

Index

Figures	xiii
Tables	xv
List of acronyms and abbreviations	xviii
Summary.....	xxii
Resumen	xxiv
Resum	xxvii
Chapter 1 Introduction.....	1
1.1. Ecosystem services	2
1.1.1. Concept and historical evolution.....	2
1.1.2. Classification of ecosystem services	2
1.1.3. Ecosystem services provided by Mediterranean wetlands.....	7
1.2. Motivation for the dissertation.....	10
1.2.1. Prioritization and economic valuation of ecosystem services and decision-making	10
1.2.2. Use of Multi-criteria Decision-Making (MDCM) methods to prioritize and value ecosystem services.....	12
1.3. Objectives of the doctoral thesis	14
1.4. Methodology overview and structure of the research.....	14
1.5. Publications included in the thesis	15
References.....	16
Chapter 2 Economic valuation of ecosystem services by using the Analytic Hierarchy Process and the Analytic Network Process. Comparative analysis between both methods in the Albufera Natural Park of València (Spain).....	27
Highlights.....	28
Abstract	28
2.1. Introduction.....	29
2.2. Contextualization and methodology	29
2.2.1. The Albufera Natural Park	29
2.2.2. Ecosystem services (ESs).....	30
2.2.3. Methodology	31
2.3. Results and discussion	33

2.4. Conclusions.....	35
Acknowledgments	36
References.....	36
 Chapter 3 Comparative analysis between AHP and ANP in prioritization of ecosystem services - A case study in a rice field area raised in the Guadalquivir marshes (Spain)	39
Highlights.....	40
Abstract.....	40
3.1. Introduction.....	41
3.2. Literature review.....	43
3.2.1. Multi-criteria methods.....	43
3.2.2. Ecosystem services (ESs) and their valuation	45
3.3. Methodology	46
3.4. Study area: The Guadalquivir Marshes in Doñana	52
3.5. Results.....	53
3.5.1. Mapping of the situation in the Guadalquivir marshes	53
3.5.2. Prioritization of the ESS and comparison of AHP and ANP	54
3.6. Discussion	59
3.7. Conclusions.....	60
Acknowledgements.....	61
References.....	61
 Chapter 4 How does the type of MCDM method affect the results of the prioritization and assessment of ecosystem services? A case study in the Ebro River Delta (Spain).....	69
Highlights.....	70
Abstract.....	70
4.1. Introduction.....	71
4.2. Material and methods.....	74
4.2.1. Selection of criteria and decision-makers	74
4.2.2. Analytic Hierarchy Process (AHP)	76
4.2.3. Analytic Network Process (ANP)	77
4.2.4. DANP (Kadoić et al. (2019) proposal)	79
4.2.5. Comparison of the results obtained by the three MCDM methods.....	80
4.2.6. Decision-makers' feedback	82

4.3. Results and discussion	82
4.4. Conclusions.....	89
Acknowledgements.....	90
References.....	90

Chapter 5 How geographical factors and decision-makers' perceptions influence the prioritization of ecosystem services: Analysis in the Spanish rice field areas in RAMSAR Mediterranean wetlands..... 98

Highlights.....	99
Abstract.....	99
5.1. Introduction.....	100
5.2. Study area	102
5.2.1. The Ebro River Delta	103
5.2.2. The Albufera Natural Park and the Guadalquivir Marshes.....	103
5.3. Materials and methods	104
5.4. Results and discussion	113
5.4.1. Prioritization of the ESs provided by the Ebro Delta.....	113
5.4.2. Similarities and differences among the rice fields located in the Spanish Mediterranean wetlands	116
5.5. Conclusions.....	126
Acknowledgements.....	127
References.....	128

Chapter 6 Design of a new approach for the prioritization of ecosystem services and analysis of its influence on their economic valuation: a case study in the Albufera Natural Park (Spain)..... 138

6.1. Introduction.....	139
6.2. A case study in the Albufera Natural Park (Spain).....	139
6.2.1. Objectives	139
6.2.2. Materials and methods.....	140
6.2.3. Results and discussion	148
6.3. Influence on the economic valuation of ecosystem services	154
6.3.1. The Analytic Multi-Criteria Valuation Method (AMUVAM)	154
6.3.2. Results and analysis.....	156
6.4. Conclusions.....	159
References.....	161

Chapter 7 Overall discussion.....	165
7.1. Influence of the Multi-Criteria Decision-Making method applied	166
7.2. Influence of sociocultural and geographical factors	168
 Chapter 8 Overall conclusions.....	 171
 Annexes	 175
Annex A. Supplementary materials for Chapter IV.....	176
A.1. Ecosystem services priorities obtained per method.	176
A.2. Statistical analysis of compatibility and correlation.....	179
A.3. Statistical analysis of correlation.....	181
A.4. Statistical analysis of compatibility using the Garuti G compatibility index	183
A.5. DANP matrices of influence	184
Annex B. Supplementary materials for Chapter V	191
B.1. Element's relationship or Interfactorial dominance matrices.....	191
B.2. Weighted matrices (ANP)	192
Annex C. Supplementary materials for Chapter VI.....	209
C.1. Ecosystem services priorities per method or variant	209
C.2. Weighted matrices	213
Annex D. ANP and DANP Questionnaire templates	229
D.1. ANP template example (Albufera Natural Park)	229
D.2. DANP template example (Albufera Natural Park).....	233