

# Contents

• <b>INTRODUCTION</b>	1
<b>CHAPTER 1. THE SRI LANKA MARINE FISHERY</b>	7
1.1. Fisheries management in Sri Lanka	9
1.2. Climate	11
1.3. Marine environment	13
1.4. Key fish species	13
1.5. Vessels and gears	21
1.6. Geographical distribution of the fisheries in terms of fishing gears and target species	23
1.7. Fisheries statistics in Sri Lanka	25
1.8. Socio-economic status of marine fishermen	26
Conclusion	27
<b>CHAPTER 2. THE SMALL SCALE COASTAL GILLNET FISHERY IN SRI LANKA</b>	28
2.1. The study area	28
2.2. The vessels	29
2.3. The fishing gears	29
2.4. The fishing trips and operations	34
2.5. The target species and their relative importance	38
2.6. The daily catch of the various fishing boats as recorded by small pelagic fishery data collection programme of NARA	41
Conclusion.	54
<b>CHAPTER 3. TOWARDS A STANDARDIZATION OF THE CATCH PER UNIT EFFORT DATA AS PROVIDED BY THE NARA SURVEY</b>	55
3.1. The study area	55
3.2. The catch and effort statistics used here: available in Sri Lanka	55
3.3. Review of fishing effort standardisation studies: catch per unit effort (CPUE) as an indicator to derive indices of fish abundance	56
3.4. The GLM as used for standardization	58
3.5. Preparation of databases	58

3.6. Standardisation of sardine CPUE	59
3.7. Results- standardisation of CPUE	64
3.7.1. <i>Amblygaster sirm</i>	64
3.7.2. <i>Sardinella spp</i>	73
3.8. Discussion	82
Conclusion	86

## CHAPTER 4. AN ATTEMPT IN PREDICTING THE VARIATIONS OF ABUNDANCE

OF SARDINES USING CPUE DATA AND PREDICTIVE MODELS	87
4.1. The study area	87
4.2. Prediction models	87
4.2.1. Multiple Linear Regression models	88
4.2.2. Generalised Additive Models	88
4.2.3. Regression Tree Models	89
4.3. Preparation of the databases	89
4.4. Fitting of predictive models	90
4.5. Results	91
4.5.1. Fisheries District wise predictions of <i>A. sirm</i> abundance	91
4.5.2. Vessel wise predictions of <i>A. sirm</i> abundance	102
4.5.3. Prediction of <i>A. sirm</i> abundance in the study area	110
4.5.4. Fisheries District wise predictions of <i>Sardinella</i> abundance	113
4.5.5. Vessel wise predictions of <i>Sardinella</i> abundance	121
4.5.6. Prediction of <i>Sardinella</i> abundance in the study area	128
4.6. Discussion	130
Conclusion	134

## CHAPTER 5. A PRELIMINARY MULTISPECIES TROPHIC MODEL OF THE COASTAL ECOSYSTEM OF SRI LANKA

5.1. The ECOPATH model and software	136
5.1.1. Mass balance modelling	136
5.1.2. Time-dynamic simulation (ECOSIM)	138
5.2. Constructing the model	139
5.2.1. Boundaries for the proposed ECOPATH model to represent the coastal ecosystem of Sri Lanka	139

5.2.2. Identification of species/groups	139
5.2.3. Actual catch	139
5.2.4. Biological information for fish	141
5.2.5. Biological information for groups other than fish	146
5.2.6. The diet composition of every group	148
5.4. Results of the trophic study	149
5.5. Results of the ECOSIM simulations	153
5.6. Discussion	160
Conclusion	163
• <b>GENERAL CONCLUSION</b>	164
• <b>REFERENCES</b>	167
• <i>Annexe</i>	