

Technology for Salinity Management and Use of Low Quality Waters for Irrigation

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Coachella Valley MSCA System (as developed by the U.S. Salinity Laboratory)



Predicted spatial ECe map (0-1 ft): Field GC02

ECe(0.15)
dS/m

- < 8
- 8 - 12
- 12 - 18
- > 18

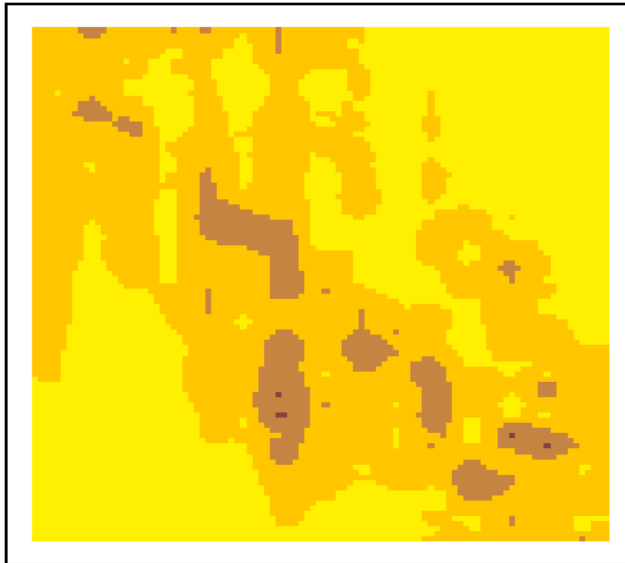
Data Bounds

X: min & max

579118.7
579466.4

Y: min & max

3727259.2
3727640.7



Predicted spatial ECe map (1-2 ft): Field GC02

ECe(0.45)
dS/m

- < 8
- 8 - 12
- 12 - 18
- > 18

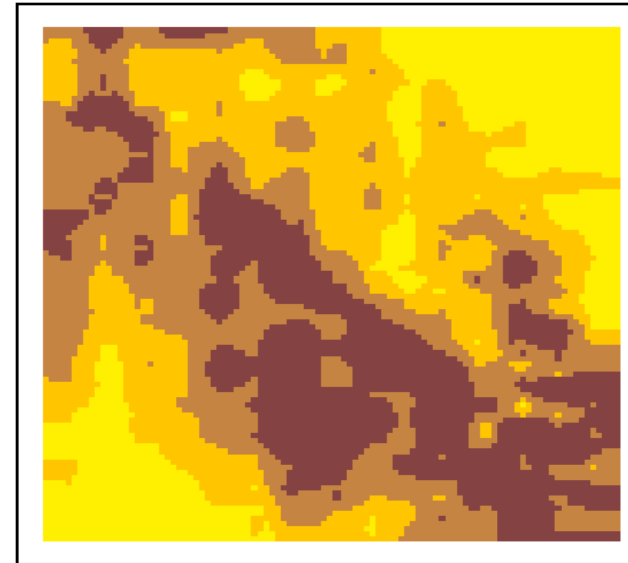
Data Bounds

X: min & max

579118.7
579466.4

Y: min & max

3727259.2
3727640.7



Predicted spatial ECe map (2-3 ft): Field GC02

ECe(0.75)
dS/m

- < 8
- 8 - 12
- 12 - 18
- > 18

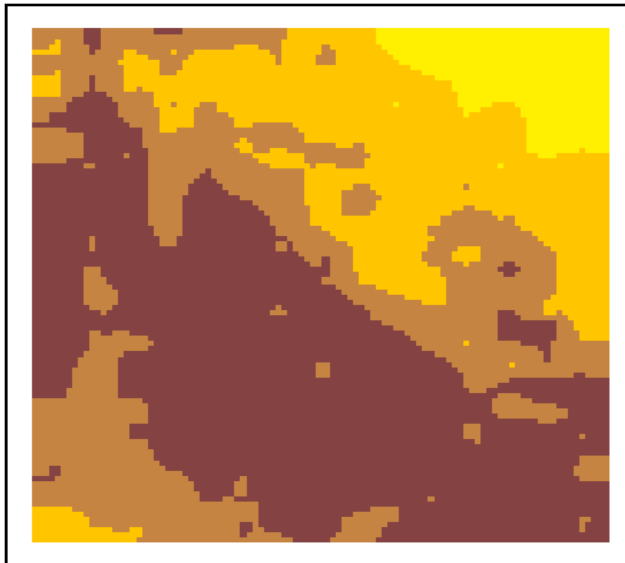
Data Bounds

X: min & max

579118.7
579466.4

Y: min & max

3727259.2
3727640.7



Predicted spatial ECe map (3-4 ft): Field GC02

ECe(1.05)
dS/m

- < 8
- 8 - 12
- 12 - 18
- > 18

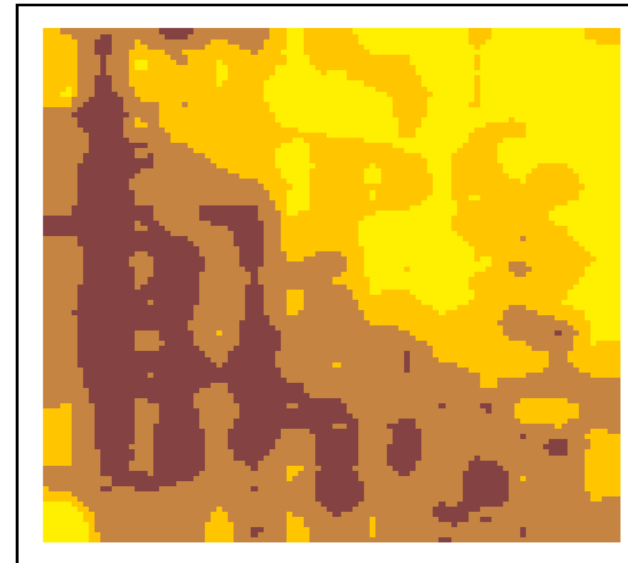
Data Bounds

X: min & max

579118.7
579466.4

Y: min & max

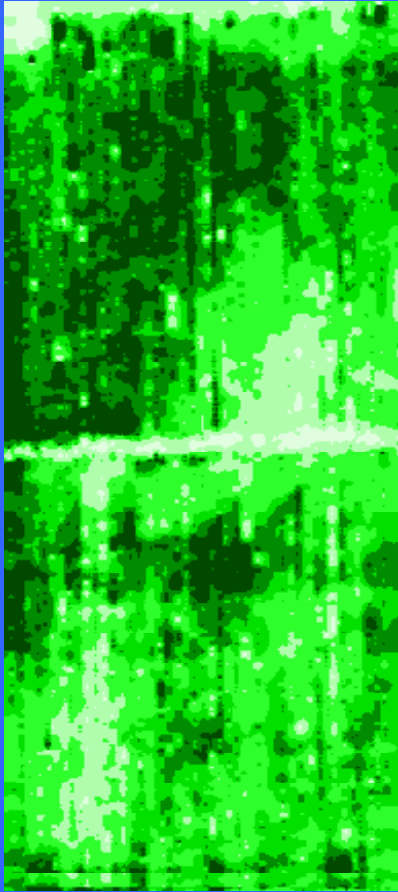
3727259.2
3727640.7



Measured vs. Predicted Yield

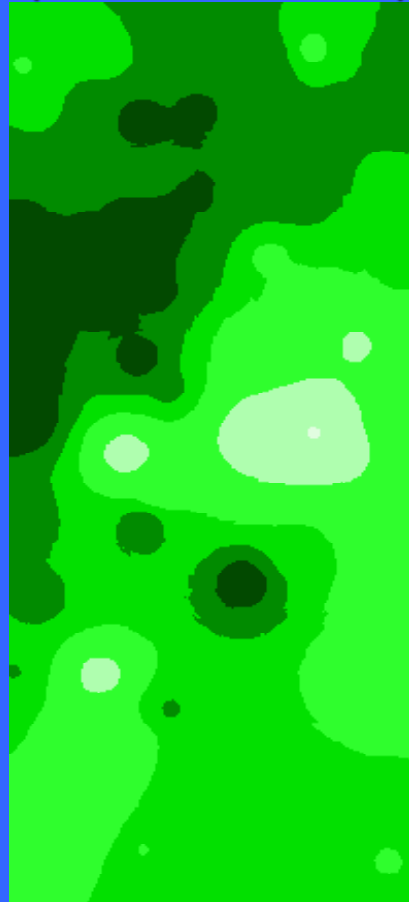
Measured

(based on 7706 sites)



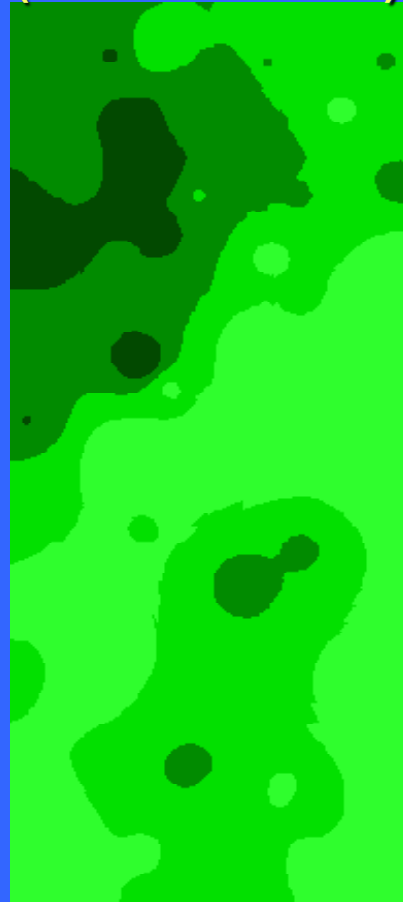
Measured

(based on 59 sites)

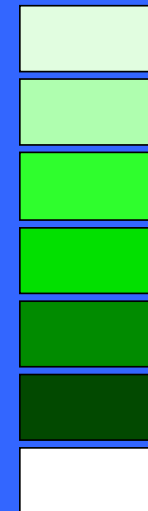


Predicted

(based on 59 sites)



Cotton Yield Mg/ha



0 - 2.8

2.8 - 4.5

4.5 - 5.6

5.6 - 6.2

6.2 - 6.7

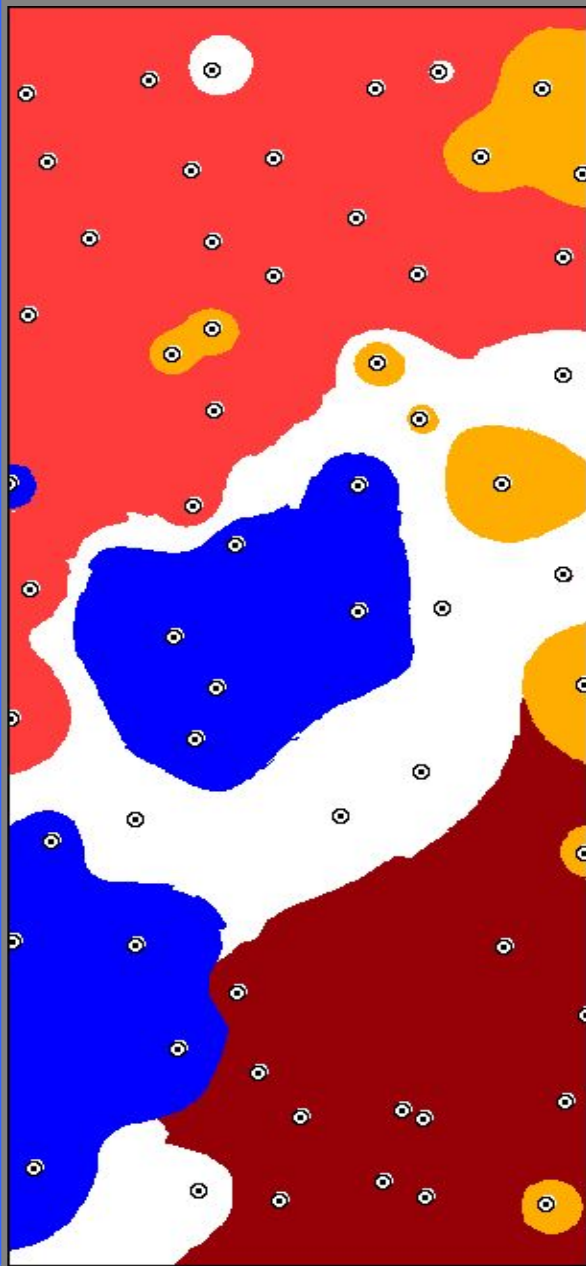
6.7-11.2

No Data

200 0 200 400 Meters



Management Recommendations for Site-Specific Management Units



○ EC_a -directed soil sample locations

■ Leaching fraction: reduce LF to < 0.4

■ Salinity: reduce E_{ce} to < 7.17 dS/m

■ Coarse texture requires more frequent irrigation

■ pH: reduce pH to < 7.9

Corwin, D.L. and S.M. Lesch. 2005. Apparent soil electrical conductivity measurements in Agriculture. Computers and Electronics in Agriculture. 46:11-43.

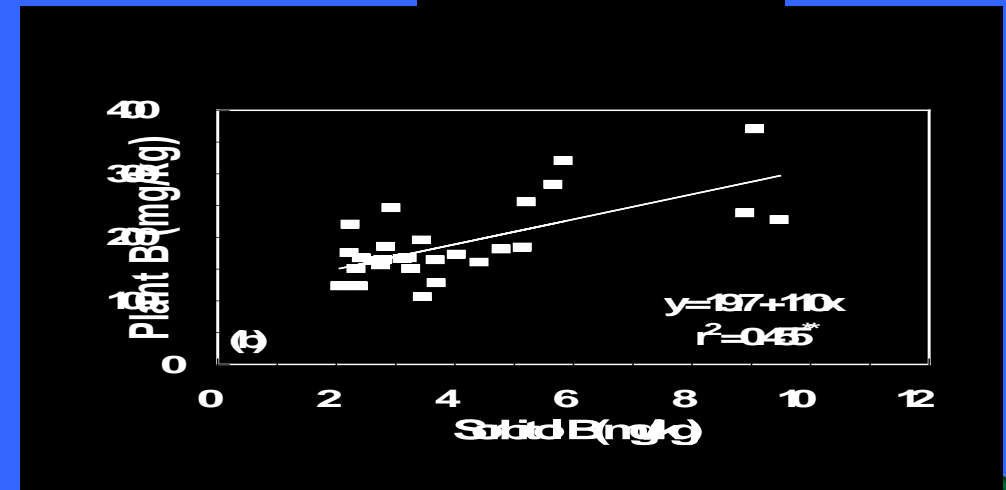
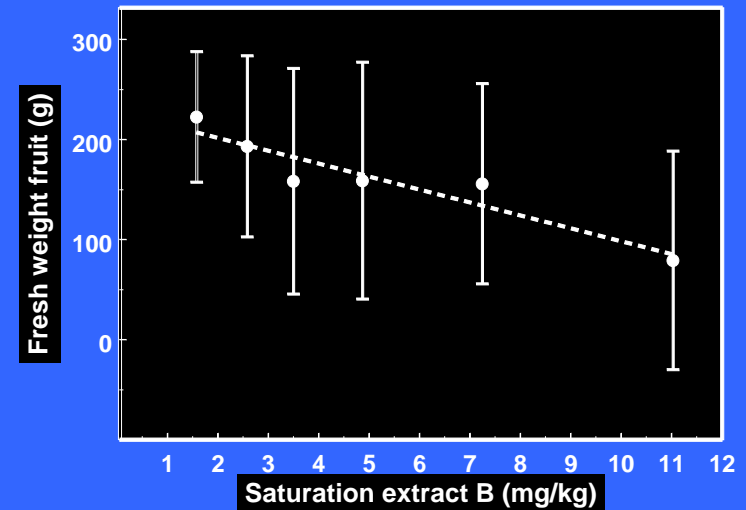
Evaluation of B Soil Tests for Conditions of B Toxicity

- Prediction of B content of container-grown melons

Goldberg, S., P.J. Shouse, S.M. Lesch, C.M. Grieve, J.A. Poss, H.S. Forster, and D.L. Suarez. 2003. Effect of high boron application on boron content and growth of melons. *Plant Soil* 256:403-411

- Prediction of B content of cotton, alfalfa, and melons under field conditions

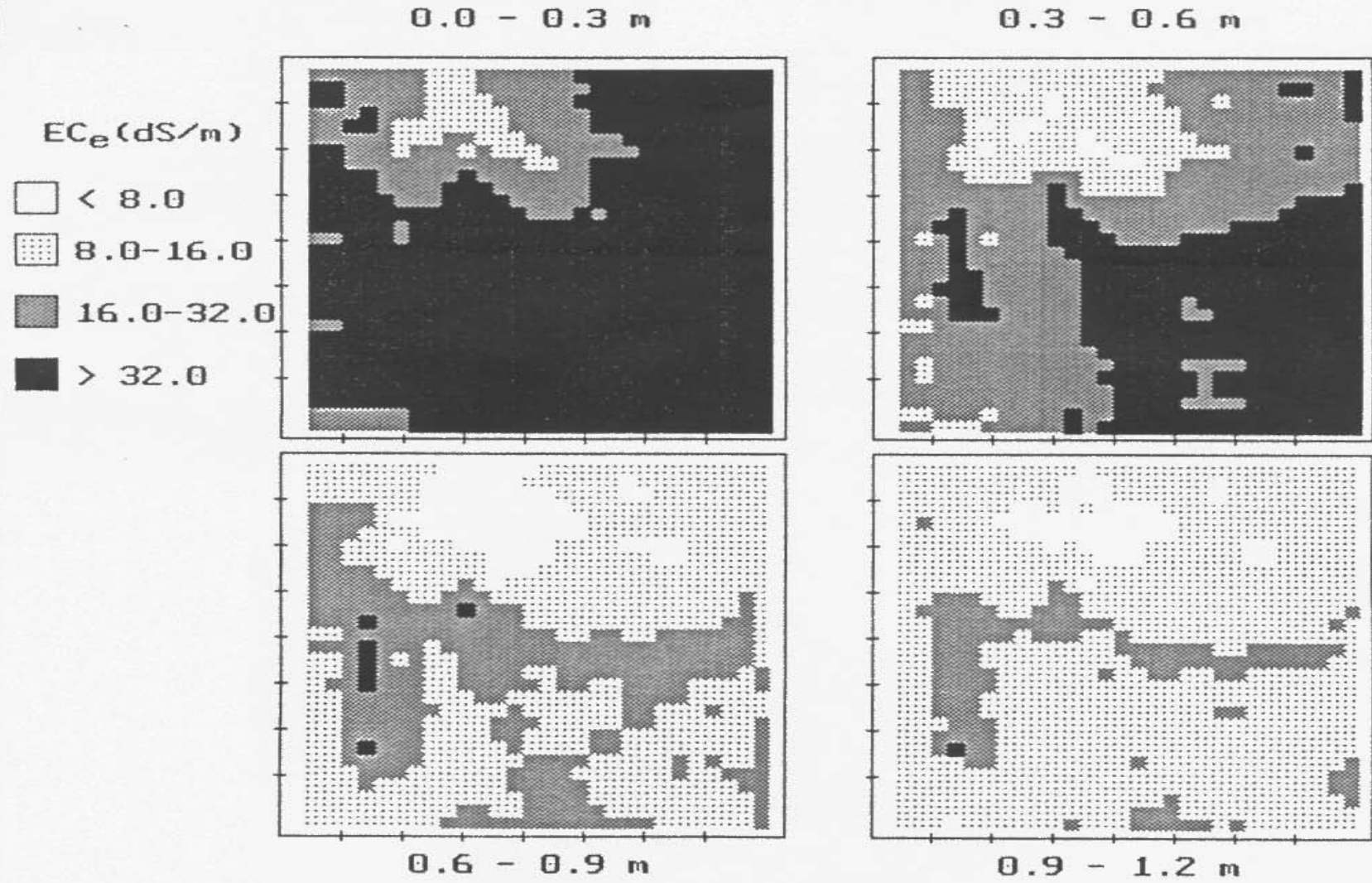
Goldberg, S., P.J. Shouse, S.M. Lesch, C.M. Grieve, J.A. Poss, H.S. Forster, and D.L. Suarez. 2002. Soil boron extractions as indicators of boron content of field-grown crops. *Soil Sci.* 167:720-728.



Saline and Sodic Soil Management

Simulation models such as FAO-SWS (UNSATCHEM) are well suited to evaluate management options

EC Initial

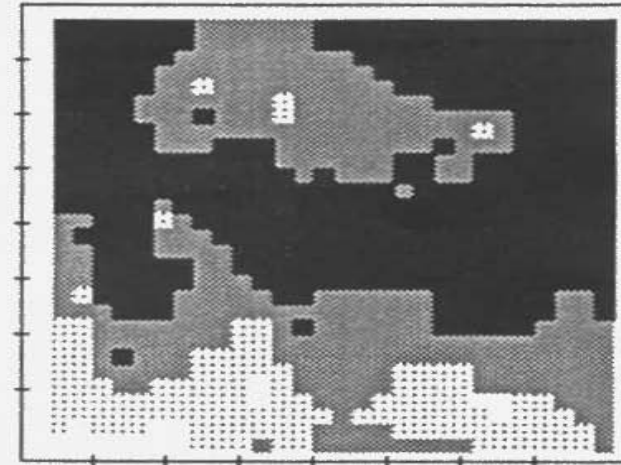
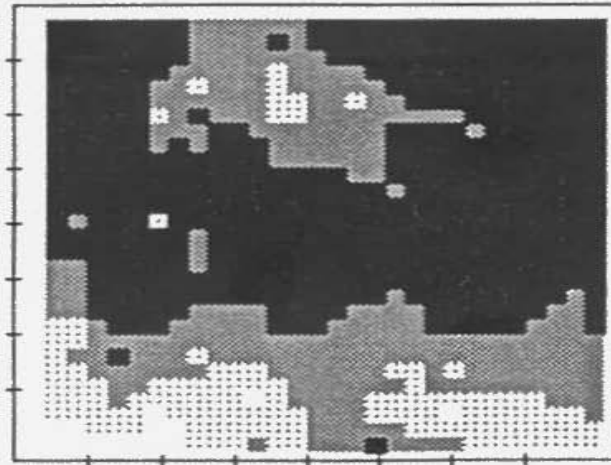
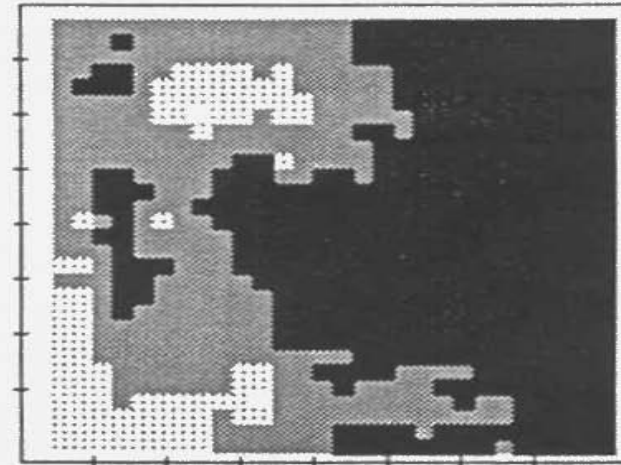
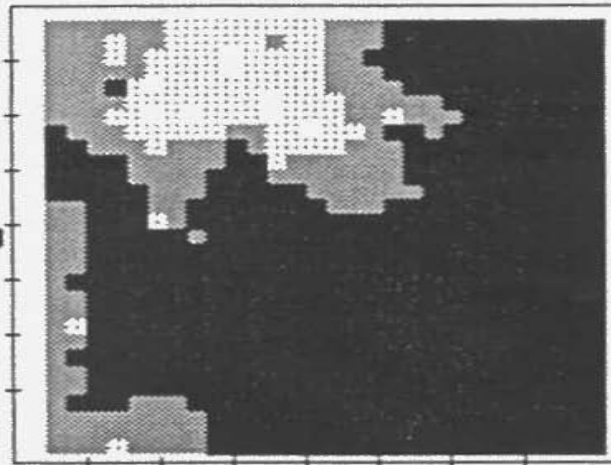
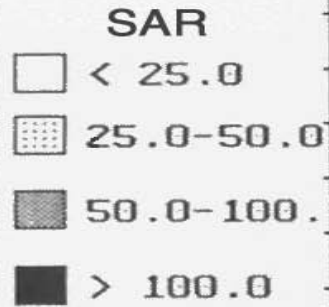


Suarez, D.L. 2001. Sodic soil reclamation: Modeling and field study. Aust. J. Soil Res. 39:1225-1246

SAR Initial

0.0 - 0.3 m

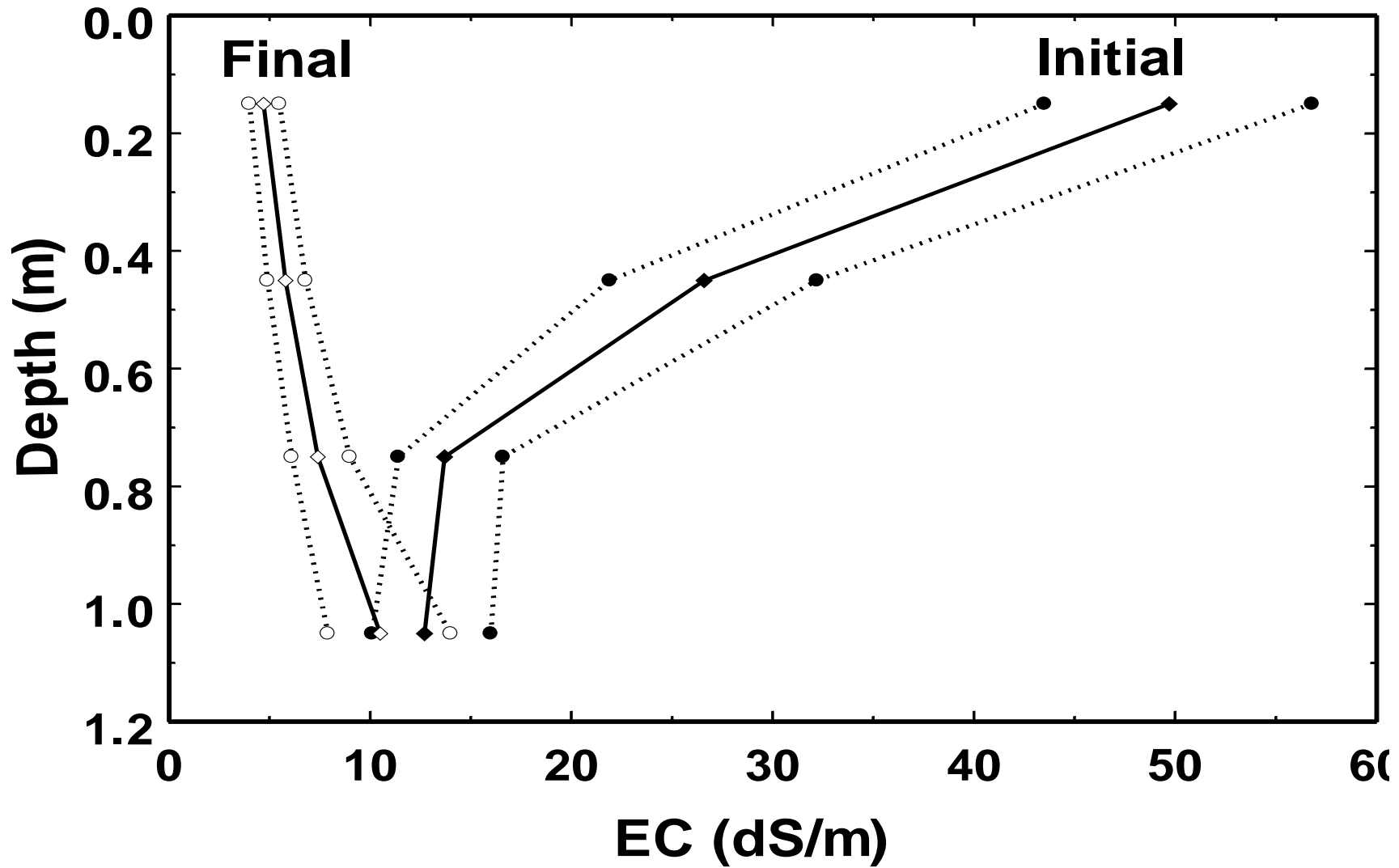
0.3 - 0.6 m



0.6 - 0.9 m

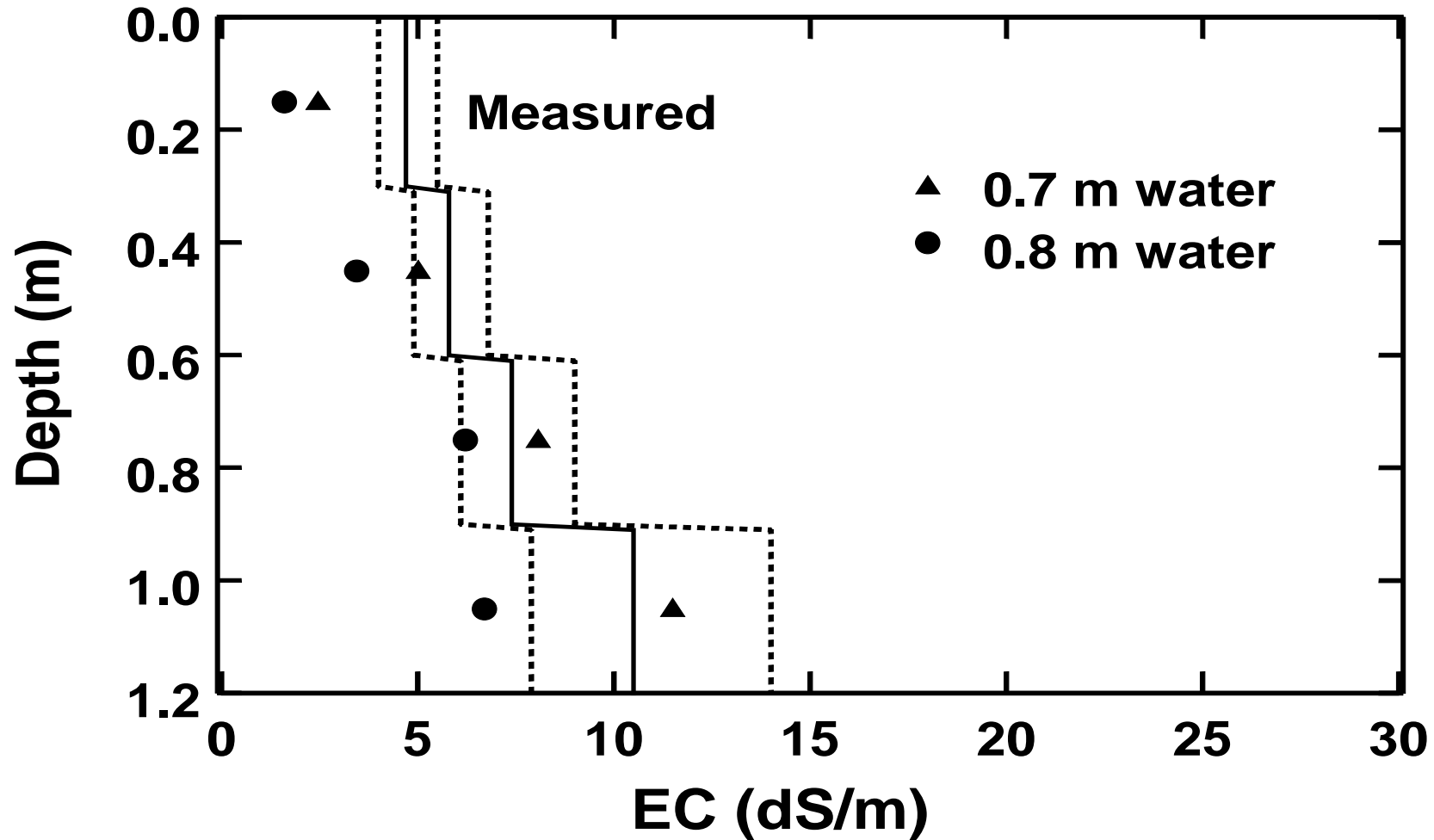
0.9 - 1.2 m

Suarez, D.L. 2001. Sodic soil reclamation: Modeling and field study. Aust. J. Soil Res. 39:1225-1246

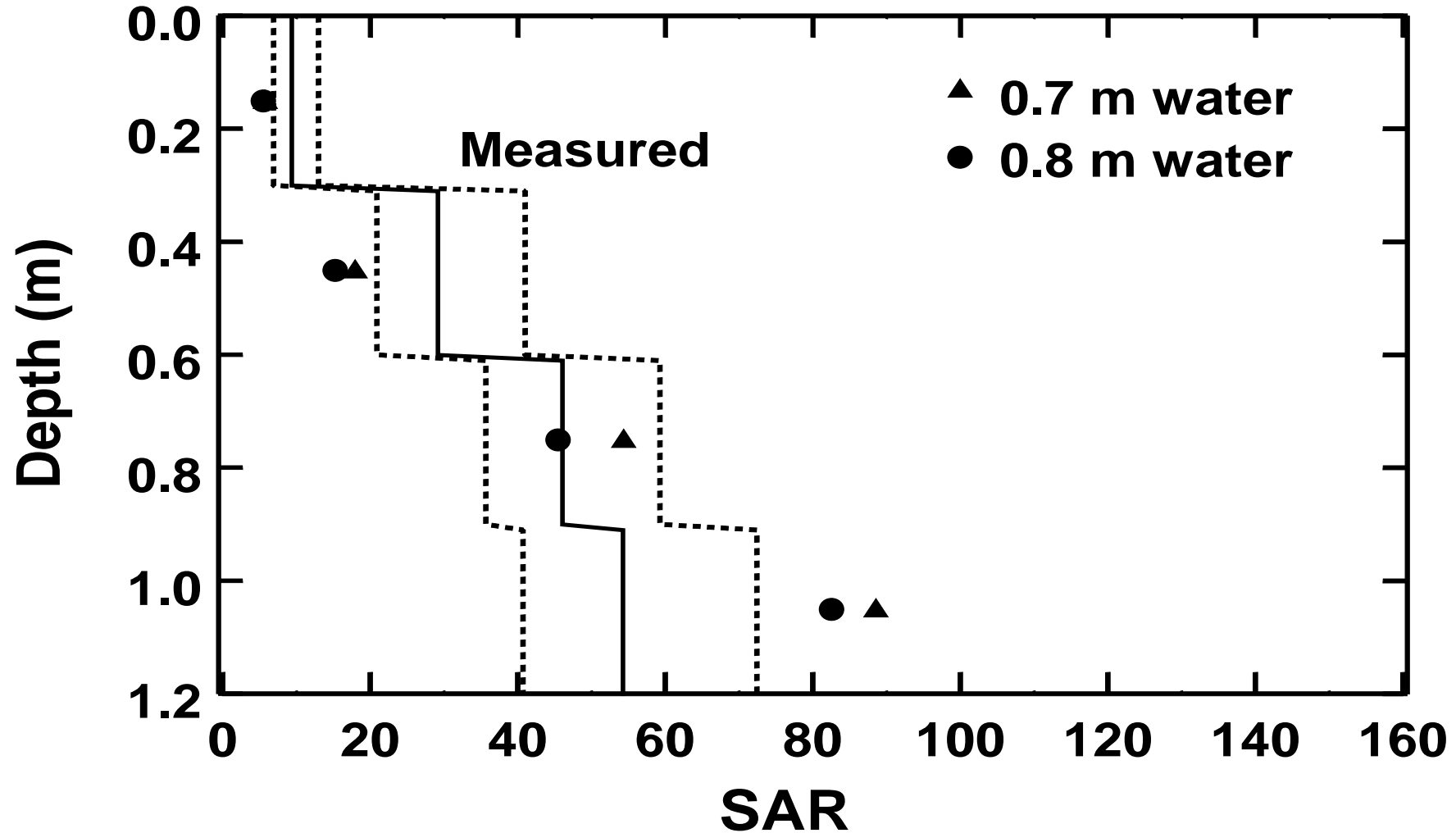


Suarez, D.L. 2001. Sodic soil reclamation: Modeling and field study. *Aust. J. Soil Res.* 39:1225-1246

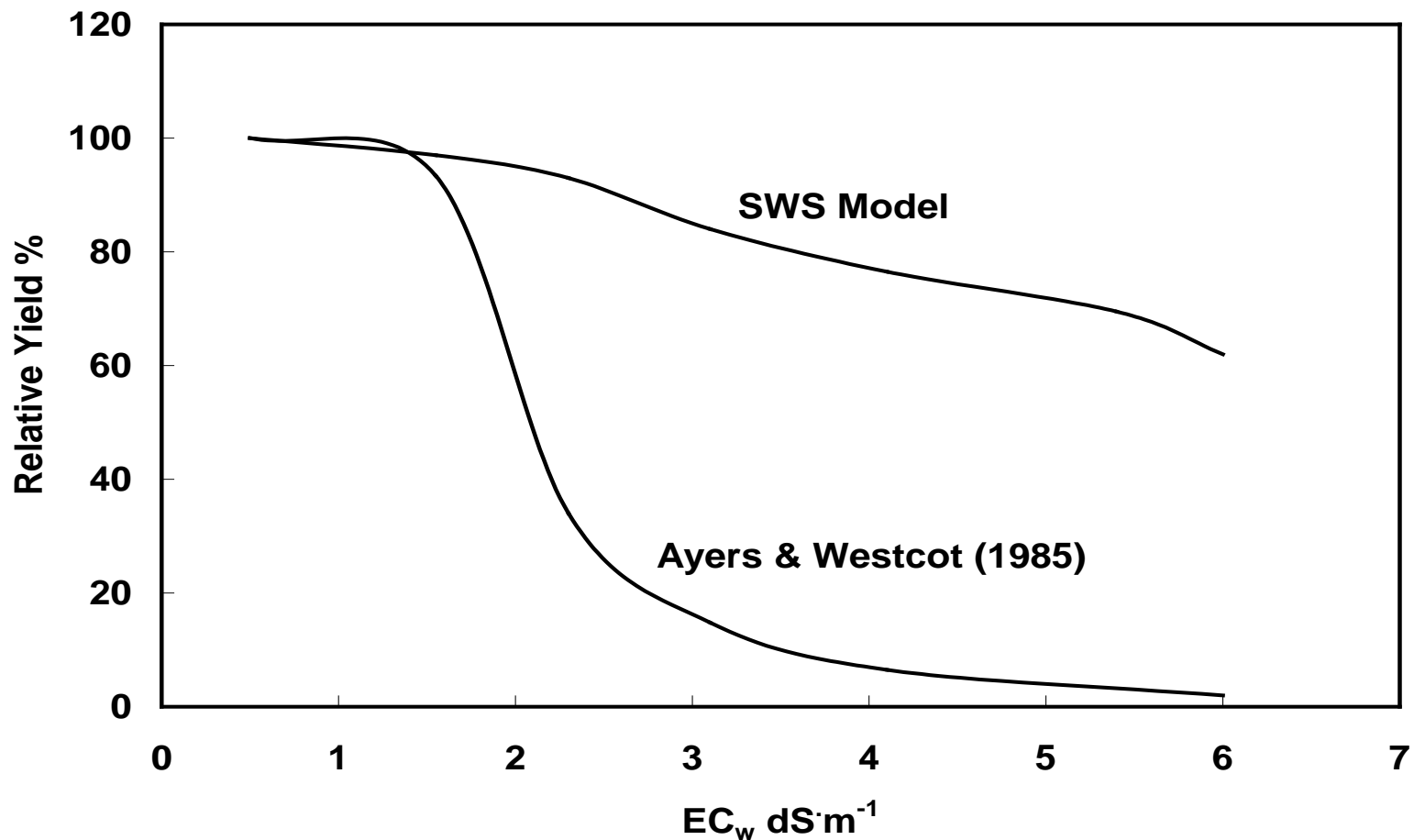




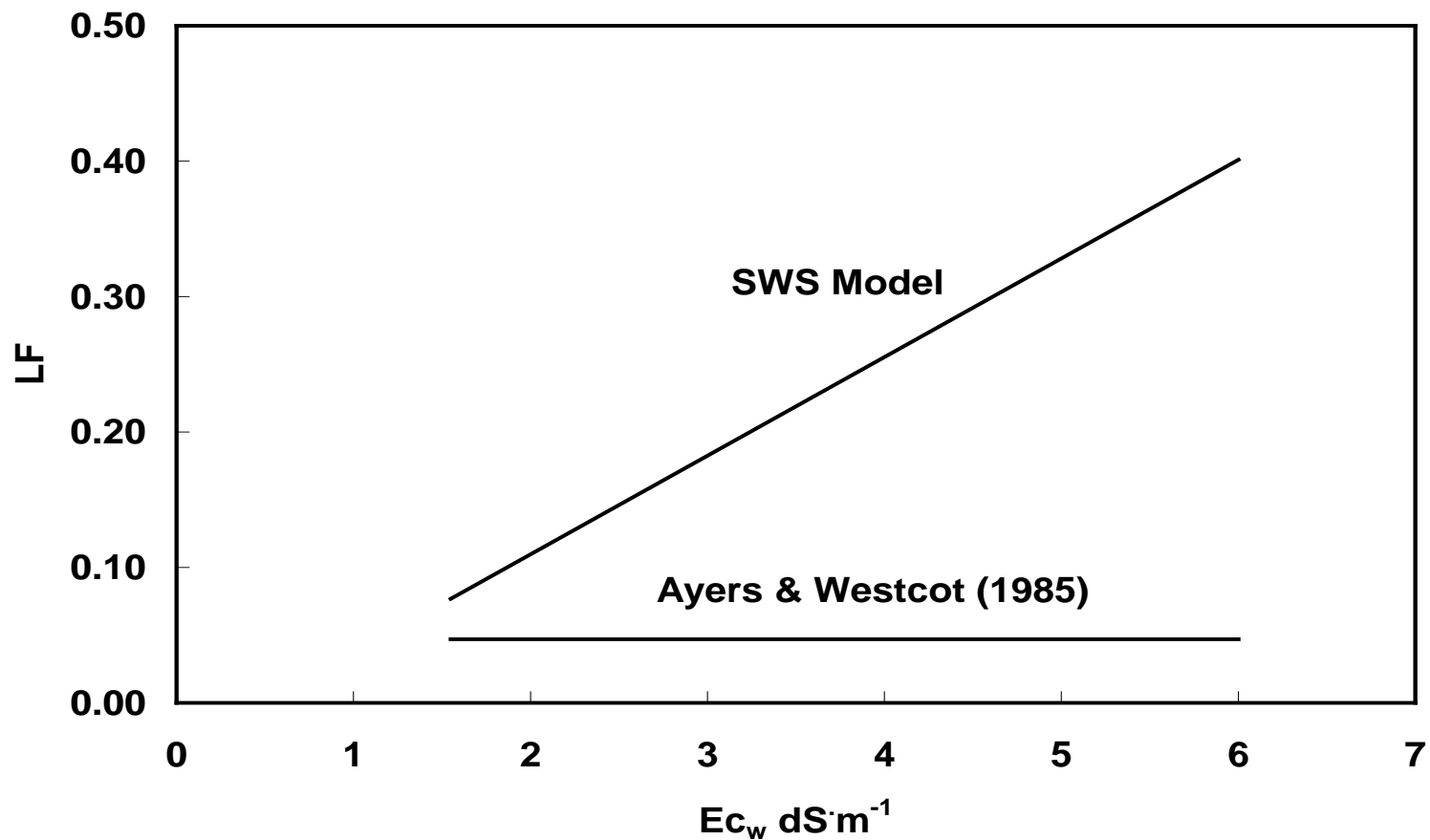
Suarez, D.L. 2001. Sodic soil reclamation: Modeling and field study. *Aust. J. Soil Res.* 39:1225-1246



Suarez, D.L. 2001. Sodic soil reclamation: Modeling and field study. Aust. J. Soil Res. 39:1225-1246

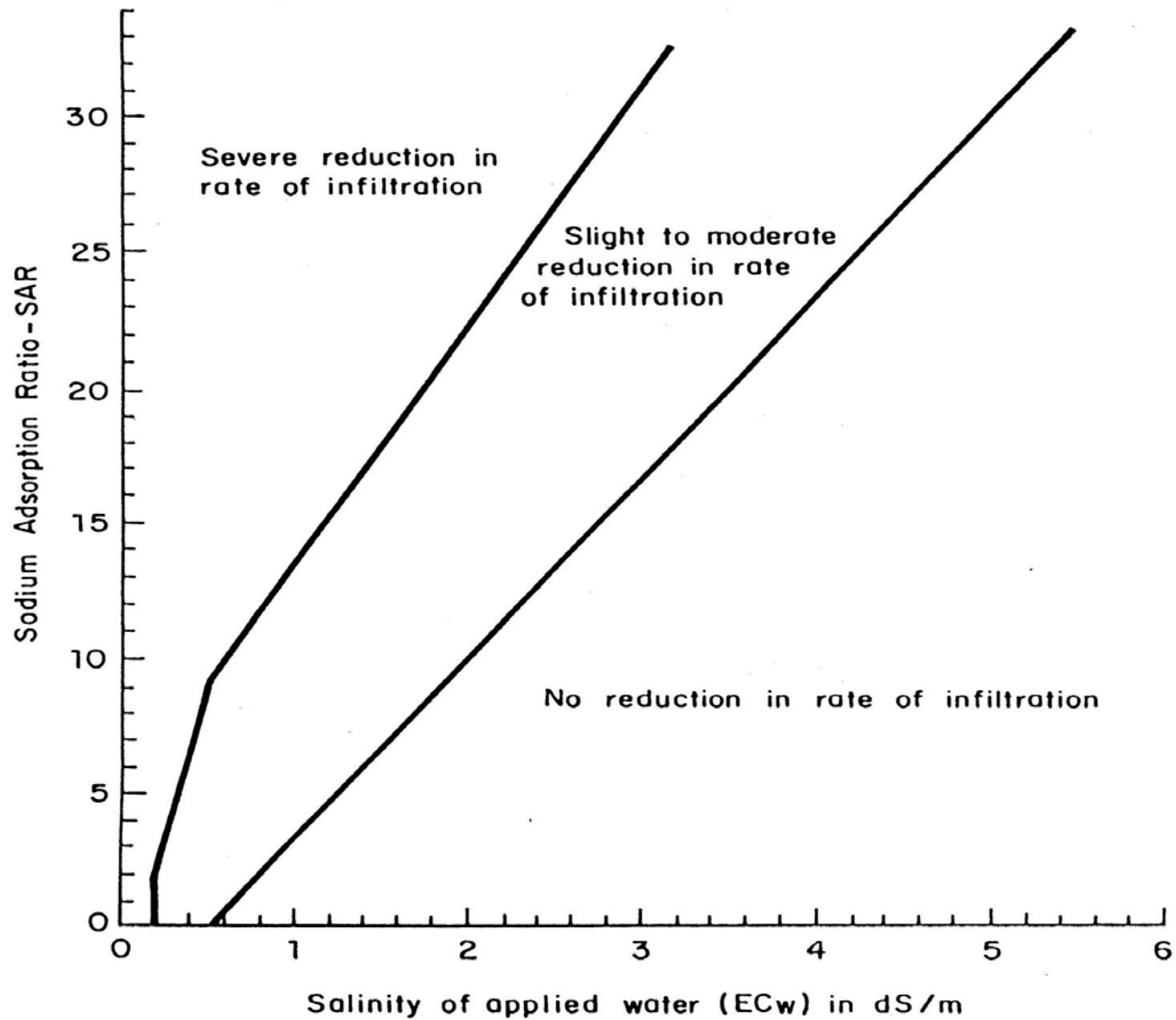


Comparison of SWS model and Ayers and Westcot (1985) predicted crop relative yield as related to irrigation water EC, for a crop with an $h_{50} = -50$ m (-0.5 MPa), $ET_p = 200$ cm and 209 cm applied water.



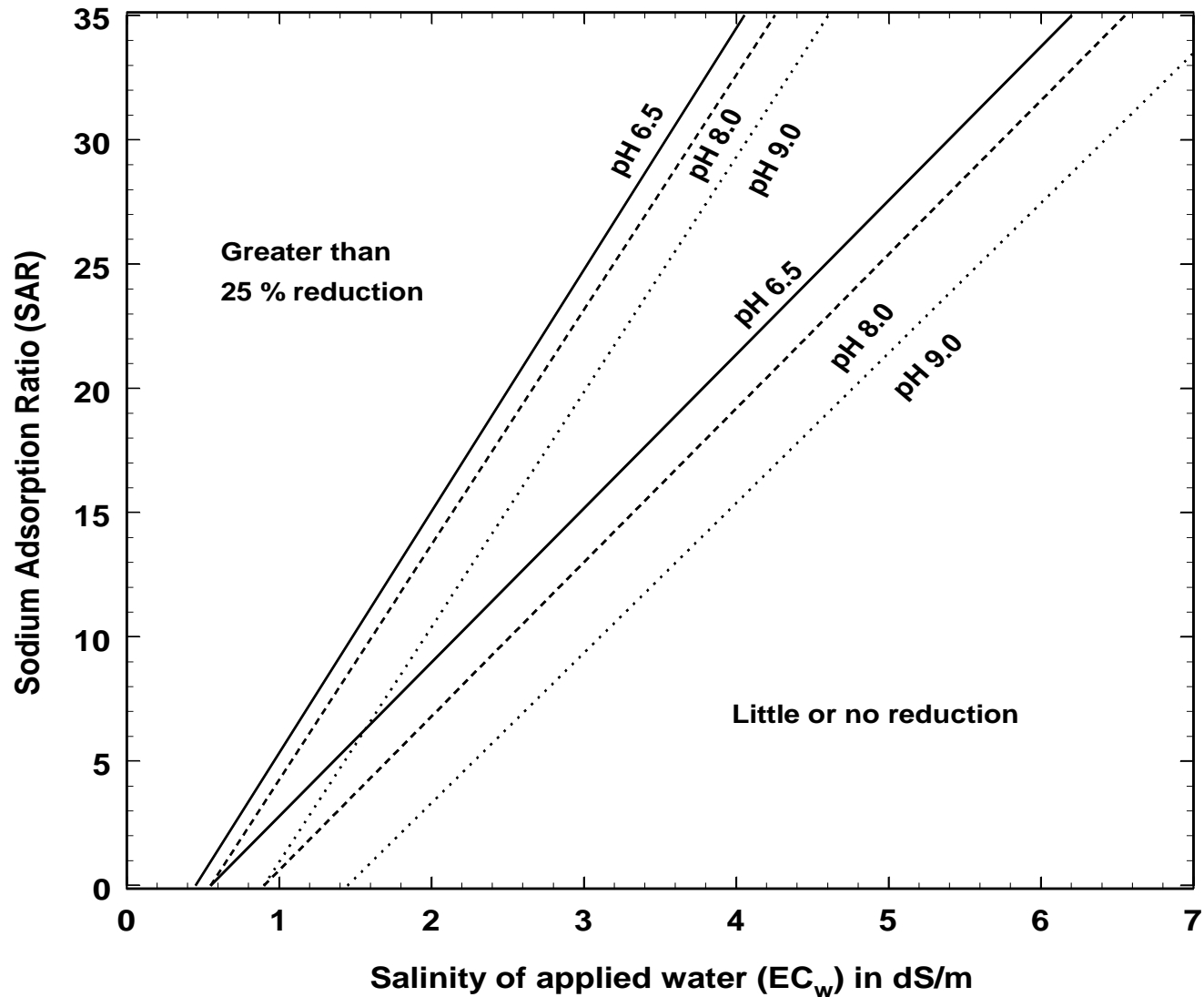
Comparison of SWS model and Ayers and Westcot (1985) predicted leaching fraction as related to irrigation water EC, for a crop with an $h_{50} = -50$ m (-0.5 MPa) salt tolerance value, $ET_p = 200$ cm and 209 cm applied water.

Suarez, D.L. 2010. Extent of global salinization and management options for sustainable crop production. Proceedings of the International Conference on Soils and Groundwater Salinization in Arid Regions. Muscat, Sultanate of Oman. Pages 1-7.

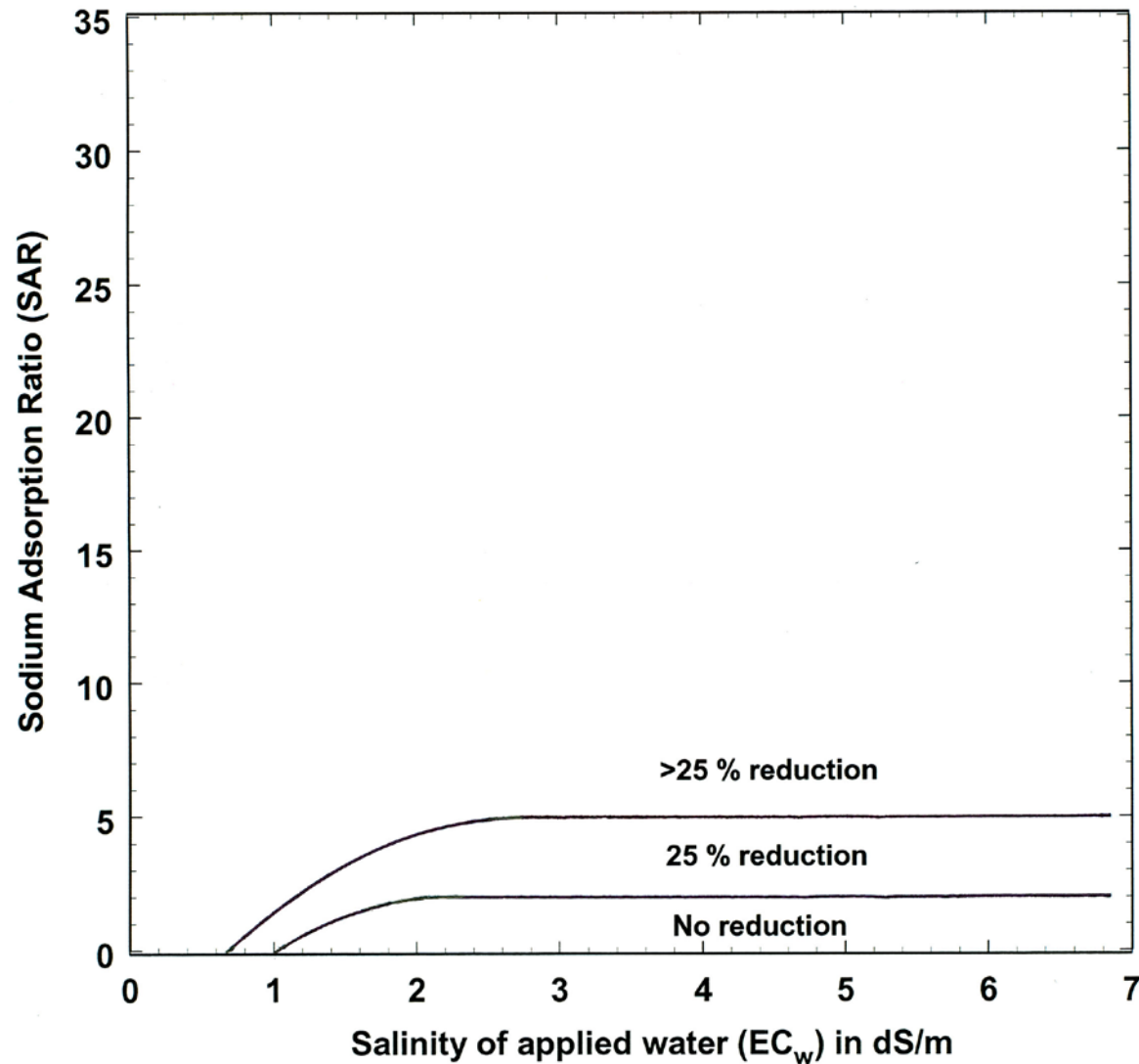


Ayers, R.S., and D.W. Westcot. 1985. Water Quality for Agriculture. FAO Irrigation and Drainage Paper 29 rev. 1 FAO Rome.





Suarez, D.L. 2010. Irrigation water quality Assessments. In: K.K. Tanji and W.W. Wallender (eds.) ASCE Manual and Reports on Engineering Practice No. 71 Agricultural Salinity Assessment and Management (2nd Ed). ASCE, New York, NY. (In press). Chapter 11



Suarez, D.L. 2010. Irrigation water quality Assessments. In: K.K. Tanji and W.W. Wallender (eds.) ASCE Manual and Reports on Engineering Practice No. 71 Agricultural Salinity Assessment and Management (2nd Ed). ASCE, New York, NY. (In press). Chapter 11