

THE ECONOMIC THEORY OF MANAGEMENT OF COMMON POOL RESOURCES – AN INCLUSIVE PERSPECTIVE

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Abstract

Examples of Common Pool Resources (CPRs) include fisheries, forests, irrigation systems, and pastures. Since, these CPRs have a constant supply, the total amount of resources available for exploitation remain unchanged and benefits/profits that an individual procures from them is inversely proportional to the population exposed to these resources. The governing of these commons by the communities via the 8-fold model developed by Elinor Ostrom is what is looked at closely via this paper. The paper aims at deconstructing the theory and proving its validity in terms of practical applicability. While we often make arguments against government intervention or privatization in the management of CPR, we need to focus on how viable is it to entrust the local communities with this responsibility. The economic problem of limited resources and unlimited human wants along with the ability of the local community to maintain sustainability of the resources, while satisfying their needs and refraining from overexploitation and propagating personal benefit, will be evaluated here. The importance of formulation of a structure that covers and exceeds the opportunity cost of bare minimum and sustainable utilization of these limited resources is a key element in ensuring appropriate management of the CPRs. The study aims at promoting the establishment of this structure via policy framework. Moreover, the viability of Ostrom's theory and evaluation of the current models developed on the basis of this theory is looked at in the course of this paper. Conclusions will be drawn on the basis of primary data collected from the regions of Tadoba and Corbett.

1. INTRODUCTION

Common pool resources (CPRs) are characterized as resources for which the exclusion of users is difficult (referred to as excludability), and the use of such a resource by one user decreases resource benefits for other users (referred to as subtractability). Herein, exclusion of users essentially implies the isolation of those individuals who have access to the common pool resource from procuring benefits by use of such a resource. Local CPR examples include fisheries, forests, irrigation systems, pastures etc. Global CPR examples include oceans and atmosphere etc. These resources are considerably vulnerable and are subjected to overexploitation by its users.

From the above given definition we can deduce that CPR is a resource whose supply is characterized by constancy. Thus, the total resource available for exploitation remains

unchanged and benefits/profits that an individual procures from it is inversely proportional to the population exposed to this resource. Higher the population using the resource implies lower per capita benefit, as the profit then gets divided among a larger denominator. A crucially essential factor associated with these resources is their sustainability. As the supply of these resources is unchanged and demand ever increasing, their optimum and rational use is of utmost importance.

This paper shall work towards understanding the various theories/models that influence policy frameworks. It will further highlight the various measures taken, and interventions involved in ensuring protection and sustainability of CPRs.

The paper further proceeds towards evaluating feasibility and performance of these institutions and measure its

successes and failures, thus, bringing into focus the theory and model of management of common pool resources as established by the Nobel Prize winner economist- Elinor Ostrom.

2. LITERATURE REVIEW

News-stories about various threatened and degraded natural resources have aroused concern with respect to the management of these common pool resources.

The most popular economic reasoning that backs this problem is namely the “Tragedy of Commons”. This phrase has been popularly used to symbolize expected degradation of CPRs when used by individuals based on Garrett Hardin’s challenging article in *Science* (1968). Human wants are ever increasing and each rational individual aims at maximizing his share of profits and maximum utilization of available resources. However, rational decisions of individuals may not necessarily lead to overall rational outcomes. Hardin explains this scenario by using the example of pasture land. Understanding the herder’s perspective, he says that each herder benefits from his animal and thus he would work towards maximizing this benefit, as would any rational individual. Similarly, every herder who has access to that pasture land would work towards obtaining maximum benefit from it by means of its capital (which is the animals). This rational act by each individual herder of increasing individual herd with no limits may result in significant degradation of the limited resource of the pasture land. Hardin’s model has often been formalized as a prisoner’s dilemma under game theory. Consider that the herders are players in the game using a common grazing meadow. Since the grazing meadow is a fixed resource, i.e. its supply is not flexible, the extent to which this resource can be utilized is given by an upper limit. This upper limit is on the number of animals that can graze on the meadow for a season and be well fed at the end of it.

There are thus two approaches/strategies adopted by the herders in response to this limit. Let, the upper limit is denoted by L . The number of herders having access to the meadow is two. According to the first strategy that can be adopted in this case, known as the “corporate strategy”, each herder grazes $L/2$ animals thus procuring equal and adequate benefits. The second strategy here is known as the “defect strategy” wherein the herder does not restrict himself to grazing only $L/2$ animals. Under this strategy, each herder would maximize the number of animals grazing the meadow in order to procure maximum optimal output. It is thus the latter form of strategy that brings about the threat of overexploitation and non-sustainable use of the common pool resources.

The utilization of the available resource can also take the form of a combined strategy approach where one herder applies the defect strategy in order to maximize individual benefit while the other applies corporate strategy, ensuring overall benefit. However, under this kind of a situation, it is the herder using the corporate strategy who is not making sufficient individual gains. Similar theories were propounded by various other economists, for example- William Forster Lloyd (1977) in 1833, H. Scott Gordon’s (1954) logic in the classic: “The Economic Theory of a Common-Property Resource: The Fishery.”

In order to overcome exploitation and ensure sustainability, economists like Ophuls and Hardin came up with policy-oriented solutions that involved:

- I. Government intervention in the management of common pool resources
- II. Privatization of resources

The argument of economists for these policy recommendations is based on the belief that individuals are rational only for oneself, and are inclined towards procuring maximum benefit for themselves while not looking at the bigger picture. Thus, there is a need of an external body that can regulate the management of these resources.

This paper aims at proving the above policy implementations as weak and rather being relatively ineffective. One shall understand how information asymmetry exists when an external body is involved. Moreover, when Hardin’s model is formalized as a prisoners’ dilemma, the underlying assumption is that there is information asymmetry and that one player (herder) is unaware about the actions of the other.

However, the credibility of this assumption needs to be tested as there is a high degree of information transmission that takes place in communities living close together and using the commons. Via an extensive research, this paper also would bring out the degree of information transmission and the transparency that exists in these communities.

The paper argues on how the two policy solutions for management of CPRs- government intervention and privatization of resources- by themselves are contradictory in nature. The governing of these commons by communities via the 8-fold model developed by Elinor Ostrom is what is looked at closely via this paper.

The eight design principles propounded by Ostrom are given as follows (as per Gari, Newton, Icely and Serrano’s paper, (2017)) :

- I. Clearly defined boundaries: Individuals or households who have rights to withdraw resource units from the CPR must be clearly defined, as must be the boundaries of the CPR itself.
- II. Congruence between appropriation/provision rules and local conditions: Appropriation rules restricting time, place, technology, and/or quantity of resource units are related to local conditions.
- III. Collective-choice arrangements: Most individuals affected by the operational rules can participate in modifying them.
- IV. Monitoring: Monitors who actively audit CPR conditions and appropriate behavior are accountable to the appropriators or are appropriators themselves.
- V. Graduated sanctions: Appropriators who violate operational rules are subject to graduated sanctions (depending on the seriousness and context of the offence) by other appropriators, officials accountable to these appropriators, or both.
- VI. Conflict-resolution mechanisms: Appropriators and their officials have rapid access to low-cost local arenas to resolve conflicts among appropriators or between appropriators and officials.
- VII. Minimal recognition of rights to organize: The rights of appropriators to manage their own institutions are not challenged by external governmental authorities.
- VIII. Nested enterprises: Appropriation, provision, monitoring, enforcement, conflict resolution, and governance activities are organized in multiple layers of nested enterprises (for CPR that are parts of larger systems).

Mishra and Kumar's paper (2007) "Institutionalizing Common Pool Resource Management" involves case studies of Pastureland Management in the various villages of Rajasthan helps us in concluding how institutionalizing needs to be a bottom-up process rather than being a top to bottom process. The paper suggests that understanding local needs and dynamics and the approach of the individuals using CPR is of utmost importance while designing an institution for its sustainable existence. Moreover, it is necessary here, to pay attention to the fact that there cannot be one single standard and a single most appropriate solution for geographically scattered places and for a plethora of situations. In other words, each institutional solution is a design influenced by the reactions and responses of the individuals with respect to ensuring the best possible outcome for the community and its resources as a whole. The paper also brings out the failure of allocation of control of a Common Pool Resource in the hands of governing bodies/ heads. It brings out the issues of biased and non-neutral behavior of the panchayats (with respect to the villages of Rajasthan).

Thus, this research paper aims at highlighting the im-

portance of the involvement of individuals in the management of CPRs and their involvement in developing the various institutions for the sustainable use of commons. The most favorable outcomes are achieved when institutions are participatory and voluntary in nature rather than being forceful. Reason beings- cooperation is the essence of management of common pool resources. Nagendra, Ghate, Rao's (2012) paper entitled "Governing India's Common, The Influence of Elinor Ostrom's Ideas", helps one understand that people of the country associate high degree of value and importance to the resources of the nature (i.e., the CPR). This element of sacredness associated to natural resources act as an incentive for its proper and adequate management by the community themselves. Research studies explain how a system of management of the commons would maximize efficiency only when it has the involvement of the individuals using these resources. An essential role of authority here is to provide a nudge/incentive to these individuals via benefits (through policy framework) on protecting and ensuring sustainable use of the commons.

3. HYPOTHESES

- I. The economic theory of management of common pool resources is the way towards ensuring sustainability, ecological balance and economic development.
- II. Nudge theory and thus incorporation of behavioral economics plays an important role in policy making, in line with Ostrom's theory.
- III. Problems of information asymmetry are substantially reduced if not eradicated by the application of this theory.

4. OBJECTIVES

- I. To prove the viability of Ostrom's theory and evaluate current models developed on the basis of this theory.
- II. To bring out the significance of nudge theory in policy framework. The study would help uncover metaphorical significance of the statement, made popular by Thaler and Sustein - "Putting fruit at eye level counts as nudge. Banning junk food does not."
- III. In addition to this, the paper also aims at the possibility of eliminating other economic problems like information asymmetry by looking at the management of CPRs from Ostrom's perspective.

5. METHODOLOGY

Methodology used in this study would be heavily based

on primary data, supplemented by secondary data. Primary data involves understanding the institutional set ups and community involvement in the field of sustainable use of resources in the forest areas of Tadoba and Corbett. These regions form important areas of analysis and comparison given the stark difference in the management practices in them.

Moreover, understanding these two kinds of management systems enable understanding of design principles. This study will be facilitated by an insightful and meaningful interaction with a naturalist who has worked very closely with the local community for over a decade by being a part of it and understanding its social, economic and cultural backgrounds. He has also been a consultant to the forest department for around a decade and has been a visiting consultant to the government for the management of forest resources and its conservation. The policy programmes, extent of government intervention involved, incentives/nudges that enable sustainable utilization of the limited resources and the institutional set up that has been established with the aim of ensuring sustainable use of commons will be analyzed. The intensity and significance of changes over the various years of management of CPR is evaluated. The various models in the areas of Tadoba and Corbett are then compared to the 8fold model proposed by Elinor Ostrom. The extent of community satisfaction, support and involvement with respect to current conservation and sustainability practices is then evaluated.

This technique enables one to uncover the dynamics of geographically and demographically diverse places and the essence of customization, dynamism and diversity of approaches involved in the management of CPRs in these places.

6. ANALYSIS:

6.1. The geographical set-up in Tadoba

The region of Tadoba has been divided into two segments:

- I. Core Region
- II. Buffer Region.

The core region lies over an area of 625 square km. This part of the forest is associated with pure conservation, implying that resources here are essentially and ideally untouched and cannot be exploited for the conduct of any activity by any individual. The core region primarily forms the “middle” of the forest. Currently there are two villages comprising the core region of Tadoba.

The second region is the buffer. The buffer region sur-

rounds the core region. It is spread over an area of 1100 square km. Resources of this region are essentially used to meet the requirements of the villages/forest communities living in Tadoba. This area is metaphorically explained as a shield to the core region. The appropriate and sustainable use of resources here by individuals, while keeping the core area untouched, ensures the sustainability of the forest. The number of villages comprising this region is sixty seven.

The geographical set up in Tadoba reflects the presence of Ostrom’s DP1 (Design Principle) which is concerned with the presence of clearly defined boundaries which, according to Gari, Newton, Icely and Serrano’s (2017) paper, is defined as: “Individuals or households who have rights to withdraw resource units from the CPR must be clearly defined, as must be the boundaries of the CPR itself.” Here, the two regions form the clearly defined boundaries. Out of these two regions, the buffer is the clearly defined area that provides access to the villages to extract resources for utilization.

6.2. Institutional set-up in Tadoba

The institutional set-up in Tadoba highlights the presence of Ostrom’s DP8 which is the presence of nested enterprises i.e. appropriation, provision, monitoring, enforcement, conflict resolution, and governance activities are organized in multiple layers of nested enterprises for CPR that are parts of larger systems. (Gari, Newton, Icely & Serrano, 2017)

The nested institution in Tadoba is an organized structure formed by the forest department. This structure has the following hierarchy (bottom to top):

- Van-Mazdoor: They work at the lowest level, performing every job as required and assigned to them by the people higher up in the hierarchy of management of CPR. Their work is purely clerical in nature and they are employed as permanent workers only after a probation period of 25 years (before that they are mere daily wage workers). The qualification criterion here is education up to grade 12.
- Forest Guard: Above the Van-Mazdoor is the forest guard who is assigned the responsibility of managing the villages inside the forest area. One guard is assigned one village.
- Round Officer (RO): The round officer is allotted regions of management. These regions comprise of the villages falling under the area for which the RO is placed as in-charge. One RO is allotted one region (the magnitude of each region may not necessarily be the same).
- Range Forest Officer (RFO): The RFO is the immediate superior of the RO and is in-charge of various ranges. One RFO is in-charge of one range.

- Assistance Conservator of Forest (ACF): he is the assistance to the DFO (Deputy Forest Officer) and superior to the RFOs.
- Deputy Forest Officer (DFO) [or Deputy Conservator of Forest (DCF) - only when concerned with the CPR management in Maharashtra]: At this level of operation, the significance of the individual's work can be metaphorically compared to that of the prime minister's. The individual allotted this post is the one responsible for complete development and management of activities that are either directly or indirectly contributing towards conservation of the forest community.
- Chief Conservator of Forest (CCF) / Field Director (FD): The CCF/FD has the highest authority pertaining to the conduct of various programs and conservational methodologies in the concerned CPR.

The Conservator of Forest (CF): This is an additional post which has been created in Tadoba. The reason for creation of this post is to solely ensure reduced stature from that of the CCF of the efficient individual who is being transferred here for the required position.

6.3. Institutional Management of CPR in Tadoba

Tadoba has been immensely successful in the management of its forests via a management structure essentially involving people. This progress in Tadoba has been observed essentially during the period from 2012 to 2018. In 2012, Praveen Pardesi, (the then forest secretary) conducted a meeting in Melgad with respect to governance and management of the forest area of Tadoba. This meeting essentially discussed the development of a mechanism that fetched resident's goodwill to the forest department of the region. Hence, new measures were introduced for the same. One of the major regions of development has been the area of tourism. Responsibility for the conduct of activities under this sector has been given to the local communities. This has been instrumental in making the villagers develop a sense of belongingness to the forest and thereby increasing the goodwill of forest department.

Another prominent measure has been the introduction of the Eco-Development Committee (EDC). This committee consists of the people in the villages and those who have been working with the forest department (essentially the round officer). This step taken brings out the presence of Ostrom's DP7 which is the presence of minimal recognition of rights to organize, which according to Gari, Newton, Icely and Serrano's paper (2017) is defined as- "the rights of appropriators to devise their own institutions are not challenged by external government

authorities." The committee's mandate ensured that every individual in every village should necessarily have a bank account with complete electronic connectivity. With this there has been an improvement in the compensation system with the individuals being given timely justified compensation. (For example, in cases of deceased cattle etc.).

The DCF Buffer of Tadoba, Gajendra Narwane's incredible work, in simultaneously ensuring sustainable utilization of forest resources and the development of employment opportunities of villagers, thereby ensuring village participation in the process of sustainable development and generating large cumulative revenues for villages. This revenue is transferred into the bank accounts of villages. The money is then used for developmental purposes and to provide loans to villagers in case of emergencies sanctioned by the round officer, with no time constraint on interest payment.

This process of rational sanctioning clearly highlights the presence of Ostrom's DP4 which is the presence of monitoring, which according to Gari, Newton, Icely and Serrano's paper (2017) is defined as- "Monitors who actively audit CPR conditions and appropriate behavior are accountable to the appropriators or are appropriators themselves."

The major employment generation activities in these forest areas were:

- I. Tourism
- II. Production of incense sticks. The product under the brand of Cycle Agarbatti is the creation of the people residing in the Tadoba forests.
- III. Bamboo Art/ Bamboo Furniture: essentially only the forest department is permitted to sustainably extract bamboo from the forests, making bamboo extraction otherwise illegal. This extracted bamboo is then given to the villagers to be able to work on it and develop articles/commodities. Very recently efforts have been taken to devise and incorporate a scientific method of bamboo extraction, thus making this process legal.
- IV. Weaving- for themselves and for supplying outside, essentially to the Tata Group.

These activities have led to a cumulative annual revenue generation of an approximate of rupees sixty crore for the Moharli Range Buffer. This is then employed for developmental purposes and advancements in the educational system.

While, the forest department in Tadoba emanates the presence of Ostrom's DP8 which is given as collective-choice arrangements (as per Gari, Newton, Icely and Serrano's paper (2017)) is defined as- most individuals affected by operational rules can participate in modifying

them; the forest of Corbett follows a complete opposite approach of conservative management by isolation of the human population leading to them not developing a sense of belongingness towards the forest.

6.4. Understanding the landscape and the mechanism of ensuring sustainability in Corbett

The forests of Corbett lie in a very uniquely shaped landscape that comprises an amalgamation of valleys, rivers, lakes, mountains, deciduous forests, evergreen forests, perennial forests, grasslands etc. This beautifully unique landscape gives the forest a natural advantage in ensuring sustainability.

According to the retrieved primary evidences, it is found that Corbett has a natural advantage; its forest department takes minimum or no efforts in developing a structure of integrated management of resources. The department follows the colonial method of complete isolation. It not just practices isolation but also curbs any form of sustainable forest activity. Activities that pose to be revenue generating and sustainable tourism conducts have also been banned (as has been, till a few years ago, practiced by the Kyari village in Corbett). Thus, the Forest Department of Corbett curbs any form of tourism apart from safaris which ironically is an unsustainable tourism practice. A possible reason for the above is the mere unwillingness of the department to form an institutional set for the development of any such activity.

Keeping people of the forest in complete isolation from its management has caused widespread dissatisfaction and anger amongst the individuals towards authorities. Unlike Tadoba, villagers here not just defy the process of consciously ensuring sustainability but also leave no chance of revolting while facing a conflict of interest with the department. This way there have been cases of them burning down the forest area, thus leading to further depletion of resources.

V) Tadoba v/s Corbett:

While the forests of Tadoba exhibit most of Ostrom's Design Principles via an integrated approach of sustainable management, the forests of Corbett show zero existence of these Design Principles.

The sustainable management of common pool resource of Tadoba can be credited to integrated management approach, whereas the sole reason for the hitherto sustenance of the forests of Corbett owes only to its uniquely shaped landscape. Concern for the issue of sustainable management in Corbett gains a greater impetus when the

Forest Department in Tadoba states that its integrated approach is the key towards ensuring that their forest lands do not deplete like those of Corbett. This very evidently explains the seriousness of the situation in Corbett.

7. CONCLUSION

This paper establishes an understanding of the geographical settings of the two forest regions of Tadoba and Corbett, which form the common pool resource under study over here. Via the bifurcation of all forest regions in India into core region and buffer region, one sees a uniform presence of Ostrom's DP1.

This paper also helps understand the presence of most of the Ostrom's design principles in the management of the forest of Tadoba. The integrated management approach in Tadoba has proven to be immensely successful. The success in the management of the commons in Tadoba has attracted researchers and members of the other Forest Departments for the purpose of studying its institutional arrangement and working towards the application of the basic model in the forestlands elsewhere in the country.

The institutional arrangement followed by the Forest Department in Tadoba ensures a wholesome approach with the involvement of people in the sustainable use of the resources. While this mechanism might restrict conduct of few activities, at the same time, it will also provide alternative avenues for revenue generation thus ensuring that the people of the forests are satisfied. This satisfaction indeed leads to conscious efforts on part of the individuals in helping the Forest Department governing the resources of the common. This management approach has not just ensured sustainable use of resources, but has also facilitated the generation of huge revenue which has been used to further used for the development of the people of the forests. One of the beneficial applications of these funds can be seen when they are used for classroom development in village schools by incorporating e-learning methods.

In the case of Tadoba, we also notice that people of the village are not given direct management control even though they are indirectly involved in the process of this integrated mechanism. This method can be concluded as being more effective than when the users of the commons are given direct control due to the reason that these individuals have not acquired complete knowledge or expertise in the field of forest management and moreover, they do not have adequate experience of being in a position of power. However, any individual who resides in the forest and desires to work in a position of power can undergo the educational process and appear for the UPSC

exams in India before finally being allotted a position of power depending on the individual's capability.

This mechanism also ensures the absence of information asymmetry. This occurs due to the fact that the people in positions of power like the RO and the RFO have been working in this field and geographical area for a reasonable period of time to understand the dynamics of the common pool resource under management.

By drawing a comparison between the institutional settings in Tadoba to that of Corbett's, the paper concludes that a well-planned institutional management is the key towards long term sustainability of common pool resources. Mere reliance on the natural dwellings and advantages will not be beneficial in the long run. There has been a significant presence of Ostrom's DPs in the management mechanism over a long duration to understand

and evaluate the progress made in CPR.

Finally, what is understood via this research is that there must be integration and transparency in the management mechanism with information being completely available and understood by every individual who is the user of the resource. This can be facilitated through intensive research papers written in a format that not just merely incorporates scientific terms but are also written in an easily understandable manner enabling individual reading. Methods like those of publishing related information in local languages (which is practiced in Tadoba where the people are kept well informed via articles that are published in Marathi newspapers) should complement the work being presented via research papers in a simplified manner.

REFERENCES

1. Elinor Ostrom. (first published 1990, 4th printing 2018). *Governing the Commons, The Evolution of Institutions for Collective Action*. United Kingdom: Cambridge University Press.
2. Geoffrey M. Heal, A. A. (2002). *Agriculture and Ecosystem Services*. ELSEVIER, *Handbook of Agricultural Economics*.
3. James P. Robson, Iain J. Davidson-Hunt, Alyne Delaney, Gabriela Lichtenstein, Lapologang Magole, Aroha Te Pareake Mead. (2014). *Policy Matters (IUCN Commission on Environmental, Economic and Social Policy*. Australia.
4. Joseph, R. J. (2017). *Revisiting the Commons: Sustainable Resource Management Strategies for Inclusive Growth*. Mumbai: 14th SOUTH ASIAN ECONOMIC STUDENT MEET.
5. Kumar, P. K. (2007). *Institutionalising Common Pool Resources Management (Case Studies of Pastureland Management)*. *Economic and Political Weekly*.
6. Tanya Heikkila, D. P. (2017, August, October 11th, 25th). *Common Pool Resources*. Retrieved from Oxford Bibliographies: <http://www.oxfordbibliographies.com/view/document/obo-9780199363445/obo-9780199363445-0011.xml>
7. Walljasper, J. (2011, October 2). *Elinor Ostrom's 8 Principles for Managing A Commons*. Retrieved from *Commons Magazine*: <http://www.onthecommons.org/magazine/elinor-ostroms-8-principles-managing-commons#sthash.wqsni3CF.am5EkWnZ.dpbs>
8. Wilson, D. S. (2016, October 29). *The Tragedy of the Commons: How Elinor Ostrom Solved One of Life's Greatest Dilemmas*. Retrieved from *Economics, The Next Evolution of Economics*: <http://economics.com/tragedy-of-the-commons-elinor-ostrom/>