RESPONSES)

Theme	Project Name	Objective	Method	Outcome	Ranking / Average Weighted Score
C. Harvesting Technology / Productivity	C.1.2 Development of remote controlled tree-to-tree harvesting machine	Continue momentum in projects to eliminate manual tree felling on steep slopes ("No worker on the slope")	<ol style="list-style-type: none"> 1. Complete development of remote controlled steep slope harvesting machine ("Stick Insect") & felling wedge to commercial stage 2. Lab and field testing 3. Commercial partner identified 	<ol style="list-style-type: none"> 1. Commercial products available 2.Reduced safety risk with operators isolated from harm 3. Reduced manual tree felling workload 4. Minimise travel to site 5. Improve productivity (24-7 operation) 	1 6.0
	C. 1.3 Totally New Felling Technologies	Develop automation and robotics further to remove worker from danger in high risk forest operations	<ol style="list-style-type: none"> 1. Generating new ideas for felling technology to enable harvesting phase to be either remote-controlled or teleoperated (all operators off-site) 2. Brainstorm new ideas for automation of operations 3. Develop "chainless" harvesting to reduce downtime and increase safety 3. Look in new places and engage people not traditionally used (both inside and outside industry). 4. Rethink / redesign / modify 	<ol style="list-style-type: none"> 1. Recognition of great ideas 2. Stimulate communications 3. Develop disruptive technologies. 4. Innovative culture that fosters continuous improvement towards safer and more productive forest operations 	2 5.9

Theme	Project Name	Objective	Method	Outcome	Ranking / Average Weighted Score
A. Supply Chain Logistics	A.1.2 Log Identification during Processing	To develop individual log ID system for processor head to eliminate manual scaling and log weighing.	<ol style="list-style-type: none"> 1. Design and development of processing head log ID system. 2. Develop system to transfer and manage production data. 3. Develop sales and payment system based on cubic volume measured and graded by processing head. 	<ol style="list-style-type: none"> 1. Improve efficiencies of log processing and downstream log handling. 2. Optimised truck loads (known volume) and reduced docket delays. 3. Move to cubic volume measure for sale and payment. 4. Eliminate log weighing/ scaling. 	3 5.1
	A.2.1 Value Chain Optimisation	Optimise Supply Chain from stump to cut-to-length customer to reduce delivered costs by 25%	<ol style="list-style-type: none"> 1. Build value chain model to test and quantify financial impact of changes. 2. Identify bottlenecks and inefficiencies 3. Understand cost implications of changes in one part of supply chain on other parts. 4. Determine benefits/optimal conditions by region (similar to meat and dairy processing model). 5. Propose more efficient system / improvements for scaling/grading to meet customer needs. 	<ol style="list-style-type: none"> 1. Builds on collaboration between industry contractors and other stakeholders. 2. Understanding impacts of process change. 3. Reduce delivered costs by 25%. 4. Platform to drive supply chain efficiencies and innovations. 	4 4.9

Theme	Project Name	Objective	Method	Outcomes	Ranking / Average Weighted Score
B. People / Training	B.1.1 Determine industry needs for workforce of the future	Clarify career pathways and determine skills required	<ol style="list-style-type: none"> 1. Labour market research 2. Survey skill level of existing workforce 3. Define future skills requirements 4. Define skills gap 5. Investigate monetary incentives (parity with comparable industries) 6. Benchmark exemplar sectors e.g. Scandinavia and set benchmark for industry needs 7. Develop career pathways 8. Investigate training options (possibly using outside assistance to diagnose problem and propose solutions. 	<ol style="list-style-type: none"> 1. Industry benchmark to establish gaps of skills to provide framework for future training and certification standards. 2. Career path development 3. Industry has continued supply of motivated well-trained workers. 	5 4.7

Theme	Project Name	Objective	Method	Outcomes	Ranking / Average Weighted Score
A. Supply Chain Logistics	A.2.3 Reducing Log Grade Complexity	Quantify cost benefit of reducing number of log sorts from stump to customer (mill/port)	<ol style="list-style-type: none"> 1. Evaluate current number of log sorts and associated supply chain costs. 2. Benchmark against world best practice. 3. Evaluate scenarios of fewer log sorts and assess market implications / costs. 4. Standardise log grade specifications within the log supply chain. 	<ol style="list-style-type: none"> 1. Information on supply chain costs so that forest owners can make decisions on harvesting / supply chain systems. 2. Reduced number of log sorts 3. Standard NZ Log Grades. 4. Improved understanding of log grades within the industry 	6 4.7

Theme	Project Name	Objective	Method	Outcomes	Ranking / Average Weighted Score
A. Supply Chain Logistics	A.1.3 Automate JAS Log Scaling Method	Develop an automated log measurement method for calculating log volume that better fits the current NZ resource than the JAS scale.	<ol style="list-style-type: none"> 1. Investigate alternative log scaling methods such as photogrammetry. 2. Automate JAS log scaling method. 	Reduced cost with better precision of log volume calculation and a good fit of volume to the current NZ resource.	8 3.7

Theme	Project Name	Objective	Method	Outcomes	Ranking / Average Weighted Score
D. Health and Safety	D.1.1 Safe high productivity workplaces	Managing fatigue to improve safety	<ol style="list-style-type: none"> 1. Undertake human factors workplace studies (on-site monitoring and evaluations). 2. Design "Guidelines" to manage fatigue. 	<ol style="list-style-type: none"> 1. Tools/guidelines to manage fatigue and other hazards. 2. Improved industry image regarding workload of tasks. 	9 3.5

SCOPE FOR POTENTIAL NEW RESEARCH

The scope for a potential new research programme is harvesting and logistics operations within the forest industry in New Zealand. The research will consider the impact on the total value chain from felling to log delivery at mill or port.

To determine whether each project is suitable for investment in a new programme of Harvesting and Logistics research the following criteria should be applied to each project:

1. Does this research meet an identified industry need?
2. Is it within scope (i.e. Harvesting and Logistics)?
3. Is it a gap – or are others doing this research?
4. Is there a safety or environmental imperative?
5. What is the likelihood of adoption/uptake?
6. How quickly will benefits be realised?
7. What is the potential commercial payback?
8. Will this research have spillover benefits?
9. Does this research link to existing research?
10. Is this research enhanced by collaboration?
11. What is the potential for leverage of industry funding?
12. Will this research maintain/build existing capability?
13. Will this research require new capability to be built?

CONCLUSIONS

This report details the results of a survey among forest grower and harvesting stakeholders of industry priorities for a new harvesting and logistics research programme. The industry survey has prioritised industry proposed research projects to address needs and gaps in the following areas:

1. Need for reduced costs and improved profitability (Harvesting Technology / Productivity)
2. Need for increased efficiency across the supply chain (Supply Chain Logistics)
3. Imperative to improve safety (Health & Safety)
4. Reduced impact of harvesting and improved environmental performance (Environmental Management)

The analysis of results showed a consistency in responses regarding the top three ranked projects among the various sub-groups of the industry surveyed (forest management companies as likely major investors in the projects, smaller investors (FFR consultant and associate members) and other stakeholders (which are likely non-financial contributors to such projects). There was also a reasonable level of commonality among the next 5-6 ranked projects.

Some of the ideas are clearly not research projects, such as the need to improve skills and attract more workers into forestry (People / Training). It will be important to identify the appropriate resources to address these ideas and direct these ideas to the right place to ensure they can be discussed, agreed and actioned (e.g. FFA/FOA committees, Worksafe NZ, Competenz etc.)

NEXT STEPS

The next stage of the process will be to invite a small working group of forest industry stakeholders to develop a number of research themes arising from these stated industry priorities into a potential new research programme.

Further work will determine the project resources likely to be required (co-funding, research providers, timing etc.). Funding for undertaking these research programmes will be developed through the FOA/FFA Forest Research Committee (for Forest Grower Levy funding - if additional resources are available) or as a coalition of willing investors (through FFR).

Funding bid(s) will then be developed through the appropriate channels, such as Primary Growth Partnership or MBIE or other Government funding sources, depending on the nature of the programme supported by industry investment.

APPENDIX 1: SURVEY RESPONDENTS

Industry Type	Company	Stocked Area (ha)	Production (tonnes)
Category A Forest Management Companies	Blakely Pacific Ltd	23,049	315,006
	City Forests Ltd	15,486	274,676
	Craigpine Timber Ltd	2,983	500,000
	Crown Forestry - MPI	41,850	1,255,479
	Ernslaw One Ltd	111,707	1,443,805
	Forest Enterprises Ltd	20,085	210,648
	Hancock Forest Management (NZ) Ltd	197,815	4,166,609
	Hikurangi Forest Farms Ltd	25,027	789,294
	Juken NZ Ltd	31,887	503,473
	Lake Taupo Forest Trust	18,927	-
	Rayonier / Matariki Forests	119,921	2,420,622
	Nelson Forests Ltd	51,459	1,039,309
	NZ Forest Managers Ltd	9,407	53,369
	PF Olsen Ltd	134,919	2,988,948
	Roger Dickie (NZ) Ltd / FMNZ	26,522	47,465
	Timberlands Ltd	174,255	3,700,464
Wenita Forest Products Ltd	23,848	356,765	
Category B Non-Corporate Investors	Anvik	-	-
	Blackburne Group Limited	-	-
	Forme Consulting Group Ltd	-	-
	Interpine Forestry Limited	-	-
	NZ Farm Forestry Association	-	-
	Trinder Engineers Limited	-	-
	Waiariki Institute of Technology	-	-
Category C Non-Investor Stakeholders	Awdon Technologies Ltd	-	-
	Dewes Contracting Ltd	-	-
	Dodd Forestry Ltd	-	-
	Stubbs Contractors Ltd	-	-
	Te Wananga o Aotearoa	-	-
	Tramroad Limited	-	-
TOTAL	30 Responses	1,029,147	20,065,932