



Laser levelling

What is laser levelling?

Laser levelling involves the use of a laser guided land plane to re-level the paddock surface, filling low spots and removing high spots to give a uniform paddock surface and to create a suitable slope for improving the watering efficiency of paddocks and improving the growth of crops and pastures.

Improved watering efficiency means less time spent irrigating and less water used per bay. The water is also applied more evenly over the paddock giving better growth. Because less water is used less wastage occurs through drainage and the paddock spends less time drying out after irrigation. Excess irrigation water which leads to large drainage volumes means that pasture growth is lost while the paddock dries out and fertilisers are “washed away” in the drainage.

However: laser levelling is only one part of getting the watering right!

Lasering is only one component of a total management package which will help you to grow and utilise more feed resulting in better production. You must be prepared to ensure that your drainage is good, watering structures are big enough, your irrigation scheduling practices are sufficient and that you have selected the right crop type.

See the check list on the back page before you start – there may be more things for you to do than just level your paddock!

Planning your levelling project

You should plan what is to be done in the paddocks before you start. At the very least the soil profiles under the paddock should be examined to make sure there is enough top-soil for laser levelling.

There are basically 3 soils on the swamps all distinguished by their colour—the black topsoil, a brown subsoil and a grey subsoil. The grey clays are very poorly structured, usually associated with shallow water-tables and are also usually very salty. If these are exposed at the paddock surface after lasering or mixed with good topsoil during lasering then the result may be little or no pasture growth and take a long time to come good.

To assess the soils you should dig holes at least 2 feet, or 60cms, deep every 40 to 50 metres up the paddock and look for any areas where grey coloured clays occur.



Laser levelling on the Lower Murray.

Photo taken at the Cowirra trial site which was surveyed and designed to keep 10cms of BI clay over a band of grey clay. The result was very even pasture growth.



BI: Friable clay

Friable black clay topsoil (the good stuff) needs to be stockpiled and respread if less than 20cms depth is found.



BI: Sticky black clay

Less structured “sticky” black clay sets hard and smears. This reduces seed germination and pasture establishment if exposed at the surface by cutting. It needs to have at least 10cms of BI over the top.



Grey saline clay

Grey clay is the “enemy”! Usually saline and wet, very sticky and boggy. Do not uncover at surface by “cutting”. Ensure at least 10cms of good topsoil (BI) cover either by minimising cutting or by replacing topsoil.



Sand

Pure ‘beach’ sand can occur in bands through some swamps. It can let saline groundwater or river water into and under a paddock depending on where in the paddock it is found. It can let water under a paddock you are trying to dry out, coming from a neighbouring paddock you have just watered. It can be cut and lowered if it is at or near surface and then covered with BI.

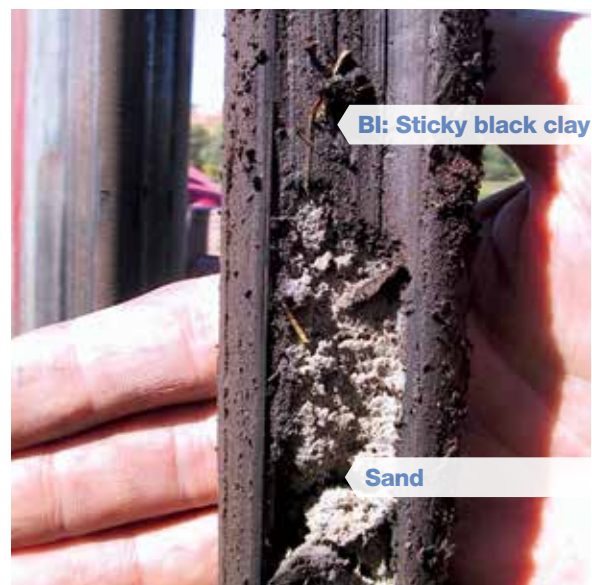


BI: Friable clay

BI: Sticky black clay

Grey saline clay

This shows a complete gouge auger profile. If you look carefully you can see the friable BI, the sticky BI, and the grey saline clays.



BI: Sticky black clay

Sand

This shows the boundary between BI: sticky black clay and the sand layer.

You should also have some idea of the existing slope, which should then enable you to assess whether the paddock is suitable for lasering and an idea of the final slope.

What can you do if you find grey clays? Depending on the depth and extent of the clay, in some cases top soil can be spread over the area during lasering, the slope can be changed or stepped, or, in the worst case, if the area is large and the existing slope of the paddock is fairly flat, then the paddock may not be suitable for laser levelling at all.

Above all—talk to your laser levelling contractor before the job is started—they are often only too happy to take levels before the job and help you plan for the best outcome

Remember: Laser levelling only creates the *potential* to water more efficiently—you must still strive to turn off the water at the right time to try and minimise surface run-off and avoid expensive fertiliser losses, lost production through water-logging and poor pasture growth. Trials have shown that even an extra 15–20 minutes of water can make an enormous difference in run-off. Also you must check your watering structures to ensure that they have adequate flow rates onto irrigation bays to take advantage of lasering. High flow rates are needed and some water supply structures may need repair or upgrading.

Trials have shown that up to 17% of phosphorous fertiliser applied to a paddock can be lost in surface run-off. Even after lasering it is important to ensure that minimum surface run-off occurs through careful attention to when to close the sluice gate. It is easy to get caught out especially when some of these paddocks water so much more quickly after levelling, and remember even 15 minutes of extra water makes an enormous difference to the amount of surface run-off!

When should I laser level?

Laser levelling should ideally be undertaken as part of a paddock renovation program on farms. Lasering is usually done in either Spring or Autumn—if paddocks have a bad weed problem, eg. with couch or kikuyu, then consideration should be given to lasering in the Spring and sowing to millet followed by Winter-mix, millet again and then into permanent pasture. This gives 3 or 4 opportunities to control the weeds. If the paddocks are clean, then they could be lasered in the Autumn and put straight back into permanent pasture. There are other combinations of sowings which can be used to complement the cropping situation on most farms.

What should I grow?

This depends on what you are using the paddock for and advice should be sought for your specific needs. You need to consider the weed status of your paddock and whether you laser in spring or autumn—as mentioned above, you may want to get good control of couch and other persistent weeds, in this case a rotation of millet—winter mix—millet—permanent pasture is the go. Trials are underway as part of the Sustainable Soils project. Contact Monique White (see details next page) for further information.

Otherwise you can plant permanent pasture straight away if lasering in Autumn. On difficult paddocks where slopes are less than ideal (flatter than 1:1000) or there is a salinity or drainage problem which can not be easily fixed, such as on some 'back' swamps, you may wish to consider sowing one of the new fescues with white and/or strawberry clover, or a permanent pasture mix which includes 2 kgs per ha of paspalum.

Remember: Your grazing pattern must suit the pasture type sown. Try to stick to the rule of grazing pastures when they are 6–8 inches high and taking the cows out when they are grazed down to 2 inches. Use pasture topping especially on fescue and paspalum dominant pastures to keep them fresh and prevent thatch developing which will reduce clover growth and quality. Remember—the correct grazing rotation protects your paddock and sets you up for the best future growth.



Laser levelling checklist

Does my site have site use approval?

For areas in the LMRIA to be irrigated they must have a site use approval issued by the Department for Environment, Water and Natural Resources, (DEWNR). If in doubt, contact DEWNR with your section number and property title information.

Are my drains deep enough and clean—drainage comes first!

Drains should be at least 75cms deep and clean of excessive weeds and any other blockages—drainage has to get away quickly! Drains can be cleaned by excavator, rotary spinner, spraying or burning or a combination. Without good drainage laser levelling will not give good results Drains can be re-constructed during the lasering process—plan first!

Have I checked my soil depths and types?

If you have less than 20cms of topsoil you may need to have it stripped and stockpiled for re-spreading (top-soiling). This costs more so should be budgeted for but will give the best job and quickest pasture response. Grey clays need to be identified and planned for.

Are my watering inlets big enough and the right type?

Paddocks must water quickly—big flows are needed. If you have less than 45cms of head available over the paddock (the height of the water surface in the supply channel above paddock level) then door inlets are best, if you have more than 45cms of head then pipe inlets work best—there are many types of each available. The areas around the inlet, the meter and the supply channel must be clean (weeds) and well maintained for good flow.

Drought Recovery: If your paddock/s are drought damaged—cracked and slumped soils—you may need to rip the paddock close together, diagonally and lengthwise, follow up with a chisel plough or off-set disc (twice over), then rotary hoe. After lasering the paddock may benefit from harrowing and/or rolling with a heavy roller. The paddock will most likely need to be re-levelled again at a later stage as a follow up. Infrastructure damaged by the drought also needs to be repaired: side drains, inlets, fences, toe drains. The first irrigation after repairs you may need to 'plug' side drains and toe drains to hold water on the paddock, then clear for subsequent watering.

What is the paddock slope and what slope can I get?

Ideally the final slope should be at least 1:800. If you can't get this slope you can look at options including stepping the paddock and changing the pasture type you may sow for best results.

Is my site damaged by the drought?

For areas that were damaged by the drought—severe and deep cracking and slumping of the soil—the site may need extra preparation. See *Fact sheet: Number 8*.

Am I prepared to schedule irrigations to suit pasture water use?

Irrigations should be scheduled to suit the pasture water use to get the best result. See *Fact sheet: Number 2*.

Can I vary my grazing rotation to best utilise my feed?

Regardless of pasture type, you should aim to graze pastures at around 6 inches (140mm) and take cows out at 2 inches (50mm). This will result in a grazing rotation which varies from up to 3 weeks to as little as 10 days depending on time of year—BUT you will get the best pasture re-growth. You are ensuring you graze the paddock before growth slows and take the cows out before there is too little pasture left to get quick re-growth.

Have I talked to my laser levelling contractor to get the right job?

Your laser levelling contractor can help you to make the right decisions—they can check slopes and advise on cutting and stepping paddocks and likely cost of top-soiling of paddocks.

For more information contact: Monique White on 0400 972 206 or monique@dairysa.com.au



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