

**GUIDELINES FOR PLANNING AND DESIGN OF
SMALL WATER TREATMENT PLANTS
FOR RURAL COMMUNITIES, WITH SPECIFIC
EMPHASIS ON SUSTAINABILITY AND
COMMUNITY INVOLVEMENT AND PARTICIPATION**

TABLE OF CONTENTS

Executive summary

Acknowledgements

CHAPTER 1	Page
INTRODUCTION	
1.1 Need for guidelines for planning and design of small water treatment plants	1.1
1.2 Aims of the project	1.2
1.3 Intended use of guidelines document	1.2
1.4 Workshop on Sustainability of Small Water Systems in Southern Africa	1.2
1.5 Lay-out of the document	1.3
 CHAPTER 2	
OVERVIEW OF SMALL WATER SYSTEMS IN SOUTH AFRICA: PROBLEMS AND NEEDS	
<i>EXCERPTS FROM PAPERS PRESENTED AT THE WORKSHOP ON SUSTAINABILITY OF SMALL WATER SYSTEMS IN SOUTHERN AFRICA</i>	
2.1 Why modern technology cannot ensure the sustainability of small water systems by itself (<i>M Marler, Development Bank of Southern Africa</i>)	2.1
2.2 The sustainability of community water supply and sanitation systems: A recipe for success? (<i>J Rivett-Carnac, National Community Water and Sanitation Institute</i>)	2.5
2.3 Investigation of small water systems treatment practices and technologies in South Africa (<i>CD Swartz, Chris Swartz Water Utilization Engineers</i>)	2.7
2.4 Critical components for sustainable small water treatment systems (<i>CD Swartz, Chris Swartz Water Utilization Engineers</i>)	2.16
2.5 Planning, design and operation of small water systems (<i>P Thompson, Umgeni Water</i>)	2.22

CHAPTER 3 COMMUNITY NEEDS AND EXPECTATIONS FOR SMALL WATER TREATMENT SYSTEMS

3.1	Introduction	3.1
3.2	Delivery crisis	3.1

CHAPTER 4 GUIDELINES FOR COMMUNITY INVOLVEMENT AND PARTICIPATION

4.1	Experience and current policy trends internationally	4.1
4.2	Community participation	4.5
4.3	The importance of institutional arrangements	4.13
4.4	The importance of operation and maintenance	4.22
4.5	Village case studies	4.28
4.6	A matrix of evaluation and monitoring village water schemes	4.33
4.7	Salient points	4.38

CHAPTER 5 INSTITUTIONAL ASPECTS EXCERPTS FROM PAPERS PRESENTED AT THE WORKSHOP ON SUSTAINABILITY OF SMALL WATER SYSTEMS IN SOUTHERN AFRICA

5.1	Institutional arrangements for sustainable rural water schemes (<i>B Netshiswinzhe, Mvula Trust</i>)	5.1
5.2	Institutional framework for Water Services provision in rural areas (<i>A Vermeulen, Dept. of Water Affairs and Forestry</i>)	5.8
5.3	Support Services Agents: Their role in achieving sustainability of Rural water schemes (<i>DA Stephen, Umgeni Water</i>)	5.19

CHAPTER 6 TECHNOLOGICAL CONSIDERATIONS FOR PLANNING AND DESIGN OF SMALL WATER TREATMENT SYSTEMS

6.1	Introduction	6.1
6.2	Legal considerations	6.2
6.3	Water quality	6.3
6.4	Choice of a treatment system	6.9
6.5	Summary of treatment technologies for small water treatment systems	6.10
6.6	Process selection	6.30
6.7	Procedure for establishing a water purification works	6.32
6.8	Water supply under emergency conditions	6.34

CHAPTER 7 INDIGENOUS WATER TREATMENT TECHNOLOGIES

7.1	Introduction	7.1
7.2	Absorbents and weighting agents	7.2
7.3	Natural polyelectrolytes	7.2
7.4	Nirmali seeds	7.3
7.5	Moringa oleifera seeds	7.3
7.6	Chitosan	7.4

CHAPTER 8 DESIGN GUIDELINES FOR SMALL WATER TREATMENT SYSTEMS FOR RURAL COMMUNITIES

8.1	Pre-treatment	8.2
8.2	Coagulation and flocculation	8.2
8.3	Sedimentation	8.5
8.4	Filtration	8.8
8.5	Disinfection	8.14
8.6	Stabilisation	8.16

References

APPENDICES

Appendix A: Workshop on the Sustainability of Small Water Systems in Southern Africa

Appendix B: Checklist for design of water treatment plants

Appendix C: List of South Africa Guideline Documents and Publications on Drinking Water Treatment