

Appendix 3. Standardized description of the six case studies containing the basic mechanisms proposed by Heylighen (2013), as well as information on the type and period of the disturbance; relevant historical, cultural, socioeconomic and environmental traits; formal and informal institutional arrangements; stakeholders involved.

Case I – Capivara fishing accord (Ummus 2017)

The lake system referred to as Capivara sector (Middle Solimões River region, AM) provides several fishing resources, especially “pirarucu” (*Arapaima* sp.). The area is inhabited and used by around 80 families of riverine people divided into five localities. This case refers to the self-organized constitution of the Capivara Fishing Accord, which in 2015 comprised 120 small-scale fishers. Fishing accords are formal institutional arrangements between resource users and environmental agencies to organize small-scale fishing of certain species or in specific areas (de Castro 2000). The alignment process to design the agreement started in 2007, triggered by conflicts with large-scale fishing operations over the use of the lakes, added to decreasing fish stocks and restrictions on the use of other lakes in the region. The group of participating fishers grew, enabling division of labor involving surveillance and monitoring of the lakes in 2011. The four-year workflow of surveillance and monitoring was followed by fish harvesting. The result was an increase in fish stocks and income from pirarucu fishing and greater control of the lakes by the community (aggregation).

Case II – Reconstruction of São Luiz do Paraitinga (Farinaci 2012)

São Luiz do Paraitinga, in São Paulo State, is considered one of the last strongholds of traditional cultural manifestations in the region and boasts architectural heritage sites. Its natural heritage is also relevant, as a Protected Area covers part of the municipality with many patches of native Atlantic Forest. In early January 2010, the river that cuts through its urban area rose 11 meters above the normal level, isolating the city for three days and destroying historical buildings. More than 5,000 of the approximately 10,000 inhabitants were displaced. This unprecedented flood was favored by the history of land use in the rural area, which caused soil compaction and erosion, and silting of water courses. Despite the magnitude of the disaster and the great material losses, there was alignment and the local community responded to the crisis effectively, avoiding human losses and quickly restoring normal living conditions. There was division of labor resulting from great mobilization among civil society and the private and public sectors to clean the town, rescue residents and ensure the provision of utilities. Workflow was also established, with the resolution of emergency situations followed by initiatives to rebuild the town and resume normal life (aggregation), demonstrating high capacity for self-organization in response to the crisis.

Case III – REDESUAPA stakeholder network (Moraes 2019)

Soon after the great flood described above, several working groups were formed to rebuild the town. A group formed by professionals from different state agencies, representatives of the municipal government and local and regional third sector institutions self-organized and showed alignment from the outset, defining concrete strategies to prevent similar disasters. Based on division of labor, this network concentrated its initial efforts on specific projects and initiatives for soil recovery and conservation in the town’s rural area. The established workflow then led to conservation actions combined with income generation for smallholders, mainly through alternative production systems (such as pasture rotation and agroforestry) adapted to the local socioeconomic, geographical and environmental reality (aggregation). Five years later,

the group identified the need to further align values and define common goals among its members as guidelines for future work. An organization was created: “Rede para o Desenvolvimento Sustentável do Alto Paraíba” (Upper Paraíba River Sustainable Development Network – REDESUAPA). This group has experienced several crises since its inception, which so far have been faced and overcome collectively. REDESUAPA meetings support the construction and expansion of knowledge and favor continuous alignment and learning among its members. Its dynamics strengthens cooperation among members and favors the agency of individuals and of the actual network (Moraes and Islas 2020). Currently the network is on “standby mode”; members are connected through virtual platforms and social media. Face-to-face interactions paused after São Paulo State government merged the Secretary of the Environment into the newly formed Secretary of Infrastructure and the Environment, in early 2019 (Moraes and Islas 2020).

Case IV - Reaction to protected areas in Trindade (Araujo 2014)

The community of Trindade (about 1000 inhabitants), on the south coast of Paraty, RJ, has undergone major economic, social and environmental changes since the 1970s. This process was marked by the expansion of tourism and the real estate sector, the development of energy and road infrastructure, and the creation of Protected Areas (PAs). From the 2000s, the Serra da Bocaina National Park (a no-take PA that includes parts of Trindade) started implementing initiatives in the community, triggering several conflicts between part of the community and the PA’s managers (de Freitas and de Araujo 2020). With the increased tourism and the initial restrictions to the access and use of areas and natural resources of the PA, there was alignment between two local community associations. Drawing on division of labor and workflow, they carried out a number of long-term initiatives, such as: representation in PA Steering Committees, participation in reviewing the management plan of two PAs; negotiation with the PA to exploit tourism services; hiring of qualified advisory services; revival of a traditional local culture festival; and strengthening of partnerships in local and regional networks. These actions changed the institutional structure of the associations and their operating methods, which resulted in at least two important events from 2016 (aggregation): the building of a headquarters for local associations and Escola do Mar (School of the Sea), the latter as a community organization of education and traditional culture (Araujo et al. 2020).

Case V - Artisanal fishing monitoring program in Tarituba (Dias 2015)

The community of Tarituba, on the north coast of Paraty, RJ, has about 500 residents, most of whom living off tourism and fishing. In 2006, a marine area where important traditional small-scale fisheries overlapped with parts of a no-take PA (Tamoios Marine Protected Area) was subject to regular inspection. This led to the banning of traditional fishing, creating a serious crisis. In order to mitigate conflicts between fishers and the Tamoios MPA management office, in 2012 there was alignment within the PA Steering Committee to establish an agreement, allowing traditional fishing in certain areas with specific gears and vessels. This agreement was institutionalized as a Statement of Commitment in 2017, establishing that fishing should be monitored. This led to the development of a participatory monitoring program for artisanal fishing. During this process there was division of labor, since the different stakeholders involved – fishers, environmental managers, representatives of state and municipal agencies, and a university – contributed to the collective construction of a monitoring program from the individual perspective of each stakeholder. The workflow involved the Tamoios PA Steering Committee, which includes representatives from various sectors of government and

civil society, in decision-making regarding the monitoring program. A directive with goals and indicators was established (aggregation) aiming to guide managers and fishers in generating relevant information to reconcile the needs of coastal and marine environment conservation and the well-being of fishers.

Case VI – Reorganization of community-based tourism at Aventureiro (Prado 2013)

Inserted in a no-take PA since 1981, the community of Praia do Aventureiro (around 100 inhabitants), in Ilha Grande, RJ, started engaging in community-based tourism activities in the mid-1990s. Following a number of clashes with the competent environmental agency, tourist activities (especially campgrounds) were banned for 8 months in 2006. This was a critical and disturbing period for the way of life of local families, who depended on the income from local tourism. The ban on tourism triggered a process of self-organization in the community as a whole. Alignment arose from the need for greater political organization to claim the community's land rights as well as adapt and foster other activities, such as fishing. There was division of labor and workflow among the leadership of the local community organization, external partners (tourists, universities, NGOs) and other local residents looking for alternative livelihoods. After a number of legal negotiations, tourism was admitted and regulated by a deferred prosecution agreement that set a maximum number of tourists, configuring the aggregation of the self-organization process. This conflict also generated a drawn-out process to reclassify part of the no-take PA as a sustainable use protected area, which happened in 2014.