

Cracks

During dry periods the soil and material the dam was built with may crack as the embankment dries out. Some soil types are more prone to cracking than others. If large cracks appear, it is necessary to fill in and compact the areas with clay (Bentonite). Some cracks may be more difficult to attend to and may require trenching out the cracked area before filling and compacting with clay. Water is needed to help with compaction.

Pollution

Stock dams which are located below stockyards and other animal enclosures need to be managed carefully to ensure nutrient runoff from these areas is diverted away from the dam.

Stockyards and animal enclosures usually encompass a high nutrient environment which through water run-off, can promote excess growth of algae, waterweeds and bacterial contamination of stored water.

Vegetation

It is vital to the structural integrity of a dam that trees and shrubs be removed from the

embankment, from within the bywash and the bywash return slope. The roots from trees and shrubs can penetrate through the embankment resulting in seepage paths which could cause the dam to bust/ and fail (see Figure 5).

Trees and shrubs in the bywash area can collect debris and restrict and divert bywash flow around the base of a tree which can lead to erosion.

Aquatic plants in the water storage area should be monitored and managed if they become troublesome.

Identification and control techniques of aquatic plant species should undertake prior to removal.

Figure 5: Tree roots and debris build up contributes to gully erosion in dam bywash



Reference

- The State of Queensland, Department of Primary Industries (DPI), 1996, 'Water Notes Collection: A compilation of notes on water supply conservation, use and maintenance for wet and dry times', Second Edition, Compiled by O'Sullivan, D. and Schmiede, D.
- Dam types illustrations, Mark Genrich

Further reading

- Lewis B., 2002, *Farm Dams Planning Construction and Maintenance*, Landlinks Publication, ISBN 0-643-06576-8

Farm dams - tips on maintenance

Dams are an important asset for any farm operation as they provide infrastructure for storing water with minimum maintenance costs in most seasons.

Many farm operators have incorporated the use of dams to help with the management of their landscape. A key to a dam's success is the proper planning, design and construction of a suitable bywash.

To fulfil its purpose and reduce the risk of failure, it's also necessary for a dam to be regularly maintained. This fact sheet is designed to provide landholders with some basic tips on bywash design and construction, and farm dam maintenance.

Bywash - design and construction

It's important for a bywash to be correctly designed and located to prevent flood water overtopping the dam or eroding a new channel around the end of, or beside, the embankment. The dimensions of a bywash depend on catchment size, ground cover condition, steepness and grass cover of the bywash return slope and rainfall patterns. A good bywash will ensure a stable dam.

Table 1 illustrates a rough rule for calculating bywash widths for dams with catchments up to 200ha. The rule used to prepare Table 1 is:

$$\text{Bywash width (meters)} = 2 \times \sqrt{\text{catchment area (ha)}}$$

Table 1: Dam Bywash widths

Catchment Hectares (ha)	Bywash width (metres)
10	6
20	8
30	10
40	12
50	14
60	16
70	16
80	18
100	20
150	24
200	28

Note: If you want to convert Hectares to Acres multiply by 2.471

Narrow bywash widths cause bywash scouring and gullying so it is important to have a good wide bywash. One of the most common issues associated with maintaining a well-grassed bywash and return slope is trickle flow. This continuous low flow of water can cause significant damage to the bywash area over time regardless of soil type (see Figure 1). However, this can be rectified by constructing an outlet pipe leading from the bywash inlet through the embankment, and down to the bed of the gully or natural watercourse (DPI, 1996, pg. 12). Otherwise through regular monitoring and maintenance, landholders can fill in and promote grass growth where rills have developed.



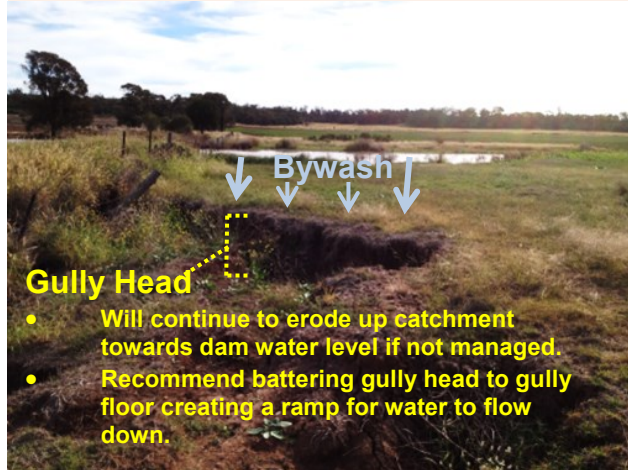
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Figure 1: Gully erosion occurring in a dam bywash



- Gully Head**
- Will continue to erode up catchment towards dam water level if not managed.
 - Recommend battering gully head to gully floor creating a ramp for water to flow down.

Topsoil

If proper planning, design and construction of a farm dam is undertaken there should be a layer (15cm thick) of topsoil placed over the entire embankment. Where this is not the case, it's well worth the effort of adding a layer on already established dams.

This can be done by bringing topsoil from another area, using spoil from inside the dam (de-silting), or using gravel or gravel material.

This topsoil layer provides a suitable environment to support grass or a ground cover. The coarser the material, however, the more difficult it will be to establish grass or a ground cover. Topsoil or silt can also be used to reinstate low sections of the dam embankment (see Figures 2 and 3).

Figure 2: Before photo of a broken dam embankment

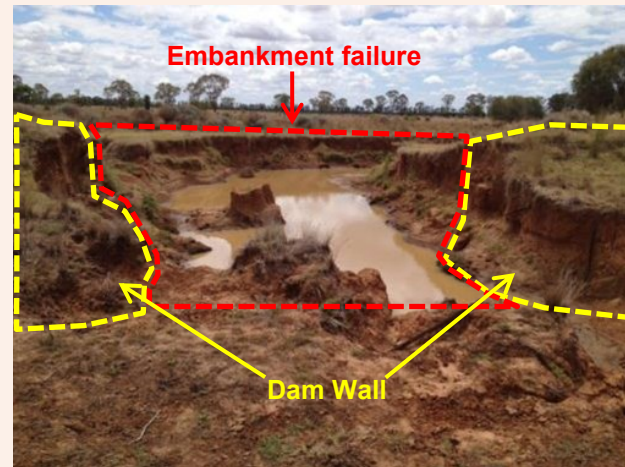
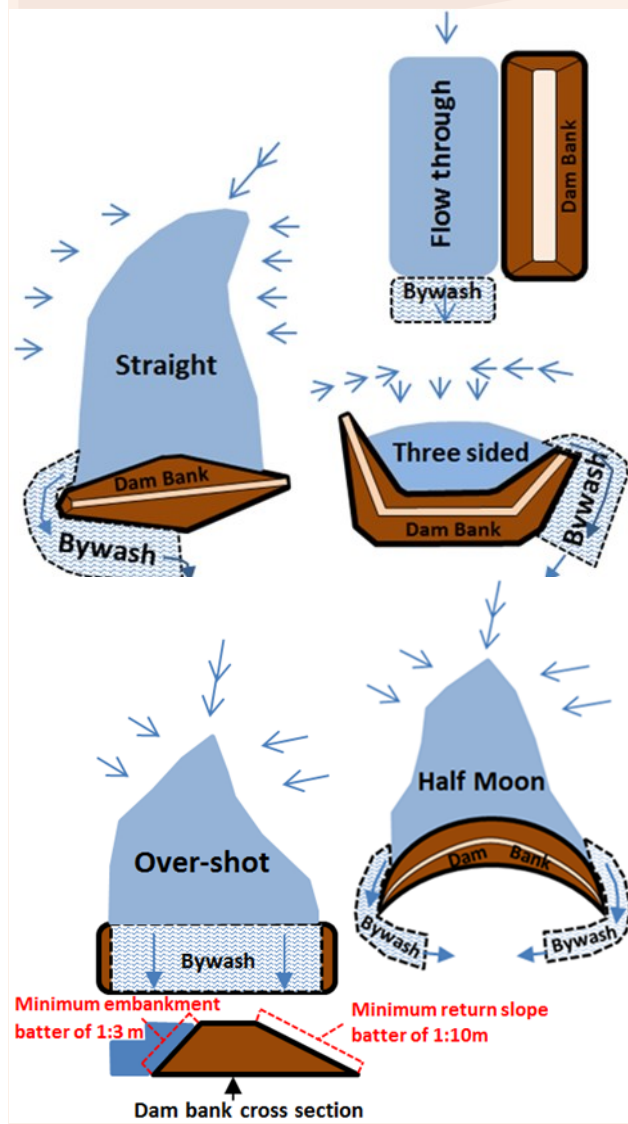


Figure 3: After photo of dam bank reinstatement



Dam types



Top-soil or silt can also be used to top-dress low sections of the dam bywash as long as it's used above the bywash water level (see Figure 4).

Figure 4: Reinstated low section of dam



Grass/cover crop

There are many types of grass species available to landholders on the current market but the preferred varieties are those which spread with runners and create a mat of grass. These grass species are termed stoloniferous and provide great cover for holding the soil surface together. It's important to plant stoloniferous grass species around the dam, on the dam embankment, in the by-wash and on the bywash return slope immediately after dam construction is complete. Grasses that provide good ground cover include kikuyu, couch, pangola, creeping blue and Rhodes grass.

It's best to avoid using tufted or tussocky grasses species such as buffel or green panic. To ensure quick establishment of ground cover, it's recommended that a cereal cover crop be planted prior to sowing the grass. Grass species can be planted with the cover crop or at a later stage, or planted into the crop when climate conditions suit grass establishment (ie Spring).

For optimal ground cover it is recommended the area be fertilised and watered to reduce the risk of erosion.

If areas become bare of topsoil, it's necessary to top-dress them using silt or spoil from the dam so that grass cover can be maintained. Regular slashing of grass in the by-wash and bywash return slope areas will also promote the development of a dense groundcover.

Maintenance

Debris

Any material such as logs, trees and rubbish, or features such as feeding troughs, cattle tracks or a lack of ground cover can concentrate or divert water flow from a dam and should be removed from the area.

Fencing

To increase a dam's longevity and avoid excessive stock bogging during the next dry period, it's recommended that a fence be constructed around the dam area. This includes the embankment, storage area, bywash and bywash return slope. Fencing of a dam will improve water quality and promote grass growth thereby preventing erosion. It can also help reduce concentrated water flow, soil erosion and polluted water resulting from livestock pads and vehicles tracks.

Silting

Dam silting can result in a reduction in water supply and quality but there are preventative measures that can be applied. These involve taking care of the catchment above the dam and reducing the possibility of sediment deposition from erosion. Zero or minimum tillage and good ground cover are two forms of erosion prevention in cropping land and grazing lands.

When this not possible, silt traps such as grassed areas can be established in the catchment upstream to intercept silt from entering the dam. When incorporating silt traps in the landscape, it is important that they are maintained so that they function properly.