

# TABLE OF CONTENTS

|  |      |
|--|------|
| ACKNOWLEDGMENT                                 | i    |
| ABSTRACT                                       | ii   |
| TABLE OF CONTENTS                              | iv   |
| LIST OF TABLES                                 | vii  |
| LIST OF FIGURES                                | viii |
| LIST OF ABBREVIATIONS                          | x    |
| <br>CHAPTER 1 INTRODUCTION                     |      |
| 1.1 Background                                 | 1    |
| 1.2 Problem Definition                         | 3    |
| 1.3 Objectives of the Study                    | 5    |
| 1.4 Research Approach                          | 5    |
| <br>CHAPTER 2 GENERAL FEATURES OF BNABLUS AREA |      |
| 2.1 Nablus through Ages                        | 7    |
| 2.2 Location                                   | 8    |
| 2.3 Population                                 | 9    |
| 2.4 Climate                                    | 10   |
| 2.5 Water Resources                            | 10   |
| 2.6 Water Consumption and Demand               | 11   |
| 2.7 Infrastructural Services                   | 12   |
| <br>CHAPTER 3 LITERATURE REVIEW                |      |
| 3.1 Introduction                               | 13   |
| 3.2 Factors Affecting Water Use                | 13   |
| 3.2.1 Economic Factors                         | 13   |
| 3.2.2 Physical Factors                         | 17   |
| 3.2.3 Social Factors                           | 18   |
| 3.2.4 Technological Factors                    | 20   |
| 3.2.5 Geographical Factors                     | 22   |

|  |    |
|--|----|
| 3.2.6 Factors Related to Cultural Tradition and Religion                               | 23 |
| 3.3 Water Demand Modeling Approaches   | 23 |
| 3.3.1 Historical Extrapolation   | 24 |
| 3.3.2 Statistical Technique  | 24 |
| 3.3.3 Engineering Approach   | 28 |
| 3.3.4 Choice of Modeling Approach  | 30 |
| 3.4 Hypothesis Tests   |    |
| 3.4.1 Classification of Hypothesis Tests   | 31 |
| 3.4.2 Structure of Hypothesis Tests  | 34 |
| 3.5 Sampling Methods   | 35 |
| 3.5.1 Probability Sampling   | 36 |
| 3.5.2 Cluster Sampling   | 37 |
| 3.6 Sample Size  | 38 |
| 3.7 Previous Studies   | 39 |
| <br>CHAPTER 4 DATA COLLECTION AND ANALYSIS   |    |
| 4.1 Introduction   | 41 |
| 4.2 Questionnaire Design   | 41 |
| 4.3 Field Survey   | 43 |
| 4.4 Measurement of Water Consumption   | 44 |
| 4.5 Data Analysis  | 45 |
| 4.6 Statistical Analysis and Results   | 45 |
| 4.6.1 First Model: Water Consumption Model for Nablus City                             | 47 |
| 4.6.2 Second Model: Water Consumption Model for Villages<br>Related to Nablus City     | 51 |
| 4.6.3 Third Model: Water Consumption Model for Camps<br>Related to Nablus City         | 56 |
| 4.6.4 Fourth Model: Water Consumption Model for Service<br>Area of Nablus Municipality | 59 |

CHAPTER 5 CONCLUSIONS AND RECOMMENDATIONS

|                     |    |
|---------------------|----|
| 5.1 Conclusions     | 78 |
| 5.2 Recommendations | 79 |

LIST OF TABLES

|  |    |
|--|----|
| REFERENCES   | 81 |
| ANNEXES  | 84 |
| ABSTRACT IN ARABIC   | 4  |
| 1.1 Descriptive Statistics   | 46 |
| 1.2 Model Summary for Nablus City (First Model)                                    | 49 |
| 1.3 T-Test Results for First Model (Nablus City)                                   | 50 |
| 1.4 One-Way ANOVA Test for the First Model (Nablus City)                           | 51 |
| 1.5 Model Summary for Villages Related to Nablus City (Second Model)               | 54 |
| 1.6 T-Test Results for the Second Model (Villages Related to Nablus City)          | 55 |
| 1.7 One-Way ANOVA Test for the Second Model (Villages Related to Nablus City)      | 56 |
| 1.8 Model Summary for Camps Related to Nablus City (Third Model)                   | 57 |
| 1.9 T-Test Results for the Third Model (Camps Related to Nablus City)              | 58 |
| 1.10 One-Way ANOVA Test for the Third Model (Camps Related to Nablus City)         | 59 |
| 1.11 Model Summary for the Service Area of Nablus Municipality                     | 64 |
| 1.12 T-Test Results for the Fourth Model (Service Area of Nablus Municipality)     | 65 |
| 1.13 One-Way ANOVA Test for the Fourth Model (Service Area of Nablus Municipality) | 66 |