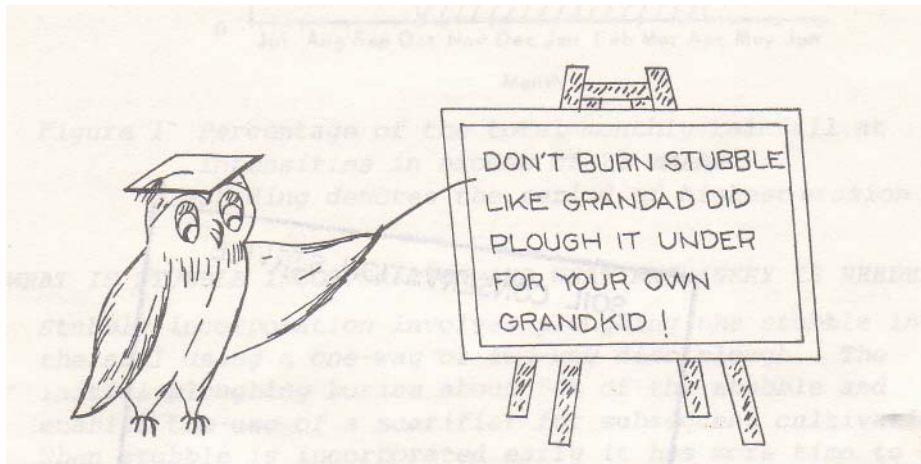


# STUBBLE: TRASH OR TREASURE



## **WHAT IS STUBBLE MANAGEMENT?**

Stubble management involves the retention of stubble either in or on the seedbed during fallowing between crops by the practices of incorporation or surface mulching.

## **WHEN DO YOU NEED STUBBLE MANAGEMENT?**

The conventional management practice of burning the stubble leaves the soil bare and consequently unprotected from raindrop impact when the risk from erosion is highest. The period of highest rainfall intensity occurs from October to April (figure 1).

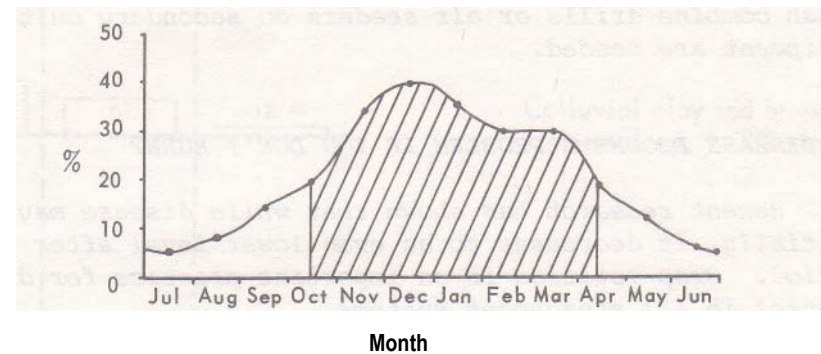


Figure 1 Percentage of the total monthly rainfall at intensities in excess of 25 mm/hr. Shading denotes the period of highest erosion risk.

## **WHAT IS STUBBLE INCORPORATION AND WHAT MACHINERY IS NEEDED?**

Stubble incorporation involves ploughing the stubble into the soil using a one-way or two-way disc plough. The initial ploughing buries about 50% of the stubble and enables the use of a scarifier for subsequent cultivations. When stubble is incorporated early it has more time to decompose and hence there are fewer problems with blockages of a conventional combine at sowing.

**WHAT IS STUBBLE MULCHING AND WHAT MACHINERY IS NEEDED?**

Stubble mulching involves retaining sufficient stubble on the surface during fallowing to minimise the erosion risk. This is achieved by the use of 'sweep' or 'blade' implements. A rod weeder or scarifier with adequate height and tyne spacing to clear stubble may be used for weed control at later stages of the fallow. Chisel ploughs can be used on areas of hard-setting soils or soils containing stones or stumps but they destroy more stubble than 'sweep' or 'blade' implements.

Because of the large amounts of protective stubble retained on the soil surface, specialised sowing machinery such as trash combine drills or air seeders on secondary cultivation equipment are needed.

**WILL DISEASE BECOME A PROBLEM IF YOU DON'T BURN?**

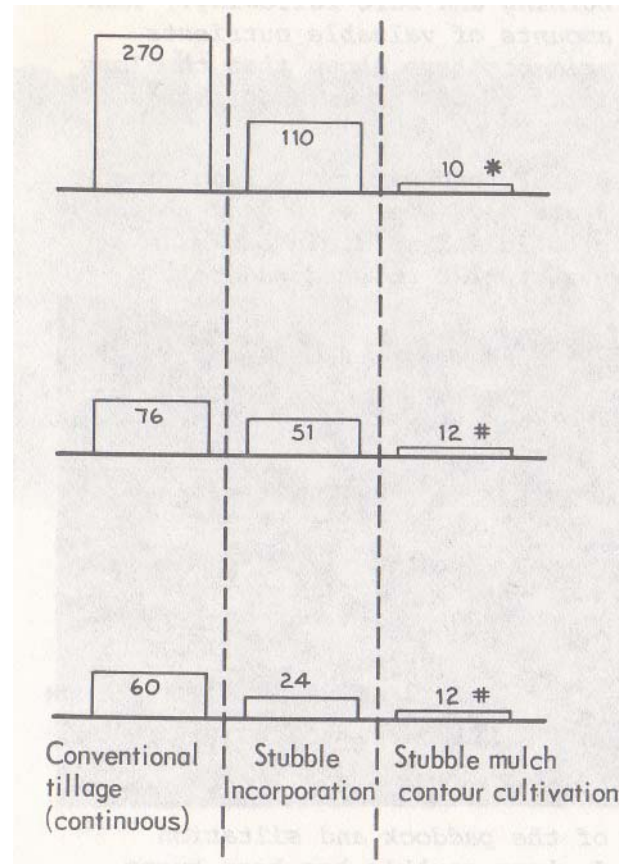
NO! Recent research has shown that while disease may increase initially, it decreases to an even lower level after a short period. Crop rotation is an important practice for disease control in all management systems.

There is little difference in the incidence of disease with stubble mulching where crop rotations are practised.

**WILL STUBBLE MANAGEMENT SYSTEMS REDUCE YIELDS?**

NO! Not in the long term. Initially, until the soil microbes build up there may be a slight loss in yield in paddocks that are already under crop. This is due to a large increase in the microbial populations using the nitrogen to break down the organic matter. This is only a temporary problem until a new equilibrium is reached.

The addition of 20 kg/ha of nitrogen fertiliser in each of the first two years can overcome this problem.



SOIL LOSS (tonnes/hectare/year)

Colluvial clay red brown colour  
1 metre deep, 5-8% slope.

Colluvial clay red brown colour  
1 metre deep, 1-2% slope.

Alluvial fertile self-mulching  
clay soil 1-2% slope.

FIGURE 2

### **WHAT IS THE COST OF SOIL EROSION?**

Figure 2 shows that a lot of soil can be lost by the traditional practice of stubble burning and bare fallowing. This lost soil can contain large amounts of valuable nutrients needed for crop growth. Experiments have shown that the loss of 8 cm of soil can reduce yields by 50% or more on most soil types.

Soil erosion can also silt up banks and waterways requiring them to be rebuilt (figures 3 and 4). Over a 10 year period it can cost up to 50% more to build and maintain banks in a stubble burnt paddock than in a stubble mulched paddock.



Figure 3 Extensive rilling of the paddock and siltation of the bank channel where stubble has been burnt.

### **IS THE COST OF BUYING SPECIAL EQUIPMENT JUSTIFIED?**

YES - the actual capital costs of stubble management equipment are no different to that required for conventional farming. The benefits of erosion control by stubble management can be substantial (see figure 5).

Stubble incorporation is a practice that can be undertaken by all landholders by adapting conventional equipment, but stubble mulching requires specialised equipment.



Figure 4 Minor erosion in a stubble incorporated situ for the same storm event as in figure 3.

### **WHAT EFFECTS DO STUBBLE MANAGEMENT SYSTEMS HAVE ON THE CROPPING LAND?**

Stubble mulching or incorporation benefit the cropped area by -

- (i) protecting the soil surface better by increasing the vegetative cover.
- (ii) improving the soil structure of most soils by increasing soil organic matter.
- (iii) reducing the rate of water runoff.

- (iv) reducing the soil loss (figure 2) and maintaining soil fertility.
- (v) reducing access problems caused by siltation, rilling or gullying.



Figure 5 experimental site at Gunnedah Research Centre showing soil erosion following a high intensity summer storm in April. The plots alternate from stubble burnt in the foreground, then stubble incorporated, followed by burnt, and incorporated in the distance.

**WHICH METHOD - STUBBLE INCORPORATION OR STUBBLE MULCHING?**

The choice depends on the equipment available, the extent of soil erosion and the stubble density. Dense stubble may best be incorporated. A light stubble will give no protection if ploughed in. Stubble mulching protects soil the best but requires specialised equipment.

Stubble incorporation uses conventional equipment and reduces soil loss compared to bare fallowed ground, but savings are second best when compared to stubble mulching.

**IS STUBBLE MANAGEMENT WORTHWHILE?**

YES. Conserving the topsoil of your cropping land is your investment in tomorrow.

The cost of purchasing special equipment and the changes in management practices are a small price to pay for what it will cost you otherwise in reduced yields and repairs to eroded paddocks.

**STUBBLE IS NOT TRASH -  
TREASURE IT.**

