

# Contents

Preface	vii
Acknowledgements	ix
Introduction	1
Objective of this publication	2
How to use this publication	3
<hr/>	
<b>Part 1. The systems approach to management</b>	<b>5</b>
<hr/>	
Chapter 1. Organizational systems	7
Chapter 2. The operational system	11
Definition	11
Objectives	11
Component elements	12
Chapter 3. Subsystems of the operational system	14
Design and construction management subsystem	14
Water and sanitation operation subsystem	16
Installations and equipment maintenance subsystem	20
<hr/>	
<b>Part 2. Management of operation and maintenance</b>	<b>23</b>
<hr/>	
Chapter 4. Management levels	25
Senior management	25
Middle management	28
Operational management	30
Relationship between management levels and agency functions	33
<hr/>	
<b>Part 3. Planning and control of operation and maintenance</b>	<b>37</b>
<hr/>	
Chapter 5. Loss control programme	39
Reducing loss of water	39
Objectives of a loss control programme	42
Component projects	43

<b>Chapter 6. Water loss control projects of the operational system</b>	<b>44</b>
Network survey	44
Macrometering	46
Leakage control	47
Mapping and inventory of pipes and fittings in the water supply system	49
Improvement of house connections	49
Controlling the operation of the water supply system	50
Water demand	51
Electromechanical maintenance and instrumentation	51
Maintenance of distribution networks	53
Review of design and construction criteria	54
<b>Chapter 7. Water loss control projects of other organizational systems</b>	<b>55</b>
Projects of the commercial system	55
Projects of the human resources administration and development system	56
Projects of the administration support system	56
<b>Chapter 8. Programme for the control of the production and quality of drinking-water</b>	<b>58</b>
Definition	58
Objectives	58
Projects	59
<b>Chapter 9. Programme for the operation and maintenance of sewage collection, treatment, re-use and disposal</b>	<b>63</b>
Objective	63
Projects	63
<hr/>	
<b>Part 4. Information systems</b>	<b>71</b>
<hr/>	
<b>Chapter 10. The basis for management decision-making</b>	<b>73</b>
Centres of decision	73
Management indicators	74
<b>Chapter 11. Decision support systems</b>	<b>82</b>
<b>Chapter 12. Management decisions</b>	<b>85</b>
Budget preparation	85
Staffing and equipment	85
Materials and services	85
Evaluation of productivity	86

---

<b>Part 5. Implementation</b>	<b>87</b>
<b>Chapter 13. Establishing a functional organizational structure</b>	<b>89</b>
Defining an organizational structure	90
Implementing a functional organizational structure	91
<b>Chapter 14. Developing human resources</b>	<b>93</b>
Objective	93
Activities	93
Staff training	95
<b>Chapter 15. Developing a management information system for operation and maintenance</b>	<b>96</b>
Objective	96
Activities	96
<b>Chapter 16. Organizing the programmes</b>	<b>98</b>
Functional structure	98
Tasks	99
Implementation by agencies	100
<b>Selected further reading</b>	<b>101</b>