

## TABLE OF CONTENTS

1. INTRODUCTION .....	1
1.1. <i>Background</i> .....	1
1.2. <i>Objectives</i> .....	3
2. SYSTEM DEVELOPMENT .....	4
2.1. <i>Overview</i> .....	4
2.2. <i>The MyCanesim system user interface</i> .....	8
2.3. <i>System control module</i> .....	12
2.4. <i>Reply path</i> .....	14
2.5. <i>System performance</i> .....	14
3. SYSTEM IMPLEMENTATION .....	16
3.1. <i>Introduction</i> .....	16
3.2. <i>Background of two small-scale irrigation schemes</i> .....	16
3.3. <i>Weather data</i> .....	19
3.4. <i>Soil data</i> .....	20
3.5. <i>Participation by farmers and extension</i> .....	20
3.5.1. <i>Introduction</i> .....	20
3.5.2. <i>Workshops and meetings</i> .....	22
3.6. <i>Extension support</i> .....	27
3.7. <i>Challenges</i> .....	32
3.8. <i>Conclusion</i> .....	35
4. FIELD EVALUATION .....	37
4.1. <i>Introduction</i> .....	37
4.2. <i>Methods</i> .....	37
4.2.1. <i>Measurements</i> .....	37
4.2.2. <i>Simulations</i> .....	39
4.3. <i>Pongola results</i> .....	41
4.3.1. <i>Rainfall and irrigation input data</i> .....	41
4.3.2. <i>Simulation accuracy: Soil water balance</i> .....	44
4.3.3. <i>Simulation accuracy: Canopy cover</i> .....	53
4.3.4. <i>Simulation accuracy: Yield</i> .....	55
4.3.5. <i>Observed crop growth</i> .....	56
4.3.6. <i>Advice validity</i> .....	59
4.3.7. <i>Farmer adoption of advice</i> .....	60
4.4. <i>Makhathini</i> .....	62
4.4.1. <i>Rainfall and irrigation input data</i> .....	62
4.4.2. <i>Simulation accuracy: Soil water balance</i> .....	62
4.4.3. <i>Simulation accuracy: Canopy cover</i> .....	67
4.4.4. <i>Simulation accuracy: Yield</i> .....	69
4.4.5. <i>Observed crop growth</i> .....	69
4.4.6. <i>Adoption of advice</i> .....	71
4.5. <i>Conclusions</i> .....	72
5. EVALUATION AT SCHEME LEVEL .....	74
5.1. <i>Introduction</i> .....	74
5.2. <i>Results and discussion</i> .....	74
5.3. <i>Conclusion</i> .....	77
6. FARMER SURVEY .....	78
6.1. <i>Introduction</i> .....	78
6.2. <i>Method</i> .....	78
6.3. <i>Results</i> .....	79
6.4. <i>Conclusions</i> .....	83
7. FEASIBILITY OF IMPLEMENTING AN OPERATIONAL IRRIGATION ADVISORY SERVICE .....	84

7.1.	<i>Introduction</i> .....	84
7.2.	<i>Method</i> .....	84
7.2.1.	Service impact assumptions used by Fourie and Grové (2008).....	84
7.2.2.	Service impact assumptions for follow up analysis .....	85
7.2.3.	Service implementation options .....	85
7.2.4.	Subscription scenarios .....	86
7.3.	<i>Results from by Fourie and Grové (2008)</i> .....	86
7.4.	<i>Results from follow up analysis</i> .....	87
7.5.	<i>Conclusion</i> .....	89
8.	<b>CONCLUSIONS</b> .....	90
8.1.	<i>System development</i> .....	90
8.2.	<i>System implementation: Pongola</i> .....	90
8.3.	<i>System implementation: Makhathini</i> .....	92
8.4.	<i>Farmer survey</i> .....	93
8.5.	<i>Economic feasibility study</i> .....	93
8.6.	<i>General</i> .....	93
9.	<b>RECOMMENDATIONS</b> .....	96
10.	<b>REFERENCES</b> .....	97
11.	<b>APPENDIX</b> .....	99
11.1.	<i>MyCanesim system components</i> .....	99
11.2.	<i>Report on farmer meetings held in 2006</i> .....	104
11.2.1.	Pongola.....	104
11.2.2.	Makhathini .....	107
11.2.3.	Conclusions .....	110
11.3.	<i>Extension reports</i> .....	110
11.3.1.	Mr Nene .....	110
11.3.2.	Mrs Simelane.....	112
11.4.	<i>Information sheet for demonstration field day held on 5 September 2007</i> .....	114
11.5.	<i>Questionnaire for farmer survey</i> .....	116
11.6.	<i>Economic feasibility study report</i> .....	127
11.7.	<i>Publications</i> .....	150
11.7.1.	Scientific publications .....	150
11.7.2.	Conference papers .....	150
11.7.3.	Popular media.....	150
11.8.	<i>Capacity building</i> .....	151
11.8.1.	Farmers .....	151
11.8.2.	Extension staff .....	151
11.8.3.	Researchers and technicians .....	151