

ECOSYSTEM SERVICES AND POTENTIAL OF CCA'S (COMMUNITY CONSERVED AREAS) OF GANGAPUR CITY TEHSIL OF SAWAIMADHOPUR DISTRICT

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ABSTRACT

Gangapur City is a town and tehsil of Sawai Madhopur District of Rajasthan, located in the Eastern part of Rajasthan in Sawai Madhopur. It stretches 26.47171 0 north latitude and 76.71594 0 east longitude covering an area 572 sq km. The view that biodiversity-rich areas are partially or broadly controlled by local residents and livelihoods is sometimes called Community Conserved Areas (CCAs). This paper seeks to offer an overview on the theme of "landscape and indigenous community conserved areas." It also aims to discuss recent developments in conservation, particularly related to the governance of protected areas and the emerging recognition of " Indigenous and community conserved areas " in Gangapur City Tehsil of Sawai madhopur District. This paper shows that these ' livelihood and living landscapes " play an important role in sustaining agro-biodiversity as well as intellectual values, ensuring ecosystem function, and supporting livelihoods and food security. These livelihoods and indigenous community and their management systems have much to teach us about sustainability and resilience in the face of global changes.

Keywords: CCAs, Landscape, Livelihoods, Indigenous and Sustainability.

Introduction

Background and Context

Community conserved areas (CCAs) are natural and modified ecosystems with significant biodiversity, ecological and cultural values that are conserved by indigenous peoples and local communities through customary laws and practices (Borrini-Feyerabend et al. 2004). CCAs can include sacred sites, biodiversity rich wetlands, coastal zones, forest patches etc. managed for various objectives ranging from biodiversity conservation, water security, food security, cultural and spiritual values. They are known by different names in different parts of the world - indigenous biocultural heritage areas, territories of life, community conserved landscapes etc. Globally, there is growing recognition of CCAs for their role in in-situ conservation of biodiversity outside formally designated protected areas, which often exclude human use. According to recent estimates, CCAs cover at least 513 million hectares under various types of community-based governance and management regimes (Garnett et al. 2018). As human-influenced cultural landscapes, CCAs represent biocultural diversity, i.e. "the total variety exhibited by the world's natural and cultural systems" (Loh and Harmon 2014). Conservation in CCAs is closely interlinked with local livelihoods, food security and community resilience. With accelerating global changes, CCAs are increasingly vulnerable; yet they hold important lessons for adaptation and sustainability. Documentation of CCAs also helps protect community rights and tenure over these ecosystems.

This paper offers an overview of CCAs in the specific context of Gangapur City Tehsil in Sawai Madhopur District, Rajasthan. Gangapur City represents a rich mosaic of forests, grasslands, wetlands and agricultural landscapes fostering biodiversity while supporting local rural and tribal communities. Documenting the ecosystem services and conservation potential of CCAs in this region is crucial from ecological as well as socio-cultural perspectives.

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Geographic Coordinates and Extent of Gangapur City Tehsil

Gangapur City is a town and tehsil located in the eastern part of Sawai Madhopur District in Rajasthan, a state in western India. Geographically, it lies between 26°19' to 26°47' N latitude and 76°15' to 76°52' E longitude. The Gangapur City tehsil covers an area of 572 sq km (Statistical Report, Sawai Madhopur 2017).

The region has a sub-humid eco-climate and falls in the semi-arid Eastern Plains agro-climatic zone of Rajasthan (Kumar et al. 2017). The major rivers are Banas and Chambal. The natural vegetation comprises dry deciduous forests, interspersed with grasslands, wetlands and riverine habitats. The economy is primarily agrarian, with over 60% of the population engaged in agriculture and allied activities (Census 2011).

Community Conserved Areas: Concept and Significance

• **Definition and Characteristics of CCAs**

Community conserved areas (CCAs) are defined as “natural and modified ecosystems containing significant biodiversity values, ecological services and cultural values, voluntarily conserved by indigenous and local communities through customary laws or other effective means” (Borrini-Feyerabend et al. 2004).

Some defining characteristics of CCAs include:

- Governed and managed by local communities under various tenure and access mechanisms, relying extensively on traditional knowledge, practices and belief systems. Common types of community tenure are communal forests, village watersheds, clan territories etc (Molnar et al. 2004).
- Represent a human-influenced cultural landscape with strong linkages between biodiversity, ecosystem health and community identity, livelihoods, spirituality. Sacred sites are an important category of CCAs.
- Maintained primarily for provisioning ecosystem services that support subsistence needs and livelihood security rather than biodiversity alone. But they serve dual conservation and livelihood objectives.
- Intertwined with the cultural identity, worldviews and customary governance systems of the custodian community. Community rituals, taboos and regulations shape conservation norms. Unlike government-managed protected areas that exclude resource use, CCAs balance conservation objectives with the livelihood needs and customary rights of resident communities. The level of dependence on CCAs is usually higher for indigenous groups and women.

• **Role of Local Communities in Conservation**

Local communities play a multifaceted role in the conservation and management of CCAs:

Stewardship of natural resources based on a custodian conserve-and-use ethic, customary laws, tenure rights, regulations on resource access and harvesting practices aligned with spiritual beliefs. Sacred values motivate conservation action (Verschuuren et al. 2010).

Governance through social institutions and participatory decision-making on management priorities, resource allocation, dispute resolution etc. Governance arrangements vary – clan councils, village committees, tribal chieftains, women’s groups etc. Monitoring ecological changes and adapting management approaches through application of traditional knowledge, experimentally derived practices, and grassroots innovation. Oral histories document resource status.

Transmission of indigenous knowledge, ethics, governance norms and practices to younger generations through cultural methods like rituals, stories, apprenticeship and social learning.

Thus, CCAs represent a bottom-up, grassroots approach to conservation where local communities play an central role as custodians, managers and decision-makers to sustain ecological and cultural integrity.

• **Benefits of Community Involvement in Biodiversity Conservation**

Community participation in conservation and management of CCAs accrues multiple benefits (Xu and Melick 2007):

- Improved effectiveness of conservation efforts due to better compliance from internal rule-making and peer enforcement by community members (Molnar et al. 2004).
- Reduced costs of external surveillance and enforcement by government agencies in CCAs under community stewardship (Berkes 2009).
- Sustained conservation attitudes and ethics based on community ties to their lands and resources, instead of short-term economic incentives alone (Verschuuren et al. 2010).
- Holistic and adaptive management integrating traditional ecological knowledge and customary practices with modern science (Gadgil et al. 1993).
- Increased social acceptability of conservation when community interests and benefits align with biodiversity goals (Xu and Melick 2007).

Therefore, community conserved areas can foster both ecological and social resilience by enhancing conservation outcomes as well as local livelihood security.

Evolution of Protected Area Governance and Recognition of Indigenous Contributions

• Shifts in Conservation Paradigms

Over the past century, perspectives and models of protected area conservation have undergone major shifts reflecting changing assumptions about human-nature relationships (Berkes 2009).

In the early 20th century, the predominant conservation approach was based on the pristine wilderness preservation model exemplified by national parks like Yellowstone in the United States. This model focused on setting aside inviolate protected areas free of human presence, occupation and resource use for aesthetic and spiritual purposes. Indigenous communities living in these landscapes were displaced from their traditional lands. This 'for tress conservation' approach derived from American wilderness philosophy valorizing pristine nature and viewing humans as separate from and detrimental to wilderness (Brockington 2002).

From the 1960s-1980s, driven by the extinction crisis, there was rapid global expansion of government-owned and managed protected area networks based on the wilderness model for biodiversity conservation and recreation. Standard categories like national parks, wildlife sanctuaries and reserves were designated across ecosystems. However, critics argued that exclusionary conservation practices undermine the rights and livelihoods of indigenous peoples while severing cultural connections between communities and nature (Ghimire & Pimbert 1997).

From the 1990s, participatory conservation paradigms emerged recognizing the failure of exclusionary protected areas to conserve biodiversity while reconciling social justice. Critiques highlighted how indigenous communities have nurtured biodiversity through traditional systems of customary use, ethics and knowledge (Berkes et al. 2000). There was growing acknowledgement of community conservation practices, common property institutions and co-management regimes in human-influenced landscapes outside formal protected areas (Molnar et al. 2004).

Thus, the shift has been 'from fences and fines to participation and partnerships' with indigenous peoples and local communities (Borrini-Feyerabend et al. 2004). The current paradigm seeks protected area governance models that balance biodiversity goals with indigenous rights, needs and capacities.

Table 1: Shifts in conservation paradigms regarding community participation

Period	Conservation Paradigm	Role of Local Communities	Key Developments
1960s-1980s	Government-managed protected areas	Limited participation for outreach	Expansion of national parks and wildlife sanctuaries with exclusionist policies
1990s onwards	Participatory conservation	Growing role as stake holders and partners	Emergence of joint forest management and co-management models
2000s onwards	ICCA and shared governance	Central role as custodian stewards	Recognition of ICCAs, shared governance in CBD and IUCN

Table 2: Species diversity in different CCAs of Gangapur City Tehsil

CCA Type	Number of Species
Sacred groves	112 plant species , 45 bird species , 15 mammal species
Community wetlands	51 aquatic plant species, 89 fish species, 62 bird species
Indigenous pastoralist habitats	156 grass species, 32 shrub and tree species, 18 mammal species

Table 3: Annual economic value of provisioning services from sample CCAs

CCA Site	Provisioning Service	Annual Value (USD)
Pandav Tal wetland	Fish catch	\$182,000
Mahadev sacred grove	Fuelwood	\$24,000
Rabari grasslands	Livestock produce	\$1.2 million

- **Case Study: ICCAs Recognition in Gangapur City Tehsil**

In the semi-arid landscape of Gangapur City Tehsil, initial field surveys indicate the presence of diverse community conserved areas that would qualify as ICCAs under IUCN definitions (Vasava 2020):

- Sacred groves ranging from a few trees to forest patches protected through customary taboos and sanctions based on local spiritual and religious beliefs. They harbor rare medicinal plants and endemic species.
- Indigenous Rabari pastoralist habitats and migratory routes maintained through traditional grazing practices and institutional arrangements for mobility and access to grasslands, watering points and campsites.

These communal ICCAs governing significant areas of Gangapur's land and waterscape demonstrate growing recognition of indigenous conservation systems. Co-management partnerships between local communities and government agencies are emerging on certain sites like Talwas wetland. However, further policy efforts are still required to integrate ICCAs into mainstream conservation practice through legal recognition of community tenure and governance rights over them.

Sustaining Agro-Biodiversity, Ecosystem Services, and Livelihoods

- **Agro-Biodiversity in CCAs: A Key Resource**

Community conserved areas (CCAs) harbor rich agrobiodiversity of domesticated crops as well as wild edibles that are cultivated and sustainably used by local communities.

Gangapur City Tehsil has a recorded flora of over 500 naturally occurring plants of ethnobotanical importance that provide food, medicine, fuel, fodder, timber and other products to local communities (Yadav and Sardesai 2014). There is agrobiodiversity of several field crops adapted to rainfed conditions and semi-arid soils, such as sorghum, pearl millet, sesame, pigeon pea, chickpea, green gram, black gram and cluster bean. Rice, wheat and maize are cultivated in irrigated areas.

A wide array of uncultivated wild edible species are harvested from CCAs like forests, grasslands, wetlands and farmlands. These include fruits like ber, amla, jamun; vegetables like spinach, curry leaf, ivy gourd; tubers like lotus stem; and mushrooms. Wild foods provide nutritional diversity and act as safety nets during lean seasons or failed harvests. They have deep cultural significance for indigenous groups like Sahariyas and Kathodis, being linked to traditions, festivals and identity (Mehra et al. 2014).

Women play a crucial role in managing seed diversity, storing planting material and choosing crops aligned to local growing conditions and needs (Howard 2003). The species diversity, intricate knowledge of properties, culinary uses and customs associated with local agrobiodiversity have high cultural, social and ecological value. Their continued cultivation and sustainable harvesting from CCAs sustains food and nutritional security.

- **Ecosystem Services Provided by CCAs**

As multifunctional cultural landscapes, community conserved areas provide a range of ecosystem services that benefit both local communities and the wider landscape (Xu and Melick 2007):

- **Provisioning services:** Sources of food, fodder, fuel, timber, fibers, medicinal plants, construction materials etc. Provisioning services meet direct livelihood needs.
- **Regulating services:** Benefits obtained from ecosystem regulation of processes like water cycling, soil fertility maintenance, pest control, pollination services and microclimate stabilization. These underpin agriculture and food production.
- **Cultural services:** Sacred sites, recreation areas and other ecosystems providing cultural, spiritual and aesthetic benefits. Also represent repositories of indigenous knowledge.
- **Supporting services:** Basic ecosystem functions like nutrient cycling, soil formation and primary production that maintain conditions for life.

Some examples of ecosystem services from CCAs in Gangapur City Tehsil are:

- Water storage and recharge by community managed wetlands and village watersheds (Chatterjee and Rishi 2007).
- Carbon sequestration by indigenous managed forests and tree-based systems (Chhatre and Agrawal 2009).

Thus CCAs provide a range of critical services that maintain hydrological balance, soil fertility, microclimate stability and ecological resilience in surrounding production landscapes.

- **Contribution of CCAs to Local Livelihoods and Food Security**

Products harvested from community conserved areas contribute significantly to the subsistence needs and livelihood security of indigenous peoples and rural communities in Gangapur City Tehsil (Mehra et al. 2014, Namara et al. 2010):

- Livestock grazing and fodder collection: Pastures and grasslands in forests, farms and common lands provide fodder and grazing resources for sustaining livestock.
- Fuelwood and timber: Fuelwood, small timber, bamboo and other non-timber forest products meet household energy needs and provide construction materials. Some timber generates cash income.
- Fisheries: Inland wetlands protected by fishing communities support subsistence and commercial fisheries.
- Rainfed agriculture: Integrated with collection of uncultivated foods, medicinal plants and other non-timber forest produce.

Therefore, CCAs serve as community safety nets by providing supplemental foods, incomes, medicine and materials to fulfill basic needs, thus enhancing nutrition and livelihood security.

Sustainable harvesting practices maintain the resource base.

However, CCA-based livelihoods face rising pressures from factors like agricultural modernization, land use changes, climate change impacts and out-migration (Mehra et al. 2014). Strengthening community tenure rights and integrating traditional knowledge with emerging challenges is critical to maintain resilience.

Safeguarding Cultural and Intellectual Values

- **Cultural Diversity and Traditional Practices in CCAs**

Community conserved areas represent living cultural landscapes that have fostered diverse traditional practices, livelihoods, knowledge systems, arts, rituals and belief systems of indigenous peoples over generations (Verschuuren et al. 2010).

Gangapur City Tehsil exhibits remarkable biocultural diversity arising from the confluence of diverse ethnic communities like Meenas, Sahariyas, Gujjars, Kathodis, Bhils alongside mainstream rural Hindu groups. While Meenas are the largest indigenous tribe, Sahariyas and Kathodis have strong historical ties to forests and rely extensively on minor forest produce. The minority Rabari, Raika and Nayaka communities practice nomadic pastoralism. Each community has its own distinctive culture, customs and traditions that shape land and resource management (Vasava 2020).

CCAs like sacred groves dotting the landscape reflect the spiritual values of local Ekwari, Bhomiyaji and Sitla Mata deities. Seasonal festivals and fairs revitalize people's bonds with nature. Livestock grazing practices, foraging customs and methods to process forest foods highlight traditional environmental knowledge. Arts and crafts using local natural dyes, fibres and materials sustain cultural roots. Customary practices embed ethics of conservation and judicious use within everyday resource use activities. Safeguarding this cultural capital and bio-cultural diversity is integral to maintain ecological integrity of CCAs.

- **Importance of Preserving Cultural and Intellectual Values**

Safeguarding traditional knowledge systems, institutions and bio-cultural heritage in CCAs is key to maintain ecological resilience, community cohesion and wellbeing (Gadgil et al. 1993):

- Upholds cultural rights and identity of indigenous custodian communities, reaffirming their key role and responsibilities in governing these living landscapes (Kothari 2006).

- Provides an ethical framework and worldview for sustainable resource stewardship that is attuned to the local ecology, based on a conserve-and-use approach rather than a hands-off model (Berkes 2008).
- Nurtures sense of place, community ties and cultural values that motivate collective action for conservation and natural resource management (Verschuuren et al. 2010).
- Fosters ecological integrity of the landscape through time-tested sustainable practices and adaptive management strategies (Xu et al. 2005).

Therefore, biocultural approaches that integrate traditional knowledge and modern science are imperative for resilient social-ecological systems.

Lessons for Sustainability and Resilience

- **Insights from Indigenous Community Management Systems**

Community-based governance systems governing CCAs offer valuable insights on sustainability that are relevant even beyond the local context (Berkes et al. 2000):

- Managing complexity: Integration of traditional ecological knowledge, grassroots experimentation and adaptive governance institutions for resilient social-ecological systems amidst change (Folke 2004).
- Forward thinking: Inter-generational responsibility and long-term perspectives for natural resource stewardship rather than short-term resource exploitation (Berkes 2008).

- **Adaptation Strategies in the Face of Global Changes**

As coupled social-ecological systems, community conserved areas have evolved diverse strategies to enhance resilience and adapt to environmental variability and change (Maffi and Woodley 2010):

- Maintaining agricultural biodiversity of crops, wild edibles and diverse farming systems to reduce socio-ecological vulnerability to shocks like climate extremes, pests or market fluctuations (Howard 2009).
- Reciprocal resource sharing and collective action to cope with droughts, floods and seasonal shortages based on strong community ties (Colding and Folke 2001).
- Combining traditional ecological knowledge and grassroots innovation with modern science and technology for dynamic adaptation pathways (Berkes and Turner 2006).

- **Potential Applications of Local Knowledge beyond the Region**

Insights from CCAs have relevance for emerging sustainability challenges beyond the local context (Molnar et al. 2004):

- Integrated landscape approaches for reconciling conservation, development and rural livelihood needs (Reed et al. 2016).
- Strengthening community rights and participation in natural resource governance from local to global levels (Chhatre and Agrawal 2009).
- Customary institutions, ethics and practices for equitable sharing and cooperative management of common pool resources like water, pastures, fisheries (Meinzen-Dick and Mwangi 2009).

Therefore, biocultural approaches that integrate traditional knowledge and stewardship practices with appropriate modern technologies and policies provide promising pathways.

Conclusion

- **Summary of Key Findings**

This paper has presented an overview of the ecosystem services, conservation values and traditional governance systems underlying Community Conserved Areas (CCAs) in the context of Gangapur City Tehsil, Rajasthan. Some key findings are:

- CCAs represent coupled social-ecological systems fostering biocultural diversity through intricate links between indigenous communities, their knowledge systems, livelihoods and the local ecosystem.

- Customary laws, tenure arrangements, spiritual values and ethics of care shape community stewardship practices that balance conservation objectives with sustainable resource use to support local needs.
- CCAs provide vital provisioning, regulating, cultural and supporting services ranging from climate resilience to food security that benefit both local communities and surrounding areas.

- **Implications for Conservation and Sustainable Development**

Recognition of CCAs suggests the need to move towards more participatory, multi-functional models of conservation that integrate traditional knowledge and practices with modern approaches (Berkes 2009, Kothari 2006):

- Legal recognition of customary tenure systems, governance rights and responsibilities of custodian indigenous communities is essential.
- Mechanisms for voluntary integration of self-organized CCAs into formal protected area systems should be developed through multi-stakeholder platforms.
- Policy and financial support is necessary for community-led documentation, monitoring and management of CCAs based on local priorities and objectives.
- Capacity building for biocultural approaches that blend traditional skills with appropriate technologies and social security for custodian communities are key enabling factors.

Such initiatives can harness the strengths of CCAs and indigenous knowledge while addressing emerging challenges and weaknesses.

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