

Calling for Better Ecological Values: Integrating Indigenous Knowledge System with Sustainable Policies

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Abstract

Sustainability is increasingly becoming a popular term in the fields of research and practice. The concept is gaining momentum due to increasing awareness about the environment of common people, stringent government policies, and the recognition of the finite nature of resources. We live in the anthropocene and the future of humanity and of our planet lies in the hands of today's younger generation (Banerjee and Prasad, 2018). Rapid industrialization for more than the last hundred years has taken a huge toll on the environment. The emission of greenhouse gases (GHS) is continuously increasing the average global temperature. Governments worldwide have imposed different environmental policies (popularly known as carbon policies) to reduce emissions. Despite the stringent laws, increasing awareness, and several high-level international conclaves the emissions around the world are increasing steadily.

In this paper, we have discussed the livelihood of some indigenous tribes of India. These tribes in general stay away from the critical discussions related to "sustainability", but their practices and culture have upheld the concept of sustainability for ages. These practices often outcome from their traditional knowledge with an inherent respect for nature and its resources. In this paper, we have discussed the sustainable lifestyle and practices of a few tribal communities in the Indian state of Odisha. Encouraging, and fostering these practices can promote the concept of "sustainability" to a large extent.

Keywords: Sustainability, Kondh, Greenhouse, Industrialization, Emission

Introduction

Today, the nature of an ever-competitive business environment has become both dynamic and an essential characteristic of globalisation. Constant shift in processes, communication and interdependence, indeed, sustainability in the functioning of any organisation has become an ever-augmenting trend (Tripathy et. al, 2023). Environmental pollution has become a pressing concern in modern times, with ongoing emissions of greenhouse gases into the atmosphere driven by rapid industrial advancement posing a significant threat to both the environment and the survival of human civilization. Scientific findings indicate that over the last 130 years, the Earth's average temperature has increased by around 0.85°C. Projections suggest that from 2030 to 2050, approximately 250,000 deaths may occur each year

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due to changes in weather patterns. The consequences of global warming, such as the melting of glaciers, rising sea levels, and more frequent extreme weather events, are evident manifestations of this phenomenon [Ghosh et. al (2016), WHO (2015)]. The recognition that human actions are the primary contributors to greenhouse gas emissions and climate change has prompted governments and regulatory agencies to enact various laws and implement diverse emission control policies, widely known as carbon policies

(Ghosh et. al., 2020). These carbon policies currently in place can be categorized into three primary types: carbon tax policies, carbon cap-and-trade policies, and strict carbon-cap policies (Ghosh et. al., 2021 Benchmarking). Further, Ghosh et al. (2021) proposed a seminal policy- the “carbon-lockdown” policy. However, despite the existence of so many policies in theory and/or practice the level of carbon dioxide in the atmosphere is currently elevated to a degree unprecedented in the last 400,000 years (NASA, 2024). So, it can be concluded that only the rules and regulations are falling short of delivering the expected outcomes. In recent years many studies have revealed that sustainable practices

In this paper, we have studied the sustainable lifestyles and practices of Kondh tribe of Odisha, which has been identified as one of the vulnerable communities in India. These people have been performing agriculture by indigenous method for centuries. Our objectives are to study, highlight, and promote the practices of Kondh tribe through this literary work.

Literature Review

Engaging in sustainability as scientific versus indigenous knowledge perceived as archaic, must look at the history of such analysis. Historical divide between indigenous knowledge and scientific knowledge, highlights how this division has often marginalized indigenous perspectives in decision-making processes, particularly in development contexts (Agarwal, 1995). It undermines how contributed positively to sustainable development initiatives, environmental management, or other areas. The challenges and complexities of integrating indigenous knowledge into mainstream scientific discourse, including issues of power dynamics, cultural appropriation, and the need for respectful collaboration between different knowledge systems is the call for next step towards

environment policy. It would advocate for a more holistic and inclusive approach to knowledge production and policy-making which values and incorporates diverse forms of knowledge.

Fikret Berkes seminal work explores the relationship between traditional ecological knowledge (TEK) and contemporary resource management practices (Berkes, 1999&2009). It examines how indigenous societies around the world have developed sophisticated understandings of their environments over centuries, drawing on their cultural, spiritual, and practical interactions with nature. His work discusses how TEK differs from scientific knowledge in its holistic and interconnected view of nature, emphasizing the spiritual and cultural significance of ecosystems. It advocates for a more inclusive and integrated approach to ecology and resource management that values and learns from indigenous wisdom. It emphasizes on the holistic and interconnected nature of indigenous knowledge, contrasting it with the reductionist approach often associated with Western scientific methods. Indigenous ways of knowing incorporate spiritual, cultural, and practical dimensions, offer valuable perspectives on complex environmental phenomena.

Incorporating traditional and local ecological knowledge (TEK/LEK) into forest conservation efforts in the Pacific Northwest region of the United States has yielded positive response (Charnley, et al. 2018; Perez, et al. 2020). This study demonstrates how successful collaborations between scientists, conservation practitioners, and indigenous/local communities in integrating TEK/LEK into conservation initiatives. Hence, such integration enhances the effectiveness and sustainability of biodiversity conservation efforts by combining scientific research with traditional wisdom and practices. Another study focuses on traditional livelihoods of the Maasai people in East African rangelands (Homewood, et al. 2009).

Conservation efforts and economic development agendas impact Maasai communities, their cultural practices, and their ability to sustain their pastoralist way of life. Empirical research illustrates the challenges faced by Maasai communities in navigating conservation policies, land tenure systems, and market pressures. Maasai communities cope with external pressures, including diversification of livelihoods, engagement in tourism ventures, and participation in community-based conservation initiatives. This work offers critical insights into the complexities of conservation and development dynamics in East African rangelands, emphasizing the need for participatory approaches that prioritize the well-being and agency of local communities like the Maasai.

Inculcating a distinct education system incorporating knowledge from both these worlds can enable fixing policy gaps and introducing the youth to a new appreciation for indigenous knowledge (McGregor, et al.2010) and spiritual rituals concerning nature. Exploring indigenous research methodologies within the context of education must delve into various theories and practices surrounding indigenous research, emphasizing the importance of relationships within Indigenous research frameworks.

Indigenous knowledge can complement scientific approaches to conservation, offering holistic and sustainable solutions rooted in centuries of experience and understanding of local ecosystems. Policies and frameworks that recognize and support indigenous land tenure and governance systems, empowering indigenous communities to play a central role in conservation efforts. There many successful examples of collaboration between indigenous peoples, governments, NGOs, and other stakeholders in biodiversity conservation projects. These examples demonstrate the effectiveness of inclusive approaches that respect indigenous rights, knowledge, and practices while

promoting environmental sustainability and community well-being (Tauli, 2009).

In the context of discussing tribal vulnerabilities within a strict scientific method of sustainability, it is pertinent to understand the idea of 'edges' (Turner, et al. 2008). Here, edges—both ecological and cultural—is an essential source of diversity that contribute to the resilience of social-ecological systems. Transitional zones between different ecosystems or cultural boundaries can foster unique ecological and cultural dynamics.

Human communities living on ecological edges, such as coastal areas, mountainous regions, or ecotones, develop adaptive strategies to thrive in dynamic environments. Similarly, cultural edges, where different social groups, traditions, or worldviews intersect, can lead to the exchange of knowledge and practices that enhance resilience and innovation (ibid).

TEK led by Mongolian nomadic pastoralists contributes to the sustainable management of rangeland ecosystems. Generations of nomadic herders have developed a deep understanding of the local environment, including plant and animal behaviour, climate patterns, and soil conditions. Thus, indigenous knowledge is applied in day-to-day pastoral practices, such as livestock grazing patterns, migration routes, and water management strategies. They are highly adaptive and are able to respond flexibly to environmental changes based on their ecological knowledge and experience. Yet, recently, similar to Kondh tribes of Odisha, they face challenges facing traditional rangeland management practices in the context of modernization, climate change, and socio-economic shifts. External interventions and policies often fail to recognize or incorporate indigenous knowledge systems, leading to conflicts and unsustainable resource use (Fernández-Giménez, et al. 2012 and 2000). Similarly, comparing and contrasting the institutional designs

of customary fisheries management across the three case study regions (Indonesia, Papua New Guinea, and Mexico) would enable identify common patterns, challenges, and success factors (Cinner, 2012).

Sustainability: Concept, use and critique

The terms 'sustainability' and 'sustainable development' have become a common parlance no longer confined as academic jargons. It is pertinent to understand what exactly the terminology entails before analysing its current limitations. Sustainable refers to having a positive between environment and development, though there are multiple debates as to how to link these and to what extent? (Parris & Kates, 2003). There has been attempts to define the term through all the multiplicity of concepts and debates (Chichilnisky, 1997; King, 2008; Greenberg, 2013). In short, however, sustainability was defined by United Nations Brundtland Commission (1987) as, "meeting the needs of the present without compromising the ability of future generations to meet their own. It considers the short and long-term ecological, social and economic consequences of our actions and emphasizes both environmental and human well-being as essential ends in themselves". It a moral duty of present generation to preserve the rich ecological diversity and heritage for the future generation, hence essential steps must be taken to secure nature. In its recent form it has become inclusive to include equality and justice beyond class, caste and race and move from its urban origins (Greenberg, 2013). Rather than focusing on balancing environmental wellbeing with economic growth, many proponents of sustainability are adding another dimension to broadly define it. The social dimension is pertinent to link with the concepts to strive for notions of justice and equality. Thus, a more holistic approach towards sustainability is being advocated by a significant group of scholars. Economic growth has not led to disappearance of

economic disparity and uneven development. Environmentalists, academics, most notably feminists are attempting to redefine the concept by including, vital, non-economic aspects of life (King, 2008). For example, unpaid housework, mostly done by women is not part of GDP or accounting system of economy.

Another vital aspect of sustainability is its focus on securing the future or needs of future generations. Securing the potential and opportunities of this 'future' involves investment and focus on poverty alleviation, eradication of child abuse, promotion of child welfare and gender justice amongst others. Thus, sustainability is to broaden human rights, freedom, and capabilities. According to Amartya Sen, five types of freedom are required for facilitating human development they are political entitlements, economic facilities, social opportunities, transparency guarantees, and security (Sen, 1999:38-39). These ideas of inclusivity of rights and guarantees, was in sharp contrast with of the Brundtland Report of 1990. According to this report the capacities/abilities of the environment can be divided neatly into four basic functions. It includes, source function, sink function, service function and spiritual function. It refers to extraction of raw materials, recycling waste produced by human action, climate stability or biodiversity and recreational or aesthetic values, respectively. Though it is a narrow definition of the term, yet it suggests some ways to keep intact the capacities of 'earth.' The report discusses careful extraction of renewable resources below earth's capacity to renew and recycling of non-renewable resources, without its overproduction (Maude, 2014). Further, careful it discusses minimal use of non-biodegradable resources and safely storing, using, and breaking down of biodegradable waste to prevent it from interfering in the ecosystem and spiritual values of environment (ibid). Thus, identifying areas of target and merely stating out rules and prescriptions was part of this report in the initial years of

sustainability. For this all levels of officials, academicians and scientists must focus on a robust system of law and redefine the ideas of justice in particular. They must rally together to form a solid socio-legal basis for protecting the environment, nurtured by not needs but minimal exploitation of nature of needed.

The various aspects of sustainability from the vantage point of ecology, economy, and society, must also discuss the normative aspect. Such discussion would entail discussing the ethics which are part of our social system at large (Vucetich and Nelson, 2010). This dimension of sustainability doesn't discuss economic versus social areas or quality versus quantity; rather it calls for interdisciplinary studies and research or collaborations between academics from diverse areas, such as economics and sociology or environment and political science etc (ibid). This will lead to cohesiveness of sustainability. We should not care about our environment just because it nurtures life and provide for our needs but because it is intrinsically valuable and ethical as human beings to preserve our nature.

There should be a continued guarantee of both quantitative and qualitative areas of life. Sustainable means something that can be continued for the long term into the future. Despite multiple aspects and definitions of sustainability the common point is keeping intact the ability of the environment to provide for the needs of the future and sustain healthy life on the planet. Sustainability means looking at both needs (as in poverty alleviation as a priority) and imposed state limitations on environmental exploitation.

Furthermore, scholars have proposed various frameworks for understanding sustainability, such as the triple bottom line approach, which considers the economic, social, and environmental dimensions of sustainability (Elkington, 1997). Others have expanded this framework to include

cultural and governance dimensions, recognizing the interconnectedness of sustainability with broader societal values and institutions (Hopwood et al., 2005).

The critique of sustainability points out that the concept has become a buzzword for corporate marketing and appropriated by neo liberal economy (Cock, 2011). The concept of 'sustainable development' denotes converting ecologies or nature as commodity or its adaptation to the market policies. Today, populist terms, such as, 'green capitalism' would be more about accumulation of goods and products than about inherent goal of preserving 'greenery' or ecosystem. The very logic of capital accumulation will invariably lead to some form of resource depletion, environmental harm and destruction of local biodiversity. Any consumption of natural resources is irreversible, except for targeted intervention to minimise its impact. The idea of sustainable growth denotes sustaining growth itself, rather than environmental concerns. Hence, "sustainable capitalism is a fiction" (White and Harriss, 2007, p. 92). This statement can be further asserted by looking at the way capital accumulation, consumerism have taken over our everyday life. Furthermore, for any sustainable development to make actual impact, it must assert the ideas of justice and equality, it is not possible in a strongly capitalist economy with emphasis on merely economic growth (Giddens, 2009). Since resources are always scarce, the idea of justice would claim that those resources be preserved, nurtured and accessed equally by everyone than only the privileged few. Hence, the idea of sustainability without its core values of justice and equality is simply an oxymoron (Giddens, 2009, p. 63)

The word 'capital' conjures up the image of something concrete which can be seen, measured and quantified. In its populist definitions, it refers to any kind of accumulation of wealth/resources, market system, cash flows, etc. However, it is

undeniable that capital plays a role in determining human relationships, community formation.

Recently, voices academia and activism are ardently critiqued and questioned terms such as 'green capitalism' and 'sustainable development' (Shiva, 2010, 2006; Sullivan, 2009, Jolly and Singh, 2021). Terms such as 'Green Washing' and capitalist monopoly within dominant development paradigms has only been a business strategy to clean corporate image. Market based solutions, tools and instruments, including technical interventions is propagated as solutions for climate change and environmental crisis. However, it has resulted in hijacking of climate governance policies only to capitalist and market-based solutions, rather than focusing on alternative development strategies (Pearse, 2014; Roy, 2016). Market based solutions or interventions have not done much to reduce actual emissions. For example, UNREDD (the collaborative United Nations program for Reducing Emissions from Deforestation and forest Degradation) framework has not only failed in cutting emissions but has led to deprive those communities who were dependent on forests for their livelihoods. Often, market-based technologies and frameworks might be solely concentrating on emissions, while producing other externalities which are not conducive to sustainability or ecological welfare (Roy, 2016). Ashish Kothari, discusses this in his work, relating to the farmer and agrarian lifestyle. According to Sayan Roy, "A closer look, however, suggests that REDD is more about preserving rainforest carbon sinks in order to enable the global north to continue emitting unacceptable levels of pollutants. These neo-colonial architectures subjugate developing countries to absorb or compensate for the atmospheric pollution generated by energy intensive economies in the developed world. They address neither the real issue of alarmingly rapid deforestation nor the inequity of such subjugation. For native forest-dwellers this translates to a loss of access to the

forests upon which they have relied for generations (Long, et al, 2011, Roy, 2016, p. 84)".

Often, adequate compensation or money is seen as enough for land acquisition or private development projects. However, those uprooted feel a sense of directionless and demotivation as a result of their separation from agriculture, farming and agrarian lifestyle (Kothari, 2012). Here, sustainability doesn't extend beyond monetary compensation, or looks at the complicated and natural relationship that indigenous communities or farmers share with nature and natural livelihood system. Each component is rather quantified, dictated by the current market value.

Sustainability activists are lately expressing concerned about the weak strategy of sustainability only through technological intervention. In popular terms, these attempts are also called 'green washing'. Often companies or organisations, in an attempt to play the 'sustainability' goals, chalk out business strategy or improve brand image rather than taking concrete steps to address the core issues of ecological harm. Strictly, in terms of technical and economic intervention, Kuznets' curve and trickle-down effect were seen as ideal solution for environmental well being and social justice, but it failed to materialise (Roy, 2016). Why are these concepts important while discussing sustainability? It demonstrated that just an increase in per capita income and GDP, in general, can not only led to status quo in terms of quality of life but also might put traditional communities with traditional livelihoods, under risk as their capacity to live such life and their bargaining power in the economic system rapidly declines (Tadem, 2012; Kothari, 2009). Thus, a pluralistic and inclusive paradigm of sustainability should be framed as a part of the climate change and environmental justice policies. Roy (2016) also criticises the 'develop or perish' model of growth that many developing countries strongly propagate today.

Elaborating more on the 'trend' of sustainability, embracing carbon markets by elite financial institutions will not lead to any radical transformation in itself (Bohm, Misoczky, et al. 2012). Institutionalization of carbon market is another step towards commodification of ecology and furthering unequal development paradigm. The attempt towards transforming capitalist market system through embracing (institutionalization) carbon market, the growth paradigm of accumulation has not shifted. By leveraging carbon market financing, many elite financial institutions often impose certain restrictions and control mechanism in developing economies. Sullivan (2009) advocates for a through anthropological investigation into various cultural landscapes to understand the experiences of different cultures' connection with nature and natural resources. "Environmental issues such as deforestation and climate change are inherently complex. Market instruments such as emissions cap-and-trade schemes and the clean development mechanism do not represent effective solutions" (Roy, 2016, p. 88).

Ecofeminists, are discussing the limiting aspect of sustainability, when entwined with capitalism and the market system. Such critiques look at the inherent patriarchal nature of capitalism (Shiva, 2014). The typical growth model discard women's contribution to economy as their labour, nurture and contribution to sustenance is not part of GDP calculations (ibid). This unpaid housework is seen as not generating income and non-working women are seen as consumers who do not produce anything! The second aspect which hits harder in capitalistic discourse is the displacement of women, especially indigenous women from their natural resources and livelihoods (ibid). Sustainable ways of 'managing forests' has become a tool to control tribal ecology. Forest protection laws and acts have led to tribals restricted access of tribes into forest, which was, not long back, their dwelling. It has led to fall in indigenous food

diversity and collection of forest produce. There is a perception among ecofeminists that when sustainability is propagated by capitalist entities, such as, corporate or profit-making organisations, then commodification of land or earth is inevitable, leading to further pillaging of earth in some forms. They compared this commodification of nature and spirituality to that of the degradation of women and symptomatic of degradation of women's labour and skills.

Thus, sustainability is not just a clean or so-called 'green ways' of using, developing or optimizing technology. Though they are important but they can only be a means and not an end to achieve real sustainability, rather emphasis should be on creative interventions and on social and cultural values to show us a path of living in a harmonious way with nature in the future (Wagner & Andreas, 2012). Sustainability is more of a cultural question than a technical one. Since less attention is paid to this, there is no universally accepted definition of what is a culture of sustainability? Institute for Interventional Research and Cultural Sustainability is trying to develop such a model, by focusing on environment and society and not just economy (ibid). "A culture of sustainability brings with it a normative bias" (ibid, 93). This entail living a lifestyle which practices sustainability in daily living and is internalized and institutionalized (ibid). Rather than imposition or presence of it as an outside entity, sustainability should part of collective representation and habit. According to Wagner and Andreas (2012), cultural sustainability should reflect in social structure, arts & aesthetics, knowledge, values and norms, education and institutions.

Sustainable practices of tribal people in Odisha:

In the Raghurajpur village and Pipili village of Odisha in Puri districts, one can see beautiful and colourful handicrafts and motifs dotting the streets and houses. These villages are heritage handicraft

and artisan's villages. The type of materials used to create colours, motifs or textiles patterns are remarkable for its sustainability and use of recycling as an ancient technique in Indian villages. For example, the sought after “*pattachitra*” art of Odisha depicting stories of Hindu mythologies are drawn on silk cloth or palm leaves with eye catching organic colours. Local varieties of rocks, stones, leaves and even conch shells are used for obtaining different colours. Before sustainability, reuse or recycle became popular words, these artisans of a rural village were practicing exactly that since centuries. Almost all local “waste” products, household products and ecosystem are a part of both the artists' profession and everyday life.

Research on Khasi tribes in Meghalaya and Kondh tribes of Odisha show that both the communities have a rich heritage of forest management (Kakoty,2018). This specific knowledge system is not rigidly 'scientific' or comes under an organised, science backed knowledge system. However, it has enabled the growth and nurture for local ecosystems since centuries (ibid). Their extensive knowledge on microorganisms and growth of specific vegetation/crops, ways to naturally increase soil productivity, forest cycles, medicinal information on plants, among others, have enabled forest to sustain tribal population even today. This so called 'informal and unscientific knowledge system' is now becoming part of agricultural studies, researches and forest management paradigm (Rist, et al. 2007). Yet, it needs to be embedded and extended to the current sustainability crisis faced by modern societies. Kloppenburg, 1991; Rist, et al. 2007). Both traditional belief on ecosystems backed by a scientific effort and acknowledgement can go a long way in harnessing sustainability.

The Kondhs of Rayagada begin the agriculture cycle by sacrificing a chicken to please '*dharani penu*' or the earth goddess. Unlike, idols or pictures

of gods and goddesses, *Dharani Penu* lies on the centre of the village (courtyard) and made up of local rock varieties. Each year the tribal proudly display all the conserved seeds and tubers to show it to the earth goddess as their pride and achievement. The multiple varieties of millets, rice, food crops and sometimes, rare seeds, become a part of inter village seed exchange in this seed festival, locally called *Burlang Jatra*. Today, many of them who have had exposure to city life, modern education and unskilled labour market, still imbibe it as part of their culture. Similarly, many educated, adivasi youth in the Niyamgiri hills, believe in the blessing of 'Niyam Raja' who is the king of hills and jungles and protects it. Hence, it the duty of Dongaria Kondhs to protect the hills in return. Thus, the Niyamgiri movement against Vedanta Aluminium was a success. The movement was backed by both organised activism and spiritual passion for the forest and hills.

For Kondhs, seed festivals, seed exchange culture and rituals are all related to earth and rotation of their agriculture lives. They start it by wiping away their mud huts with cow dung, mixed with local red soil and sometimes neem leaves are added to the mix, making it an organic disinfectant. After through cleaning of their homes and deities, they draw beautiful motifs made up of rice powder and water. These tribal art forms would be graphic *managala* art or scenes from jungles, dancing or hunting. Then the village brings out their collected seeds, over the year. They showcase it to *dharani penu* and often make an offer of local liquor (made up of millets) and a chicken. Then nearby villagers and non-tribal who are invited to the village can exchange seeds. Similarly, in a span of month or two each village celebrate this festival according to the convenience of their village. Other villagers join the celebration and they indulge in seed exchange, social drinking, feasting and dancing. Interestingly, instead of looking at Hindu religious charts to look for a sacred day of seed festival, the Kondhs take a more informal approach.

Before taking any decision on marriages, birth celebrations, seed festival or rituals, the village gathers around for a meeting of elderly and capable women and men, the group is called 'Kutumba'. The Kutumba consult each family or individuals about their convenience, finances and contributions, before deciding a suitable timing and intensity of the festivals/rituals. These are highly respected people from the community representing both men and women. Unlike Khap panchayats, they don't impose punitive measures and are skewed in favour of patriarchy, rather they sometimes resolve conflicts but today, they mostly meet for deciding village level activities and development plans. They are not a part of the official panchayat system but form an organised, yet informal, social group within the community.

Another important role in traditional Kondh societies was the role Bejuni, traditional healers and priestess. These women often might inherit their 'skills' from their mother but many of them become bejunis if they have certain talent or skills of not only healing and medicines but also what Kondhs believe magic to communicate with local spirits. However, these women gain respect as they age, due to their extensive knowledge of medicines and herbs which treats flu, skin diseases, fevers, pregnancy related weaknesses and minor ailments. For these, Kondhs depended on bejunis rather than visiting doctors, as many of them never had cash for healthcare, few decades ago. They learn through the indigenous knowledge system of flora and fauna passed down from generations. However, they are witnessing socio-cultural changes which will be discussed in latter part of the paper.

The everyday life of Kondhs until a few decades back, produced enough for their community and local markets without using any pesticides or relying on Bt. Cotton cultivation (which they do now). They still practice multiple cropping which includes planting small shrubs and climbers under

larger trees and plants, utilising space for saag and mushrooms, alongside food crops and exclusive use of organic, home-made fertilizers made of cow dung, cow urine, local soil and neem leaves. Above these, their agricultural biodiversity was preserved due to knowledge of crop rotation and a mix of shifting and settled cultivation.

The Kondhs cultivate both of hills and plain lands. Today, they mainly cultivate bt. Cotton and Eucalyptus in the plain land and mostly it involves commercial dealings and negotiations with local traders. The cotton cultivation has a distinct local economy and method of operation that is not sustainable and involves a lot of local capitalism at play today. However, many of them still cultivate food crops even on plain land, which produce enough for household consumption. On the hill land, which belongs to nobody officially but to all. Kondhs cultivate varieties of millets, food grains, pulses, oil seeds, etc. There are farmers who have managed to produce 75-80 varieties of food crops solely relying on rains, as the terrain is often difficult for other sources of irrigation. Hills cultivation or *Dongar Chasa* is still widely practiced by Dongaria Kondhs. As a shifting cultivation, no technical intervention is used to enhance soil fertility. The staple food of Kondhs include home grown bananas, dates, palm, mausambi, guavas, tubers and mushrooms. Many of these are collected from foraging through the jungles. Uncultivated forest food, are the crux of food ecology of this tribal community. It forms a large chunk of their consumption, thus, reducing their dependency on the market. Furthermore, during lean agricultural period the art of collecting forest food works as an insurance against food scarcity, debt trap and even starvation. Ignoring these alternative food sources and focusing on sustainability simply as a framework for agriculture will not work much in favour of preserving the rich forest diversity in tribal and hilly regions.

The sustainability framework should approach

forest not just a green patch of land to be preserved/protected but also improve access for the tribal and conserve biodiversity (Stork, et al, 1997) “.....in creating a suitable framework for applying a proposed a set of forest biodiversity indicators and verifiers. The framework and the indicators and verifiers require field testing, and we fully expect there to be changes resulting from the field trials, which will be reflected in major improvements in their effectiveness” (Stork, et al. 1997).

Conclusion:

At the household and community levels, there have been emerging strategies, particularly for tribals, "institutional arrangements for the management of land and forests, and varying degrees of participation in or resistance to government schemes and programs" (Cramb, et al. 2009). Reassertions and realignments in these areas are reproduced in cultural identities and resource management. The entry of cash crops and cash in forms of money has improved lives, in terms of access to medical facilities, education and technology but has increased agrarian vulnerability. In such changing scenarios, Kondh's reliance on shifting cultivation and tradition of multi-cropping acts as an informal safety net to withstand the pressure of the market. However, increasing conflicts within various local groups and alignments based on caste/class identities can further marginalise at least part of the population and narrow many choices regarding their biodiversity for many others. Government policies and interventions can further accentuate These differences and conflicts (Rout & Patnaik, 2014; Preet, 1994). Nevertheless, instead of being passive in their role as part of the neoliberal market or recipients of government policies, Kondhs and many other indigenous communities are, in various ways, building resilience.

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