SOUTH + CENTRAL QUEENSLAND REGIONAL FORESTRY HUB

# EVALUATE THE FEASIBILITY OF USING NEW HARVESTING TECHNOLOGIES AND PROCESSES IN QUEENSLAND'S FOREST OPERATIONS

Queensland's harvesting industry is losing value because resource characterisation is incomplete, steep and wet-site access limits operations, supply-chain inefficiencies increase costs and skilled operator shortages constrain machine utilisation. Time-bound pilots and focused regional training are needed to test technologies and build local capability so industry can make informed investment decisions.

## Critical Operational Risks

Terrain diversity and the mix of plantation and private native holdings create operational complexity: some sites require low-impact extraction or winch-assisted methods, others suit full-scale mechanical cut-to-length operations, and fragmented holdings make high-capex machines less economical. The interaction of stand form (including pruned stems) and terrain drives the need for precise resource information and flexible operational approaches.

| Challenge | Operational Impact |
|---|---|
| Poor resource characterisation | Queensland loses potential value when high-quality or pruned trees are not identified and matched to higher-value processing streams |
| Steep and wet terrain | Reduced harvestable area and increased site damage and safety risk where conventional methods are applied |
| Transport & scheduling inefficiencies | Extended roadside stacking, increased log-quality loss (e.g., blue stain) and higher delivered costs. |
| Skills, training and maintenance gaps | Reduced machine reliability, higher downtime and limited local ability to operate and maintain advanced systems. |

## Resource Profile

| | |
|---|---|
| Softwood Plantations | ~190 000 ha. |
| Native Forest | State: 20 million ha.<br>Private: 1.9 million ha. |
| Terrain mix | A substantial portion of commercial stands sit on moderate to steep slopes or wet-site soils where conventional wheeled skidding causes elevated soil disturbance and restricted access windows. |
| Operation types | From large, mechanised plantation harvesting to selective small-scale private native forest operations and farm forestry; machine and workforce needs vary by scale and terrain |

*"Key challenges include limited pruning activities, poor access to productive sites, working delays within the supply chain, lack of skilled harvesting operators, lack of sufficient mechanics and training for harvesting crews."*

***Field testing and local capability building will allow the sector to determine which solutions deliver genuine commercial and environmental returns.***

| Technology | Primary benefit & deployment | Potential Trials |
|---|---|---|
| Remote sensing (LiDAR / UAV / Hovermap) | Supports per-tree measurement, pruned-tree detection and more accurate stand characterisation to inform harvest planning and value matching. | Measure per-tree value uplift and improved matching to processing streams. |
| Central dispatch & scheduling systems | Coordinates trucks and onsite activities to reduce queuing, improve log-to-mill matching and lower transport cost per $m^3$. | Evaluate reductions in queuing and transport costs. |
| Shovel-logging and tracked loaders | Offer lower capital entry and greater manoeuvrability for smallholdings and selective harvests. | Compare extraction methods on productivity, site damage and safety outcomes. |
| Mini-harvesters and mini-forwarders | Reduced machine reliability, higher downtime and limited local ability to operate and maintain advanced systems. | Test economic viability and operator training models. |
| Wet-site mitigation (rubber tracks, wide tyres, brush mats) | Reduce rutting and extend operational windows during wetter periods. | Assess rut reduction and extended seasonal access. |
| Biomass integration & roadside drying | Capture additional residue value where markets and drying infrastructure exist; requires supply-chain coordination. | Measure delivered cost and value recovery from residues. |
| Improved communications (satellite links, repeaters) | Improve safety, data transfer and remote coordination in low-coverage areas. | |

*Risutec planting machines tested in New South Wales, Australia (https://www.farmweekly.com.au)*

*Mechanical pruner concept (https://foresttech.events/autonomous-pruning-the-future-of-forest-management/)*

*Tracked-based loader used for shovel logging operation in USA (https://www.ncforestservice.gov/publications)*

***Effective technology trials require trained operators, data analysts and local maintenance capability; training underpins safe deployment and reliable evaluation.***

## RECOMENDATIONS

1. Undertake well-designed high priority pilots (remote sensing, dispatch and cable-assist) to gather Queensland-specific evidence on costs, benefits and environmental outcomes.
2. Invest simultaneously in regional training so pilots have the operational capability to succeed and scale.
3. Consider complementary policy measures (e.g. funding, leasing models) to ensure smallholders and contractors can participate without bearing all up-front risk.

READ THE FULL REPORT

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