

Stubble Management Guidelines



Mechanical Stubble Management



Cutting and spreading straw is one option for mechanical stubble management Photo: UNFS

The benefits of stubble retention are well understood; however, the practice can become a double-edged sword, with too much stubble creating issues of its own.

While yield losses are unlikely in Upper North conditions, GRDC trials in New South Wales have found that stubble retention benefits peak at 2-3 tonnes per hectare stubble loads, with potential for yield losses above 3t/ha.

Mechanical stubble management is one option for growers looking to retain the benefits of stubble retention without risking losses in higher yielding seasons.

Mechanical stubble management can also be useful when growers need to manage a stubble-related issue (table 1). By retaining some stubble growers can still retain many of the benefits of stubble-retention compared to burning or cultivation.

See the *UNFS More or Less Stubble Guideline* for more information on the advantages and disadvantages retaining high and low stubble loads.

Grazing is another option to manage high stubble loads, see the UNFS guideline *Stubble grazing management* for more information.

Key Facts

- While optimal outcomes can often be obtained with standing stubble, it is sometimes necessary to reduce stubble loading.
- Mechanical stubble management can allow retention of some level of stubble and therefore the benefits of stubble retention.
- Reasons for mechanical stubble management include seeding capability, nutrition, weed or disease control.
- When cutting stubble, it is important to ensure an even spread of residue.

Project Information

This management guideline has been developed for the Upper North Farming Systems Group (UNFS) as part of the Maintaining Profitable Farming Systems with Retained Stubble Initiative, funded by the Grains Research and Development Corporation (GRDC).

The Stubble Initiative involves farming systems groups in Victoria, South Australia and southern and central New South Wales, collaborating with research organisations and agribusiness, to address challenges associated with stubble retention.

The GRDC, on behalf of growers and the Australian Government, is investing \$17.5 million in the initiative that has been instigated by the GRDC Southern Regional Panel and the four Regional Cropping Solutions Networks that support the panel.



TABLE 1: Mechanical stubble management can allow growers to manage stubble-related issues

ISSUE	RETAINED STUBBLE SOLUTION	CHALLENGE	MECHANICAL MANAGEMENT SOLUTION
Weed control	Weed seed destruction (e.g. Seed Destructor)	<p>Weed seed destruction can require high capital investment.</p> <p>Retained stubble can reduce efficacy of some pre-emergent herbicides.</p>	Collect residue with chaff cart and burn or graze to destroy seeds.
Stubble-borne disease	Sow break crops with reduced disease risk or choose resistant varieties.	A high-risk crop may be required for other reasons, such as weeds, nutrition or gross margins considerations	Harvest lower or double-cut to reduce stubble load.
Nutrition	Retain nutrients through full stubble retention.	High stubble loads can immobilise nutrients, making them unavailable to the crop and increasing fertiliser requirements in the short term.	<p>Cut and spread straw at harvest to retain nutrients.</p> <p>Smaller straw pieces will break down faster to improve availability of nutrients to the crop.</p>
Seeding capability	Change seeding configuration to one that can handle full stubble loads (see <i>UNFS Seeding Guideline</i>).	Changing seeding configuration can require high capital investment.	Harvest lower or double-cut to reduce stubble load.
Snail control	Baiting	Baiting alone may not be sufficient when snail pressure is high.	Cable or roll paddocks in summer to kill snails.



RESIDUE SPREADING

When chopping and spreading residue, even distribution is important to minimise the risk of seeder blockages, ensure even nutrition, improve crop establishment and herbicide efficacy.

Newer headers generally have improved residue spreading, and there are residue spreading units that can be retrofitted to older headers. However, even new machinery often obtains spreads of only 9–10m compared to header widths of 12m and wider.

Options to improve spread width and distribution uniformity include:

- Systems which mix straw and chaff.
- Air distribution of residue.
- Double spreaders.
- Maintaining sharp chopper blades to ensure consistent residue sizing.
- Spreader positions lower to the ground provide a more even spread in windy conditions.

Optimal chop length depends on multiple factors:

- Wind (smaller straw pieces are harder to distribute in windy conditions);
- Nutrition (smaller pieces breakdown faster); and
- Fuel costs (cutting shorter increases fuel consumption).

HARVEST METHODS

Growers who intend to perform mechanical stubble management must choose at harvest which method to use:

- Cut low (e.g. 15cm), chop and spread residues: This will slow down the harvesting operation but reduces number of passes.
- Cut low and use chaff cart: Less effective at reducing stubble load compared to chopping and spreading, but improves weed control.
- Double-cut: Harvest high (e.g. 60cm) or with a stripper front, then use the header a second time to cut lower and spread residue. This increases harvest speed but requires multiple passes.

In GRDC studies harvesting high has been shown to increase harvest efficiency by up to 41 per cent, and reduce fuel consumption by up to 78 per cent, compared to harvesting low.

A UNFS demonstration in 2015 found cutting at 32cm compared to 12cm improved harvest efficiency in tonnes per hour by 50 per cent while reducing fuel consumption by 10 per cent.

The choice between these options depends on growers' unique circumstances such as harvest urgency, seeder configuration, labour and fuel costs and weed pressure.



Putting it into practice - farmer feedback on mechanical stubble management

Barry Mudge, Port Germein

Barry harvested a 5 t/ha barley crop in November 2013. His NH89 harvester had relatively poor spread of straw, which resulted in high stubble loads directly behind the harvester, and he was unable to sow through these heavy stubbles with his seeder.

In response Barry purchased a different seeder (John Deere Conservapak) with greater stubble handling capability and upgraded his harvester with a Redekop MAV® straw chopper.

The straw chopper smashes the straw into small pieces and spreads it relatively evenly to a width of 9.5m, slightly short of the 10.5m comb width.



He also improved his inter-row sowing capacity, with the help of guidelines identified as part of the UNFS Stubble Initiative (See the UNFS guideline *Inter-row sowing stubble management*).

The implementation of better stubble management and improved seeding machinery has enabled Barry to manage high stubble loads at harvest and improve seeding efficiency, crop emergence and herbicide efficacy.

References

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