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EFFECT OF DIFFERENT LINING MATERIALS FOR REDUCES THE SEEPAGE LOSSES IN BHADRA COMMAND AREA

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ABSTRACT

A field experiment was conducted during 2010 and 2011 at Agricultural Research Station, Kathalagere to know the effectiveness of different lining materials to reduces the seepage losses in field channels. The studies indicated that the minimum (0.45 LPS) water losses were recorded in rectangular lining (Brick + Cement+ Mortar) and earthen lining channels, respectively.

Keywords- Channel, Lining, seepage.

INTRODUCTION:

A large portion of the irrigation water is lost as conveyance and operational losses if the filed channels are not properly lined to receive water. The lined channels are used for water conveyance by the farmers in developed countries. But in developing countries, the farmers are using earthen channels. Most of the earthen channels are vulnerable to seepage, which necessitate the saving of water by low cost technology to improve the socio-economic condition of poor farmers. In the past, a few attempts have been made to check the seepage losses of water by lining channels with Soil + Cement, Chemical sealment, Bituminous mixture, Polythene film, Impervious Earth Materials, Cement Concrete, etc.(Anonymous, 1985, Michael, 1986, Batta, 1996, Tripathi et al., 1997). The farmers, because of rate availability of materials and high cost, did not accept these techniques. A few works have been reported on the use of various combinations of lining materials such as Brick+ Cement+ Mortar, Cement +Sand+ Jelly, Cement + Sand, Cement + Soil and Kadapa stone lining to check the seepage losses and to the know the economics of different lining materials. With these objectives, detailed study carried out to minimize the seepage losses.

MATERIALS AND METHODS

A field experiment was conducted during 2010-11 at agricultural research station, Kathalagere, Karnataka. The treatments included were rectangular channel lining by using brick+ cement+ Mortar1:2:4, Trapezoidal channel lining – cement+ sand + jelly in 1:2: 4, Trapezoidal channel lining- cement + sand in 1:6 Trapezoidal channel lining in cement+ soil in 1:6, kadapa stone lining (2.5 cm thickness) and earthen lining (control). The parshall flume was used to measure the water losses in 200 m length of each channel was measured to know the seepage losses of different lining channels.

RESULTS AND DISSCUSSION

The average values of two years data (2010 and 2011) in respect to discharge seepage losses and their savings do to various lining materials are presented in table 1. The seepage loss varied from 13.33 % in rectangular channel lining with Brick + Cement + Mortar in 1:2:4 ratio and 43.33% in trapezoidal channel lining cement + soil 1:6 ratio as compared to control (57.80%). All the treatments exhibited superiority over control in treatments in one, the minimum seepage loss was to rectangular channel lining – Brick +Cement+ Mortar 1:2:4. This combination showed superiority over rest of the treatments. This may be implied that treatment one can be use full and more durability in lining channel, though its cost of lining materials is high as compared to other treatments. Ray et al. (1978) and Tripathi et al. (1997) obtained the similar results. From the foregoing study, it can be concluded that rectangular channel lining with Brick + Cement+ Mortar at 1:2:4 ratio could be more effective to seepage loss, more water saving and hence it can be adopted by the farmers as materials of choice for the channels.

Table 1. Seepage losses, water saving and cost of lining as influenced by various lining materials

Sl No	Treatment	Year	Discharge at 0 m (LPS)	Discharge at 200 m (LPS)	Seepage Losses (LPS)	Seepage (%)	water saving over control	Total cost of Lining (Rs.)
1	Rectangular channel lining - brick+ cement+ Mortar (1:2:4)	2010 2011 Mean	2.93 3.08 3.00	2.57 2.64 2.60	0.36 0.44 0.40	12.28 14.28 13.33	48.69 39.31 43.85	- - 4064.00
2	Trapezoidal channel lining – cement+ sand + jelly (1:2: 4)	2010 2011 Mean	4.42 4.03 4.22	3.79 3.35 3.57	0.63 0.68 0.65	14.25 16.87 15.40	46.72 36.72 41.78	- - 3420.00
3	Trapezoidal channel lining - cement + sand (1:6)	2010 2011 Mean	4.72 4.55 4.63	3.22 2.82 3.02	1.50 1.73 1.61	31.77 38.02 34.77	29.20 15.57 22.41	- - 2870.00
4	Trapezoidal channel lining - cement+ soil (1:6)	2010 2011 Mean	5.42 5.84 5.63	3.08 3.31 3.19	2.34 2.53 2.44	43.17 43.32 43.33	17.80 10.27 13.85	1920.00 - -
5	Kadapa stone lining (2.5 cm thickness)	2010 2011 Mean	1.90 4.73 6.63	1.26 3.34 2.30	0.64 1.39 1.01	33.60 29.38 31.49	27.37 24.21 25.79	3300.00 - -
6	Earthen lining (control)	2010 2011 Mean	6.97 7.24 7.10	2.72 3.36 3.04	4.25 3.88 4.06	60.97 53.59 57.18	- - -	- - 400.00

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