

LIST OF TABLES

| Table No. | | Page Nos. |
|-----------|--|-----------|
| 4.1 | General Environmental Valuation Techniques: Applicability, Strength and Weakness | 121 |
| 4.2 | Definitions of CV, CS, EV and ES with Price Change | 128 |
| 4.3 | Types of Bias Associated to WTP and WTA in SPM | 130 |
| 4.4 | Conceptual, Practical and Philosophical Differences of Ecological Economics and Traditional Environmental Economics | 148 |
| 5.1 | Global Water Stocks | 172 |
| 5.2 | Sector-wise Water Consumption Since 1900 | 177 |
| 5.3 | Region-wise Urban and Rural Water Supply and Sanitation | 181 |
| 5.4 | State-wise Irrigation Potential, Flood Control, Ground Water, Distribution of Large Dams and Hydro Potential Status- India | 190 |
| 5.5 | Ground Water Resources of India, 1998 | 193 |
| 5.6 | Water Demand (in BCM) for Various Sectors | 193 |
| 5.7 | Sanitation Coverage of India: People Served/ to be Served in 2015 | 195 |
| 5.8 | Rural-Agrarian and Urban-Industrial Ecologies: A Comparison | 226 |
| 6.1 | Kerala-Physiographic Units, Altitude and Area | 245 |
| 6.2 | District-wise Rainfall Data (Yearly Average in mm) from 1997 to 2008 | 246 |
| 6.3 | Kerala Water Scenario | 247 |
| 6.4 | District wise Distribution of households Depending on Wells as Source of Drinking Water, Kerala, 2001 | 248 |
| 6.5 | Bulk Density and Water Holding Capacity of Different Types of Soils | 249 |
| 6.6 | Seasonal Water availability in Kerala | 251 |
| 6.7 | Seasonal Water Demand in Kerala | 251 |

| | | |
|------|---|-----|
| 6.8 | Ground Water Resources of Kerala as on 31.03.2004 | 252 |
| 6.9 | Terrain Units in Palakkad District Area in Percentage | 255 |
| 6.10 | Water Scarce Areas of Palakkad Districts | 257 |
| 6.11 | Chittoor and Attappady Blocks of Palakkad: A Comparison | 259 |
| 6.12 | Plachimada at a Glance | 262 |
| 6.13 | Socio-Economic and Demographic Features of Plachimada | 265 |
| 6.14 | Water Test Results at Plachimada | 269 |
| 6.15 | Noticed Health Problems at Plachimada | 269 |
| 6.16 | Birth Weight of Children at Plachimada | 270 |
| 6.17 | Status of Agricultural Production at Plachimada | 271 |
| 6.18 | Status of Irrigation Water | 271 |
| 6.19 | AHADS -Various Working Groups | 276 |
| 6.20 | General Meteorological characteristics of Attappady Block | 278 |
| 6.21 | Changing Pattern of Forest Since 1959 | 279 |
| 6.22 | Land Use Pattern at Attappady | 280 |
| 6.23 | Afforestation and Biomass Conservation | 281 |
| 6.24 | Soil and Water Conservation on Private Lands | 282 |
| 6.25 | Private Land Development- Agro forestry Plantations | 283 |
| 6.26 | Current Demographic Distribution of Tribes and Hamlets | 284 |
| 6.27 | Changes of Population over time in Attappady 1951-2001 | 284 |
| 6.28 | Average Climatological data observed in selected Observation Stations | 287 |
| 6.29 | Pudur (DU4): Household distribution | 290 |
| 6.30 | Demographic Pattern of Attappady | 291 |
| 6.31 | Occupation and Income Pattern of Attappady | 292 |
| 6.32 | Housing Pattern of Attappady | 293 |
| 6.33 | Banking Culture of Attappady | 294 |
| 6.34 | Physical Assets of ST and Non ST Households of Attappady | 295 |

| | | |
|-------|---|-----|
| 6.35 | Education Infrastructure at Attappady | 296 |
| 6.36 | School Dropout Cases at Attappady | 296 |
| 7.1 | Details of the Data Collection | 312 |
| 7.2 | Basic Profile of the Agriculture Labour Households- Plachimada | 314 |
| 7.3 | Drinking Water Scenario – Plachimada | 320 |
| 7.4 | Under 10 Age Children and Their Mothers: Plachimada Labour Settlement Area | 323 |
| 7.5 | Birth Weights of Children - Under Age 10 | 325 |
| 7.6 | Agricultural Labour Scenario | 328 |
| 7.7.a | Water Sources and Availability of Water for Irrigation Before 2000 | 331 |
| 7.7.b | Water Sources and Availability of Water for Irrigation 2000-2006 | 332 |
| 7.7.c | Water Sources and Availability of Water for Irrigation After 2006 | 333 |
| 7.8.a | Agriculture Scenario Before HCBPL | 334 |
| 7.8.b | Agriculture Scenario During HCBPL | 335 |
| 7.8.c | Agriculture Scenario After HCBPL | 336 |
| 7.9 | pH Value of Soil and Interpretations | 340 |
| 7.10 | Recommendations for the Use of Chemical Fertilizers for Plachimada Agro-system | 341 |
| 7.11 | Soil Fertility Data of Plachimada Area | 342 |
| 7.12 | Area and Water Requirement | 343 |
| 7.13 | District-wise Rainfall Data of Kerala – From 1997 to 2008 | 344 |
| 7.14 | Pudur Macro Watershed (DU 4) Land Use Pattern | 347 |
| 7.15 | Development of Irrigation Water at DU-4 Pudur Since 1996 | 356 |
| 7.16 | Agri. Labour Scenario of DU4-Pudur Since 1996 to 2009 | 358 |
| 7.17 | Other Income Sources of Labour Supply Households of DU4-Pudur Since 1996 | 360 |
| 7.18 | Development of Agriculture at DU-4 Pudur Since 1996 | 361 |

| | | |
|------|--|-----|
| 7.19 | Other Income Sources Agrarian Households of DU4-Pudur Since 1996 | 362 |
| 7.20 | Plachimada Ecological Concerns | 366 |
| 7.21 | Attappady DU4 Pudur Ecological Concerns | 371 |
| 7.22 | Percentage of People Lying Among Various Lines of Ideology | 371 |
| 8.1 | NEEM's Ecological Policy Frame for Water Governance | 376 |

LIST OF FIGURES

| Figure No. | | Page Nos. |
|------------|---|-----------|
| 1.1 | Water Scarcity Driven Vicious Circle of Poverty | 11 |
| 1.2 | Triangular Democracy and Deprivation Linkages | 13 |
| 3.1 | The Standard Circular Flow Model | 74 |
| 3.2 | The Circular Flow Linked to the Biosphere | 75 |
| 3.3 | Circular Flows with Energy and Recycling- “Environmental Economics Model” | 76 |
| 3.4 | Deductive and Inductive Reasoning Process Chart | 81 |
| 3.5 | Logical Map of the Study | 82 |
| 4.1 | Consumers’ and Producers’ Surplus | 111 |
| 4.2 | Linking the Benefits of Nature to the Total Economic Value Framework | 117 |
| 4.3 | Taxonomy of the Total Economic Value of the Environment | 119 |
| 4.4..a | Compensating Variation from a Price Change | 125 |
| 4.4.b | Consumer Surplus from a Price Change | 126 |
| 4.4.c | Equivalent Variation from a Price Change | 126 |
| 4.4.d | Superimposition of 4.3a, 4.3b and 4.3c | 127 |
| 5.1 | Global Water Stocks | 173 |
| 5.2 | Region-wise Precipitation, Evaporation and Run-off of Water | 174 |
| 5.3 | Global Fresh Water Withdrawal and Consumption | 175 |
| 5.4 | Sector-wise Global Fresh Water Consumption | 176 |
| 5.5 | MDGs’ Water Sanitation Target: Region-wise | 180 |
| 5.6 | General Principles of Cost of Water | 218 |
| 5.7 | General Principles of Value in Use | 219 |
| 5.8 | CAC Interactions for Water Governance | 231 |
| 6.1 | Topography of Kerala | 244 |
| 6.2 | Schematic Section of Kerala | 245 |
| 6.3 | Location Map of Plachimada | 261 |
| 6.4 | Location Map of Attappady | 274 |
| 6.5 | Operational Divisions of AWCECOP | 277 |

| | | |
|-------|--|-----|
| 6.6 | DU4 Pudur-the Climatic Region | 288 |
| 7.1 | Eco-logical Design of NEEM Analysis | 309 |
| 7.2 | The Study Area | 313 |
| 7.3 | Average Land and Family Size Plachimada Labour Households | 316 |
| 7.4 | Demographic Features of Plachimada Labour Households | 317 |
| 7.5 | Travelling Distance to the Drinking Water Source: Plachimada Labour Households | 318 |
| 7.6 | Water Use of Labour Households at Plachimada | 319 |
| 7.7 | Loss of Working Days by Ill Health and Drinking Water Scarcity: Plachimada Labour Households | 321 |
| 7.8 | Time Taken for Drinking Water Collection by the Plachimada Women | 322 |
| 7.9 | Travelling Distance to Working Place by the Plachimada Labour Force | 326 |
| 7.10 | Loss of Agricultural Working Days by Irrigation Water Scarcity at Plachimada | 326 |
| 7.12 | Depth of the Bore Wells of Plachimada Farmers | 337 |
| 7.13 | Water Level of the Bore Wells at Plachimada | 337 |
| 7.14 | Acres of Land under Cultivation | 338 |
| 7.15 | Annual Income of the Agriculture Based Households at Plachimada | 339 |
| 7.16 | Land Use and Location Map of Pudur Macro Watershed: The Study Area | 348 |
| 7.17 | Drinking Water Scenario: Attappady DU-4 Pudur | 351 |
| 7.18 | Water Use of Non-Scheduled Tribes at DU-4 Pudur | 352 |
| 7.19 | Water Use of Scheduled Tribes at DU-4 Pudur | 352 |
| 7. 20 | Distances to the Drinking Water Source: Non-STs DU-4 Pudur | 353 |
| 7.21 | Distance to the Drinking Water source: STs of DU-4 Pudur | 353 |
| 7.22 | Time Taken for Water Collection by Non-ST Households at DU-4 Pudur | 354 |
| 7.23 | Time Taken for Water Collection by STs at DU-4 Pudur | 354 |
| 7.24 | Agriculture Labour and Farming Days at DU-4 Pudur | 357 |
| 7.25 | Distance to the Work Place: DU-4 Pudur Labour Class | 358 |
| 7. 26 | Weekly Income of the labour Households by Labour Supply: Du-4 Pudur | 359 |

| | | |
|------|---|-----|
| 7.27 | Weekly Income of the Labour Households from Other Sources: DU-4 Pudur | 360 |
| 7.28 | Total Areas of Cultivation by Agrarian Household Samples at DU-4 Pudur | 362 |
| 7.29 | Annual Income from Subsidiary Crops : DU-4 Pudur | 363 |