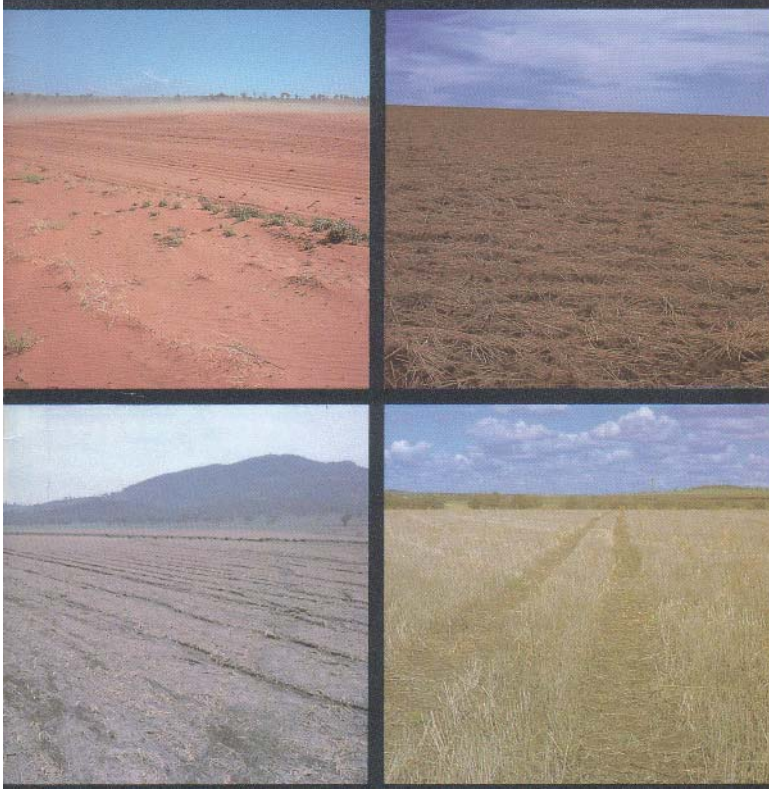


Stubble Assessment for Erosion Control



The benefits of stubble retention: *Above* – The effect of wind erosion (*left*) and similar land under stubble (*right*). *Below* – The effect of water erosion (*left*) and similar land under stubble (*right*).



Published 1985

Stubble is the straw residue remaining on the surface of the soil following harvest of a grain crop. It includes standing straw and that discharged by the harvester. Soil losses due to water and wind erosion are significantly reduced where a sufficient cover of stubble is maintained.



Stubble weight 0.6 t/ha (Equivalent grain yield 0.4 t/ha)

Stubble weight 3.5 t/ha (Equivalent grain yield 2.3 t/ha)





Stubble weight 1.2 t/ha (Equivalent grain yield 0.8 t/ha)

Stubble weight 5.7 t/ha (Equivalent grain yield 3.6 t/ha)



Stubble weight 2.5 t/ha (Equivalent grain yield 1.5 t/ha)



How to Use the Photostandards

1. Flatten out an area of stubble.
2. Lay a 50 cm x 50 cm wire frame over the area.
3. Spread the stubble evenly within the frame area.
4. Estimate the amount of stubble in the frame according to the five photos.
5. Repeat this a number of times across the paddock.

Tips for Greater Accuracy

- If the whole frame area is covered by a thin layer of stubble, at least 3 t/ha of stubble is present.
- Don't over-rate chaff. Chaff weighs less than stubble.
- These photos relate to flattened wheat stubble. Ratings will be different for stubble with different densities, e.g. barley stubble is less dense and therefore its rating should be lowered.

The Value of Stubble

With proper management, stubble will help to prevent soil erosion during the critical fallow period. New designs in farm machinery, together with conservation farming systems, give landholders the opportunity to discontinue old fashioned practices—such as stubble burning and bare fallowing—and to use stubble to protect soil at the time it is most likely to suffer erosion damage.

By retaining stubble on the soil surface, landholders can effectively reduce wind erosion and greatly assist in the control of water erosion.

The following generalisations apply to stubble retention for both wind and water erosion control.

- The more surface stubble the better.
- Anchored stubble is more effective than loose stubble.
- Standing stubble is twice as effective as flattened stubble.
- Fine stubbles (e.g. wheat) are three times more effective than coarse stubbles (e.g. sorghum).
- Stubble aligned across the direction of the erosive agent (wind or water) is more effective than stubble aligned in the same direction as wind or water flow.
- Erodible soils (e.g. sandy soils or those with poor structure) and more hazardous sites (e.g. sloping or exposed areas) require greater amounts of stubble for erosion control than more stable soils.



Primary tillage using a chisel plough for stubble retention.

Surface stubble reduces erosion as it:

- reduces raindrop impact and the breakdown of surface soil.
- improves water infiltration.
- reduces the amount and velocity of runoff, thereby reducing its soil transporting ability.
- reduces wind velocity at the soil surface.
- traps wind blown soil and acts as a binding agent for small soil particles.

Choosing a Tillage Program to Maintain Stubble

The choice of tillage implements and the number of cultivation passes significantly affects the amount of stubble left on the soil surface at sowing.

Effect of Tillage Implements on Stubble

Tillage Implement	Stubble retained per Tillage Pass (%)
“Chemical”**	100
Blade plough	90
Rod weeder	90
Chisel plough (with sweeps)	85
Chisel plough (5 cm points)	75
Scarifier	70
Disc plough	50

*The use of chemicals in place of tillage implements for weed control allows for retention of almost all stubble.

By knowing the amount of stubble present at the beginning of the fallow, and the effect of tillage implements, the amount of stubble remaining at sowing can be calculated. This amount can then be compared to the values in the table below to determine if the soil is protected or at risk.

Amount Of Stubble Required For Erosion Control In An Average Situation

Erosion Type	Soil Type	Amount of standing wheat stubble required to protect soil from erosion (t/ha)*	Equivalent wheat yield (t/ha)
WATER	Loamy sand	0.5	0.3
	Clay loams	0.8	0.5
	Clay	1.0	0.7
WIND	Loamy sand	1.0	0.7
	Clay loams	0.5	0.3
	Granulated clay	0.8	0.5

*Double value for flattened stubble.

The amount of stubble shown in the table is the minimum required throughout the fallow period. Note that other factors which cause stubble reduction (such as natural stubble decay, depth of tillage, speed of operation, etc.) have not been taken into account.

Example Calculations

Stubble at beginning of fallow	Proposed tillage program	Stubble remaining at sowing
Farm A 3 t/ha	Blade—Rod Weeder—Rod Weeder—Rod Weeder	
3 t/ha	0.9 x 0.9 x 0.9 x 0.9 =	1.97 t/ha
	RESULT: Soil Protected	
Farm B 3 t/ha	Disc—Scarifier—Scarifier—Scarifier	
3 t/ha	0.5 x 0.7 x 0.7 x 0.7 =	0.51 t/ha
	RESULT: Soil At Risk	
Your Farm ...t/ha —..... —..... —.....	
...t/ha x x x	=t/ha
	RESULT:	

Like to know more?

Contact your nearest Department of Land & Water Conservation office for additional information or assistance. Publications on Conservation Farming are available from all offices and contain detailed information on many aspects of the farming system including further advice on stubble management.

