

1 **When promises become pathologies: Fragmentation in Lake Victoria’s polycentric fisheries**  
2 **in Tanzania**

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8  
9 **Abstract**

10 Polycentric systems, with multiple, autonomous, coordinating decision centers are  
11 supposed to contribute toward ensuring robust, adaptive socio-ecological systems. Accordingly,  
12 interest in investigating the promised benefits of polycentric systems has increased, but  
13 pathologies of polycentric systems have been understudied. Drawing upon qualitative data from  
14 Tanzania’s Lake Victoria’s fisheries, this research investigates how may interactions fragment  
15 decision centers to create a dysfunctional polycentric system? With the Institutional Analysis and  
16 Development framework serving as the theoretical framework, findings suggest that authority,  
17 information, and resources shape non-cooperative coexistences, conflicts, and perverse  
18 cooperation between higher and lower-level decision centers, while enabling cooperation among  
19 higher level centers. These interactions fragment lower-level authorities, facilitating centralized  
20 control over fisheries management. The paper elaborates upon these findings and concludes with  
21 questions on pathologies in polycentric system for future research.

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33           **Section 1: Introduction**

34           Tanzania adopted fisheries co-management in the 1990s to facilitate power-sharing  
35 between the government and fisherfolks. Co-management reforms occurred in a context of a  
36 devolution, giving rise to multiple, independent, overlapping decision centers across different  
37 governance levels. These decision centers include central and local governments, and co-  
38 management institutions called as Beach Management Units (BMUs) consisting of fisherfolks  
39 and government, coordinating with each other to manage the lake's fisheries. The semi-  
40 autonomous, coordinating decision centers with overlapping authority correspond to a  
41 polycentric system.

42           Co-management was expected to improve fisheries management and outcomes by  
43 increasing compliance of fisherfolks with regulations (Raakjær Nielsen et al., 2004). However,  
44 co-management has been failing, and illegal and overfishing has been rising (Nunan, 2020). On  
45 January 1, 2018, Tanzania's central government started Operation Sangara, a crackdown on  
46 illegal fishing by seizing and burning illegal fishing gear that took lower-level decision centers  
47 by surprise (Mudliar, 2018). The exclusion of lower-level authorities from the Operation  
48 resembles a fragmented polycentric system, one in which coordination between higher and  
49 lower-level decision centers is actively discouraged (Pahl-Wostl and Knieper, 2014). Thus, this  
50 study seeks to investigate how may interactions fragment decision centers?

51           Fragmented systems are dysfunctional because isolated decision centers result in a loss of  
52 effectiveness and efficacy (Biddle and Baehler, 2019; Carlisle and Gruby, 2019; Pahl-Wostl and  
53 Knieper, 2014). Fragmented systems with unclear or unestablished procedural rules are less  
54 likely to produce cooperative outcomes (Berardo, Olivier, and Lavers 2015). Yet, decision  
55 centers in fragmented systems can self-organize to tackle cross-sectoral problems, despite  
56 institutional and actor complexity (Bodin, 2017; Galaz et al., 2012; Kellner et al., 2019; E.  
57 Ostrom, 2010; V.Ostrom et al., 1961). For instance, Galaz et al. (2012) hypothesize that even in  
58 fragmented polycentric systems, decision centers not subject to authoritative control may self-  
59 organize and mutually adjust. However, the emergence of polycentric order is predicated on  
60 building cooperative relationships and coordination, which itself is a challenge in fragmented  
61 systems (Berardo and Lubell, 2016; Fidelman and Ekstrom, 2012). Identifying and rendering  
62 visible the interactions that drive fragmentation can shed light on the processes and conditions  
63 that create dysfunctionalities in polycentric systems. This study also responds to calls to analyze

64 dysfunctionalities in polycentric systems to develop more nuanced theory that explains the  
65 promises and pathologies of polycentricity in different contexts (Biddle and Baehler, 2019;  
66 Carlisle and Gruby, 2019; Kellner et al., 2019; Villamayor-Tomas, 2018).

67 The article first reviews the different interactions in a polycentric system, followed by a  
68 description of the Institutional Analysis and Development (IAD) framework. I then describe  
69 Tanzania's Lake Victoria's fisheries and the qualitative case study methods. In Section 6, I report  
70 and discuss the results that suggest that the center deliberately wields its authority to avoid  
71 interactions with and withholds information and resources from lower-levels. Interactions  
72 between higher and lower-level decision centers take the form of non-cooperative coexistence  
73 and conflicts because lower-level centers are either unable or they are prevented from  
74 performing their functions without authority, information, and resources. Overall, these  
75 interactions fragment the polycentric system. Given the vacuum left in the management  
76 functions by lower-level decision centers, the central government takes control of enforcement  
77 operations, the culmination of which is Operation Sangara. I conclude in Section 7 with  
78 questions for future research.

79 **Section 2: Interactions in a polycentric system: The role of authority, information,**  
80 **and resources**

81 Polycentric systems have gained interest in fisheries governance because of their  
82 potential to promote broadest levels of interactions, involvement, and participation of decision  
83 centers and actors for increasing policy freedom at the local level and providing contextual  
84 solutions to local problems (Cvitanovic et al., 2017; Gelcich, 2014; Ostrom, 2010). Interactions  
85 are a key feature of polycentric systems (Koontz et al., 2015). There is a growing scholarship on  
86 examining interactions from a variety of polycentric contexts such as water governance (Baldwin  
87 et al., 2018; Biddle and Baehler, 2019; Kellner et al., 2019; Koontz, 2019); water markets  
88 (Garrick and Villamayor-Tomas, 2019); fracking (Heikilla, 2019), Nitrogen and Phosphorus  
89 governance (Ahlström and Cornell, 2018); fisheries governance (Carlisle and Gruby, 2018;  
90 Mudliar and O'Brien, 2021), and the water-energy nexus (Villamayor-Tomas, 2018).  
91 Understanding interactions is key for finding the right institutional fit in multilevel governance  
92 systems (Young, 2008) and for determining more flexible and adaptive forms of governance (da  
93 Silveira and Richards, 2013).

94 Interactions are defined as the ‘myriad ways in which governance actors and institutions  
95 engage with and react to one another’ (Eberlein et al., 2014). These interactions include  
96 cooperation, conflict and conflict-resolution, and competition (V. Ostrom et al., 1961; Stephan et  
97 al., 2019; Koontz et al., 2019). Cooperation is when government, non-government, academic,  
98 industry, and individual actors work together to advance mutually shared goals. Conflicts,  
99 defined as disputes and disagreements among actors may occur when decision centers have  
100 competing interests or goals with respect to governance choices (V. Ostrom et al., 1961).  
101 Competition provides a market logic for decision centers to respond to demands and provide  
102 public goods and services efficiently (Koontz et al., 2019).

103 Previous research suggests that authority, information, and resources are important for  
104 shaping interactions of decision centers (Koontz et al., 2019). Authority structures may hinder or  
105 incentivize cooperation, but no single authority structure can force actors to cooperate for policy  
106 formulation (Andersson and Ostrom, 2008). In theory, authority structures marked by a lack of  
107 vertical hierarchies allow multiple actors to participate together and share power in a cooperative  
108 setting (Koontz, 2019). The threat of outside regulatory authority may motivate participants to  
109 seek collaboration (Prokopy et al., 2014). Power imbalances can hinder collaboration (Innes and  
110 Booher, 2010). A flipside of cooperation is that cooperative linkages among higher level  
111 decision centers can retain and increase authority over lower-level decision centers (Mudliar and  
112 O’Brien, 2021).

113 Conflicts may arise if public goods are required at a scale that exceeds the authority of a  
114 single jurisdiction, disagreements among authorities on the need for public goods, or if one  
115 jurisdiction attempts to free-ride off the public-goods provision of another. Disputes can arise  
116 over who has appropriate authority to make decisions when authorities overlap, inadequate and  
117 ambiguous authority, rule interpretation by authorities, power imbalances, and monitoring and  
118 enforcement operations (Biddle and Baehler, 2019; Heikilla, 2019; Favero et al., 2016; Mudliar  
119 and O’Brien, 2021; Orchard and Stringer, 2016; Young, 2010). Conflicts may also occur when  
120 authorities provide limited participation arenas (Castro and Nielsen, 2001).

121 Conflict-resolution mechanisms may enable fair and open contestations, dialogue, and  
122 engagement of actors to discuss conflicting ideas and information and settle disputes (Heikilla,  
123 2019). Opportunities for fair and open contestation, dialogue, and engagement with relevant  
124 actors, with recognized authority to participate can shape conflict-resolution outcomes.

125 Sometimes even if authority brings together conflicting actors, it may not lead to changes in  
126 values, which hinders actors from crafting mutually beneficial agreements (Muñoz-Erickson et  
127 al., 2010). Competition to provide and deliver public goods to citizens may drive overlapping  
128 authorities to produce goods more efficiently (Carlisle and Gruby, 2019; Garrick and  
129 Villamayor-Tomas, 2019). Garrick and Villamayor-Tomas (2019) found that distribution of  
130 authority among decision centers can create a dynamic tension and lead to potential conflict  
131 between decentralized governance of irrigators and local water users, and institutions to address  
132 sectoral competition and the redistribution of water across jurisdictions.

133 Information is critical for planning in collaborative settings (Emerson, Nabatchi, and  
134 Balogh, 2012). Frequent information-sharing helps build relationships in multi-jurisdictional  
135 decision-making (Cosens, 2013). Authority structures and complex bureaucracies may impede  
136 information-sharing among decision centers, preventing cooperation (Mudliar and O'Brien,  
137 2021). Further, not just the lack of information, but ambiguity in information or  
138 misinterpretations of laws and policies may foster conflicts (Mudliar and O'Brien, 2021).  
139 Successful conflict-resolution may depend upon information with actors and how that  
140 information is exchanged (Emerson et al., 2009). Information asymmetries can influence the type  
141 and effectiveness of organizations competing with each other and provide mechanisms to  
142 reallocate resources on a competitive basis (Garrick and Villamayor-Tomas, 2019).

143 Resources are a key element that provide capacity for decision centers in polycentric  
144 systems to work together (Berardo and Lubell, 2016). Resource-sharing and funding for joint  
145 production and service contracting among decision centers can spur cooperation (Koontz, 2019).  
146 The lack of resources can prevent decision centers from participating in cross-scale collaborative  
147 venues (Mudliar and O'Brien, 2021; Wyborn, 2019). Decision centers can use resources and  
148 information to pursue conflicting aims in different venues or can frame conflicts around  
149 particular information sources. Access to resources can enable venue shopping and may create  
150 conflicts while limiting the efficiency of conflict-resolution processes (Heikilla, 2019).  
151 Resources can build networks and collaboration with non-state actors to facilitate conflict-  
152 resolution (Heikilla, 2019).

153 Authority, information, and resources interact to affect patterns of competition.  
154 Information and resource asymmetries can justify the devolution of authority from river basin  
155 organization to second-order organizations to generate and disseminate information about water

156 use and demand and provide mechanisms to reallocate water on a competitive basis (Garrick and  
157 Villamayor-Tomas, 2019). In a context of scarce resources, citizens are unduly burdened when  
158 overlapping authorities compete with each other to raise revenue (Lieberman, 2011; Mudliar and  
159 O'Brien, 2021).

160 In addition to cooperation, conflict and conflict-resolution, and competition, scholars  
161 have identified interactions such as coexistence where decision centers complement one another  
162 without interacting (Jordan et al., 2015); and resistance, where decision centers resist the  
163 authority of other decision centers (Mudliar and O'Brien, 2021). These interactions need more  
164 elaboration in the polycentric literature to understand what activates these interactions and how  
165 decision centers achieve their policy goals and outcomes.

### 166 **Section 3: The Institutional Analysis and Development Framework**

167 Scholars have used the IAD framework to examine how authority, information, and  
168 resource shape cooperation, conflict and conflict-resolution, and competition (Koontz et al.,  
169 2019). Action situations includes actors who possess authority, information, and resources  
170 (Koontz et al., 2019). Action situations are affected by exogenous factors (e.g., community  
171 attributes and features of the biophysical context). An action situation leads to interactions  
172 among actors. This study will focus on a key feature of the IAD framework, i.e., the multiple  
173 levels of action: constitutional, collective, and operational-choice levels (Ostrom, 1990). The  
174 levels of action aid in understanding and explaining the extent and mechanisms of endogenous  
175 change in polycentric settings (Blomquist and Schrodër, 2019).

176 The constitutional-choice level is where actors constitute the decision-making body to  
177 collectively make rules and how the rules will be carried out. Constitutional-choice processes  
178 include formulation, governance, adjudication, and modification of those decisions (Ostrom,  
179 1990). An example is the creation of policies and acts designed to establish power-sharing and  
180 collaboration among higher and lower-level decision centers. Collective-choice activities include  
181 policymaking, management, and adjudication of policy decisions. Collective-choice activities  
182 involve interactions among decision makers to identify, prioritize, plan and strategize  
183 implementation of actions to improve social and environmental conditions. A key result of  
184 collective-choice activities is a set of operational rules about how a resource is to be used or how  
185 collective work is to be done (Ostrom, 1990). Examples include decisions on how to allocate  
186 their organization's budget or a rule that fishers must only use a certain type of gear for fishing.

187 These activities often improve the flow of information among decision centers, resulting in  
188 coordinated management.

189 Operational-level activities include day-to-day activities such as appropriation, provision,  
190 monitoring, and enforcement (Ostrom, 1990). Such activities are affected by the collective rules  
191 concerning when, where, and how to manage a resource, who should monitor the actions of  
192 others, what information must be exchanged or withheld, and what rewards and sanctions will  
193 be assigned to different combinations of actions and outcomes (Ostrom, 1990, p.52). Operational  
194 activities in fisheries include enforcing regulations, performing technical studies, promoting best  
195 management practices among fishers, and conducting education and outreach campaigns.

#### 196 **Section 4: Study Context**

197 Lake Victoria shared by Tanzania (51%), Uganda (43%), and Kenya (6%) is the second  
198 largest freshwater lake in the world and the world's largest freshwater fisheries. The lake was  
199 once rich in species diversity, with a thriving fishery based on two endemic species of Tilapia  
200 and over 600 species of Haplochromis (Balirwa et al., 2003). The British colonists introduced  
201 Nile perch in 1954 that radically transformed Lake Victoria's fisheries, with overseas and  
202 regional markets developing for the newly introduced fish. The open-access nature of the  
203 fisheries in Lake Victoria spurred migration to the lake basin, increasing population, and  
204 depleting fish stocks. More than 4 million people live in the Tanzania catchment of the lake and  
205 depend directly or indirectly on the lake for livelihood and food security. The Tanzania portion  
206 of the lake accounts for over 60% of the total national fish production with three prominent  
207 commercial fish species, the non-native Nile perch (*Lates niloticus*) and Nile tilapia  
208 (*Oreochromis niloticus*), and the indigenous sardine-like fish *Rastrineobola argentea* (mukene).

#### 209 ***Devolution and co-management in Tanzania***

210 In 1961, Tanzania emerged from independence with colonial institutions intact that acted  
211 as agents of the central government instead of representing local concerns (Picard, 1980). From  
212 1961 to 1982, Tanzania established, abolished, and reestablished Local Government Authorities  
213 (LGAs) to enhance local participation in development. In 1996, the central government started  
214 "Decentralization by Devolution" (DbyD) to devolve responsibilities of funds and personnel to  
215 district councils (Mollel and Tollenar, 2013).

216 During DbyD, fisheries management was also decentralized to lower-level decision  
217 centers to replace centralized control. BMUs were formed to involve fisherfolk in fisheries

218 management and end detrimental fishing practices of using poison and dynamite (Eggert and  
219 Lokina, 2009). While BMUs succeeded in reducing the use of poison and dynamite (Lokina,  
220 2009), illegal and overfishing has risen since 2000s. Regulations prohibit gillnets with mesh  
221 sizes larger than six inches, beach seine and monofilament nets, and fishing in breeding areas  
222 during closed seasons but these regulations are poorly enforced.

223 At the central level, the Ministry of Livestock and Fisheries Development includes the  
224 departments of Fisheries, Fisheries Planning, Fisheries Resources Protection Unit (FRPU), Fish  
225 Quality and Marketing and makes policy. At the county level, the Ministry of Local  
226 Governments implements fisheries regulations. Counties consist of a district; a district consists  
227 of wards; and several villages make up a ward. BMUs are local organizations responsible for  
228 fisheries management in their landing site, limited to one village and sometimes a few villages.  
229 Anyone engaging in any fishery activities, including fishers, fish processors, fish mongers,  
230 traders, processors, boat and net repairers, gear repairers and suppliers, and boat builders, is  
231 included in a BMU. A BMU committee consists of 9-15 members elected from the local  
232 population.

### 233 **Section 5: Methods**

234 Qualitative case studies are appropriate for identifying interactions across the  
235 constitutional, collective, and operational-choice levels in Tanzania's Lake Victoria's  
236 fisheries. Case study approaches corroborate or falsify existing concepts or theory, or develop  
237 new concepts or theory (George & Bennet, 2005). Semi-structured interviews with government  
238 officers and fishers, group discussions with BMUs, and policy documents helped triangulate data  
239 (Yin, 2009). A workshop at the Lake Victoria Fisheries Organization. (LVFO), Jinja, Uganda in  
240 February 2018 helped initiate contact with the Tanzania Fisheries Research Institute (TaFIRI).  
241 Association with the LVFO enabled access to visible, but hard-to-recruit central and local  
242 government fisheries officers in Tanzania from February to March 2018. Through snowball  
243 sampling, 15 in-person semi-structured interviews were conducted with local government  
244 officers (e.g., municipal and ward officers) (n=3), central government officers (n=5), county  
245 governor/politician (n=1), and scientists (n=6) in English. One group discussion was conducted  
246 with a BMU in Swahili. A scientist from TaFIRI translated from Swahili to English. 10  
247 interviews were conducted with fishers (n=8) and local fisheries officers (n=2) in 2017. In total,  
248 25 interviews from three landing sites were conducted.



249           Semi-structured interviews included open-ended questions on interactions of decision  
250 centers, issues and factors that foster and hinder interactions, challenges in working together,  
251 roles and functions of officers, and information and resource-sharing with decision centers.  
252 Interviews were 60-90 minutes, conducted at the workplace of interviewees. Since interviewees  
253 shared confidential and politically sensitive information, positions of the interviewees and the  
254 landing sites are not named. All interviews were recorded and transcribed verbatim. The  
255 National Fisheries Policy 2015, Fisheries Act of 2003, and Fisheries Regulations of 2009 were  
256 included in the document analysis. Interview transcripts and documents were coded in QSR  
257 NVivo V.12.6.0. A codebook was created with code, description, and example following  
258 DeCuir-Gunby, Marshall, and McCulloch (2011). I labeled segments of text with codes of  
259 authority, information, and resources, and interactions, and then mapped these codes to the  
260 constitutional, collective, and operational-choice levels of the IAD framework.

## 261           **Section 6: Results and Discussion**

262           Here I present the findings of the case study to illustrate how authority, resources, and  
263 information-sharing shape interactions of decision centers at the constitutional, collective, and  
264 the operational-choice levels.

### 265           ***6.1 Constitutional-choice level: Establishing decision centers***

266           The constitutional level is where actors constitute the decision-making body that will  
267 collectively make rules, such as deciding whom to include in decision-making and how the  
268 decisions and rules will be carried out.

#### 269           *Authority*

270           Interviewees said that central government departments regularly cooperate for  
271 policymaking. While the Ministry of Livestock and Fisheries formulates policy, and the Ministry  
272 of Local Government is supposed to implement policy, both governments designate officers to  
273 implement policy. Thus, the central government plays a role in both, policy formulation and  
274 implementation. Functions of officers from both governments overlap, but differences in their  
275 policy implementation roles and responsibilities are not defined. Overlaps without clarifying  
276 responsibilities can lead to confusion (da Silveira and Richards, 2018; Mudliar and O'Brien,  
277 2021; Song et al., 2010).

278           All local authorities are accountable to the central government, and only the central  
279 government has authority to resolve conflicts between local authorities. If local authorities

280 mismanage their functions, the central government can take over their functions and remove or  
281 suspend local officers. In 2017, the central government suspended local fisheries officers on  
282 charges of corruption. Regulations authorize, but do not require, collaborations between the  
283 government and BMUs. Thus, authority is largely vested with the central government.

284         The BMU executive body is constituted by elections. Shadow authorities such as local  
285 politicians attempt to install their candidates in the BMUs by rigging or interfering in elections.  
286 Interviewee 10 said, “The election of leadership in the BMU is based on the most influential  
287 local politicians who may be illegal fishers or who may not even be fishers.” Nunan (2020)  
288 documents this phenomenon, where shadow authority figures such as politicians, invisible in  
289 official policy documents, influence the task of constituting the BMUs by not cooperating with  
290 legitimate processes of elections. This interaction is a variation of coexistence, where decision  
291 centers coexist, but instead of complementing each other, they exist in an uneasy tension, aimed  
292 at undermining other decision centers.

### 293         *Information*

294         The authority of and information-sharing from the Ministry to the departments fosters  
295 collaboration in the central government for policymaking. Interviewee 9 said, “We have direct  
296 communication with the Ministry. Within our ministry there is a lot of collaboration because we  
297 are getting directives directly from the Minister to make policy.” This kind of information-  
298 sharing is unique only within the central government. Constitutional-choice rules encourage the  
299 central government to consult and inform local authorities, but rules authorizing downward, and  
300 upward flow of information are absent. Thus, interactions between governments for information-  
301 sharing take the form of non-cooperative coexistence.

### 302         *Resources*

303         There are no rules for resource-sharing, but the central government is supposed to  
304 provide funds to local government. The central government has established a Fisheries Trust  
305 Fund for managing fisheries, but interviewees said that there are no funds to operationalize the  
306 Fund. Resources rarely reach the BMUs, who are expected to work voluntarily. Interviewee 15  
307 said, “When the BMU comes in, it is at a low profile because they are not financed. They are not  
308 powerful, and they are not as empowered as the government.” According to interviewees and as  
309 documented by other scholars, funds are perpetually insufficient to cover costs (Nunan, 2020),  
310 resulting in non-cooperative coexistence.

311 Overall, authority is distributed across higher, lower, and community decision centers,  
312 but authority rests with the central government to formulate and implement policy. There is  
313 cooperation among higher-level decision centers for policymaking. Shadow authorities and  
314 BMUs do not cooperate with each other. Non-cooperative coexistence is seen between higher  
315 and lower-levels for information and resource-sharing. Such increase in authority at the center  
316 can set the stage for potential regime realignment through external shocks (Morrison, 2017).

317 ***6.2: Collective-choice Level: Planning among decision centers***

318 The collective-choice level is where actors craft rules, develop plans that identify,  
319 prioritize, and strategize implementation of actions to improve social and environmental  
320 conditions.

321 *Authority*

322 The structure of the devolved government, determined at the constitutional-level, where  
323 the central government makes policy and the local government implements policy, is not  
324 conducive to cooperation for planning between both governments. Instead, it creates a perception  
325 that the local government's planning is inadequate, creating conflicts between both centers.  
326 Interviewee 1 said, "Cooperation is difficult because they are two different ministries, and they  
327 have different interests. They have to decide only their own agenda, so it is difficult. There are  
328 several clashes." Even without conflicts, the structure encourages a non-cooperative coexistence  
329 between both authorities. Interviewee 3 said,

330 The structure challenges the management of resources. The local government has full autonomy,  
331 and I cannot tell them what to do. Sometimes, the way they are doing things is probably not the  
332 way I would like to see. The guide is here at the national level, but the local government is not  
333 doing enough to make sure that we are moving in the same direction. If I find somebody in the  
334 local government is mismanaging the resources, then I have the power to jump in, but I cannot tell  
335 them how to implement the law. I can tell them I don't want to see illegalities in budget  
336 management, but I cannot tell them how to manage the budget.

337 Even though co-management was supposed to be a power-sharing, collaborative  
338 arrangement between governments and fishers, co-management has been a top-down approach.  
339 A fisher said, "The government just came and stipulated some guidelines for the BMU. The  
340 condition was that if you want your landing site to be registered, then you have to form a BMU.  
341 Otherwise, the landing sites will not be registered and will be considered illegal, and that we are  
342 all illegal fishers." Without being considered as true partners, BMUs lack independent authority

343 to manage their landing sites. Interviewee 5 said, “BMUs have to take permission from the local  
344 authorities for everything, but they are left out of decision-making and are still expected to fulfil  
345 their functions.” The exclusion of the BMUs from decision-making results in BMUs existing  
346 without being able to cooperate with local authorities.

347 In implementing top-down co-management, existing community-level institutions and  
348 authority were not sufficiently considered. The Fisheries Regulations states that the BMUs and  
349 the Village Councils (VCs) can develop by-laws and undertake MCS operations, but the  
350 overlapping authority of VCs and BMUs has led to some VCs perceiving that BMUs will replace  
351 them. Interviewee 15 elaborated, “Conflicts have occurred because of the perception that the  
352 BMUs will coopt the tasks of the VCs. The BMUs are not doing everything. They are working  
353 on fisheries, and this role has never been a part of the village government. But the VC feels like  
354 it is being threatened, with a fear of being subordinated by the BMUs.” Thus, conflicts due to  
355 overlapping authority arise since new decision centers were created without accounting for  
356 existing decision centers. While the central government is authorized to resolve conflicts among  
357 local authorities, it has not resolved these conflicts. Conflicts are considered to indicate an  
358 overall lack of coordination among decision centers (Blomquist and Schröder, 2019). Less  
359 functional polycentric systems are characterized by few opportunities for conflict-resolution  
360 (Biddle and Baehler, 2019).

361 Shadow authorities such as local politicians hinder fisheries officers and BMUs from  
362 planning their activities. Politicians routinely delegitimize fisheries regulations and encourage  
363 illegal fishing to gain votes from fishers. Interviewee 10 said,

364 Elected leaders openly contradict government policy. When a political leader supports an activity,  
365 there is no one who can say that this is illegal. This makes the illegal fishers stronger because they  
366 are supported by strong people. Politicians are unable to collaborate with the BMUs and Fisheries  
367 Department. When you meet them, they might say, yes, illegal fishing should not be allowed. But  
368 then they go to fishers and allow illegal fishing because they want the vote.

369 Thus, actors not in-charge of management are more powerful than actors authorized to  
370 manage fisheries, resulting in non-cooperative coexistence between politicians and fisheries  
371 officers. A fear of politicians prevents conflicts between politicians and fisheries officers because  
372 if fisheries officers complain against politicians, they are transferred to a new position.  
373 Interviewees said politicians are influential at all levels of governance, right from the local level  
374 to the top, confirming previous findings of political interference in co-management (Mudliar,

375 2020; Mudliar and O'Brien, 2021; Nunan 2020). Thus, powerful shadow actors, not included in  
376 policy, can hijack and break existing institutions for their own self-gain (Huppé et al., 2012).

377 *Information*

378 There are conflicts between central and lower-levels without constitutional-choice  
379 information-sharing rules. Interviewees said that the last time that the Ministry convened an  
380 information-sharing forum was in 2005. Without information-sharing, officers cannot plan  
381 together for management activities. Interviewee 3 said, "What we need to share, so that we move  
382 together, is information. If somebody is not informed, the plans are just under the carpet, and  
383 services are not delivered to the people." In the absence of information-sharing, the perception  
384 that local fisheries officers promote illegalities is intensified. Interviewee 17 said, "We need to  
385 collaborate, sit together, and discuss challenges and solutions rather than assuming that everyone  
386 knows everything. The central government thinks that the local government is facilitating illegal  
387 fishing and that we are not good people, but if we come together, we can discuss and resolve the  
388 issues." This finding reiterates the importance of information for shaping conflict and conflict-  
389 resolution (Heikilla, 2019). Rules for resolving conflicts between central and local governments  
390 are absent.

391 In the backdrop of weak constitutional-level information-sharing rules, governments  
392 rarely interact and communicate with BMUs for planning. Any information-sharing that occurs  
393 between local authorities and BMUs is sporadic and occurs once in two years or more. This  
394 prevents capacity-building of BMUs and affects their ability to function, reinforcing their non-  
395 cooperative coexistence. Interviewee 11 said,

396 BMUs don't have enough knowledge, and they think they don't have much to do. We are then  
397 expecting the BMUs to have the same language and perception of management that the  
398 government has, without ever communicating with them. If the government really believes that  
399 BMU are partners and treats them as such, that can co-manage the fisheries, but that has not yet  
400 happened until now.

401 Thus, information-sharing does not occur between governments and BMUs and results in  
402 non-cooperative coexistence. Without cross-sectoral linkages, processes of cooperation, learning,  
403 and resource distribution in polycentric systems is hampered (Fischer and Maag, 2019).

404 *Resources*

405 A lack of resources prevents BMUs from planning activities. Interviewee 6 said, "The  
406 local government collects funds from the fishing communities, and they are supposed to put it

407 back into the community. But, if it goes back, it goes to the VCs and not the BMUs. So BMUs  
408 can't plan without funds." A lack of resources prevents not just the functioning of the BMUs, but  
409 also prevents their participation at conferences at regional and national meetings. Thus, most  
410 BMUs are existing with little ability to carry out their tasks. As Interviewee 11 said, "BMUs still  
411 exist in Tanzania. Some are working, but majority are just existing, doing nothing." This lack of  
412 resources excludes and marginalizes BMUs from decision-making and results in a non-  
413 cooperative coexistence.

414 Overall, lack of sufficient authority, information, and resources prevent cooperation for  
415 joint planning. Instead, interactions of conflicts, and non-cooperative and non-coordinating  
416 coexistence occur due to unclear or absent constitutional-level rules. Unintended and  
417 spontaneous overlaps between village level authorities and BMUs, and between shadow  
418 authority figures and fisheries officers result in conflicts and non-cooperative coexistence.

### 419 ***6.3: Operational Choice Level: Implementation***

420 The operational level is where actors perform on-the-ground actions, such as conducting  
421 MCS operations, education and awareness activities, and collecting revenue.

#### 422 *Authority*

423 Different mandates of the central and local government create conflicts for enforcing  
424 regulations. Interviewee 10 said, "The district director is interested in revenue while the national  
425 fisheries director is interested in conservation. The fisheries officer will not listen to the national  
426 regulation because if he is not bringing in money, then he is redundant. This sort of conflict  
427 between both governments really affects fisheries management." Despite having different  
428 mandates, both governments undertake enforcement, creating an overlap made possible by the  
429 constitutional-choice rules that authorizes enforcement to both governments. Without a clear  
430 delineation of the functions of central and local governments at the constitutional-level, the  
431 overlap creates conflicts between them at the operational-level. Interviewee 5 said,

432 The local government also has fisheries officers i.e., District Fisheries Officers (DFOs). They are  
433 responsible for law enforcement and for we are responsible for it, too. We mainly deal with the  
434 hotspot areas where we think we need to intercept, and local government may also be there. There  
435 is an overlap there, which results in a conflict over who is the manager. They feel like they are the  
436 ones who own the fisheries people and the resources. But as a center we are responsible for the  
437 entire region.

438 Notwithstanding overlaps, higher and lower-level authorities do not collaborate with each  
439 other for enforcing regulations. Instead, interviewees said that the Ministry deliberately excludes  
440 local authorities from joint patrols, resulting in a non-cooperative coexistence. Such an absence  
441 of vertical social ties implies a misalignment of collaborative structures and ecological issues,  
442 contributing to dysfunctionality (Sayles and Baggio, 2017).

443 The lack of clarity in the functions of officers from both governments creates conflicts for  
444 local fisheries officers. According to the Fisheries Resources Act, ward officers are employed by  
445 the local government, but are expected to follow the central government's orders. Interviewee 14  
446 said, "The DFO wants money, but the Ministry wants to limit fishing. The ward fisheries officer  
447 is stuck in the middle then. Should he listen to the DFO who is his employer or the directorate of  
448 fisheries? So, there are some conflicts." Similarly, BMUs face confusion over who has authority  
449 over them. Interviewee 5 said, "There is a conflict between BMUs, local government, and the  
450 central government about who is the boss. So, if I [central government] say 'don't do this' and  
451 the DFO says, 'do this', it is a problem for the BMU. So, there is a dilemma for them regarding  
452 from whom they should get the command." Such confusion over authority in the management of  
453 Lake Victoria's fisheries has been noted by Lawrence (2013). Interviewees said that conflicts  
454 over different centers claiming and holding authority create difficulties for accountability. Other  
455 scholars have noted that increasing institutional complexity diminishes accountability because no  
456 center claims responsibility (Bixler, 2014; Lieberman, 2011; Mudliar, 2020; Wyborn 2015).

457 Conflicts arise due to the overlapping authority of the fisheries officers and BMUs.  
458 BMUs patrol the lake and collect fish levies at the landing site—activities that local fisheries  
459 officers once conducted. Interviewee 12 said, "There is a conflict between fisheries officers and  
460 the BMUs because they are struggling for power. The BMU's activities were once performed by  
461 the fisheries officers, so they feel that their power has been reduced and it makes them furious."  
462 The overlap of functions between the fisheries officers and the BMUs has led to fisheries officers  
463 perceiving a threat to their authority.

464 Finally, since the BMUs were constituted in a top-down manner, the fishing community  
465 considers the BMUs to be an extension of the government. Interviewees said that fishers rarely  
466 follow regulations and frequently engage in conflicts with the BMUs, undermining the BMU's  
467 authority. Marshall, (2009) documents a similar finding from farmers in Australia adopting  
468 strategies to oppose government bodies and groups perceived to be allied with the government.

469 *Information*

470 Since constitutional-level information-sharing between higher and lower-levels are  
471 absent, there are conflicts between both governments at the operational-level. Interviewee 5 said,  
472 “Sometimes the local authorities complain that they don’t have enough funds for carrying out  
473 law enforcement, but do they communicate to us so that we can then see which area to assist? So,  
474 this is a problem. It is a communication problem.” The central government, too, does not  
475 communicate with lower-levels, but actively suppresses information, contributing to conflicts.  
476 Interviewee 5 said, “According to protocol, if they [central government] come into my area, they  
477 have to inform me before hand, but we lack that information. If they tell me, I will at least know  
478 that such an activity is being conducted in my area. They feel that we will discourage those  
479 exercises.” A central government officer justified the suppression of information, “When we go  
480 to the districts for enforcing a law, we get complaints from the district that we went without  
481 informing them. They [local government] want us to inform them, but if I am doing something  
482 good, why should you complain?” Without information from the central government, the local  
483 government’s authority is undermined among fishers and BMUs. A local officer said, “We are  
484 government officers and we, too, are in-charge of managing the fisheries. It is better to hear from  
485 them than hear from the fishing community and admit to them that we don’t know about those  
486 things.” In the absence of information-sharing, stakeholders are unable to use information to  
487 coordinate operations, thereby cementing fragmentation (Jasny and Lubell, 2015). At the  
488 community-level, perverse cooperation for information-sharing among fishers is high to avoid  
489 getting caught during patrols. Interviewee 10 said, “Apprehending illegal fishers is difficult. If  
490 your brother is an illegal fisher and you need to make a patrol, they will tip the brother and say,  
491 “tomorrow we are conducting a patrol, so please don’t go.”

492 *Resources*

493 The success of polycentric governance systems depends upon decision centers having  
494 sufficient resources to perform activities (Cvitanovic et al., 2018). A lack of resources from the  
495 central government and the central government’s authority prevents higher and lower-levels  
496 from conducting joint enforcement operations. Interviewee 10 said, “Cooperation will happen  
497 when the national level will tell the FRPU to work with the local government. The FRPU cannot  
498 protect the resource effectively because patrolling depends on the budget. If they don’t have  
499 money, they cannot involve the local fisheries officers because there are no funds to support



500 them.” Limiting funds is one way that central governments exert control over local authorities  
501 (Aworti, 2011; Kakuma, 2010). In the absence of resources, there are non-functional overlaps in  
502 enforcement, where decision centers are in a non-cooperative coexistence. A similar interaction  
503 is seen in the overlap for licensing functions. The central government is not as spread out at the  
504 district, which prevents it from licensing all fishers, but they are prevented from coordinating  
505 with lower-levels. While the DFOs are spread out, they lack the resources for licensing fishers.  
506 Thus, licensing functions create a non-functional overlap, resulting in non-cooperative  
507 coexistence, where licensing is either stalled or slowed down. Licensing was meant to limit  
508 fishers on the lake but has turned into a revenue generation instrument. Without coordination  
509 between these interlinked activities and between decision centers, ecological fit is compromised,  
510 which is essential for the functioning of ecosystems (Biggs et al., 2014).

511 A lack of resources impedes cooperation between the BMUs and the fisheries officers for  
512 enforcement operations. When BMUs find an unregistered boat on the lake they communicate  
513 with the fisheries officers for registering the boat. Without resources to reach the BMUs on the  
514 lake, local government officers are unable to provide the necessary back up. With scarce  
515 resources and inadequate authority, existing provisions are underused. Thus, effectiveness of  
516 enforcement of regulations is reduced, and decision centers coexist without cooperation. An  
517 underuse of existing provisions indirectly undermines the rigor of the regime and the capacity of  
518 the regime to address preexisting problems (Morrison, 2017).

519 The lack of resources enables a perverse kind of cooperation for corruption among  
520 decision centers. Interviewee 10 said, “Without resources, patrollers promote corruption and  
521 bribe culture. Because they don’t have funds, if they find someone with mistakes, they just try to  
522 get money from him. So illegal fishing continues in that way.” Interviewee 20 said, “We are not  
523 paid as BMU leaders. Someone can approach me with 200,000sh (\$86 USD) and asks me to  
524 allow them illegal fishing. Can I refuse that money given how we suffer without resources?”  
525 Thus, corruption disrupts and undermines any enforcement operations, resulting in chaos. Rent-  
526 seeking behavior, where governmental representatives abuse their power and role to increase  
527 their own benefits rather than caring for the provision of public goods, impedes coordination, and  
528 the lack of coordination encourages rent-seeking (Pahl-Wostl and Knieper, 2014).

529 Thus, at the operational level, except for cooperation for corruption, lower-level decision  
530 centers are either excluded by the central government from undertaking their functions or a lack

531 of resources prevents them from executing their functions, resulting in conflicts and non-  
532 cooperative coexistence. Similar to the interactions at the collective-choice level, interactions of  
533 conflicts and non-cooperative existence occur because of unclear or absent constitutional-level  
534 rules.

535 *Operation Sangara*

536 To address corruption and illegalities in fisheries due to perverse cooperation, conflicts,  
537 and non-cooperative coexistence, the central government started Operation Sangara (Operation  
538 Save the Nile Perch) by burning boats and illegal fishing gear. While constitutional-choice rules  
539 authorize the central government to take over local-level functions in cases of mismanagement,  
540 the rules also require the central government to notify the mismanaging authority to show cause.  
541 However, interviewees said that Operation Sangara was implemented without prior warning.  
542 Interviewee 3 justified the Operation, “Yes, it is purely top-down. What do you do when things  
543 go out of control? There used to be eleven fish processing plants, but right now there are five in  
544 Mwanza and three in Soma. These are working under capacity. I mean how can you tolerate  
545 that?”

546 Only central government officers i.e., the FRPU, police, and central government fisheries  
547 officers participate in Operation Sangara. Interviewees said that the center neither collaborates  
548 nor does it inform local officers about the Operation because of corruption, or shares resources  
549 with local governments to solicit their involvement. Thus, there is cooperation with and an active  
550 flow of information and resources among higher-level actors to execute the Operation, but cross-  
551 scale linkages for collaboration, information, and resource-sharing with local authorities are  
552 deliberately suppressed. A local fisheries officer said, “They [The Ministry] want the Ministry to  
553 be in-charge of the fisheries sector, but we are the ones who are working at the grassroots.  
554 Maybe because they are at the top, they think that there is no need to cooperate with us.” Such  
555 kind of horizontal cooperation at higher levels increases authority and oversight over lower-level  
556 decision centers (Mudliar and O’Brien, 2021). Arrangements that increase oversight of actors at  
557 the center without modifying existing arrangements have the potential for regime conversion as  
558 well as realignment by powerful actors at the center (Morrison, 2017).

559 When asked about the ability of the government to co-manage fisheries with fishers after  
560 the Operation, Interviewee 3 said, “We are not creating fear. Probably we are creating fear,  
561 undermining people’s capabilities, but, for us as a government, this is the only way we can tell

562 the people to stop illegalities. We will work with fishers after this. But the Operation is a  
563 warning to fishers.” At the time of fieldwork, all interviewees agreed that conditions on the lake  
564 were more chaotic than ever with fishers fearing and distrusting the government. Altogether,  
565 unclear and absent constitutional-level rules give the central government authority to suppress  
566 information and resource-sharing that then drives interactions of conflicts and non-cooperative  
567 interactions among decision centers to create a fragmented system with thriving illegalities.  
568 Under the guise of eliminating illegalities, Operation Sangara consolidates control with the  
569 central government.

570 Overall, findings indicate interactions of cooperation, conflicts, and non-cooperative  
571 coexistence, and perverse cooperation among decision centers (see Table 1 below). Two  
572 instances of cooperation are seen among higher-level authorities at the constitutional-choice  
573 level. Eight instances of conflict occur, all at the collective and operational-choice levels. Out of  
574 these, three occur at the collective-choice level and five occur at the operational-choice levels.  
575 Fourteen instances of non-cooperative coexistences occur at all three levels. Out of these  
576 fourteen, three occur at the constitutional level, five occur at the collective-choice levels, and six  
577 occur at the operational-level. Thus, non-cooperative coexistence is the most frequent  
578 interaction, followed by conflict. These interactions are most responsible for fragmentation and  
579 isolation of decision centers.

580 Sorting across factors that shape interactions, authority shapes two cooperations among  
581 higher-level centers at the constitutional-choice and the operational-choice level. Authority  
582 shapes six conflicts and five non-cooperative coexistences. Information shapes two cooperations,  
583 two conflicts, three non-cooperative coexistences, and one perverse cooperation. Resources  
584 shapes one cooperation, five non-cooperative coexistences and one perverse cooperation. Thus,  
585 authority and resources shape most of the interactions of conflicts and non-cooperative  
586 coexistences between higher and lower-level decision centers. Authority interacts with  
587 information and resources to create conflicts and non-cooperative coexistence. Overall,  
588 authority, information, and resources create noncooperative coexistence and conflicts between  
589 higher and lower-levels, and shape cooperation among higher-level decision centers to  
590 consolidate control at the center.

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Table 1: Authority, information, and resources shaping interactions across action levels

	<b>Constitutional-choice</b>	<b>Collective-choice</b>	<b>Operational-choice</b>
<b>Authority</b>	<ul style="list-style-type: none"> <li>-Cooperation among higher-levels for policymaking</li> <li>-Despite overlaps, interactions between higher and lower-levels are unclear</li> <li>-Non-cooperation between shadow figures and BMUs</li> </ul>	<ul style="list-style-type: none"> <li>-Conflicts between higher and lower-levels for planning</li> <li>-Non-cooperative coexistence between higher and lower-levels for planning</li> <li>-Non-cooperative coexistence between BMUs and governments for planning</li> <li>-Conflicts between overlapping authority of Village Councils and BMUs</li> <li>-Non-cooperative coexistence between shadow figures and fisheries officers for planning</li> </ul>	<ul style="list-style-type: none"> <li>-Conflicts between higher and lower-levels during enforcement</li> <li>-Non-cooperative coexistence between higher and lower-levels for enforcement</li> <li>-Conflicts among decision centers over authority</li> <li>-Conflicts between BMUs and fisheries officers due to perceived reduction in authority among fisheries officers</li> <li>-Conflicts between BMUs and fishers</li> <li>-Horizontal cooperation among higher-levels for Operation Sangara</li> <li>-Non-cooperative coexistence between higher and lower centers for Operation Sangara</li> </ul>
<b>Information</b>	<ul style="list-style-type: none"> <li>-Cooperation among higher-levels for policymaking</li> <li>- Non-cooperative coexistence between higher and lower-levels without information-sharing rules</li> </ul>	<ul style="list-style-type: none"> <li>-Conflicts between higher and lower-levels without information-sharing</li> <li>-Non-cooperative coexistence between governments and BMUs for planning</li> </ul>	<ul style="list-style-type: none"> <li>-Conflicts between higher and lower-levels due to information suppression</li> <li>-Perverse cooperation among fishers to avoid detection by patrollers</li> <li>-Horizontal cooperation among higher-levels for Operation Sangara</li> <li>-Non-cooperative coexistence in the absence of information-sharing for Operation Sangara</li> </ul>
<b>Resources</b>	<ul style="list-style-type: none"> <li>-Non-cooperative coexistence between higher and lower-levels</li> </ul>	<ul style="list-style-type: none"> <li>-Non-cooperative coexistence among</li> </ul>	<ul style="list-style-type: none"> <li>-Non-cooperative coexistence between higher and lower-levels</li> </ul>

	without resource-sharing rules	decision centers due to a lack of resources	for enforcement and licensing -Non-cooperative coexistence between BMUs and local fisheries officers for enforcement -Perverse cooperation among decision centers for corruption -Horizontal cooperation among higher-level decision centers for Operation Sangara -Non-cooperative coexistence between higher and lower-levels for Operation Sangara
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595           According to V. Ostrom et al., (1961), formal independence means that decision centers  
 596 cannot do away with each other i.e., “they possess enough autonomy to maintain their existence  
 597 and cannot be abolished without reference to some overarching rules or processes” (Stephan et  
 598 al., 2019, pp. 31). In Tanzania, while decision centers are not abolished, the center controls  
 599 authority, information and resources, undermining lower-levels and their activities. An inability  
 600 of decision centers to perform their tasks creates pathologies. Pathologies can lead to proposals  
 601 to consolidate governance under a centralized authority (Mudliar and O’Brien 2021; Underdal  
 602 2010). Here, it is the centralized authority that drives pathologies by avoiding coordination with  
 603 and withholding information and resources from decision centers, which sets the stage for a  
 604 sudden operation to take control of fisheries with the justification of curbing illegal and  
 605 overfishing. Such a phenomenon has been documented by Morrison (2019) in the polycentric  
 606 governance of the Great Barrier Reef. Thus, the center not just fragments lower-level decision  
 607 centers, but also consolidates control by shocking the system. Scholars have previously  
 608 considered fragmented system with no coordination as distinct from polycentric systems (e.g.,  
 609 see Pahl-Wostl and Knieper, 2014; Vaas et al., 2017). In line with Biddle and Baehler (2019),  
 610 this study finds that fragmentation can occur within polycentric systems, where the system can  
 611 be transformed by dismantling essential functions, cross-scale linkages, and existing provisions,  
 612 while still preserving the structure of a polycentric system. The central government largely drives

613 these endogenous dysfunctional conditions, which allows them to take over fisheries  
614 management, resulting in chaos. Thus, this research demonstrates how a misalignment between  
615 institutions and the biophysical environment can occur in fragmented polycentric systems.

## 616 **Section 7: Conclusion**

617 This study provides an example of one kind of pathology: how interactions drive  
618 fragmentation in polycentric systems. Several key insights follow from the study: First, in  
619 responding to calls for analyzing pathologies of polycentric systems, the study finds that  
620 unintentional overlaps emerge between decision centers in the absence of authority, unclear or  
621 absent constitutional-level institutions, lack of information, and resources. Where decision  
622 centers interact with each other, the interactions are those of conflicts or non-cooperative  
623 coexistence due to ambiguous and overlapping authority, the deliberate disuse of authority,  
624 perceived legitimacy and lack of, or threat to authority. More research is needed on interactions  
625 that emerge as a result of such unintentional overlaps and the outcomes of those interactions. The  
626 emergence and role of overlaps due to shadow figures is also not yet well-documented in  
627 polycentric literature and needs to be further scrutinized for their influence in shaping processes  
628 and outcomes.

629 Second, this research identifies a new interaction—non-cooperative coexistence— a  
630 variation of coexistence. Unlike coexistence as defined by Jordan et al., (2015), here, decision  
631 centers do not complement each other, but may actively undermine each other and/or  
632 deliberately exclude each other by withholding information, and resources (non-cooperative  
633 coexistence). Future research could explore what are other factors that could result in such  
634 interactions? Related, what happens to decision centers when non-cooperative coexistence  
635 continues to fester? What are other patterns of interactions that may fragment decision centers?

636 Lastly, in the presence of weak, unclear, or absent constitutional-choice rules,  
637 interactions that occur at the collective and operational choice levels are more effective at  
638 fragmenting decision centers. In the context of ecosystem management and collaborative  
639 watershed management, scholars have found similar findings where interactions at the collective  
640 and operational-choice levels are more influential than others (Hardy and Koontz, 2008;  
641 Imperial, 2005). Future research should explore the impact of constitutional-level rules and  
642 authority at the collective and operational levels to better understand how may rules and the  
643 exercise of those rules drive interactions. Research is also needed for examining changes in the

644 structure and functionality of the system since Operation Sangara; specifically, what kinds of  
645 cascading adjustments emerge among decision centers in the aftermath of a shock to the system?

646         Although this case study was restricted to only three landing sites in Tanzania and actors  
647 not mentioned by interviewees may be excluded from the sample, these findings confirm  
648 previous research on Lake Victoria's fisheries that find a trend toward power consolidation at the  
649 center (e.g., see Kantel, 2019; Mudliar, 2020; Mudliar and O'Brien 2021, Nunan, 2020), as well  
650 as a worldwide trend toward centralized control (Castro and Nielsen, 2001; Ribot et al., 2006).  
651 What then is the future of Tanzania's Lake Victoria's fisheries? It is crucial for polycentric  
652 governance models to incorporate contextual and political realities, rather than ignore political  
653 regimes, rent-seeking, militarized management, and shadow actors. As Nunan (2020) points out,  
654 underlying contextual issues are beyond the practice and the system of fisheries management  
655 itself. Therefore, institutions that take into account such system wide interactions are needed  
656 (Walker et al., 2016). Legally mandating collaboration will provide legitimacy to coordination  
657 that has been systematically undermined by authorities (Bingham, 2009). Since Operation  
658 Sangara is not a sustainable way of managing fisheries, decision centers will need to collaborate  
659 to devise and enforce commonly agreed upon regulations. Developing information-sharing  
660 forums for enabling coordination is important, but information-sharing requires resources. In a  
661 context of scarce resources, the polycentric system could become more fragmented over time if  
662 the pressure of chasing scarce resources causes organizations to develop more irreconcilable  
663 differences (Biddle and Baehler, 2019). Regardless of the type of governance model for Lake  
664 Victoria's fisheries, unless underlying factors are addressed, the promised benefits of  
665 polycentricity will continue being realized as pathologies.

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