



Assessing the effect of compaction and clay lining on seepage from on-farm channels and drains

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Introduction

Distribution efficiency of poorly constructed or located on-farm irrigation channels and drains can be low. This low conveyance efficiency results in reduced water availability to the farmer, on farm management issues due to lateral seepage - localised salinity, trafficability problems, weeds growth, or if the losses contribute to the regional groundwater system - rises in ground water levels and soil salinity problems at the larger scale. Improved site investigation and construction techniques for earthen channels could aid in reducing the impact of poor distribution efficiency.

Methodology

Existing channel and drainage lines will be investigated by EM-31 surveys, and seepage rates prior to any form of treatment will be measured before and after impact compaction. Impact compaction will be applied at varying levels and the reduction in seepage rates and the longevity of seepage reduction will be assessed. Impact compaction treatments will be applied in a randomised complete block design including an untreated control.

Experimental design

The proposed research project would select a number of predetermined seepage sites in at least four different farms of the MIA and Coleambally Irrigation Districts.

Two approaches will be used for channel sealing. These include:

- Impact Compaction
- A stabilised clay lining

Significant differences in compaction and lining treatments for each site, and percent reduction in seepage rate for three years, will be noted and economic evaluation of the benefits of research to farmers and the community will be made.

Channels			
	1	2	3
Channel Sections	Seepage rate mm/day	Seepage rate mm/day	Seepage rate mm/day
1	15	12	20
2	10	15	20
3	20	15	20
4	20	15	10

Allocation of the compaction treatments			
Channels			
	1	2	3
Channel Sections	Passes	Passes	Passes
1	4	8	0
2	0	4	8
3	8	4	0
4	4	0	8
Drain Sections			
1	Clay Lining Treatment		

Objectives

- Opportunities to increase Distribution efficiency of on-farm channels and drains with resultant reduced accessions to the groundwater system and increased water availability on farm.
- An assessment of the effectiveness of impact compaction on the seepage rate from on-farm channels / drains.
- An assessment of the longevity of the effects of impact compaction on seepage from on-farm channels and drains.
- An economic analysis of the farm and regional impacts of channel sealing by impact compaction and a Benefit/Cost analysis of adoption of this technology over time at the regional scale
- A Decision Support System (DSS) developed to guide grower actions in response to seepage from channels and drains.
- Development of two and three dimensional channel and drain ground water interaction models

Expected Outcomes

This study "Assessing the effect of compaction and lining on seepage rate from on-farm channels and drains" will help the rice industry maximise the use of water at the farm level. It will also help in reducing water losses, salinity and waterlogging problems that are a serious threat to sustainable rice production. However the approaches developed can be extrapolated to similar on-farm channel / drain or supply channel having comparable soil properties.

It will provide information-enabling farmers to avoid seepage losses from on-farm channels and drains. A methodology that can be applied to other irrigation areas as well.

Suitable and cost-effective techniques relative to some other remedial techniques, with its effectiveness not expected to diminish over time.

An enhanced knowledge, and better ways to save water.

