

75 years of irrigation along the Lower Vaal River and tributaries in South Africa: major management interventions and current impacts on natural resources



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INTRODUCTION

Natural resources

- **Rainfall**

495 mm compared to a global average of 860 mm

- **Dryland**

14.3 mil ha

7 mil ha- med pot

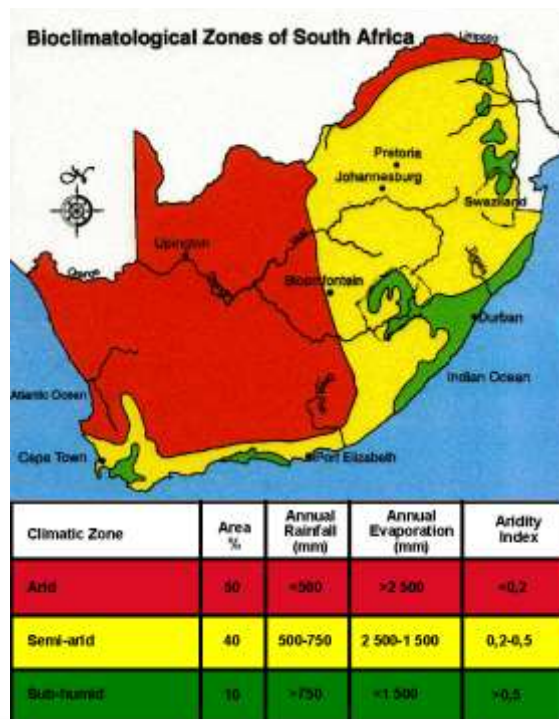
4.1 mil ha low pot

- **Irrigation**

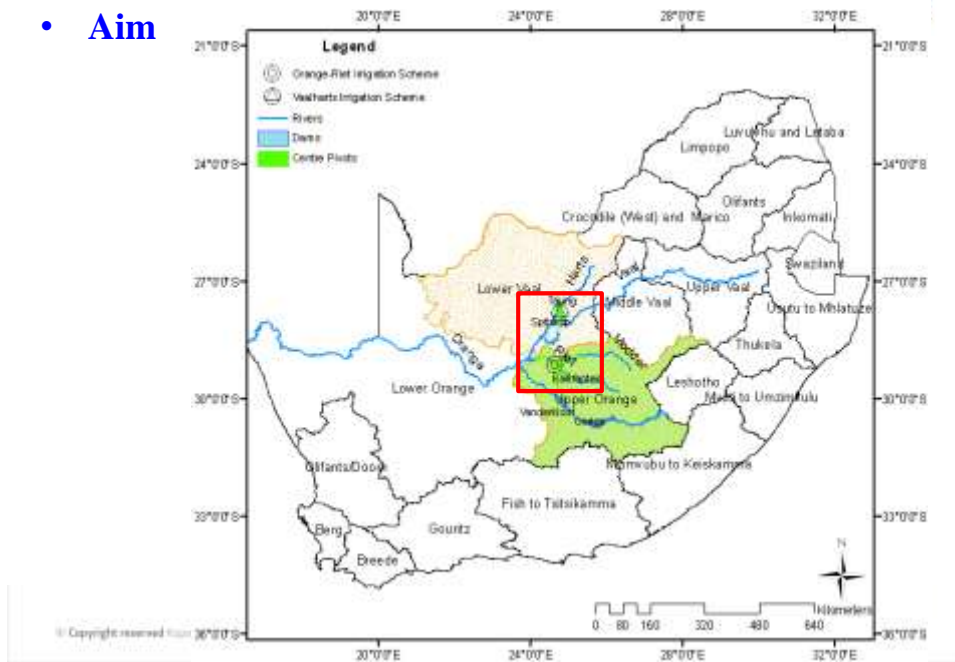
1.5 mil ha

- **Water management structure**

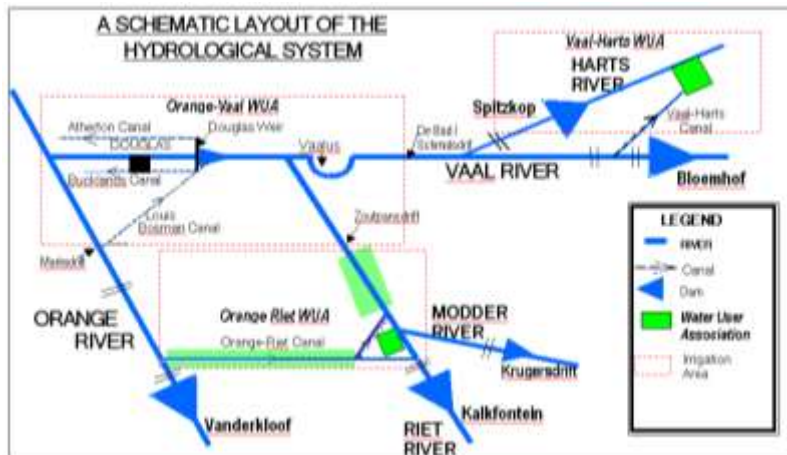
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- Water management structure
- Aim



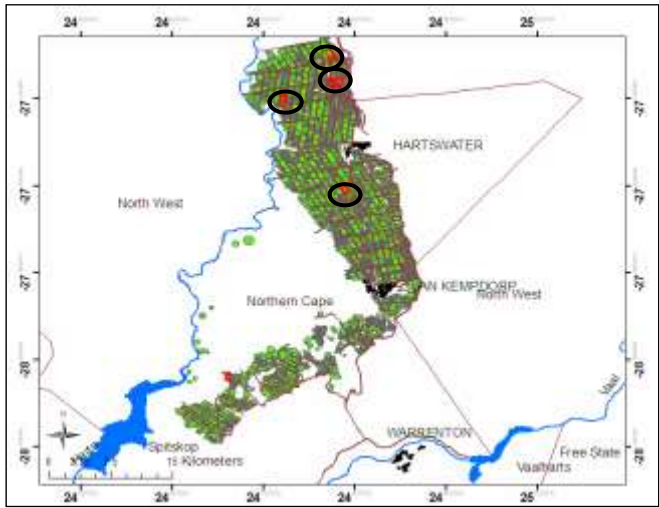
Lower Vaal and tributaries



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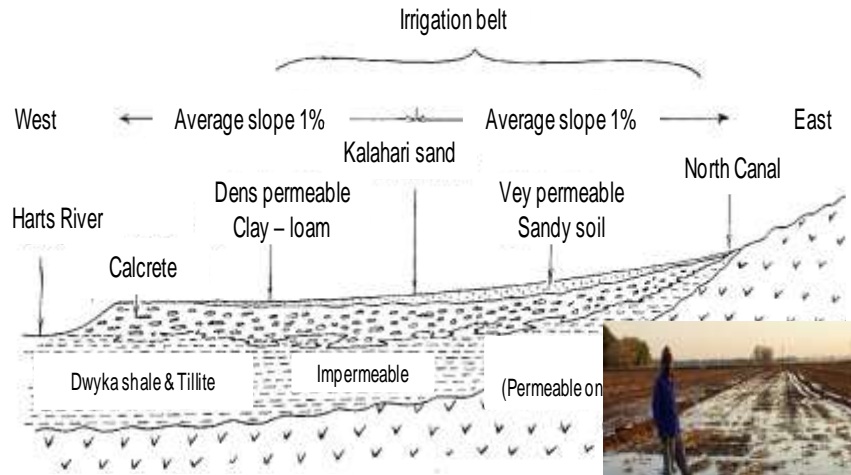
Vaalharts



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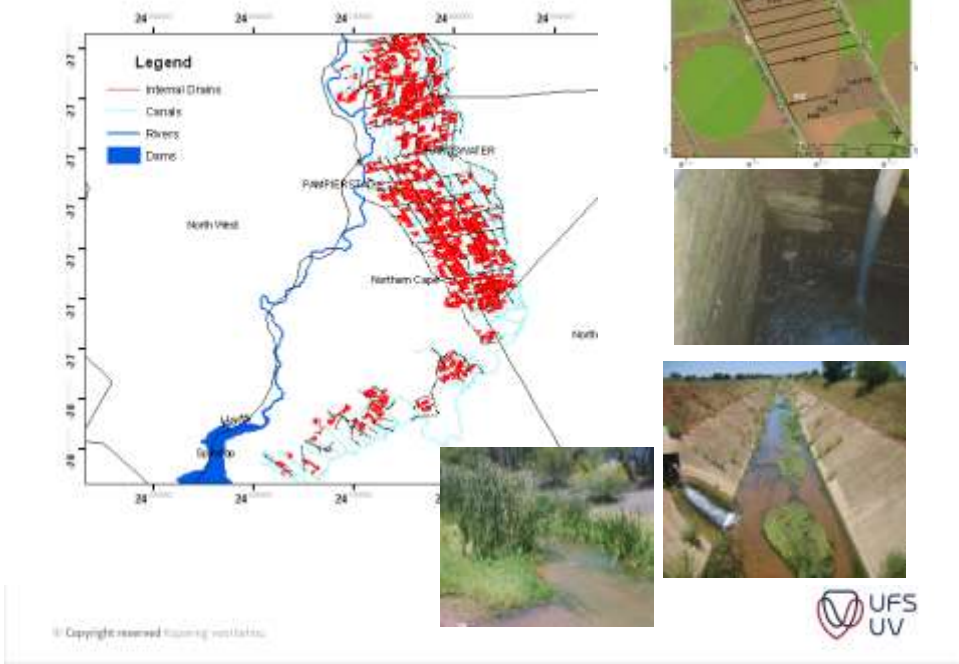


Vaalharts: Resource related research



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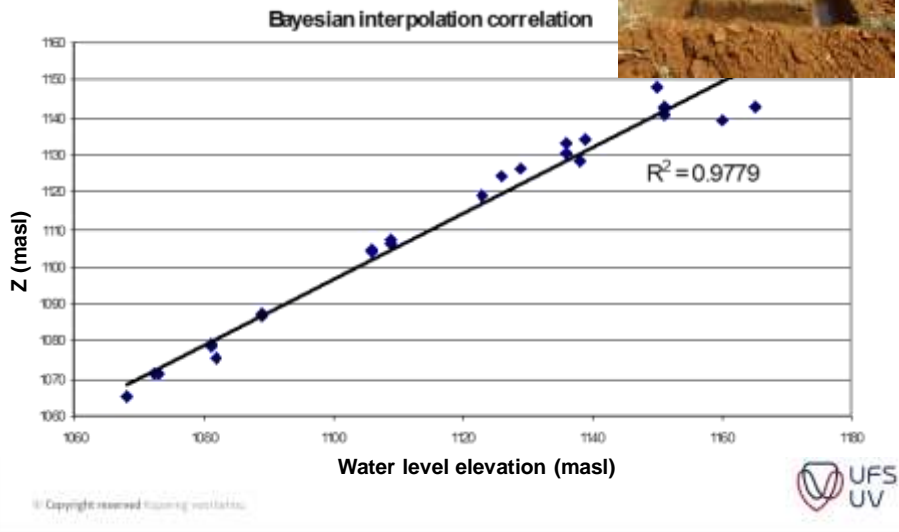
Vaalharts: 1st major interventions



Vaalharts: 2nd major intervention



Vaalharts: Rise of water table levels



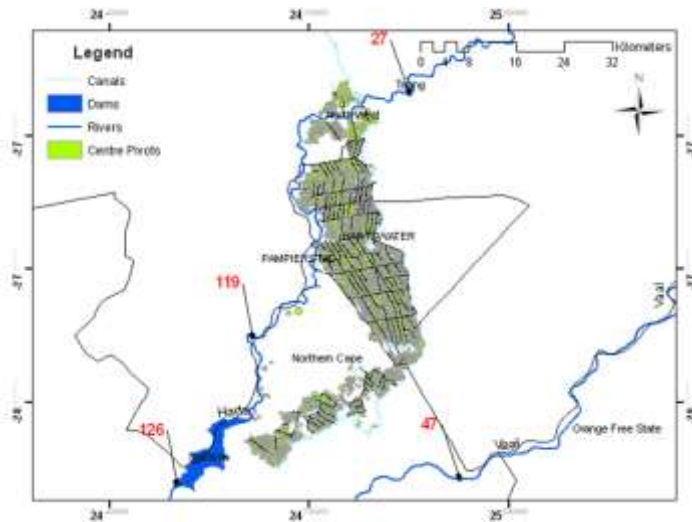
Vaalharts: 3^{de} Major interventions (5-7 year



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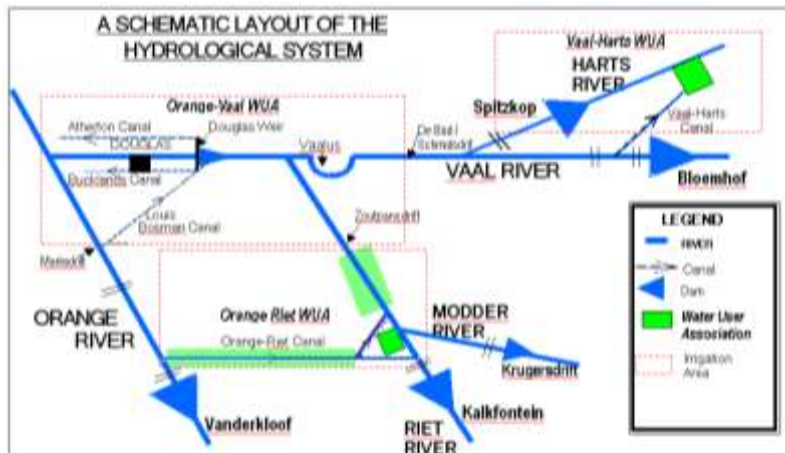
Impact of irrigation: water quality of rivers (du Preez et al., 2000)



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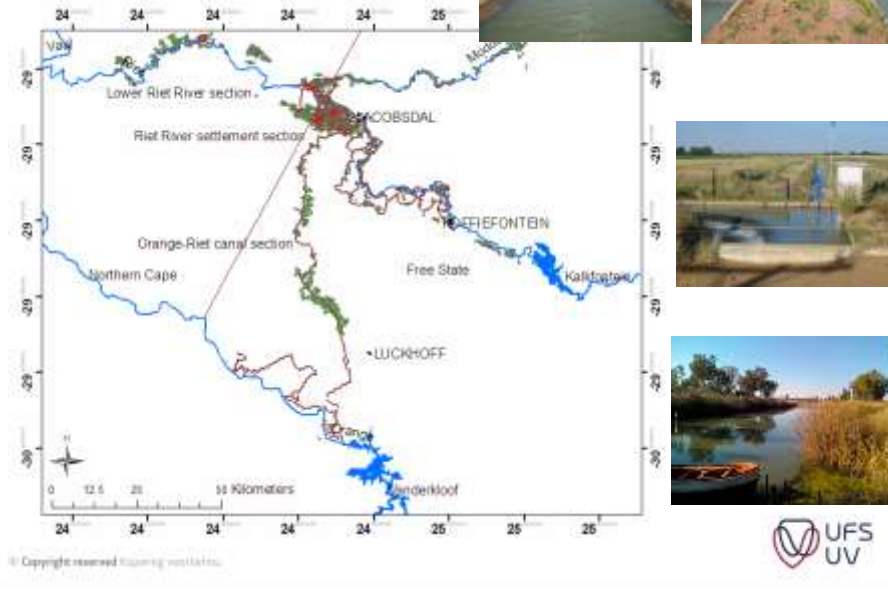
Lower part of the Lower Vaal River system



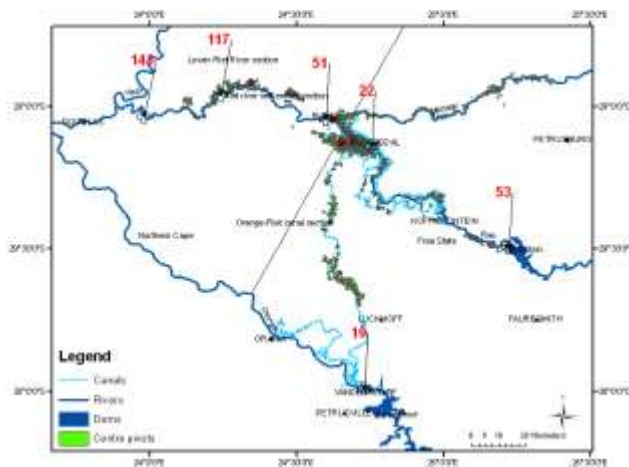
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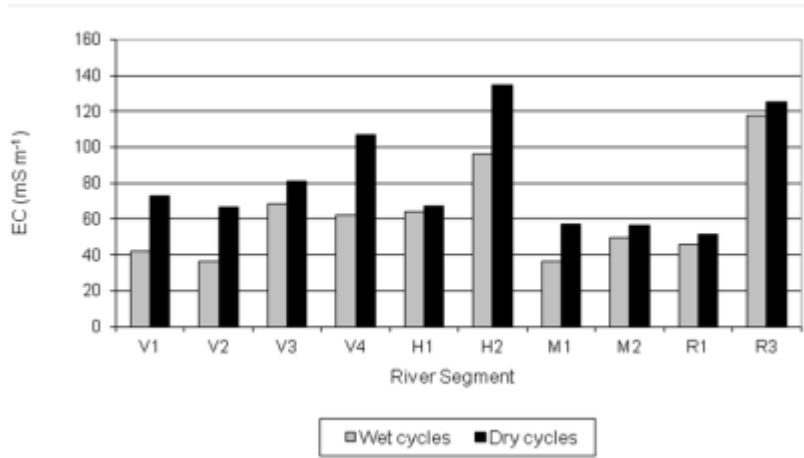
Major interventions



Impact of irrigation: water quality of rivers (du Preez et al., 2000)



Impact of irrigation: water quality of rivers (du Preez et al., 2000)



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Impact of irrigation: soils du Preez et al., 2000; Le Roux et al., 2006)

Virgin soils: > 4 ton salts / ha

Irrigation removed salts



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Impact of irrigation: soils (du Preez et al., 2000)

Virgin soils: < 4 ton salts / ha

Irrigation accumulated salts

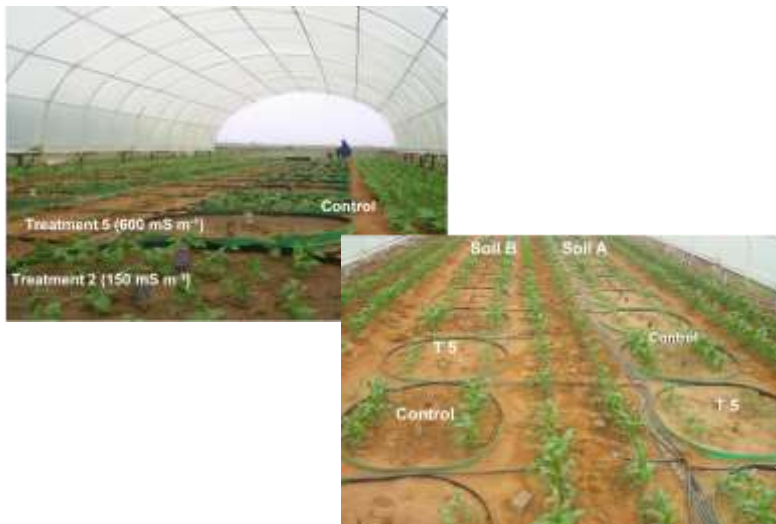


1.3 – 9 times more than virgin soils: linked to soil types and I & D systems

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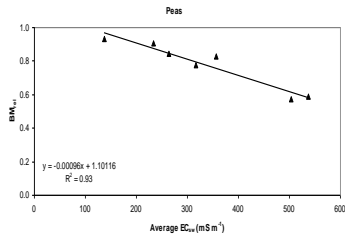
Impacts of irrigation: crops Ehlers et al., 2010



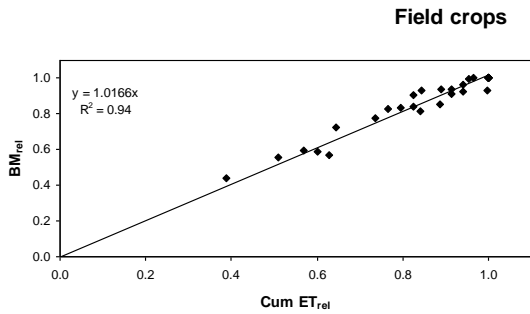
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Impacts of irrigation: crops Ehlers et al., 2010



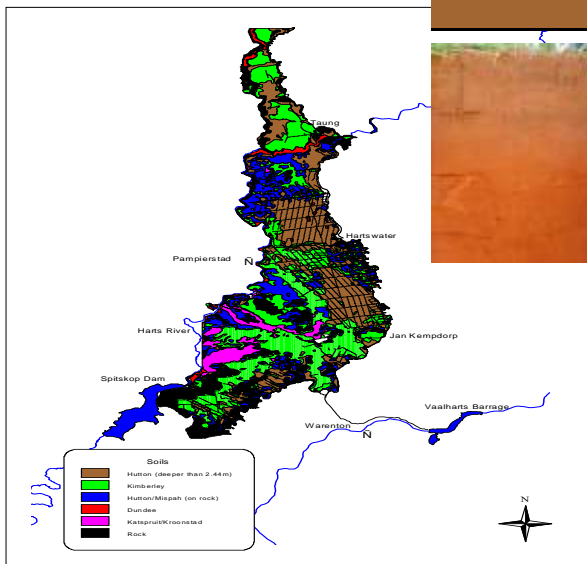
Peas



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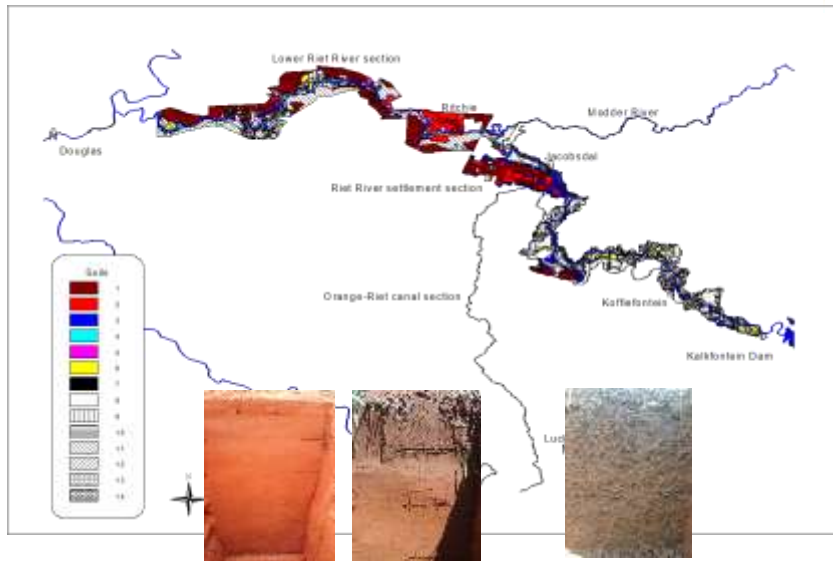
Vaalharts soils



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Orange-Riet



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Conclusion

- Protection of natural resources



- Field scale interventions:
 - irrigation scheduling
 - site specific salt monitoring in crop lands

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