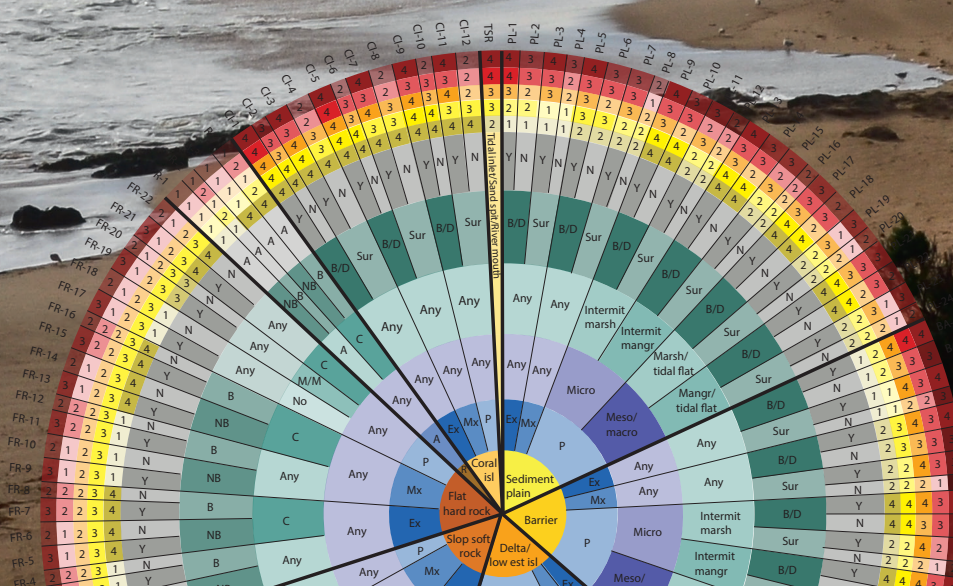




# MANAGING CLIMATE CHANGE HAZARDS IN COASTAL AREAS

## THE COASTAL HAZARD WHEEL DECISION-SUPPORT SYSTEM

### EXECUTIVE SUMMARY





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The Coastal Hazard Wheel (CHW) is an information and decision-support system for coastal stakeholders worldwide. It can be used for three main purposes:

- Multi-hazard-assessments at local, regional and national level
- Identification of relevant management options for a specific coastal location
- As a standardized coastal language to communicate coastal information

The CHW is developed as a universal coastal classification system that can be used in areas with limited data availability and can therefore be used in both developed and developing countries. The CHW constitutes a key for classifying a particular coastal location, determining its hazard profile, identifying relevant management options and communicating coastal information.

The universal coastal classification system is developed particularly for decision-support and is based on the bio-geophysical parameters determining the character of a coastal environment. The parameters included are geological layout, wave exposure, tidal range, flora/fauna, sediment balance and storm climate, and the system distinguishes between 131 generic coastal environments.

The CHW covers the hazards of ecosystem disruption, gradual inundation, salt water intrusion, erosion and flooding, and contains a total of 655 individual hazard evaluations and a complete hazard profile for each generic coastal environment. The system incorporates climate change effects in the hazard profiles and is therefore especially relevant for climate change adaptation. Furthermore, it is suited for Disaster Risk Reduction under the Sendai Framework.

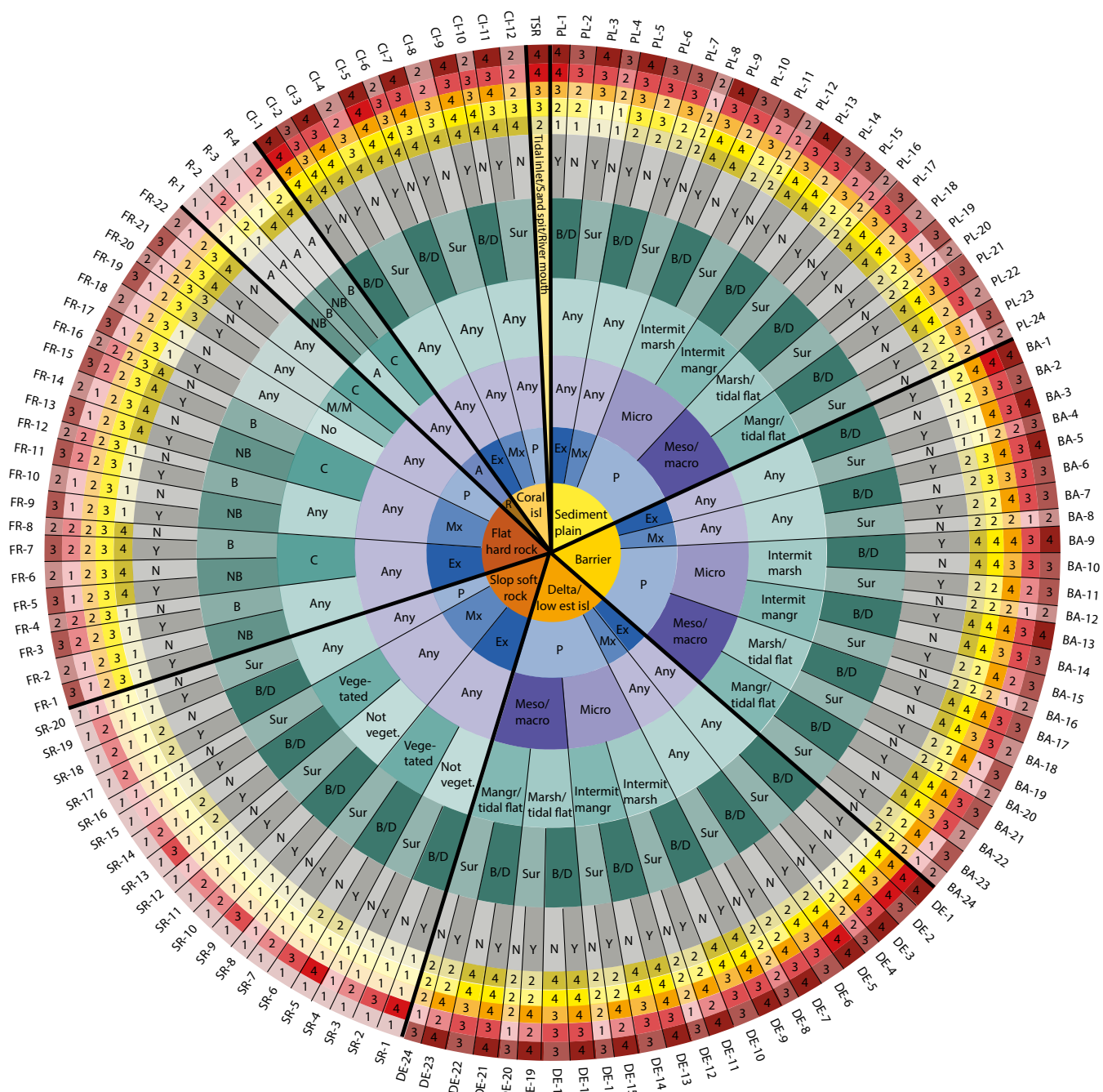
The CHW is designed to address all the main coastal management issues collectively. It can be used for coastal management at local, regional and national level and is well-suited for facilitating communication and information exchange between different management levels, scientists and policy-makers. Since a single application of the CHW applies to a particular coastal stretch of 200-300 meter coastline, it can be used for both local hazard management and for broader management schemes.

The CHW is used by starting in the wheel centre, moving outwards through the coastal classification and ending with the hazard profiles and coastal classification codes in the outermost circles. The complete coding system includes codes for land use and implemented management measures and is further described in the publication. The CHW applies a standard English terminology for the scientific parameters.

The UNEP publication package on the CHW consists of four components, namely the Executive Summary, the Quick start guide, the Main manual and the Catalogue of hazard management options. The Quick start guide provides a brief introduction to the use of the CHW for coastal decision-making and information exchange. The Main manual provides more detailed technical instructions, while the Catalogue of hazard management options provides descriptions of commonly used hazard management options.

Further information can be found on [www.coastalhazardwheel.org](http://www.coastalhazardwheel.org) and [www.unepdhi.org](http://www.unepdhi.org).

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| COASTAL CLASSIFICATION (start in wheel center)                  |   | INHERENT HAZARD LEVEL  |      |           |     |          |      |           |                      |   |   |   |   |                    |   |   |   |   |                      |   |   |   |   |         |   |   |   |   |          |   |   |   |   |
|---|---|--|------|-----------|-----|----------|------|-----------|----------------------|---|---|---|---|--------------------|---|---|---|---|----------------------|---|---|---|---|---------|---|---|---|---|----------|---|---|---|---|
| Geological layout   | <ul style="list-style-type: none"> <li><span style="display: inline-block; width: 10px; height: 10px; background-color: yellow; border: 1px solid black;"></span> Ex Exposed</li> <li><span style="display: inline-block; width: 10px; height: 10px; background-color: orange; border: 1px solid black;"></span> Mx Moderately exposed</li> <li><span style="display: inline-block; width: 10px; height: 10px; background-color: lightblue; border: 1px solid black;"></span> P Protected</li> </ul>  | <table border="0"> <tr> <td></td> <td style="text-align: center;">Low</td> <td style="text-align: center;">Moderate</td> <td style="text-align: center;">High</td> <td style="text-align: center;">Very high</td> </tr> <tr> <td>Ecosystem disruption</td> <td style="text-align: center;">1</td> <td style="text-align: center;">2</td> <td style="text-align: center;">3</td> <td style="text-align: center;">4</td> </tr> <tr> <td>Gradual inundation</td> <td style="text-align: center;">1</td> <td style="text-align: center;">2</td> <td style="text-align: center;">3</td> <td style="text-align: center;">4</td> </tr> <tr> <td>Salt water intrusion</td> <td style="text-align: center;">1</td> <td style="text-align: center;">2</td> <td style="text-align: center;">3</td> <td style="text-align: center;">4</td> </tr> <tr> <td>Erosion</td> <td style="text-align: center;">1</td> <td style="text-align: center;">2</td> <td style="text-align: center;">3</td> <td style="text-align: center;">4</td> </tr> <tr> <td>Flooding</td> <td style="text-align: center;">1</td> <td style="text-align: center;">2</td> <td style="text-align: center;">3</td> <td style="text-align: center;">4</td> </tr> </table> |      |           | Low | Moderate | High | Very high | Ecosystem disruption | 1 | 2 | 3 | 4 | Gradual inundation | 1 | 2 | 3 | 4 | Salt water intrusion | 1 | 2 | 3 | 4 | Erosion | 1 | 2 | 3 | 4 | Flooding | 1 | 2 | 3 | 4 |
|   | Low   | Moderate   | High | Very high |     |          |      |           |                      |   |   |   |   |                    |   |   |   |   |                      |   |   |   |   |         |   |   |   |   |          |   |   |   |   |
| Ecosystem disruption  | 1   | 2  | 3    | 4         |     |          |      |           |                      |   |   |   |   |                    |   |   |   |   |                      |   |   |   |   |         |   |   |   |   |          |   |   |   |   |
| Gradual inundation  | 1   | 2  | 3    | 4         |     |          |      |           |                      |   |   |   |   |                    |   |   |   |   |                      |   |   |   |   |         |   |   |   |   |          |   |   |   |   |
| Salt water intrusion  | 1   | 2  | 3    | 4         |     |          |      |           |                      |   |   |   |   |                    |   |   |   |   |                      |   |   |   |   |         |   |   |   |   |          |   |   |   |   |
| Erosion   | 1   | 2  | 3    | 4         |     |          |      |           |                      |   |   |   |   |                    |   |   |   |   |                      |   |   |   |   |         |   |   |   |   |          |   |   |   |   |
| Flooding  | 1   | 2  | 3    | 4         |     |          |      |           |                      |   |   |   |   |                    |   |   |   |   |                      |   |   |   |   |         |   |   |   |   |          |   |   |   |   |
| Wave exposure   |   |  |      |           |     |          |      |           |                      |   |   |   |   |                    |   |   |   |   |                      |   |   |   |   |         |   |   |   |   |          |   |   |   |   |
| Tidal range   |   |  |      |           |     |          |      |           |                      |   |   |   |   |                    |   |   |   |   |                      |   |   |   |   |         |   |   |   |   |          |   |   |   |   |
| Flora/fauna   |   |  |      |           |     |          |      |           |                      |   |   |   |   |                    |   |   |   |   |                      |   |   |   |   |         |   |   |   |   |          |   |   |   |   |
| Sediment balance  | <ul style="list-style-type: none"> <li><span style="display: inline-block; width: 10px; height: 10px; background-color: #2e8b57; border: 1px solid black;"></span> B/D Balance/deficit</li> <li><span style="display: inline-block; width: 10px; height: 10px; background-color: #3cb371; border: 1px solid black;"></span> Sur Surplus</li> <li><span style="display: inline-block; width: 10px; height: 10px; background-color: #4682b4; border: 1px solid black;"></span> NB No Beach</li> <li><span style="display: inline-block; width: 10px; height: 10px; background-color: #4682b4; border: 1px solid black;"></span> B Beach</li> <li><span style="display: inline-block; width: 10px; height: 10px; background-color: #696969; border: 1px solid black;"></span> Y Yes to tropical cyclone activity</li> <li><span style="display: inline-block; width: 10px; height: 10px; background-color: #696969; border: 1px solid black;"></span> N No to tropical cyclone activity</li> </ul> |  |      |           |     |          |      |           |                      |   |   |   |   |                    |   |   |   |   |                      |   |   |   |   |         |   |   |   |   |          |   |   |   |   |
| Storm climate   |   |  |      |           |     |          |      |           |                      |   |   |   |   |                    |   |   |   |   |                      |   |   |   |   |         |   |   |   |   |          |   |   |   |   |
| Note: R= Sloping hard rock; C=Corals; M/M=Marsh/Mangrove; A=Any |   |  |      |           |     |          |      |           |                      |   |   |   |   |                    |   |   |   |   |                      |   |   |   |   |         |   |   |   |   |          |   |   |   |   |

The Coastal Hazard Wheel 3.0 consisting of six coastal classification circles, five hazard circles and the coastal classification codes. It is used by starting in the wheel centre moving outwards through the coastal classification (modified from Rosendahl Appelquist and Halsnæs 2015 and Rosendahl Appelquist 2013).



[www.unep.org](http://www.unep.org)

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