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The Ord River regeneration project. 2. Dealing with the problem

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2. DEALING WITH THE PROBLEM

THE PROGRAMME of protective and remedial work being undertaken in the Ord River catchment area had as its major objective the re-establishment of perennial vegetation, as a means of controlling erosion and reducing the silt load of the rivers. It is now in its seventh year of operation.

With a protective vegetative cover re-established, run-off will be reduced, water penetration increased and the scouring effect of both wind and water reduced.

Cause of the erosion

There is little doubt that the basic cause of the erosion of the Ord River catchment area was the removal of vegetative cover by consistent and continuous overgrazing by both stock and vermin on susceptible soil types in an area of marginal rainfall. Fire and drought have also played their part.

Once the soil was stripped of its protective vegetative cover, wind and water combined to scour and gully the surface.

The numerous dead trees now in evidence almost certainly died as a result of the removal of grass cover. Such denudation causes greatly increased surface soil temperatures and prevents penetration of water through the soil surface.

Areas immediately adjacent to the major rivers and watering points are the worst affected.
Bird's eye view of contour patterns on an extensive area of bare country on the Ord River catchment

**Approach to the problem**

Remedial treatment is directed at the basic cause of the erosion—the removal of vegetative cover. Control of grazing within the area was the first requirement and a large scale fencing programme was adopted to allow this.

The establishment of a series of paddocks made possible the progressive removal of stock and treatment of enclosed sections. Future stocking of the area will depend on the success of the project.

In most pasture regeneration work manipulation of grazing, involving periodic protection or deferment, is usually sufficient to ensure re-establishment of perennial grass species. Unfortunately, in many places on the Ord catchment, degradation and removal of topsoil have advanced to the stage where this is not possible and cultivation and reseeding are necessary.

Early experience in the area confirmed that moisture was limiting and seed supplies were exhausted.

The present broad approach—progressive fencing, grazing control and large-scale pasture establishment—is necessary to reduce run-off and halt the erosion before actual gully control can be started.

In the initial treatment, work is confined to the upper slopes or ridges above the gullies, in an attempt to “starve” the gullies. As vegetation becomes established, seed drifts down to colonise the gully heads and slopes. This is already happening in many places.

Local conditions dictated that work commence on the worst affected areas
The opposed disc plough, with central ripper point and mounted seed box. Rubber hoses carry seed from the outlet holes to drop at the edges of the furrows.

first, and these were expected to give the slowest response.

Fencing
Open range grazing has applied throughout the area and, apart from a horse paddock and a bullock paddock, fencing on the project area was virtually non-existent. Some 450 miles of new cattle fencing has been constructed to contain the eroding area and divide it into 18 paddocks. Admittedly, some of these are large, but they do facilitate mustering and make grazing control possible. A further 100 miles of fencing was erected in 1967 to protect the eroding Elvira Valley, south of the original project area.

Fences are conventional, having three barbed wires, with strainer posts every 5 chains and steel standards about 18 ft. apart. The approximate cost is $490 per mile.

River crossings have required special attention and "flexible" and "swinging" log crossings have been constructed. Regular servicing and checking are necessary.

Cultural operations
Lack of water penetration is still the major factor limiting the successful re-establishment of vegetation on the bare and degraded areas, once grazing has ceased. As might be expected, the barer the soil the more serious is the problem.

On bare and compacted soils infiltration rates, as measured by a standard single-ring infiltrometer, are only 1 to 2 inches per hour. This indicates that, in heavy downpours, virtually no water penetrates and run-off is almost complete. If the Chisel plough in operation, ploughing up-slope from the bank formed by the opposed disc plough. The mounted seed box is chain driven from a sprocket on the rear wheel
surface crust of approximately ¼ inch is removed, infiltration rates rise to 5 to 6 inches per hour. Where 3 to 4 inches of top soil is removed, as with a ripper or chisel plough, infiltration rates of 10 to 12 inches per hour have been recorded.

Cultural operations are aimed at increasing water penetration, providing a seed bed and reducing wind velocity at ground level. A rough, cloddy seed bed is better than a fine one.

Due to the bare nature of the soil, the excessive run off, degree of slope and heavy incidence of rain, it was essential that all cultural operations and reseeding should be strictly on the contour.

As an added precaution against gully development all strips are made discontinuous. In practice the machine is held in the ground for about 1 chain and then held out for about ¾ chain. Each successive row attempts to cover the break above it. This system greatly increases water penetration by holding water on the slopes for a longer period, and permits surplus water to escape, but at a reduced velocity.

Distance between furrows varies with the location but on the barest areas it is about ¼ to ½ of a chain. On flatter sections, or areas already carrying some inferior annual species but where perennial intro-
ductions are required, the strips are spaced much further apart.

**Contouring**

Running of contour lines, initially done with a Dumpy Level, is now carried out by a modified tractor or vehicle-mounted hose level. With a little practice these can be operated at about 5 m.p.h. with an acceptable degree of accuracy.

The mounted hose levels are satisfactory for this large-scale work, but could not be recommended at this stage for farm scale operations, where greater accuracy is required.

**Cultural implements**

A wide range of cultural implements has been tested and many have been modified to suit the local conditions. An opposed disc plough with a centrally-mounted ripper point does a good job but conventional chisel ploughs are also favoured. When these are used in combination, with the chisel plough working up-slope from the opposed disc plough working, water penetration is greatly increased.

An opposed disc pitter, operating on the principle of the basin-lister plough, has shown distinct promise, particularly on areas already carrying some grass cover. Areas treated four to five years earlier still retain the "pits", collect seed and increase water penetration.

In follow-up work carried out in subsequent years between the original cultivated strips, wider cultivators or chisel ploughs are favoured as they provide larger areas of cultivated ground to collect both wind-borne seed and water.

**Reseeding**

The re-establishment of native perennial species can only be encouraged through grazing management, as seed is not available in sufficient quantities for large-scale reseeding.

Cultivation and reseeding have been done in the one operation with a seed box mounted either on the back of the tractor,
or on an implement, and chain-driven from a sprocket on the rear tractor wheel.

Large quantities of buffel and birdwood grasses and kapok bush seed have been planted throughout the regeneration area.

In the interests of economy of both seed and labour, the aim has been to do the minimum of cultivation over the widest possible area to obtain initial plant establishment from which seed can spread by natural means. Follow-up cultivation with broad implements between earlier rows of cultivation to collect windborne seed has proved most effective with kapok seed.

Aerial seeding has been attempted but has proved ineffective on both bare and degraded areas. However, it could have application at a later date as a means of speeding up the spread of more productive perennial species amongst established lines of vegetation or into areas carrying native annual species.

**Grazing control**

Effective control of stocking is vital to any regeneration project. Severe damage results where even small numbers of grazing animals have access to areas under treatment, as they concentrate along established rows of vegetation and selectively graze out the more palatable species. These are usually the perennials.

Stringent, long term control of grazing will be essential to ensure that an adequate ground cover of perennial species is maintained to minimise future erosion of this susceptible area.
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