Practical applications of resilience principles for coastal communities

Adapting to climate change in coastal cities needs further development of the resilience approach as well as identifying how it can be practically used in local actions, according to a new study. The researchers present resilience as a flexible, practical way of dealing with climate change’s impacts, such as coastal flooding, which can be easily built into adaptation measures.

Resilience is a term often used in ecology to mean the ability of an ecosystem to withstand change or bounce back after a particular shock. It can also be used in a societal or socio-ecological sense to mean the ability of a particular population and its environment to undergo change or shocks without collapsing into an undesired state. In terms of climate change these could be relatively slow changes, as in sea level rise, or sudden shocks, as in flooding.

The researchers involved local practitioners and scientists in interviews and a workshop to try to develop measures for adapting to climate change in the coastal city of Rotterdam, Netherlands. The participants identified practical ways in which they could build six principles of resilience into local actions.

For example, the resilience principle of ‘homeostasis’, which looks to stabilise a system and limit impacts, could be realised through early warning systems and urban planning to reduce flood damage. The principle of ‘omnivory’ uses several different approaches in case one fails. One way of incorporating this into local actions, as suggested by the participants, is to use several different types of energy supply in case one is suddenly cut.

The ‘high flux’ (quick turnover of resources) principle could be translated into adaptation actions by constructing cities so they can be easily rebuilt, for instance. The ‘flatness’ principle seeks to avoid unnecessary bureaucracy. The participants said that giving residents power to respond to threats could mean that they are dealt with more quickly.

‘Buffering’ builds capacity to absorb shocks. This could be achieved in Rotterdam via water retention areas in case of flooding, for example. Finally, the principle of ‘redundancy’, which requires multiple copies of a particular resource or function in case one fails, could be realised through a number of crisis centres or access levels to a building, among other options.

The participants were positive about the concept of resilience and considered it useful for developing climate change adaptation measures. The researchers suggest that resilience principles could help guard against the uncertainties inherent in climate change projections by enhancing a system’s ability to cope with a wide range of possible changes in the climate.


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