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Fishing the Temporal Semicommons- A Case Study on the Traditional Paddy Field Wetland Fisheries of Srikakulam District, Andhra Pradesh, India

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Abstract Man-made wetlands, such as paddy fields of Asia present an interesting case of the semicommons. The traditional rice-fish cultures are well documented in North-eastern India, but poorly understood in other parts of the country. In this context the present study attempts to explore the semicommons in the context of man-made paddy field wetlands in Srikakulam district of Andhra Pradesh, India by adopting the temporal semicommons framework. The findings of the present study suggest that paddy field wetlands are used as private rice fields with very defined private property rights when the rice crop is standing and are open to the public for fishing after harvesting of the rice crop. The transition and reversibility of property rights and ownership of paddy fields at different time scales under different ownership rubrics presents an interesting instance of the temporal semicommons. However, further studies are necessary to investigate the different facets of paddy field wetland fisheries from the lens of property rights perspective.

Keywords: *commons, semicommons, traditional fisheries, property rights, property regimes, paddy fields, srikakulam*

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1. Introduction

Semicommons, elucidated by [1], "exists when property rights are not only a mix of common and private rights, but both are significant and can interact." Smith, further elaborates that "in the semicommons, a resource is owned and used in common for one major purpose, but, with respect to some other major purpose, individual economic units – individuals, families, or firms – have property rights to separate pieces of the commons" (pp. 131). Fennell [2], illuminates that resource systems on the ground are never solely composed of individually owned or commonly owned elements [3], but an interacting mixture of private and common property.

Smith [1], explicates the semicommons by referring to the medieval farming and grazing arrangements in which pieces of farmland were individually owned but the land as a whole was shared for grazing purposes. Here, grazing is alternated with farming in a seasonal cycle in the open field arrangement. In the open field arrangement, the ownership is reflected in different scales at which the two activities – farming and grazing – are undertaken.

Smith [4], applies the information-cost theory of property to water law in the backdrop of its fugitive nature. Illustrating the riparianism and prior appropriation of water regimes, he observes that the fugitive nature of water makes exclusion in the sense of land or chattels somehow difficult. Smith [4], suggests that both the regimes combine small amounts of exclusion and increasingly elaborate governance, contrary to regular property in non-fugitive resources. He argues that water law tends to be semicommons, as in the case of fugitive resources such as water, more generally. He denotes that the aspect of water as a public good makes exclusion or prevention of access to it very costly.

Fennell [2], however, points out that Smith's illustration of the semicommons represents a relatively narrow category of mixed property – in which the commonly and privately owned farmland cover the same physical resource and the incentive structure also differs from that of the prototypical commons (pp. 17). He further argues that the semicommons is less of a distinct property type and more of a lens or frame through which the existing or proposed property rights arrangements can be viewed operating at different scales, whether simultaneously or over time.

Fennell [2], points out that literature on the semicommons [5], is focused on the simultaneous or temporally interleaved use of resources. Fennell [2], offers the term "temporal semicommons", which suggests a

mixed ownership regime. Such a mixed ownership regime might accommodate multiple activities at different scales – over time. For instance, individual parcels of land might be held as individual or private property at one time, but might be combined to form a common property for some more valuable or larger development at the other. Such "reversibility" [2], of property regimes would allow to pursue activities simultaneously at different scales under different ownership rubrics. Such property regimes may prevent private ownership from wreaking the commons, but allows a resource to be used in different configurations at different time scales.

The semicommons literature [1,4], focuses on farmlands which are also used for grazing and water regimes in the UK and USA respectively, however, such studies are meager in the context of India. Although literature on commons is abound in the Indian context [6,7,8,9,10,11] [12,13,14,15,16], but very few studies have waded into the uncharted waters of the semicommons, in the Indian context. An interesting scenario may be presented if farmlands with a high degree of private property rights are flooded with a fugitive element such as water that has high levels of public good associated with it. Perhaps, man-made wetlands such as paddy fields of Asia would be interesting to explore the semicommons.

Wetlands (both natural and man-made) present an interesting case of commons. The fugitive nature of water of wetlands and the element of greater good of water makes exclusion often very difficult. Man-made wetlands, such as paddy fields form temporary wetlands and account for over half of total wetland area in Asia [17]. Fish are known to migrate and colonize such man-made paddy field wetlands. Such paddy fields often show high diversity of production of fishes. Traditionally, local communities especially in Asia are known to practice fishing among such paddy fields [18]. In such systems, paddy fields are often privately owned parcels of land with a high degree of private rights but water and fish are often perceived as commons. Such traditional systems however, largely remain either partly recognized in law, and are often defined and defended outside the official legal system, especially in the developing countries. Moreover, private property rights and regimes in fisheries (especially inland fisheries) are comparatively limited in developing countries, except for the small-pond aquaculture and commercial fish-farming enterprises [19]. In this background the present study attempts to explore the semicommons in the context of man-made paddy field wetlands in Srikakulam district of Andhra Pradesh, India by adopting the framework proposed by [2].

2. Materials and Methods

Study Area: Seethampeta mandal, of Srikakulam district of Andhra Pradesh is designated as the study of the present study. The study area is geographically located at 18°43′04″N 83°46′44″E. The mandal consists of 117 villages and a total population of 0.06 million (Aadhar card estimation, 2021), [20]. About 90.9% of the total population of the Mandal belongs to the Scheduled Tribes (STs) and 100% of the population is rural, [21]. The major ST communities of the Mandal includes Jatapu, Savara, Gadaba, Konda Dora and Mukadora tribes among which the Jatapus and Savaras are predominant [22]. Local communities of the study area mainly depend on podu (shifting) cultivation, food gathering, fishing, hunting, wage labour, collection and sale of non-timber forest products (NTFPs), fishing, and primitive agriculture.

The region was once an epicenter of extremist movement, since suppression of the extremist activities, the Government of India has taken many steps to safeguard the land rights of the tribal population of this region. The Integrated Tribal Development Agency (ITDA) was created and initiated many economic development programmes for socio-economic development of the tribes of this region. The state fisheries department and the ITDA have initiated fisheries development in this region by supplying fish fry, nets, and offering credit with subsidies for construction of fish tanks in villages inhabited by tribes [22].

Sampling: Two villages Jami thota and Appalam kana villages of Seethampeta mandal were randomly selected for the purpose of the study. Criterion sampling, a variant of the purposeful sampling [23], was adopted for selection of the sources of evidence. The criteria applied for selection of the resource person is an indigenous person involved in traditional fishing.

Data collection and analysis: Three Focus group discussions (FGDs) were conducted for data collection. Initial contact with the local communities was made through gatekeepers. FGDs discussion sessions lasted between one and two hours [24,25], and the number of participants were between 6–8 members [26,27,28]. The present study adopts a narrative analysis method for the inquiry [29,30]. An open-ended questionnaire was administered for this purpose. Upon completion of data collection, all the observations, field notes, and recordings, which are predominantly qualitative in nature, were transcribed into text for analysis and interpretation.

3. Results and Discussion

The study site is 63 acres of paddy fields, stretched over a kilometer and geographically located between Jami thota and Appalam kana villages of Seethampeta Mandal, Srikakualm district in the Indian state of Andhra Pradesh. The paddy fields were developed in the bed of a perineal stream by the local farmers belonging mostly to Savara and Jattapu tribes [31]. About 47 households belonging to 14 villages share and own this piece of farmland. Each household owns approximately 30 cents of land, which was distributed to them by the Integrated Tribal Development Authority (ITDA), of the State Government of Andhra Pradesh during the year 1986. The stream is locally called as Noduru gedda, which originates at Sunnam goda and Kindara wada villages in the upper reaches of the hillock. The total length of the stream is approximately 8 KM. The stream flows through 23 villages, including Jami thota, and Appalam kana, and merges into Kotturu Karlem gedda of Vamsadhara canal. Approximately 750 households mostly belonging to the different scheduled tribes (ST), scheduled castes (SC) and other backward castes (OBC) inhabit the 23 villages.

Traditionally local communities of the study area have used these paddy fields for fishing for generations.

Paddy fields are colonized by fish during the wet season and support high levels of fisheries diversity and production [32,33]. Fishes, predominantly indigenous fish species of murrel/snakeheads (called locally as matta/*mitta*) are caught by pressing mud of the inundated farmlands using nothing but bare hands. Local communities are familiar with the hiding sites of fishes. Snakeheads usually burrow themselves into the soft mud and vegetation of the farmlands to hide from predators and ambush their prey. It was observed that such paddy fields serve as breeding grounds for many indigenous fish species in the study area. Studies on murrells/snakeheads suggest that it is common in freshwater plains, where murrells migrate between rivers/lakes and flooded plains/farmlands. They usually migrate into flooded farmlands during the wet season and return to permanent water bodies during the dry season, where they survive by burrowing in the mud.

Sala/Singa, a type of traditional fishing traps made of bamboo/cane are used by the local communities for fishing in the paddy fields. The sala/singa is placed overnight at the water outlet of a farm and the trapped fish are collected the following morning. Local communities in the study site catch fish throughout the year using such traditional devices. However, Ugadi (traditional new year celebrated in March), and Sankranti (a major traditional festival celebrated in January) are the two most popular fishing seasons in the study area.

The major indigenous fish species caught by the local communities for the purpose of consumption are three species of matta/matta, cheekulu, kandi karralu, elisi parigi, and mud crabs. Three species of snake heads are found in the study site known locally as striped murrel/manchi matta (*Channa striata*), the great snakehead murrel/korramenu/burada matta (*Channa marulius*) and the spotted snakehead/chukka matta/matta gudisa (*Channa punctata*). About 30% of the catch in the paddy fields comprises mud crabs.

Every year during the months from November to December, fishing season opens across the paddy fields located in the Noduru gedda stream bed soon after harvesting of the paddy crop. Villagers from all 23 villages go out for fishing in the rice fallows and each fisher catches approximately 2-3 kgs of fish using the traditional fishing methods. It may be safe to say that the paddy field wetland fisheries not only contribute to the food and nutrition security of the local communities but also minimize their dependence on markets for securing animal-based protein.

Traditionally, it is a common practice that anyone can go out fishing anywhere among the paddy fields and there are no restrictions on it. Although paddy fields are private properties, water and fish are considered as common property resources [34]. Therefore, local communities do not restrict others from fishing at their private paddy farmlands. One of the explanations of the local communities is that fish and water are nature's creation and not man-made, therefore, it is considered morally wrong to restrict others from accessing such resources. Perhaps, the only season when fishing is forbidden is during the flowering and fruiting stage of Paddy crop, which is called locally as "*vari potta dasa*". This is to prevent disturbance and avoid any toward damage caused to the standing paddy crop from fishing activities.

In addition to fishing, such rice fallows are the chief source of uncultivated foods such as wild greens of Ponnaganti kura/water Amaranth (*Alternanthera sessilis*), Gunugu kura (*Celosia argentea*), Kamanchi (*Solanum nigrum*), Ambati kura (*Boerhaavia diffusa L.* (*Nyctaginaceae*)), etc, which are open to all for collection, without any restriction [35]. Local traditional lime manufacturers (usually landless people) collect shells of snails and clams among the rice fallows for preparation of lime powder (locally known as muggu). Thus, rice fallows act as an important source of food and nutrition, subsistence and income generation for the local communities in the study area.

Such fishing grounds are under severe threat from the use of toxic pesticides, weedicides and chemical fertilizers applied in paddy fields to enhance yield. Application of toxic pesticides not only pollute the stream water but also kill fish and aquatic plants, and destroy the stream ecosystem, which in turn impact the traditional fishing culture, food and nutrition security of the local communities. However, few farmers refrain from using toxic pesticides and weedicides and application of chemical fertilizers after observing a decline in fish population among the paddy fields in the study area. It was reported that elderly farmers at the study site strictly abstain from use of toxic or chemical agriculture inputs in order to avert any potential damage to the fisheries and the environment.

It was reported that there is a drastic decline in fish catch during 2020-21 in the study area. Locals were referring to the impact of cyclones in the study area. The study area was affected by major cyclonic storms Amphan and Yaas in the year 2020 and 2021 respectively. These two cyclones are among few other severe cyclones that have battered the Eastern side of the Indian subcontinent. However, more detailed studies are necessary to understand the impact of both anthropogenic disturbances and natural calamities on the paddy field wetland fisheries of this region.

4. Conclusion

The paddy field wetlands of the study area are interesting in many ways. The paddy fields are located on the bed of a hill stream and connected to a natural waterbody which is a part of a larger aquatic ecosystem. Being a part of the natural aquatic ecosystem, the paddy fields present an interesting habitat for native fishes to migrate, colonize and perpetuate among the paddy fields in the study area.

Local communities in the study area catch fish among the paddy field wetlands throughout the year using traditional devices. Fishing inside the paddy fields is allowed only during November-December, after harvesting the rice crop. Paddy field wetland fisheries not only contribute to the food and nutrition security of the local communities but also minimize their dependence on markets for securing animal-based protein in the study area. In addition, rice fallows are an important source of uncultivated wild greens and clams which are vital for subsistence, food and nutrition and income generation

activities of the local communities.

It was observed that paddy field wetlands in the study area are prone to both man-made and natural disturbances. Man-made disturbances such as excessive use of toxic pesticides and chemical fertilizers in paddy cultivation was reported as one of the major causes for decline in fish populations among the paddy field wetlands. Natural calamities like tropical cyclones were reported to be one of the major disturbances in the study area. Further studies may be necessary to enlist both the man-made and natural disturbances that could potentially impact the paddy field wetland fisheries in the study area. Such studies are imperative especially in the wake of declining fish species diversity and populations, increase in habitat destruction and human induced climate change.

The findings of the present study suggest that paddy field wetlands act as the semicommons, which are used as private rice fields with very defined private property rights, that are guarded by cultural restrictions on fishing when the rice crop is standing in the field. Traditionally, following harvesting of rice crops, the same paddy fields are open to the public for fishing in a more common property resource arrangement. The transition and reversibility of property rights and ownership of paddy fields at different scales under different ownership rubrics presents an interesting instance of the temporal semicommons.

Although, rice-fish cultivation is gaining popularity as an innovative integrated rice-fish culture model, inspired by the traditional rice-fish culture systems of Northeast India [18]. However, understanding of the traditional paddy field wetland fisheries in other parts of the country still remains largely unexplored. Further, the paddy field wetland ecosystems are rarely investigated within the framework of the semicommons, traditional fishing practices and customary rights perspectives. It may be safe to assume that further studies are necessary to investigate the different facets of paddy field wetland fisheries from the lens of property rights, Indigenous resource management and Territories of Life [36] perspectives.

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