

Adaptive Governance of Commons: Cases from Indian Forest and Water Management

Name of the author: **Himadri Sinha**¹

Institutional Affiliation: **Xavier Institute of Social Service**

Place: **Ranchi, Jharkhand, India.**

Abstract

Biodiversity conservation essentially requires community involvement. But community-based conservation or community based resource management is not just about communities. It is about governance that starts from the ground up and involves multi-level interactions. Complexities of this multi-level governance create problems but also provide opportunities to combine conservation with development. Multi-level governance may facilitate learning and adaptation in complex social-ecological circumstances. Such arrangements should connect community-based management with regional/national government-level management, link scientific management and traditional management systems, encourage the sharing of knowledge and information, and promote collaboration and dialogue around management goals and outcomes. Governance innovations of this type can thus build capacity to adapt to change and manage for resilience.

In India, the criticality of commons with respect to social, ecological and economic perspectives is immense. Currently, the challenges for the local institutions are numerous emanating from the rapid globalization and industrialization process with constant flow of information, money, objects, ideologies and exogenous technologies. In subsistence agrarian economy where people largely depend on agriculture and forests for their livelihood requirements and a trend of transition setting in, the problem is all the more critical. Hence, it is critical for the institutions to be resilient to the increased externalities and complexities arising from the forces of globalize economy. The paper examines the institutional challenges and various social factors that influence the process of resilience building within institutional ambience. The cases of forest and water management from eastern India are considered and analyzed from a multi level governance perspective for ensuring socio-political adaptation, distributive justice and livelihood security. Findings shows that distributive justice and livelihood security remain strong in local emerged institution but their adaptation with Political system require external help and assistance.

Key words: Biodiversity, Forest, Resilience, Multi level governance, Communities

‘The author agree to allow the Digital Library of the Commons to add this paper to its archives for IASC conferences’

¹ Himadri Sinha is Professor and Head of the Department of Research and Planning at Xavier Institute of Social Service, Ranchi. He can be contacted through e-mail: himadrisinha19@gmail.com

Adaptive Governance of Commons: Cases from Indian Forest and Water Management

Introduction

Biodiversity is claimed as a local, regional, national, and international common property. For the past decade, the roles of international, national and local institutions in biodiversity conservation have been evaluated and hotly debated from different perspectives. Many conservationists promote rigid protection under centralized state agencies and institutions, citing the risks of relying on complicated communities with many different interests. Yet state agencies lack the resources, the cross-scale institutional links, and the transparency needed for implementing policies and enforcing regulations. And in most countries these same agencies lack the legitimacy to negotiate with powerful actors in broader society. As a result, despite the continuing global expansion of protected areas, paper parks are the ruleⁱ.

In the era of globalization, communities are connected to global processes perhaps more than ever before. Such connection makes them vulnerable to pressures and incentives that may originate at other levels of social, political and economic organizationⁱⁱ. Communities respond to various outside pressures through various influences and the linkages between communities. Such adjustment of communities and other levels of political organization need to be studied and understood. There is a developing literature about scale and interplay of institutions across scaleⁱⁱⁱ indicating that institutional linkages and multi-level governance systems are important for a variety of reasons^{iv}. Understanding the conservation-development issue requires attention to scale. For example, regarding the political economy of conservation in four African countries, Gibson (1999)^v showed that forces operating at the level of the nation state (many of them related to peculiarities of postcolonial governments) are quite different from those at the levels of regions and communities. In the context of tropical biodiversity conservation, Barrett et al. (2001)^{vi} argued that community-based conservation overemphasizes the role of local communities, given that local institutions are only one level in a multi-level system with a paucity of strong institutions. More robust designs may 'involve distributing authority across multiple institutions, rather than concentrating it in just one'^{vii}.

Hence, community-based conservation cannot be conservation that is conceived and implemented only at the local level -- because community institutions are only one layer in a multi-level world^{iv}. More usefully, community-based conservation can be used as an abridged label for conservation from the bottom up, or decentralized governance that starts from the ground up but involves a network of interactions at various levels. An increasingly globalized world requires institutions that link the local level to the various higher levels of social and political organization. Such linkages can provide ways to deal with governance^{viii}; multiple objectives^{ix}; multiple knowledge systems and may result in the creation of networks for learning and joint problem-solving^x. They help address various aspects of complexity, such as self-organization, uncertainty, and resilience, as well as dealing with the challenges of scale.

The study of community-based conservation in a multi-level world, with focus on horizontal and vertical linkages, can serve to extend and elaborate commons theory. Edwards and Steins (1999)^{xi} pointed out that there is a need to look beyond the community level and deal with contextual issues. More recent treatments of commons theory have been addressing the issue of scale with increasing sophistication, and have a major role to play regarding multi-level governance involving state, private and civil society actors on resource and environment issues^{xii}. Commons theory can inform conservation science and help with the understanding of issues of scale and institutional linkages. The objective of this paper is (a) to reconcile local and global objectives of conservation through community-based conservation on the basis various past researches and (b) to assess the governing system of various forest management of India in the light of the above understanding.

Background

Following some definitions, we explore the evolving thinking on the relationship between communities and conservation under four headings: developing the capacity to deal with multiple objectives; the importance of deliberative processes; using lessons learned from commons research; and developing a complexity approach for commons governance. Roe (1974: 148-149)^{xiii} observed such constellation of issues that need to be considered at higher as well as lower scales; have a large social content; interact and intersect with one another; tend to be inherently in conflict; and require long time horizons. According to Western and Wright (1994:7)^{xiv} ‘community-based conservation includes natural resources or biodiversity protection by, for, and with the local community.’ They note that defining it more precisely would be futile since community-based conservation includes a range of activities practiced in various part of the world. But, they pointed out that the coexistence of people and nature is distinctly different from protectionism and the segregation of people from nature^{xiv}. Berkes et. al. (2006)^{iv} suggested an extension of the definition, so that community-based conservation includes natural resources or biodiversity protection by, for, and with the local community, taking into account drivers, institutional linkages at the local level, and multiple levels of organization that impact and shape institutions at the local level. The concept of *livelihood* is about individuals, households or groups making a living, attempting to meet their various consumption and economic necessities, coping with uncertainties and responding to new opportunities^{xv}. Livelihood is subsumed in the concept of *well-being*, a context and situation-dependent state, comprising basic material for a good life, freedom and choice, health, good social relations and security^{xvi}. A *driver* is any natural or human-induced factor that directly or indirectly causes a change in an ecosystem^{xvi}. Complexity may be defined as an interconnected network of components that cannot be described by a few rules; generally manifest in structure, order and function emerging from the interactions among diverse parts^{xvii}. Paper has been divided into two sections. In **Section I**, we have discussed the two critical issues of multi level governance concerning biodiversity conservation and in **Section II**, we have analyzed cases of Indian Forest Management in the light of concept of multi level governance.

Section I: Critical Issues for Adaptive Governance

A. Relationships between communities and conservation

For quite some time number of researchers have been examining the conflict between conservation policies set by the state and the rights of local or indigenous peoples^{xviii}. The issue has a long history^{xix}. Biodiversity is a global commons, and its conservation is beneficial for the world. But is it also good for the local people? If biodiversity conservation is pursued through the creation of protected areas (PAs) and if these PAs exclude resource use for livelihoods, then local people are bearing the costs of a process that is providing global benefits^{iv}. Further, given the inability of the state to enforce PAs in many parts of the world, the usual experience is that when a local commons is turned into a PA, it effectively becomes open-access, benefiting neither the conservation cause nor local livelihoods. The relationships between communities and conservation are being contested in several arenas. Here we refer to two debates: the one over the human use of PAs and the one on the question of integrating conservation and development. The debate over the human use of PAs is not new. There has been a growing realization at least since the 1980 *World Conservation Strategy* of the importance of understanding the needs and perspectives of local people (IUCN, 1980). The 1992 *Convention on Biological Diversity* was developed to emphasize the sustainable use of resources and to stop the practice of excluding people, including indigenous people, from new PAs. ‘Conceived as a practical tool for translating the principles of *Agenda 21* into reality, the *Convention* recognizes that biological diversity is about more than plants, animals and micro organisms and their ecosystems – it is about people and our need for food security, medicines, fresh air and water, shelter, and a clean and healthy environment’^{xx}. Among other things, the *Convention on Biological Diversity* has resulted in the creation of new PA categories V and VI to allow for greater human use (IUCN, 1994).

Some conservationists have opposed this development as giving social considerations higher priority over biological ones, and the increased human use of resources in PAs, as taking the PA agenda toward a ‘tragic failure’^{xxi}. In turn, some social scientists have claimed that large international conservation organizations have become increasingly influential in setting the agenda for global conservation to the detriment of local interests, rolling back the *Convention on Biological Diversity* commitment to social considerations such as livelihoods and equity^{xxii}. The issue is of intensive debate both within and outside of the conservation community^{xxiii}.

The question of integrating conservation and development is a second arena of controversy. The World Bank and Asian Development Bank started funding development projects, known as Integrated Conservation and Development Projects (ICDPs) in the 1980s. Assuming that poverty drives people to encroach on protected areas, the object was to target poor people in and around parks and protected areas. Over the years, these efforts have resulted in the establishment of some kind of participatory management in national parks in most parts of the world, but ICDPs themselves have often floundered^{xxiv}.

This has led to a debate regarding the merits of community-based conservation and to critical evaluations of these efforts. Two positions have been emerging. One holds that the failure of

community conservation is not due to any weakness of the concept itself but rather its improper implementation, especially with regard to the devolution of authority and responsibility^{xxv} and to participation, empowerment and institution-building^{xxvi}. The second position holds that the conservation and development objectives, both important in their own right, should be delinked because the mixed objective does not serve either objective well^{xxvii}. To address the two debates, the big question is whether local people are willing and able to participate in protected area management and in the conservation of biodiversity in general. We have argued elsewhere that ‘Does community-based conservation work?’ is the wrong question. Sometimes it does, sometimes it does not.

More important is to learn about the conditions under which it does or does not work (Berkes, 2004). No doubt there are many ways to approach this debate. One promising approach is to focus on the livelihood needs of the local people, as done by the IIED^{xiii}, CIFOR, and IDRC among others. A focus on livelihoods as a point of entry into the conservation-development problems is consistent with the field experience in many areas^{xxviii}. Based on the results of IIED’s international project on community-based wildlife conservation, Roe et al. (2000)^{xiii} start by observing that the late 19th century notion that people and wildlife are in conflict, and that wild areas should be set aside purely for non-consumptive purposes, is a historic anomaly. And so is the assumption of ownership of wildlife resources by the state, and idea that has come to dominate conservation policy worldwide. Roe et al. (2000)^{xiii} argue that PAs based on human exclusion merely sets up a vicious circle: exclusion and lack of attention to livelihoods leads to encroachment and poaching and this, in turn, reinforces the view that people do not have the will or capacity to conserve biodiversity. The solution is to break the vicious circle by linking conservation to improved livelihoods, thereby providing incentives for people to conserve^{xiii}. Linking conservation to livelihoods, as a broad strategy, requires a search for implementation models. Salafsky and Wollenberg (2000)^{xxix} provide models of three conservation strategies. In the “protected area” model based on human exclusion, local livelihood activities merely appear as one of the internal threats to biodiversity. The PA implementation is designed to counter these threats (‘fences and fines’). In the ‘economic substitution’ model as used by some ICDPs, the project implements alternative livelihood activities as substitutes for those that adversely affect biodiversity. The goal here is to increase benefits from these other livelihoods, as a way to reduce the threat to conservation from local people. Finally, in the ‘linked incentives’ model, a link is constructed between biodiversity and livelihood. This link closes the loop and becomes the driving force leading to conservation because it establishes a direct incentive to protect biodiversity in the long-term^{xxviii}. Such an analysis brings out the necessity to deal with multiple objectives; to engage in deliberation to reconcile the local and global meanings of conservation; to make full use of lessons from commons research; and to develop a complexity approach for governing the commons.

B. Developing the capacity to deal with multiple objectives

If conservation and development can be simultaneously achieved, then the interests of both can be served. However, many ICDPs are either primarily about conservation or primarily about development -- but rarely both. More common are situations in which one objective or

the other dominates^{xxx}. For example, involving local communities in conservation is often used as a means of making conservation measures less likely to meet local resistance, but the ultimate objective remains one of conservation. Conversely, protecting the productivity of a resource may be used as a means to enhance local livelihoods and development options, but the main objective remains development. Management approaches that explicitly have more than one objective are far less common than those that have only one.

The Millennium Ecosystem Assessment terms this multiple objectives approach, ‘integrated responses’. They are those responses that explicitly and purposely state that their objectives address more than one ecosystem service(s) and human well-being simultaneously^{iv}. The Millennium Ecosystem Assessment report deals with four areas in which integrated responses are explored: sustainable forest management, integrated coastal zone management, watershed and river basin management, and ICDPs^{iv}. Integrated responses may be seen as a way of moving from problem solving in simple systems to problem-solving in complex adaptive systems. Consistent with the needs of managing complexity, integrated responses tend to involve networks and partnerships of various levels of government, private sector and civil society^{viii}. Recent approaches such as the Millennium Ecosystem Assessment, in turn, reinforces the view that people do not have the will or capacity to conserve biodiversity. The solution is to break the vicious circle by linking conservation to improved livelihoods, thereby providing incentives for people to conserve^{xiii}.

Linking conservation to livelihoods, as a broad strategy, requires a search for implementation models. Salafsky and Wollenberg (2000)^{xxix} provide models of three conservation strategies. In the ‘protected area’ model based on human exclusion, local livelihood activities merely appear as one of the internal threats to biodiversity. The PA implementation is designed to counter these threats (‘fences and fines’). In the ‘economic substitution’ model as used by some ICDPs, the project implements alternative livelihood activities as substitutes for those that adversely affect biodiversity. The goal here is to increase benefits from these other livelihoods, as a way to reduce the threat to conservation from local people. Finally, a link is constructed between biodiversity and livelihood in the ‘linked incentives’ model. This link closes the loop and becomes the driving force leading to conservation because it establishes a direct incentive to protect biodiversity in the long-term^{xxix}. Such an analysis brings out the necessity to deal with multiple objectives; to engage in deliberation to reconcile the local and global meanings of conservation; to make full use of lessons from commons research; and to develop a complexity approach for governing the commons.

Section II: Cases from Indian Forest and Water Management

In the above section we have discussed the two critical issues of concern in the field of biodiversity conservation viz, (a) Relationships between communities and conservation, and (b) Developing the capacity to deal with multiple objectives. In the light of the above issues, we will now analyze the few Indian forest management systems to understand how far we have succeeded in working out healthy multi level governing system both for the betterment biodiversity and the people who derives their livelihood out of it.

1. Multilevel adjustment in forest management in Orissa: An unfinished agenda

In a subsistent economic setting like central Orissa, where people are extremely dependent on forest and interlinked farming systems, the incentives for collective action around such resources are comparatively high. People often conform to the collective rules and to some extent the systems that have been emerged through conflicts and confrontations over the period of time. The smaller adjustments within the existing practices of resource management have been effective to some extent. However, with the changing scenario and the process of globalization setting in, now the challenges are many folds. Globalization, defined by increasing economic integration and cultural interchange, is a cross-scale phenomenon. Studies of globalization necessitate tracing connections across spatial, temporal, and intellectual scales. Globalization is of particular importance to resilience, because its increasing number of interconnections introduces new variables into human ecosystems and often invokes new forms of social-ecological interactions. These interactions frequently act to undermine the constituent stabilizing structures and processes that determine resilience, at particular times and in particular places. In a globalizing world, it is crucial to understand the ambiguous complexity that arises from the nexus of these rapid flows and dynamics. In a time when rapid global flows intensify and complicate social transformations, each and every society, to various degrees, face significant changes in almost every aspect of social life. With such influences, societies are becoming more and more transitional, to varying degrees and forms. In this respect, transitional villages are a general indication of the fundamental changes of the societies in which we live and they reflect the dilemmas that the contemporary globalization processes bring along. In this context, while the smaller adjustments would only be useful in a short run, the long term viability of such institutions calls for redefining the structural and functional space in varied scale. The paper examines the institutional challenges and various social factors that influence the process of resilience building in an institution. The factors are like, Institutional structure, ownership, rule system, adaptive mechanisms, broad based decision making, mechanisms for accountability and transparency, resource-user interactions. The paper analyses the dynamics of socio-political environment, the ongoing struggle of local institutions to internalize the externalities from within and outside.

The institutional setting: Historically, the feudal kings of the princely states had ruled majority of areas in Angul and Dhenkanal districts and therefore, there exists feudalistic reminiscence in the villages, which structurally had inherent principles of exclusion, dominance and subordination. However, over the years of socio-political changes the structure of single leadership gave way to multiple and more representative leadership. Population is heterogeneous consisting of various castes, sub castes, tribes in a single village. A complex and dynamic web of inter-relationship exists between the different caste groups and tribes depending on each other for their livelihood and existence. The major occupation is agriculture. NTFP from forest is the supplementary source of income and food in the lean season. In such a subsistence economy, forest plays a major role. The district, for most part had dense forests covering about 53% of the total area, concentrated mainly in Pallahara and Athamallik subdivision. Forests here, according to Champion's classification is typically a dry mixed tropical deciduous forest and the principal species in many places being *sal* and

bamboo. But in the recent past there has been a lot of indiscriminate and uncontrolled felling, owing mainly to urbanization and industrialization in the area. The area is mostly rainfed and prone to frequent droughts. The individual land holding is quite small with an average holding of 1.23 hectares and out of which 0.32 hectare is suitable for lowland agriculture. This along with the rainfed condition limits the community to go for intensive cropping. Every village has a village committee that governs and looks after the social, religious and the development function of the village. The village committee is an informal body consisting of representatives from all caste groups and representation ratio depending on population of the caste groups in the village or hamlet. These committees look into the management of the resources like the forests, water bodies, village fund, grain banks, and the village assets. Now days, with increasing emphasis on privatization and modernization and decentralizations by the state, challenges for the local institutions are many fold exerting from such processes and a trend of transition setting in. The transition can be characterized by increasing flow of information, money, objects, ideologies; greater physical mobility of the villagers; The emerging viewpoint of profits, magnetization and economic orientation of goods and services; prominence of individual preference; High opportunity cost of social arrangements to manage local resources. The illustration from few villages of Angul and Dhenkanal region elucidates the process more concretely. The processes at the village level are being analyzed on the basis of various attributes like changing practices, changing policy, changing social structure, increasing alternatives and increasing threat to collectivity in some mainstream villages of Angul and Dhenkanal. From the analysis it is found that the driving force of resource management is shifting from subsistence use with collective interest to economic orientation with individual incentives. Now to engage with the pace of change there is need to reconstruct the institutional mechanism through identification and preservation of those variables that enable systems to renew and organize along a desirable trajectory. There is a need to adopt multilayered institutional approach with the involvement of various actors having short term and long term stakes over the resource base. The experience of the village institutions working on natural resource management in Angul and Dhenkanal with support of Foundation for Ecological Security demonstrates some elements of resilience to deal with the prevailing situation.

Factors influencing resilience building in the local institution: Village communities of Orissa are repositories of traditional wisdom and experiences with respect to natural resource management. These villages are also having a strong history of forest protection right from the princely state era. To benefit from this, and also to make development interventions relevant to conditions of the rural habitats, it is essential that 'development village specific bylaw and village level planning' becomes an integral part of the institution building approach. Village specific bylaw is developed upon the existing rules and regulation with the inclusion of democratic values through appropriate discussion in village general body. In Orissa context, the rules and regulations of each village are unique, adapted to the environment, developed for their common good and purpose and widely accepted by the members of the institution. However these institutions are not free from biases, inequities that

emanates from its feudalistic setting in the past. When these irregularities are questioned, appropriate modification and correction are made through community consensus it becomes very effective tool to manage village resource with greater degree of community involvement. The process of rule making needs to make the attempt to devise strategies that not only respect and accommodate the existing social, cultural and political specificities but which also create spaces for those sections of the community, which are disenfranchised. The structural changes like universal membership on the basis of adult franchise, functional shifts by levying primacy on general assemble for decision-making and deliberations, etc. contributes towards the cause of disenfranchised ones.

Table 1 Changing dimension of forest management in Orissa

Attributes	Changes occurring in transitional villages	Impact on the governance of village commons
Changing practices	<ul style="list-style-type: none"> · Monetization of commodities, · Simpler practices like auctions, over-pricing to reduce use, · Sale for increasing village funds 	<ul style="list-style-type: none"> · Auctioning of village pond · Poisoning of pond by one group · Access to resource rich and politically powerful · Increase in inequity
Changing policy	<ul style="list-style-type: none"> · Confrontation of existing policies, existence of informal rules denied or over-ruled 	<ul style="list-style-type: none"> · Breaking down of village rule structure · More emphasis on legal provisions
Changing social structures	<ul style="list-style-type: none"> · Multiple leaders, internal power struggles, · Unresolved personal conflicts, and · Poor understanding of organizational process 	<ul style="list-style-type: none"> · Challenges for informal institutions, · Need for legitimate institutions, · Breakdown of conflict resolution mechanisms-need for the state to step in
Increasing alternatives	<ul style="list-style-type: none"> · Knowledge and culture shared · Rapid, expanding, and diverse global flows of objects, information, money, images, ideologies, and people 	<ul style="list-style-type: none"> · More opportunity at times inferior to existing livelihood option but seems lucrative. · Gain from different types of access
Increasing threat to collectivity	<ul style="list-style-type: none"> · Gives rise to cultural disintegration, · Deepens inequalities · Perpetuate the patterns of unequal development · Fragmentation of governance 	<ul style="list-style-type: none"> · Changing power relations more in the line of political affiliation and wealth accumulation · People having access to cash income are ruling over even resource rich person · Strong polarization by individual actors by virtue

of money power.

· Increasing transaction cost

Source: Pradhan, 2006.

The institution persists because of the support of the social actors who benefit from its rules and outcomes and who are sufficiently powerful to promote its continuation. Beneficiaries are not necessarily those who had power prior to the institution's creation; they may well have been subordinate to an alternative group at the institution's genesis. However, they subsequently become empowered by its rules and outcomes and support its continuation and even expansion. Institutional change occurs when beneficiaries of the group are weakened and overcome by other, previously subordinate groups, a situation that can occur as a result of social and economic changes. As the rule making system and the planning process provides space for incorporating peculiarities of village situation, subgroup interests, transaction of views of cross section of the communities, it makes the institution adaptive and resilient to deal with externalities.

Search for appropriate mechanisms and solutions: People in the villages, as in any other place, respond best when there are elements of trust, interest and security in any venture they undertake. Often such responses are governed by the principles of self-discovery and are an outcome of trials which are small, gradual and which do not challenge the entire system but only seek to modify elements of it, eventually taking forward the entire system and its status to a different plane. Common needs tend to bring people and communities together. Most often communities go through a natural process wherein these needs are prioritized, analyzed, a few possible solutions are arrived at, some of these alternatives are tried, monitored and the most appropriate solution adapted.

If intervention, in a way, engineers the 'social dynamics' within the village system, the effort is to be made to direct such 'social engineering' towards strengthening local initiatives and mechanisms rather than displacing them with new and outside ideas. This does not, however, imply that one would be closed to outside trials and experiments, but such ideas are introduced as one of the alternatives for the people to decide. The continuous search processes help inducing analytical flexibility within the community and provide openness to accept the new realities and manage the change efficiently^{xxxi}.

2. Check dams enabled small and marginal farmers to cultivate Rabi crop in Kakoda

Kakoda village is located in Pandhana block of Khandwa district. Mostly inhabited by the tribal communities of Bhil and Barela, poverty in Kakoda is partly due to poor natural resources in forms of degraded forest on the Satpura hills and less fertile land which was lacking irrigation facility. AKRSP(I) started interventions in Kakoda village in 2005. Subsequently in 2008, it implemented MGNREGS under Rajiv Gandhi Mission for Watershed Management in the village. Since topography of the village is undulated, hence, soil erosion was the major concern in the village. There are three small streams and a major river namely the Abna flowing through Kakoda. These streams used to be the main source of irrigation for handful of farmers earlier who were able to irrigate only few acres of land.

However, due to early drying out of the streams leading to insufficient irrigation facilities, they were facing difficulties to take second crop during rabi season. When AKRSP(I) started working in the village, farmers in Kakoda cited lack of irrigation facility as the major problem for them. After, formation of the Watershed Development Committee in the village, villagers were involved in preparation of participatory village micro plan and planned to construct check dams for irrigation. Accordingly, five check dams were constructed. Two check dams were constructed on the Mata river, two were on the Abna river, one on Gaonwali Nala and one check wall was constructed on Kumarbhata Nala to stop the water flowing through the streams. The check dams constructed are now helping to irrigate an area of 58 acre each year. Though, few farmers who have dug wells used to cultivate wheat in their fields prior to construction of the check dams, the production was very low as the water availability was not sufficient. Presently, water is available for longer period till March in the dug wells which are recharged due to construction of check dams on up streams. Now sufficient water is available for wheat cultivation. In total, 26 farmers are getting benefited through the check dams constructed. As a result of the intervention, substantial increase in production of food crop especially wheat and gram has addressed food insecurity issues faced by the households and enhanced food sufficiency round the year^{xxxii}.

3. Small Fishermen in Chilika Oxbow Lake

The Chilika lake is surrounded by about 132 fishing villages. Out of the total, 30 percent of the fishing village population is actively involved in fishing. The fishing population consists of sub-groups such as Kandaras, Khatias, Niary, Nolia, Tiaras, etc. who uses different fishing gear and catch different species of fish. Although no official statistics is available about the total fisher folk living on Chilika, a rough estimate suggests that the total fishing population shall be around 1,20,000. These fishermen were threatened by large industry who promote shrimp farming and mechanised fishing.

Recent study showed that the dynamics of livelihood, poverty and vulnerability of fishermen of Chilika lake of Odisha in eastern India and the factors that triggered social movement by the fishermen in the area from time to time. The study supports the argument that increasing mechanization and modern fishing technology have confounded the traditional fisher folk with several problems, socio-political, economic and environmental issues. Issues such as natural disasters and marginalization of farmers change in governance policy like leasing of fishing grounds, and the state versus the community management have been analyzed at micro context for macro strategy. Therefore, it was felt that small fishermen need to collaborate with activists, NGOs working towards supporting small fisher's folk and bank credit to cope up with industrial and mechanized fishing^{xxxiii}.

Conclusion

Setting up linkages between local communities and higher up other actors of biodiversity conservationist is an essential need. Delinking human element from conservation is less than any viable solution. Setting up these linkages requires understanding the relationships between communities and conservation, and developing the capacity of the actors to deal with multiple conservation objectives. In the case Indian Forest Management JFM initially brought some fresh air towards achieving the above goal. Unfortunately, forest department could not continue process of establishing multi-level governance through necessary democratization. As a result, JFM is becoming less community oriented and more of co-opted adhoc managing body dominated by forest bureaucrats.

Many self initiated community based conservation efforts in Orissa have been trying to evolve into more viable form multi-level linkages of late. These communities are showing how they are adapting new situations without compromising with conservation objectives. However, these initiatives need to work out some adjustment with governing system of the country. Such negotiation will be very crucial for the sustenance of such adapting behaviour of the communities.

References

- i Mascia, M. B., Brosius, J. P., Dobson, T.A., Forbes, B.C., Horowitz, L., McKean, M.A., Turner, N.J. (2003). Editorial. *Conservation Biology*, 17(3 – June), 649–650.
- ii Armitage, D. & Johnson, D. (2006). Can resilience be reconciled with globalization and the increasingly complex conditions of resource degradation in Asian coastal regions? *Ecology and Society* 11(1): 2. [online] URL: <http://www.ecologyandsociety.org/vol11/iss1/art2/>. ; & Berkes, F. (2004). Rethinking community-based conservation. *Conservation Biology*, 18: 21-630.
- iii Adger, W.N., Brown, K. & Tompkins, E.L. (2006). The political economy of cross-scale networks in resource co-management. *Ecology and Society* 10 (2): 9 [online] URL: <http://www.ecologyandsociety.org/vol10/iss2/art9/>. ; Cash, D.W. & Moser, S.C. (2000). Linking global and local scales: designing dynamic assessment and management processes. *Global Environmental Change* 10: 109-120.; Lebel, L., Garden, P., & Imamura, M. (2005). The politics of scale, position, and place in the governance of water resources in the Mekong region. *Ecology and Society* 10(2): 18. [online] URL: <http://www.ecologyandsociety.org/vol10/iss2/art18/>.; Young, O. (2002). *The Institutional Dimensions of Environmental Change: Fit, Interplay and Scale*. MIT Press, Cambridge, MA.
- iv Berkes, F., T.P. Hughes, R.S. Steneck, J.A. Wilson, D.R. Bellwood, B. Crona, C. Folke, L.H. Gunderson, H.M. Leslie, J. Norberg, M. Nyström, P. Olsson, H. Österblom, M. Scheffer and B. Worm (2006). Globalization, roving bandits and marine resources. *Science* 311: 1557-1558.
- v Gibson, C.C. (1999). Politicians and Poachers. *The Political Economy of Wildlife Policy in Africa*. Cambridge University Press, Cambridge. IUCN 1980. *World Conservation Strategy: Living resource conservation for sustainable development*. IUCN, UNEP and WWF, Gland, Switzerland. IUCN 1994. *Guidelines for protected areas management categories*. IUCN, Cambridge, UK.
- vi Barrett, C.B., K. Brandon, C. Gibson and H. Gjertsen (2001). Conserving tropical biodiversity amid weak institutions. *Bio Science* 51: 497-502.
- vii Barrett, C.B., K. Brandon, C. Gibson and H. Gjertsen (2001). Conserving tropical biodiversity amid weak institutions. *Bio Science* 51: 497-502.
- viii Kooiman, J. (2003). *Governing as Governance*. Sage: London.
- ix Brown, K., J. Mackensen, S. Rosendo et al. (2005). *Ecosystems and Human Well-Being: Policy Responses*. Volume 3, Chapter 15, Integrated responses. Millennium Assessment/Island Press, Washington DC, pp. 425-465.
- x Carlsson, L. & F. Berkes (2005). Co-management: Concepts and methodological implications. *Journal of Environmental Management* 75: 65-76.
- xi Edwards, V.M. and N.A. Steins (1999). A framework for analyzing contextual factors in common pool resource research. *Journal of Environmental Policy and Planning* 1: 205-221.
- xii Dietz, T., Ostrom, E. and P. Stern (2003). The struggle to govern the commons. *Science* 302: 1907- 1912.; Ostrom, E., Dietz, T., Dolsak, N., Stern, P.C., Stonich, S. & Weber, E.U. (Ed.) (2002). *The Drama of the Commons*. National Academy Press, Washington DC.
- xiii Roe, D., Mayers, D., Grieg-Gran, M., Kothari, A., Fabricius, C., & Hughes, R. (2002). Evaluating Eden: Exploring the Myths and Realities of Community-Based Wildlife Management. In Ostrom, E., Dietz, T., Dolsak, N., Stern, P.C., Stonich, S. & Weber, E.U. (Ed.). *The Drama of the Commons*. National Academy Press, Washington DC.
- xiv Western, D. & Wright, R.M. (Ed.) (1994). *Natural Connections. Perspectives in Community-based Conservation*. Island Press, Washington DC.
- xv De Haan, L. & A. Zoomers (2003). Development geography at the crossroads of livelihood and globalisation. *Tijdschrift voor Economische en Sociale Geografie* 94: 350-362.

-
- xvi MA (2003). *Ecosystems and Human Well-Being: A Framework for Assessment*. Millennium Ecosystem Assessment. Washington, D.C.: World Resources Institute/Island Press.
- xvii Levin, S.A. (1999). *Fragile Dominion: Complexity and the Commons*. Perseus Books, Reading, MA.
- xviii Moeliono, M. (2006). Conservation policy and the commons. *Common Property Resource Digest* No. 76: 1-4.; Sinha, H. (2005). *People and forest: Unfolding the participation mystique*. Concept: Delhi.
- xix Borgerhoff Mulder, M. & Coppolillo, P. (2005). *Conservation: Linking Ecology, Economics, and Culture*. Princeton University Press, Princeton NJ.; Sinha, H. (2005). *People and forest: Unfolding the participation mystique*. Concept: Delhi. ; Western, D. & Wright, R.M. (Ed.) (1994). *Natural Connections. Perspectives in Community-based Conservation*. Island Press, Washington DC.
- xx CBD (2006). Convention on Biological Diversity Home Page. <http://www.biodiv.org>
- xxi Locke, H. & Dearden, P. (2005). Rethinking protected area categories and the new paradigm. *Environmental Conservation* 32: 1-10.
- xxii Brosius, J.P & Russell, D. (2003). Conservation from above: An anthropological perspective on transboundary protected areas and eco-regional planning. *Journal of Sustainable Forestry* 17 (1/2): 39-65.; Chapin, M. (2004). A challenge to conservationists. *World Watch* November/December 2004: 17- 31. Steiner, A. (2005). Critical conservation – new strategies for engaging with society. In: *Biodiversity Science and Governance. Proceedings of the International Conference*. Museum national d’Histoire naturelle, Paris, pp. 87-94.
- xxiii Brechin, S.R., Wilshusen, P.R., Fortwangler, C.L. & West, P.C. (Ed.) (2003). *Contested Nature: Promoting International Biodiversity with Social Justice in the Twenty-first Century*. State University of New York Press, Albany. ; Borgerhoff Mulder, M. & Coppolillo, P. (2005). *Conservation: Linking Ecology, Economics, and Culture*. Princeton University Press, Princeton NJ. ; Steiner, A. (2005). Critical conservation – new strategies for engaging with society. In: *Biodiversity Science and Governance. Proceedings of the International Conference*. Museum national d’Histoire naturelle, Paris, pp. 87-94.
- xxiv Brown, K. (2002). Innovations for conservation and development. *The Geographical Journal* 168: 6-17.; Borgerhoff Mulder, M. & Coppolillo, P. (2005). *Conservation: Linking Ecology, Economics, and Culture*. Princeton University Press, Princeton NJ.
- xxv Murphree, M.W. (2002). Protected areas and the commons. *Common Property Resource Digest* No. 60: 1-3. NRC 1996. *Understanding Risk: Informing Decisions in a Democratic Society*. National Research Council/National Academy Press, Washington DC.
- xxvi Brown, K. (2002). Innovations for conservation and development. *The Geographical Journal* 168: 6-17.
- xxvii Redford, K.H. & Sanderson, S.E. (2000). Extracting humans from nature. *Conservation Biology* 14: 1362-1364.
- xxviii Western, D. & Wright, R.M. (Ed.) (1994). *Natural Connections. Perspectives in Community-based Conservation*. Island Press, Washington DC.; Zerner, C., (Ed.) (2000). *People, Plants & Justice. The Politics of Nature Conservation*. Columbia University Press, New York.; Marschke, M. & Berkes, F. (2005). Local level sustainability planning for livelihoods: A Cambodian experience. *International Journal of Sustainable Development and World Ecology* 12: 21-33.
- xxix Salafsky, N. & Wollenberg, E. (2000). Linking livelihoods and conservation: a conceptual 12 framework and scale for assessing the integration of human needs and biodiversity. *World Development* 28: 1421-1438.
- xxx Brown, K. (2002). Innovations for conservation and development. *The Geographical Journal* 168: 6-17.
- xxxi Pradhan, S. (2006). Building resilience in local institution for natural resource management. Paper presented at the *Eleventh Biennial Conference of the International Association for the Study of Common Property (IASCP)*, Bali, Indonesia (June 19-23).

^{xxxii} Mishra, J. (2013). Rural Employment Guarantee Scheme and Common Property Resource Management: AKRSP(I)'S Intervention in South-Western Madhya Pradesh. In H. Sinha & A. Kumar (Ed.), *Governance of Commons and Livelihood Security*. Ranchi: XISS & NABARD Publication.

^{xxxiii} Roy, S. (2013). Livelihood Strategies for Fishermen of Chilika. In H. Sinha & A. Kumar (Ed.), *Governance of Commons and Livelihood Security*. Ranchi: XISS & NABARD Publication.