Quotes Table C: Key criteria identified in the Community-Based Natural Resource Management (CBNRM) literature

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| **22 Key criteria of robust natural resource governance systems identified in the literature:** | **Key Principles of CBNRM (Gruber 2010,** Table 1**)** | **Ruiz-Mallén & Corbera (2013) Community-based conservation and resilience TABLE 3** | **Fabricius & Collins (2007) CBNRM - governing the commons** | **Delgado-Serrano et al. (2018) Influence of CBNRM strategies on resilient SES (especially Table 3)** |
| **1 Clearly defined rights of users to utilize resources** | Principle K: Enabling environment - There are clearly defined boundaries of the resource system; Principle F: Devolution & empowerment - establishing clear rules, procedures and regulations can empower the local community |  | Establish formalized decision-making structures (e.g. multi-level project steering committees) with clear constitutions and codes of conduct. | Table 4: Local resource governance use; Type of property rights over the resource |
| **2 Clearly defined resource boundaries** | Principle K: Enabling environment - There are clearly defined boundaries of the resource system |  | Create rules for resource use (and enforce them). | Table 4: Local resource governance access; Definition of resource’s boundaries |
| **3 Congruence or fit of appropriation rules with local ecology and local culture (i.e. sustainable use of resources)** | Principle J: Participatory decision making - Decision making is informed by analysis of key information about environmental and human-environmental systems, including life aspirations of local people. |  |  | Table 4: Ecologically sustainable use of natural resource; "Congruence between appropriation and provision rules and local conditions" |
| **4 Balance between costs expended / investments made into a resource and benefits received from resources (equitable resource use)** | Principle C: Resources and Equity |  | Establish tangible incentives to key individuals for meeting their commitments. Create lasting incentives. Understand and describe the social–ecological system. | Provision rules and local conditions |
| **5 Collective choice arrangements (individuals affected by the rules can participate in making and modifying the rules)** | Principle F: Devolution and Empowerment; & Principle J: Participatory decision making; & Principle A: Public participation and mobilization | Local leadership; Decisions based on local experience |  | "Table 4: Autonomy in relation to land and resource management Table 4: Participation and deliberation mechanisms Property rights and collective-choice rules play a key role in successful CBNRM functioning..." Role played by collective-choice rules |
| **6 Monitoring resource conditions and appropriator behavior** | Principle H: Monitoring, feedback and accountability |  | Create rules for resource use (and enforce them). | Table 4: Maintenance, documentation and conservation of biodiversity in the community; Monitoring mechanisms  Effective monitoring mechanisms. |
| **7 Monitoring the monitors** | Principle H: Monitoring, feedback and accountability - the performance of those who make decisions should be periodically reviewed by those that are affected by those decisions |  | Create rules for resource use (and enforce them). |  |
| **8 Graduated sanctions** | Principle C: Resources & equity - regulated access to natural resources and graduated sanctions can help ensure equity | Importance of informal sanctions Presence of enforcement mechanisms |  |  |
| **9 Conflict resolution mechanisms** | Principle L: Conflict resolution and cooperation |  | Clearly define and legitimize conflict resolution procedures. | Table 4: Conflict resolution; Conflict-resolution mechanisms (external and internal) |
| **10 Minimal recognition of rights to organize** | Principle A: Public participation and mobilization & Principle J: Participatory decision making | Table 3: Respect of local institutions | Understand and work within available legal frameworks. | Table 4: Support of CBNRM by international and national public policies, and regional institutions. |
| **11 Nested enterprises: governance activities are organized in multiple layers of nested enterprises** | Principle F: Devolution and Empowerment - There are nested, multiple layers of governments and enterprises related to role and activities of decision making, appropriation, monitoring, enforcement, conflict resolution and governance. | Table 3: Cross-scale institutions | Table 4: Support of CBNRM by international and national public policies, and regional institutions. Security of tenure & Legal framework for CBNRM & Autonomy from external authorities | Institutional cooperation and collaboration across scales is key to promoting adaptive and resilience-based governance systems. |
| **12 Institutional adaptability/ variety/ flexibility** | Principle I: Adaptive Leadership and Co-management - are dynamic and focused on processes rather than static structures; a learning organization that supports adaptive capacity | Flexible institutional decision-making |  |  |
| **13 Social learning** | Principle J: Participatory decision making; Principle I: Adaptive Leadership and Co-management - A robust social-ecologic organization is a learning organization that supports adaptive capacity | "They involve a process of mutual learning, reinforced through the creation of knowledge networks between scientists and local managers that are complementary to existing forms of institutional learning and knowledge sharing of local communities." |  |  |
| **14 Long-term commitment and shared understanding** | Principle B: Social capital & collaborative partnerships - Ownership by community members / stakeholders enhances ... cohesion, and encourages long-term commitment. | (5) they are guided by local leaders who have a commitment to their community traditions and cultural values and who support sustainable management practices to enhance both the well-being of local people and biodiversity conservation. | Obtain formal commitment to well-defined roles and responsibilities by key individuals. Establish and communicate a clear vision. |  |
| **15 Leadership** | Principle I: Adaptive Leadership and Co-management | Local leadership (Table 3) |  | Clear leadership within the community; Leadership responsiveness and accountability |
| **16 Capacity building (e.g., training, resources)** | Principle B: Social capital & collaborative partnerships - key to leveraging resources...; Stakeholder trainings, workshops and other collab learning opportunities can build social capital and commitment. | "Scientific knowledge that contributed to capacity building, knowledge generation through mutual learning, and trust building." | Develop the capacity for facilitation to promote communication. Develop management capacity. | Capacity building and training |
| **17 Knowledge building (e.g., learning, information sharing )** | Principle D: Communication and information dissemination; Principle E: Research and information development; (also parts of Principle J: Participatory decision making) | Collaboration with scientists | Develop knowledge networks that draw on the experience and wisdom of a wide range of key individuals. | Table 4: Knowledge access and exchange; transmission of traditional knowledge from elders, parents, and peers to the young people in a community; |
| **18 Prior Networks** | Principle K: Enabling environment: Optimal preconditions or early conditions |  | Build on local organizations. Knowledge networks |  |
| **19 Trust and Social capital** | Principle B: Social capital & collaborative partnerships; & Principle G: Public Trust and Legitimacy | Trust and social bonds "To create the conditions for the successful harmonization of traditional ecological knowledge and community-based conservation initiatives, social sources of resilience, such as social memory and social capital, should then be guaranteed and strengthened." |  | Legitimacy, trust, and reciprocity |
| **20 Resource dependence** | Principle K: Enabling Environmental Citizens and stakeholders are willing to participate because they have a high sense of community and/or dependency on the local natural resource. | Traditional ecological knowledge... ceremonies and rituals contribute to the cultural internalization of conservation rules." |  | Table 3 - resource dependence for livelihood (# of users) |
| **21 Group size** |  |  |  | Table 3 - Number of Resource Users |
| **22 Group homogeneity vs. heterogeneity** | Principle A: Seek diversity of stakeholders, including citizens, NGOs, local and regional governments, private sector, and those with programmatic, operational, scientific, and legal knowledge. Principle K: Enabling environment: Optimal preconditions or early conditions Community has a homogenous social structure, common interests, and shared norms and a local social structure in which divisions are not too serious or disruptive of cooperation. |  |  | Table 3 - Community cohesiveness |