



Palestinian National Authority
Palestinian Water Authority



السلطة الوطنية الفلسطينية
سلطة المياه الفلسطينية



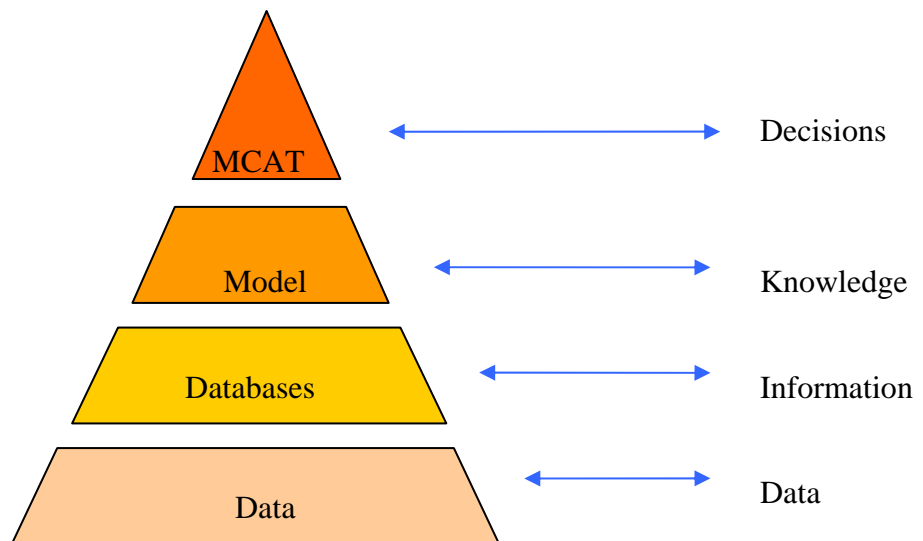
Sustainable Management of the West Bank and Gaza Aquifers

UNIVERSITY OF
NEWCASTLE



Department for
International
Development
DFID

User Guide for SUSMAQ Decision Support Toolkit Software for Sustainability Assessments



SUSMAQ- SUS # 57 V 1.0

July 2005

<p>Disclaimer</p> <p>This report is an output from the SUSMAQ project “Sustainable Management of the West Bank and Gaza Aquifers”. The findings, interpretations and conclusions expressed are those of the authors and should not be attributed to other collaborators on the SUSMAQ project.</p> <p>The project does not guarantee the accuracy of the data included in this publication. Boundaries, colours, denominations and other information shown in maps, figures, tables and the text does not imply any judgment on legal status of territory or the endorsement of boundaries. The typescript of this report has not been prepared in accordance with procedures appropriate to formal printed texts, and the partners and funding agency accept no responsibility for errors.</p>	<p>Contact Details</p> <p>Professor Enda O’Connell Project Director University of Newcastle upon Tyne Tel: +44 (0)191 222 6405 Fax: +44 (0)191 222 6669 Email: P.E.O’Connell@ncl.ac.uk</p> <p>Eng. Fadle Kawash Deputy Chairman Palestinian Water Authority Ramallah, Palestine Tel: +972 (0)2 295 9022 Fax: +972 (0)2 2981341 Email: fkawash@pwa-pna.org</p> <p>Dr. Amjad Aliewi Operations and Technical Manager House of Water and the Environment Al-Irsal Road, Al-Bireh, Palestine Tel: +972 (0)2 240 1776 Fax: +972 (0)2 240 1776 Email: amjad.aliewi@hwe.org.ps</p>
<p>The SUSMAQ Project</p> <p>The aim of the project is to increase understanding of the sustainable yield of the West Bank and Gaza aquifers under a range of future economic, demographic and land use scenarios, and to evaluate alternative groundwater management options. The project is interdisciplinary, bringing together hydrogeologists and groundwater modellers with economists and policy experts. In this way, hydrogeological understanding can inform, and be informed by, insights from the social sciences. The results of the study will provide support to decision-making at all levels in relation to the sustainable yield of the West Bank and Gaza aquifers.</p> <p>The project runs from November 1999 to October 2004, and is a partnership between the Palestinian Water Authority, University of Newcastle upon Tyne. The project is funded by the United Kingdom Government’s Department for International Development (DfID).</p>	<p>Project Results Dissemination</p> <p>The project disseminates its results through the project website www.ncl.ac.uk/susmaq, newsletters, workshops, technical meetings, publications in conference and scientific journals.</p>
<p>Bibliographical Reference</p> <p>This report should be referenced as: SUSMAQ (2005). User Guide for SUSMAQ Decision Support Toolkit Software for Sustainability Assessments. Report No. SUSMAQ - SUS #57 V1.0, Sustainable Management of the West Bank and Gaza Aquifers, Palestinian Water Authority (Palestine) and University of Newcastle upon Tyne (UK).</p> <p>Authors: Felipe Contreras-Jimenez, Geoff Parkin</p>	

CONTENTS

1	INTRODUCTION.....	1
1.1	BACKGROUND AND PURPOSE	1
1.2	OVERVIEW OF SOFTWARE	1
2	STEP-BY-STEP GUIDE TO USING THE DST.....	4
2.1	CASE STUDY INTRODUCTION	4
2.2	HOW TO USE THE DATABASE MANAGER.....	4
2.3	HOW TO USE THE MODEL BUILDER	8
2.4	HOW TO USE THE MULTI-CRITERIA ANALYSIS TOOL.....	12
3	REFERENCES.....	17

LIST OF FIGURES

Figure 1 - Flow chart for DST software.....	3
Figure 2 - Select Database Manager.....	4
Figure 3 - Database Manager Menu.....	5
Figure 4 – Scenario Database.....	5
Figure 5 – Region Database	6
Figure 6 - Package Database.....	6
Figure 7 - Management Options Database	7
Figure 8 - Basic Indicators Database	7
Figure 9 - Second and Third Level Composite Groups.....	8
Figure 10 - Model Builder	8
Figure 11 - Select Scenario	9
Figure 12 - Select Region.....	9
Figure 13 - Select Management Options.....	10
Figure 14 - Select Packages	11
Figure 15 - Select Basic Indicators	11
Figure 16 – Model Summary	12
Figure 17 - Multi-Criteria Analysis Tool.....	12
Figure 18 - Basic Indicator Values	13
Figure 19 - Basic Indicator Weights.....	14
Figure 20 - Results Level 1	14
Figure 21 - Results Level 2 and 3.....	15
Figure 22 - Management Options Ranking	16

1 Introduction

1.1 Background and purpose

A Decision Support Toolkit (DST) for sustainability assessments of water resource systems in Palestine has been developed within the SUSMAQ project. The central component in the DST is a Multi-Criteria Analysis (MCA) methodology. The basis for the MCA methodology is described in **SUSMAQ Report#41**, and its application to a demonstration case study is described in **SUSMAQ Report#60**.

The DST includes the capability to specify different components, including Scenarios, Management Options (MO), and Basic Indicators (BI) which are grouped together into Second and Third Level Indicators. The sustainability assessments involve evaluation of the indicators using a range of data from different sources, including models of rainfall, recharge, and groundwater flow and transport, and a range of databases. The main source of data is a 'Package' database (a package is a group of related investment projects that together form a coherent water resources development). This database contains information used to calculate the indicator values.

The DST provides a user interface that allows the creation and updating of the Scenario, MO, and BI information, and the maintenance of the information in the Package database.

The DST has been designed to be generic, so that it can be applied to regional water resources development projects and strategic water resources planning in different geographical areas and at different scales, with user-defined sets of Scenarios, MOs and BIs, with minimum additional software development. In some cases, certain parts of the software may require some minor modification for particular applications. In particular, the calculation of BI values and the structure of the Package database are specific to the Palestinian case study, so any changes to these calculations and database structure would require some changes to the software.

This report provides guidance for the user on application of the DST software, including the logical structure of the software, and guidance on selection of data for input to the system. Technical information on the software is given in **SUSMAQ Report#56**.

1.2 Overview of software

The SUSMAQ DST is divided into three components, a Database Manager, a Model Builder and the Multi-Criteria Analysis Tool. Each of these components is divided according to the different uses of the tool. The division is described as follows:

- Database Manager: within this option the user is allowed to add, delete or modify any of the components used in the tool.
 - Scenario: The user is able to create, delete or modify any scenario created previously. The current version of the software includes three scenarios, the details of the scenario definitions are described in **SUSMAQ Report#39**.
 - Region: The user is able to create, delete or modify any region. For the current version of the software five regions were included. The region

definition can be found in **SUSMAQ Report#39**. The use of the region can be narrowed down to any level required.

- Basic Indicators: The user is able to create, delete or modify any Basic Indicator. For the current version of the software 19 Basic Indicators were defined. The details of the Basic Indicators definitions can be found in **SUSMAQ Report#38**.
- Management Options: The user is able to create, delete or modify any Management Option installed previously. The current version of the software includes 14 Management Options, which are related to the scenario and region definitions. The user must make sure that any new Management Option created is related to the defined scenarios and regions. The definition and description of the MO's is found in **SUSMAQ Report#39**.
- Packages: The user is able to create, delete or modify any Package. The current version of the software has 141 packages, described in **SUSMAQ Report#39**.
- Model Builder: This option allows the user to build any model according to the needs of the exercise. The model builder is made of several sequential steps starting with the selection of the Scenario, selection of the Region, selection of the Packages, Management Options and finally the selection of the Basic Indicators to be used in the Multi-Criteria Analysis.
- Multi-Criteria Analysis Tool: this option allows input of data and carries out the calculations as described in **SUSMAQ Report#41**, including the following 3 steps:
 - Basic Indicator values
 - Basic Indicator weights
 - Management Options ranking.

The sequence of the DST operation is illustrated in **Figure 1**.

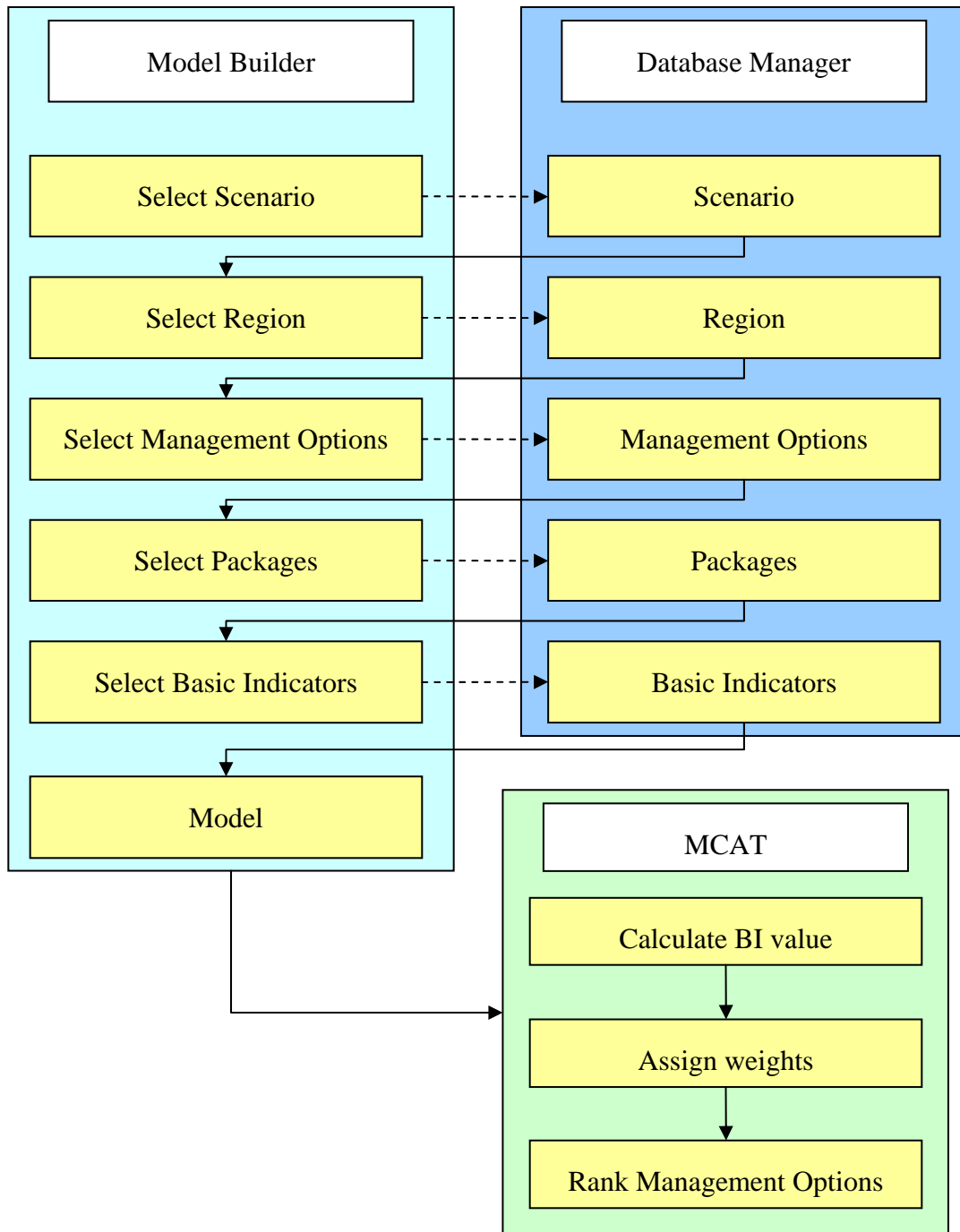


Figure 1 - Flow chart for DST software



Full report/document is not available online